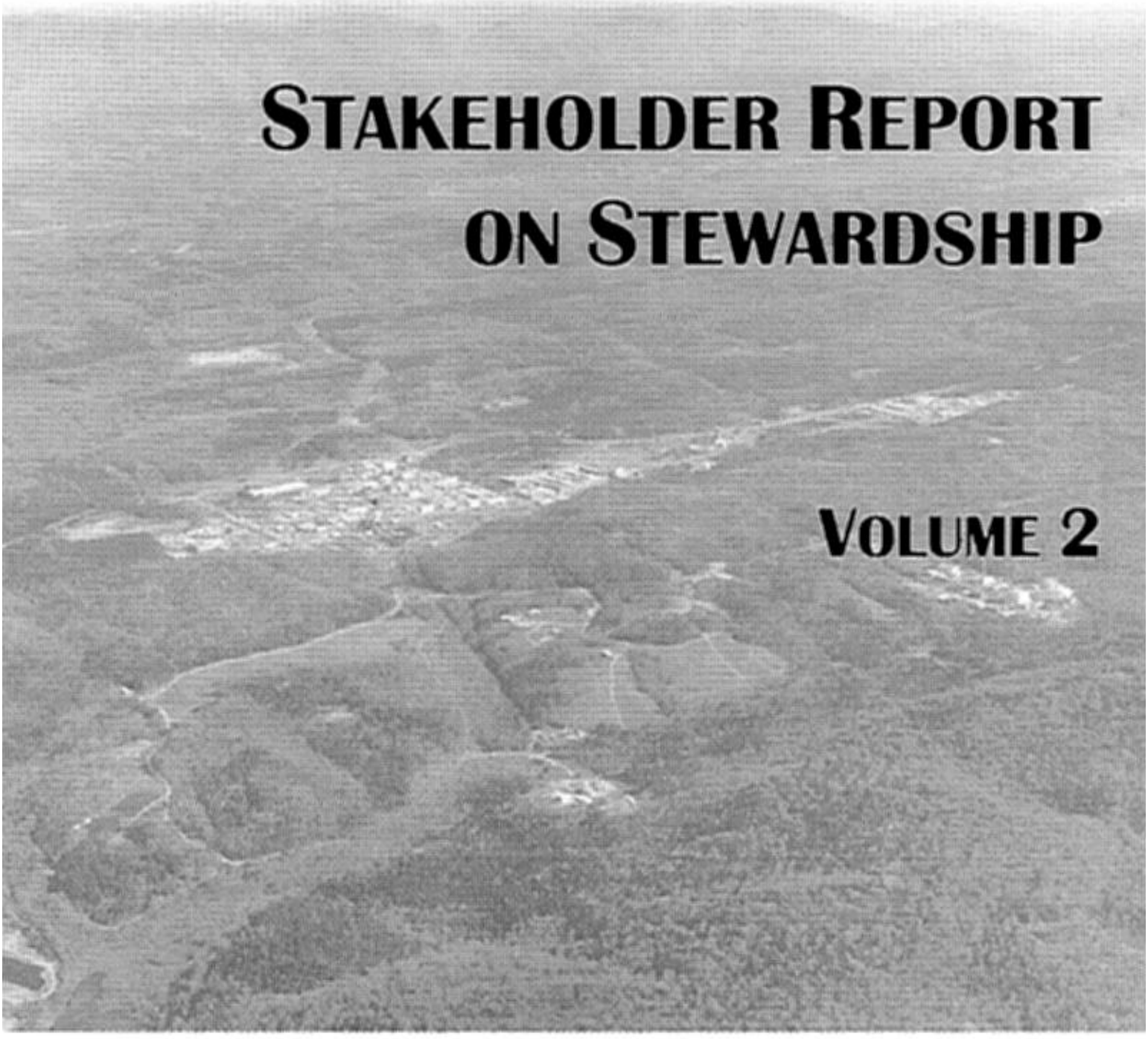
# The Oak Ridge Reservation



# STAKEHOLDER REPORT ON STEWARDSHIP

## VOLUME 2

Stewardship
SWG
Working Group

**December 1999**

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# Oak Ridge Reservation
# Stakeholder Report on Stewardship

# Volume 2

**December 1999**

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## SUMMARY OF RECOMMENDATIONS

The recommendations in this report supplement the recommendations in the 1998 *Oak Ridge Reservation Stakeholder Report on Stewardship.* (Appendix A of this report provides a list of the 1998 recommendations.) Overall, the Stewardship Working Group (SWG) was driven by a desire to see the Department of Energy, Oak Ridge Operations (herein, DOE) implement a comprehensive and legally enforceable stewardship program that has ample opportunity for public involvement.

A summary of key recommendations is presented below. More detail and a number of additional comments, conclusions and recommendations are contained throughout the text and appendices. The recommendations in this report apply only to the contaminated areas on the Oak Ridge Reservation; they do not apply to stewardship for fissile materials, to ongoing operations, or to new missions.

The Stewardship Working Group recommends that:

1. The Secretary of Energy issue a national policy establishing a commitment to long-term stewardship, to be followed by implementation guidance that allows for local participation and flexibility.

2. DOE codify its approach to fulfilling its stewardship responsibilities in all CERCLA[1] Records of Decision for the Reservation and in other legally binding documents. Interim Records of Decision must include project-specific stewardship requirements. Comprehensive long-term stewardship requirements for the Reservation must be described in final Records of Decision (Section 3.3).

3. The Federal Facility Agreement for the Reservation be amended to require and to develop appropriate milestones for the major stewardship-related documents, including the Reservation Land Use Control Assurance Plan, each project Land Use Control Implementation Plan, and final Records of Decision (Section 3.3).

4. DOE amend the Oak Ridge Reservation Public Involvement Plan and Federal Facility Agreement to provide for public and local government involvement in the following activities:

    - the Reservation Land Use Control Assurance Plan;
    - each project Land Use Control Implementation Plan;
    - the DOE Long-Term Stewardship Plan; and
    - five-year reviews (Section 3.3).

5. A Citizens Board for Stewardship be established or designated to review and assess long-term stewardship of the Reservation (Section 3.4).

[1] Comprehensive Environmental Response, Compensation and Liability Act of 1980, also known as Superfund.

6. DOE promptly recognize and work with all proposed stewards to begin implementation of their respective stewardship functions. The functions should be defined and incorporated into the DOE Long-Term Stewardship Plan (Section 3.1).

7. DOE implement, in cooperation with other entities, a Stewardship Research Program designed to understand the ecological and social impacts of residual contamination and to devise new and improved long-term remediation methods and technologies (Section 4.1.10).

8. DOE collect, preserve, and integrate all information needed for long-term stewardship of the Reservation in its information management system (Section 3.2).

9. DOE incorporate stewardship activities into a project management and tracking system to provide stewards with timely notification of stewardship activities and to track their progress (Section 3.2).

10. DOE implement a system of public information and education to disseminate timely information regarding environmental quality and required land use controls on the Reservation (Section 3.2).

11. DOE institute effective procedures for filing and registering contaminated land notices to ensure that they are found in title searches if land is transferred (Section 3.2).

12. DOE specify in relevant city, county, and state information systems the conditions and restrictions on the use of contaminated land (Section 3.2).

13. DOE continually refine its understanding of the specific costs of operating stewardship activities and incorporate these costs into the budget process (Section 3.5).

14. DOE identify for each remedial action the expected design life and the associated replacement or repair costs that can be expected by future generations (Section 3.5).

15. DOE, to the maximum feasible extent, promote mechanisms for funding stewardship that do not depend on annual appropriations, trust funds being the preferred approach. Should complete coverage of costs via trust funds not be possible, at least principal should be set aside to produce income sufficient for monitoring and other activities evaluating the impact of residual contamination on human health and the environment (Section 3.5).

*(NOTE: A minority opinion and recommendations for cost and funding of stewardship activities is contained in Appendix N.)*

# PART I—SUPPORTING INFORMATION FOR RECOMMENDATIONS

## 1. INTRODUCTION

Organized public involvement in stewardship issues for the Oak Ridge Reservation began with the End Use Working Group, a broad-based stakeholders group formed in 1997 by the Oak Ridge Site Specific Advisory Board. The group was asked by the Department of Energy, Oak Ridge Operations (herein, DOE) to study the contaminated areas on the Reservation and to make recommendations about future uses of the land.[2] During End Use Working Group deliberations, it was apparent that some level of radioactive and chemically hazardous contamination would remain and that a stewardship program would be needed to protect human health and the environment from future risks associated with contamination. Thus, in collaboration with the Stewardship Committee from Friends of Oak Ridge National Laboratory, members of the Local Oversight Committee Citizens' Advisory Panel, the City of Oak Ridge Regional Planning Commission, and other stakeholders, an End Use Working Group Stewardship Committee was formed.

The product of the End Use Working Group Stewardship Committee, the *Oak Ridge Reservation Stakeholder Report on Stewardship,*[3] was widely distributed and has influenced stewardship planning at local and national levels. The report presents the attributes and basic elements of a long-term stewardship program; describes the existing and proposed statutory provisions for stewardship and institutional controls; and presents recommendations for a Reservation stewardship program, including stewards, physical and institutional controls, information systems, research, and funding options.

The 1998 report also called for creation of a stakeholder group to follow up on issues associated with stewardship, and the Stewardship Working Group (SWG), formed in 1999, is a response to that recommendation. (See Appendix B for a description of the SWG and a list of participants.)

The activities of the SWG and this report are based on the earlier work of the End Use Working Group Stewardship Committee. While the basic elements of stewardship (i.e., authority and funding, stewards, operations, physical and institutional controls, information and research) remain much the same, the relationships among these elements are more fully developed in this report. Some of the unresolved issues associated with stewardship are treated more explicitly than before (e.g., stewardship requirements in CERCLA documents, CERCLA five-year reviews, and the role of the community with regard to oversight of stewardship on the Reservation). And, for the previously unresolved issue of funding, recent establishment of a trust fund for stewardship of the hazardous waste disposal facility in Bear Creek Valley sets a precedent for stewardship funding for other contaminated areas on the Reservation.

As noted in Section 1.2 of this report, considerable progress has been made. To move from the 1977 realization by stakeholders that long-term stewardship was essential for the Reservation, to initiation of a comprehensive plan by DOE in 1999, is a remarkable achievement. It could not

[2] Final Report of the Oak Ridge Reservation End Use Working Group, July 1998, www.oakridge.doe.gov/em/ssab/Pubs.htm

[3] Oak Ridge Reservation Stakeholder Report on Stewardship, July 1998, www.oakridge.doe.gov/em/ssab/Pubs.htm

have happened without the dedication of the Oak Ridge community, the cooperation and support of the DOE Oak Ridge Environmental Management Program, and the participation of the Oak Ridge Office of the Tennessee Department of Environment and Conservation (TDEC).

This report is organized into a Summary of Recommendations, Part I – Supporting Information for Recommendations, Part II – Stewards and their Functions, and several supporting Appendices A through N.

## 1.1 WHAT IS STEWARDSHIP?

Stewardship as applied to contaminated areas on the Reservation was defined in the *1998 Stakeholder Report on Stewardship* as:

> *Acceptance of the responsibility and the implementation of activities necessary to maintain long-term protection of human health and of the environment from hazards posed by residual radioactive and chemically hazardous materials.*

It is important to note that stewardship planning applies only to contaminated lands controlled by the DOE Environmental Management (EM) Program (about 3,500 acres), and not to the vast uncontaminated acreage of the Reservation (about 31,000 acres). Furthermore, activities analogous to much of what is called for in a stewardship plan are already in place on the Reservation (e.g., monitoring contamination, migration, and remediation effectiveness; inspecting disposal cells; enforcing access restrictions; and implementing permits and other legal controls).

The object of stewardship planning is to ensure continued responsible long-term care of the contaminated areas, to preserve information on the location and longevity of residual contamination, and to ensure that future generations do not inadvertently disturb contaminated areas. Stewardship planning does not determine the future use of contaminated land but only the care that must be provided when contamination remains on the Reservation. An effective stewardship program serves to cope constructively with any negative community image associated with contamination resulting from DOE missions.

The DOE recognizes that current technologies and remedies will not last as long as the hazards posed by waste and contamination at its sites. Therefore, stewardship will be required to ensure follow-up maintenance and replacement of remediation remedies. DOE accepts this responsibility to continue stewardship activities until the sites are safe for their intended use.[4]

## 1.2 PROGRESS TOWARD INSTITUTIONALIZING STEWARDSHIP

Applying stewardship to remediation of contaminated sites has been slow to develop in part because of the Environmental Protection Agency's (EPA) preference for "permanent" cleanups as described in CERCLA and the Superfund Amendments and Reauthorization Act of 1986. However, it is becoming increasingly apparent that EPA's "unrestricted use" goal is neither technically nor economically feasible for some portions of the Reservation and that legally-binding stewardship requirements must be promulgated to supplement remediation.

[4] *Accelerating Cleanup: Paths to Closure*, Oak Ridge Operations Office, May 1999 (DOE/OR/01-1746/Rl).

Since publication of the 1998 *Stakeholder Report on Stewardship*, progress has been made on establishing the authority and responsibility for stewardship and institutionalizing stewardship requirements.

At the national level:

- DOE published *From Cleanup to Stewardship* (October 1999). This document is a companion report to *Accelerating Cleanup: Paths to Closure* and provides background information to support the scoping process required by the 1998 Programmatic Environmental Impact Statement Settlement Study[5];

- As a result of DOE's settlement of the Natural Resources Defense Council (NRDC) et al. Lawsuit,[5] DOE must perform a study on its long-term stewardship activities, among other things. Although the outcome of the study is unclear, DOE is holding a series of regional public "scoping" meetings. These meetings provide an opportunity for stakeholders to influence DOE's long-term stewardship planning;

- DOE Headquarters established a stewardship working group composed of DOE employees to coordinate stewardship activities and ultimately to develop appropriate policy and guidance. The group is developing an outline of recommended elements of a long-term stewardship plan;

- DOE distributed a draft guidance manual, "Selecting and Implementing Institutional Controls." The manual provides project managers with regulatory information and guidance regarding selection of institutional controls as part of an environmental restoration remedy;

- DOE selected its Grand Junction office to implement the Long-Term Surveillance and Maintenance Program at remediated (i.e., cleanup completed) low-level radioactive waste disposal sites;

- DOE Headquarters offices are working together to develop a comprehensive Environmental Management stewardship program: the Office of Planning, Policy and Budget (EM-20) is responsible for developing long-term stewardship policy, the Office of Environmental Restoration (EM-40) implements Environmental Management's stewardship activities at the Grand Junction Office, the Office of Site Operations (EM-70) addresses long-term stewardship planning with regard to its lead role in the *Accelerating Cleanup: Paths to Closure* process; *(NOTE: A reorganization of the Office of Environmental Management recently provided for a separate Office of Long-Term Stewardship under the Office of Science and Technology.);*

- DOE is funding a Resources for the Future study to identify and evaluate alternatives for ensuring long-term financing and oversight of stewardship activities;

[5] The NRDC filed a lawsuit in 1997 demanding that DOE prepare a Programmatic Environmental Impact Statement on environment restoration, which they contended was required by a 1990 settlement agreement. The 1990 agreement was intended to settle a 1989 lawsuit filed by NRDC on the then proposed reconfiguration and cleanup of the nuclear weapons complex.

- EPA released new interim policy guidance[6] on the implementation of institutional controls at all properties being transferred out of federal ownership where Section 120(h) of CERCLA applies. Although transfer of contaminated areas of the Reservation may not occur in the foreseeable future, the EPA *Institutional Controls: A Reference Manual* (draft, March 1998) provides information that is valuable both in the assessment of institutional controls during remedy selection and in the implementation of institutional controls. Section 3.5 of this report (Stewardship Requirements in DOE Documents) is based in part on the EPA Reference Manual and the EPA interim policy guidance;

- Congress directed DOE to provide a report, no later than October 1, 2000, on existing and anticipated long-term environmental stewardship responsibilities for DOE sites (Appendix C describes the report required by the FY 2000 National Defense Authorization Act);

- National organizations are holding meetings across the country to discuss development, implementation, and enforcement of institutional controls and long-term stewardship (e.g., the Energy Communities Alliance, the Environmental Law Institute, the National Environmental Policy Institute, and the State and Tribal Governments Working Group); and

- In October 1999, the Oak Ridge Reservation Site Specific Advisory Board and the Stewardship Working Group invited all DOE site specific advisory boards to a workshop on stewardship. More than 100 people from 10 advisory boards, EPA, DOE, and the states participated.

At the local level,

- DOE published its *Land Use Control Assurance Plan for the Oak Ridge Reservation* (DOE ORO/OR/Ol-1824 & DO, May 1999). The plan identifies the strategy for ensuring the long-term effectiveness of land use controls being relied upon to protect human health and the environment at areas of the Reservation undergoing remediation. The plan will be enacted through a Memorandum of Understanding with EPA Region IV and TDEC;

- DOE included an End Use and Stewardship chapter in *Accelerating Cleanup: Paths to Closure* (DOE/OR/Ol-1746/RI, May 1999). Furthermore, stewardship and its estimated costs are factored into planning the Life Cycle Baseline for the Environmental Management Program budget requests;

- DOE is including a stewardship section in CERCLA documents (e.g., Proposed Plans and Records of Decision). However, to date, the documents lack a comprehensive strategy for stewardship and its implementation and enforcement;

- A DOE point-of-contact for stewardship was appointed and assigned the responsibility for developing a stewardship plan for the Reservation;

- DOE is providing support for the SWG;

[6] Institutional Controls and Transfer of Real Property under CERCLA Section 120(H)(3)(A), (B) or (C).

- The Oak Ridge City Council adopted a resolution stating that its support for a CERCLA waste disposal facility on the Reservation was conditioned on assurances that resources would be set aside for long-term stewardship and other mitigation measures; and

- DOE is establishing a trust fund (to be administered by the State of Tennessee) for monitoring and maintenance (i.e., stewardship) of the Bear Creek Valley hazardous waste disposal facility following closure of the facility.

## 1.3 IMPLEMENTATION OF STEWARDSHIP

This report describes stewardship from the viewpoint of the Oak Ridge area public stakeholders. Included here are the steps desired by stakeholders for development and implementation of a stewardship program that will guarantee protection of human health and the environment; ensure public participation in stewardship of the Reservation; and codify the federal government's continued responsibility—administratively and financially—to implement stewardship requirements.

Defining the goals and mechanics of a stewardship program is simple; actually implementing an enduring long-term stewardship plan is difficult. Most difficult will be to ensure that those responsible have the bureaucratic, political, and financial resources to institutionalize stewardship. Only when such a stewardship plan is in place can stakeholders justify support of remediation activities that leave residual contamination on the Reservation.

# 2. THE OAK RIDGE RESERVATION

The 35,000-acre Oak Ridge Reservation includes three major DOE installations: the East Tennessee Technology Park (formerly the K-25 Site), Oak Ridge National Laboratory, and the Oak Ridge Y-12 Plant. These installations occupy about 30 percent of the Reservation; the remainder of the land is designated as a National Environmental Research Park. The Research Park was established in 1980 to provide protected land for environmental science research and education and to demonstrate that energy technology development can coexist with a quality environment. It also serves as a buffer zone around the major installations. All of the Reservation lies within Anderson and Roane counties, and nearly all of the property is within the city limits of Oak Ridge. The Clinch River forms the southern and western boundaries of the Reservation. Industrial sites and the University of Tennessee Arboretum are to the east, and residential areas of the City of Oak Ridge are to the north.

## 2.1 PRE-REMEDIATION DESCRIPTION

Since the early 1940s, the Reservation has been the site of vital national security missions and also a repository for contaminated wastes from other federal facilities. These activities left a legacy of radioactive and toxic chemical wastes, requiring management and/or disposal. Between 5 and 10 percent of the Reservation has old waste disposal sites, most of which lack engineered containment structures. Radioactive and toxic chemical pollutants present in mixed-waste burial grounds, settlement ponds, seepage pits and trenches, inactive tanks, abandoned underground pipelines, and surplus facilities have contaminated soil, groundwater, and surface water in their vicinity. The radioactivity is dominated by tritium (with a half-life of approximately 12 years) and strontium and cesium (with half-lives of approximately 30 years). Hazards from these three radionuclides will markedly diminish in about 300 years. Very long-lived radionuclides are also present, and these will be around for millions of years. Uranium is the most abundant of these long-lived radionuclides, but there are substantial quantities of others, including transuranics, technetium-99, and neutron-activated metals. Many of the non-radioactive contaminants, such as mercury, do not break down over time and can persist in the environment forever.

Abundant rainfall (annual average of 55 inches) and high water tables (e.g., 0 to 20 feet below the surface) contribute to leaching of contaminants from the waste areas. These processes result in contaminated soil, surface water, sediments, and groundwater. The underlying geology is complex, and migration of contaminants in groundwater is difficult to monitor and control on many parts of the Reservation.

To consolidate investigation and remediation of contaminated areas, the Reservation has been divided into five large tracts of land roughly equivalent to the major hydrologic watersheds. The location of the watersheds is illustrated in Figure 2.1.

The DOE, with the support of the public and the concurrence of EPA Region IV and TDEC, decided that a comprehensive watershed approach to remediation planning activities is more effective than the usual unit-by-unit approach. One or several CERCLA Records of Decision for each watershed are being produced, instead of hundreds of decision documents; potentially, considerable savings in time and money can be realized. In addition, the watershed approach provides the public with a roadmap of proposed remediation activities, facilitates public

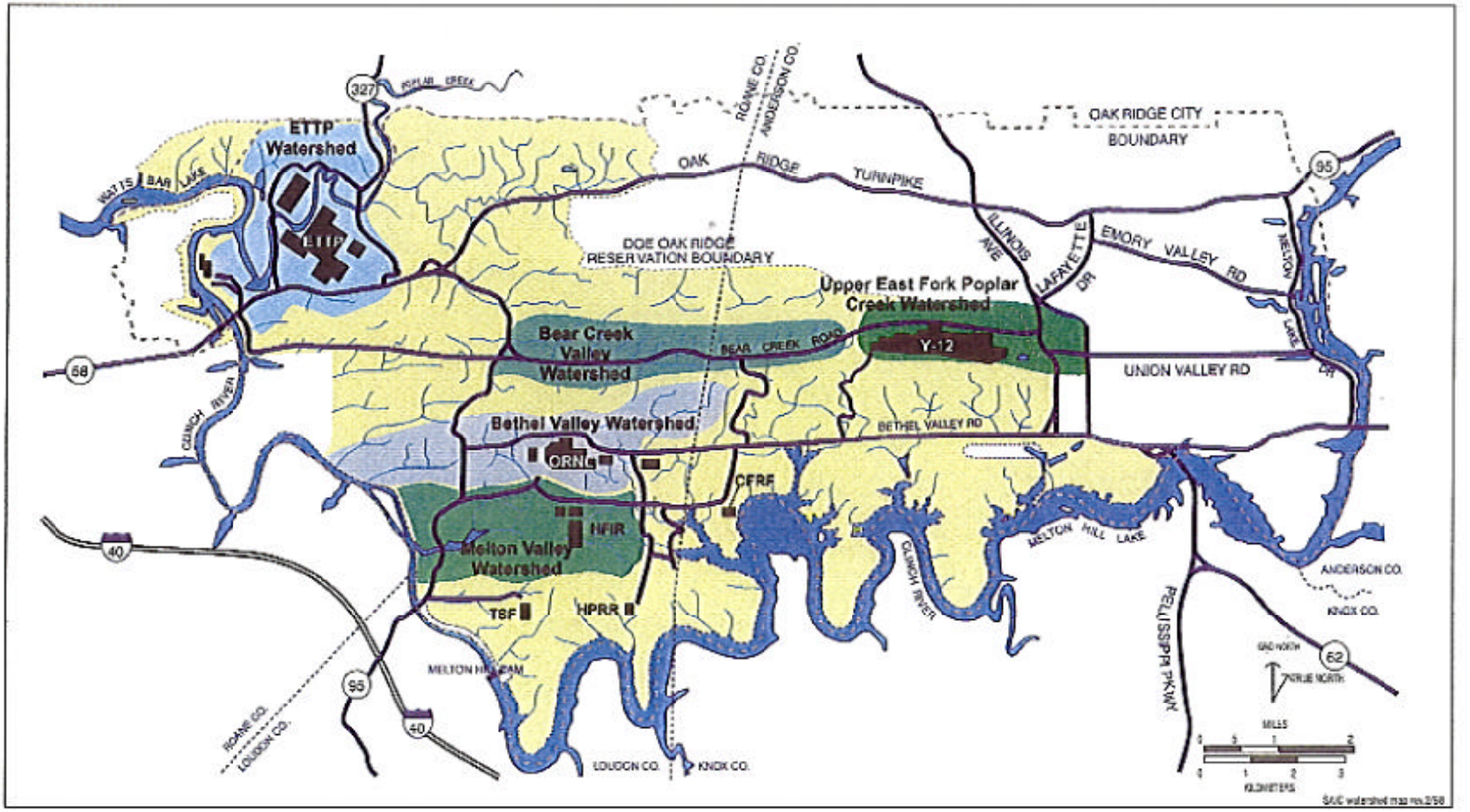


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**Figure 2.1 Oak Ridge Reservation Administrative Watersheds.**

oversight of DOE's progress, and allows comprehensive stewardship planning for the Reservation.

## 2.2 POST-REMEDIATION DESCRIPTION

The scope of stewardship activities for the Reservation is based on proposed end use scenarios for contaminated areas within the five watersheds. Regulation, compliance agreements, and DOE orders prescribe some of the stewardship activities; others are yet to be defined. They will range from varying degrees of surveillance, monitoring, water management and maintenance at sites with residual contamination to access restrictions at sites with hazards of greater concern.

The proposed end uses were developed by the End Use Working Group. They include unrestricted, uncontrolled industrial, recreational, controlled industrial, and restricted uses. Table 2.1 describes the end use scenarios and Figure 2.2 illustrates the proposed end uses for the contaminated areas.

Following remediation, the end use of the Reservation is estimated to be approximately five percent unrestricted industrial, two percent controlled industrial, 90 percent unrestricted (includes open space/recreational use), and three percent restricted access. The estimated annual cost for long-term stewardship for the Reservation is $19 million (*Accelerating Cleanup: Paths to Closure*, draft May 1999).

**Table 2.1. End Use Working Group Criteria for Comparing End Use Scenarios**

| | End Use Criteria | | | | |
|---|---|---|---|---|---|
| **End Use Category** | **Surface Use** | **Depth of Clean Soil** | **Ground Water Use** | **Surface Water Use** | **Ownership** |
| Unrestricted | Unrestricted | Unrestricted | Unrestricted | Unrestricted | Government or Private |
| Uncontrolled Industrial | Industrial | 10 feet | Not Allowed | Unrestricted | Government or Private |
| Recreational | Recreational | 2 feet | Not Allowed | Recreational | Government or Private |
| Controlled Industrial | Industrial with restrictions | 2 feet | Not Allowed | Not Allowed | Government or Private |
| Restricted | Limited to Monitoring and Maintenance | No Soil Disturbance Allowed | Not Allowed | Not Allowed | Government |

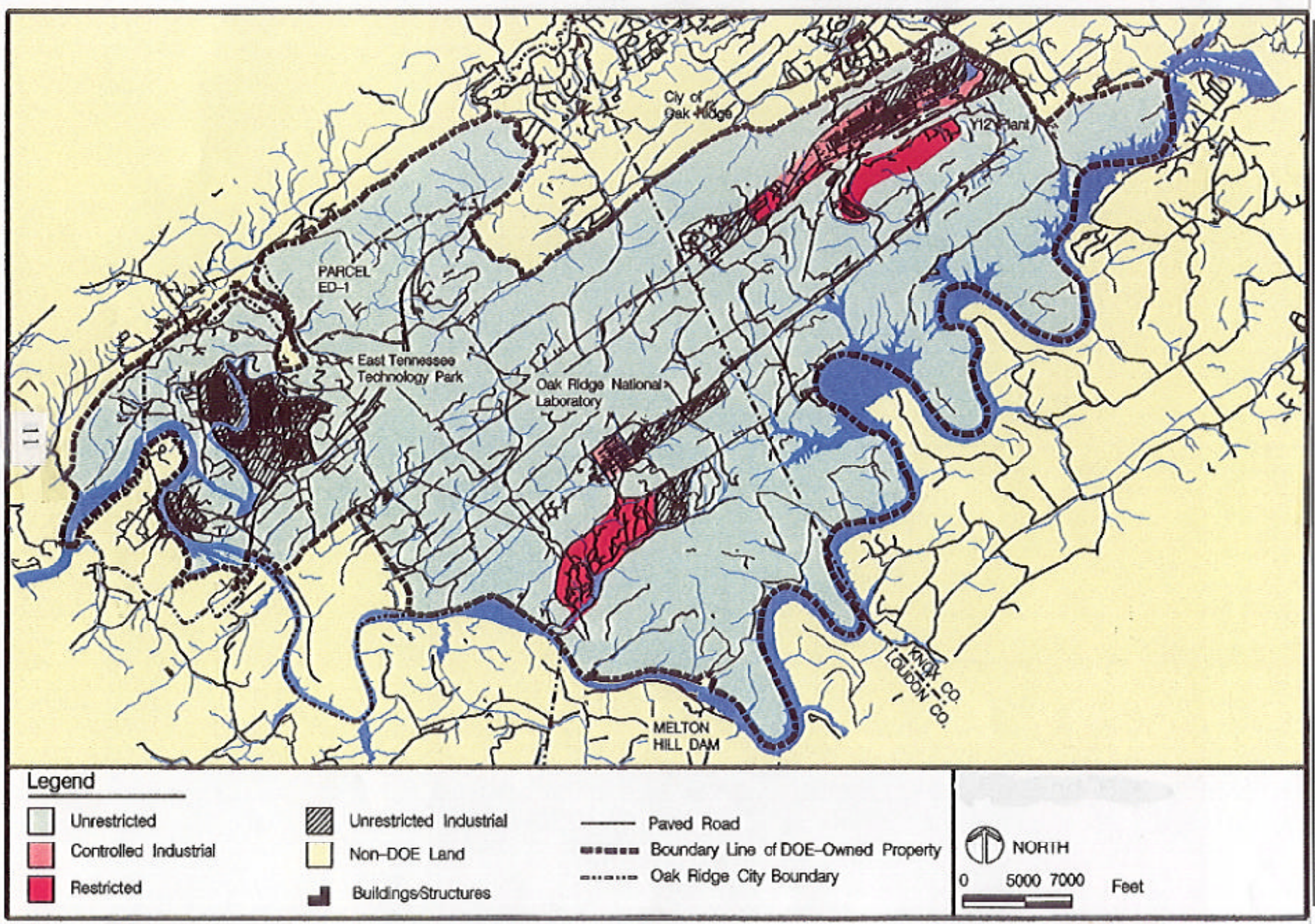


**Figure 2.2 End Uses of Contaminated Areas on the Oak Ridge Reservation.**

## 2.3 OVERVIEW OF THE CURRENT CERCLA PROCESS AND DOCUMENTS

Remediation of contaminated areas on the Reservation is subject to the requirements of CERCLA. The CERCLA process is sequential and is documented by a series of reports that are subject to the approval of EPA and TDEC. Scheduling and completion dates for the remediation activities and their associated documents are negotiated annually by DOE, EPA, and TDEC and published in Appendix E of the Federal Facility Agreement. This schedule and its milestones are binding on DOE; any changes must be agreed to by EPA and TDEC. Figure 2.3 shows the primary CERCLA documents and their relationship to remediation. (Appendix D provides brief descriptions of the CERCLA documents.)

The past and current approach to stewardship on the Reservation, generally agreed to by DOE, EPA, and TDEC, is that each Feasibility Study, Proposed Plan, and Record of Decision need not include the specifics of stewardship. In recognition of increasing public insistence that stewardship planning accompany remediation planning, recent documents include commitments by DOE that use restrictions will be maintained, surveillance and maintenance activities continued, and specific long-term institutional controls will be established in follow-on CERCLA documentation.

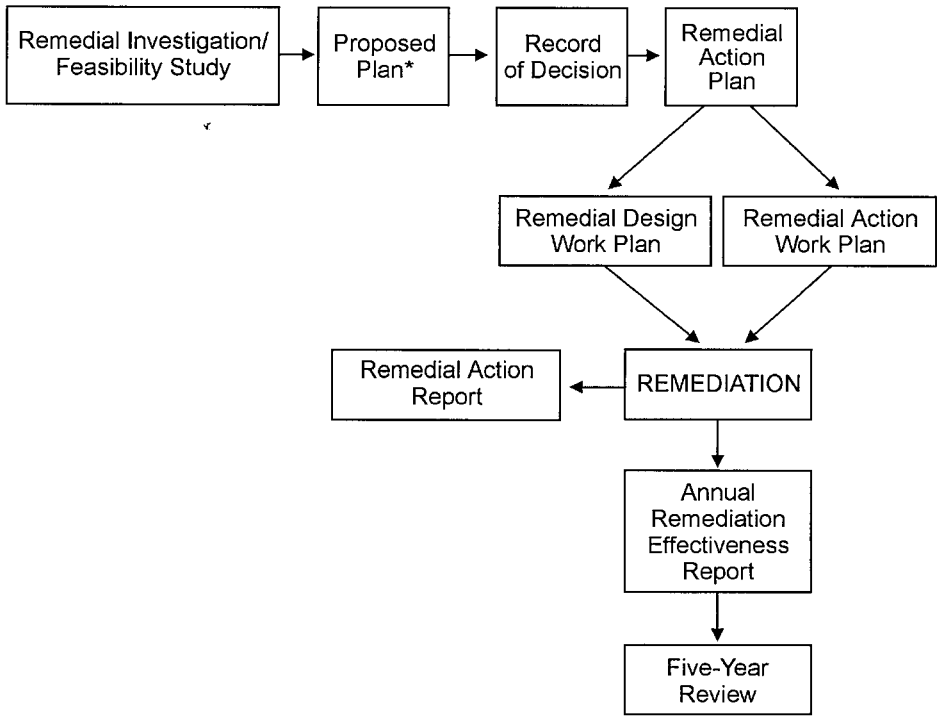


**Figure 2.3 Primary CERCLA Documents and their Relationship to Remediation.**

* Under CERCLA, only the Proposed Plan requires public participation; however, in Oak Ridge, DOE invites public involvement throughout the CERCLA process.

However, to ensure adequate planning and implementation of land use controls and long-term stewardship, DOE must include explicit stewardship requirements in its CERCLA documents, including any interim Records of Decision, post-Record of Decision documents, and any final Records of Decision issued for individual projects or watersheds. All documents must describe the long-term stewardship activities required until remediation objectives are met. In this way, public involvement is ensured, DOE is obligated to provide funding, and long-term stewardship for the contaminated areas on the Reservation is enforceable.

# 3. IMPLEMENTING STEWARDSHIP

The following seven basic elements of a stewardship program are described in the 1998 Stakeholder Report on Stewardship:

- Authority and Funding
- Stewards
- Operations
- Physical Controls
- Institutional Controls
- Information Systems
- Research

Each of these elements must work together to make stewardship effective. First, the authority and funding for stewardship must be established. Next, stewards must be identified and their individual roles and responsibilities defined. And subsequently, the tools of stewardship, including institutional and physical controls, information systems, and research must be designed and implemented. The 1998 report discussed each of these elements and provided recommendations for the use of the basic elements in an overall stewardship program.

The SWG formed three committees to evaluate further those elements of stewardship that are most essential at the current stage of remedial decision-making for the Reservation. These include funding, stewards, and information systems. Ultimately, a fourth area of interest, stewardship authority, was evaluated by the SWG. Particular attention is paid to the actions that DOE must take in the next few years to implement its stewardship program. Part II of this report provides detailed descriptions of specific stewardship activities that will need to be conducted on the Reservation.

This section of the report summarizes the roles and interactions of stewards and provides major recommendations regarding stewards (Section 3.1); broadly describes stewardship information needs (Section 3.2); presents guidelines for stewardship in CERCLA documents (Section 3.3); discusses the need for continuing public involvement in stewardship (Section 3.4); and discusses aspects of cost estimation and funding for stewardship (Section 3.5).

## 3.1 STEWARDS—THEIR ROLES AND INTERACTIONS

The federal government, currently through its responsible agency, DOE, is the principal steward for the implementation and operation of the stewardship program; this includes providing information to and initiating interactions among stewards. In many cases, stewardship activities are simple extensions to functions of existing federal, state, county, and city organizations. Thus, DOE stewardship functions can be created at modest cost. The proposed stewards and their functions are summarized below. Figure 3.1 illustrates the flow of information among stewards. (See Part II of this report and Appendix E for additional details.)

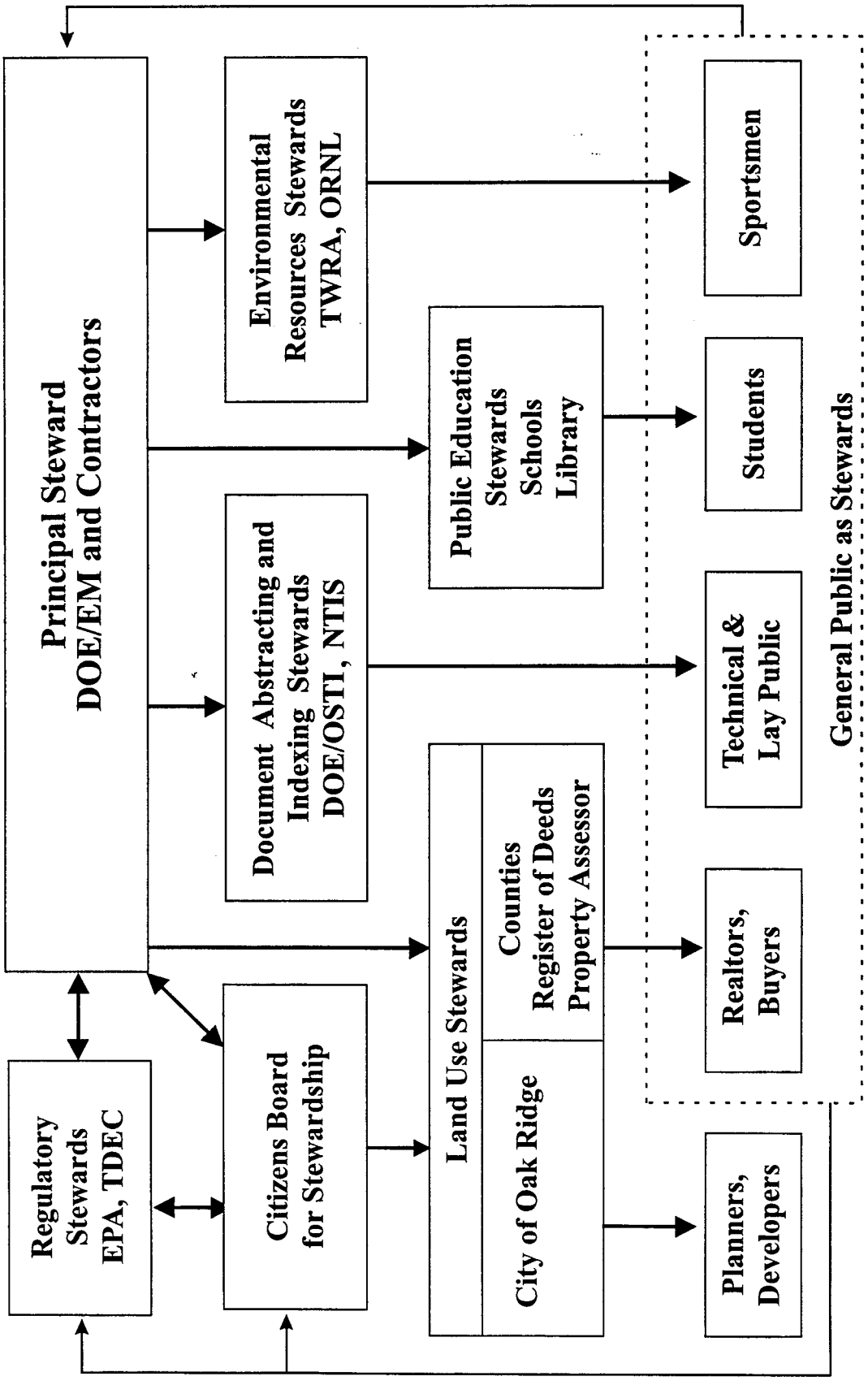


Figure 3.1 Interactions Among Oak Ridge Reservation Stewards.

- The Principal Steward (DOE) is responsible for a wide variety of functions which include: surveillance, monitoring, maintenance, the transaction database, the information repository, institutional controls, physical controls, research, and interactions with other stewards.

- The Regulatory Stewards (EPA and TDEC) are responsible for enforcement of the federal and state requirements governing remediation and stewardship actions on the Reservation.

- The Land Use Stewards (city and county governments) will exercise control over land use, enable land planning and preserve information related to land ownership, the condition of the land, and transmission of information to buyers. The City of Oak Ridge, through the Oak Ridge Regional Planning Commission and city planning staff, exercises land use planning authority and implements zoning controls in accordance with state law and local requirements. The county Registers of Deeds and the county Property Assessors are custodians of land-related documents, mapping information, and the State Parcel Mapping System. Under extension of current state law, realtors could see that sellers transfer the notice of contaminated land if land is released to the public.

- The Document Abstracting and Indexing Stewards (Office of Scientific and Technical Information and National Technical Information Service) will process and retain technical reports, distributing them upon request to federal staff and the public.

- The Public Education Stewards (local schools and libraries) will be responsible for the education of students and adults through the schools and libraries.

- The Environmental Resources Stewards (Tennessee Wildlife and Resources Agency and Oak Ridge National Laboratory) will manage the Reservation wildlife and conduct hunting and possibly other public activities on the Reservation.

- A Citizens Board for Stewardship will be established to ensure public participation in decision making for contaminated lands on the Reservation (Section 3.4).

### 3.1.1 Major Recommendations on Stewards

Based upon extensive interviews, the SWG recommends that:

1. DOE identify the stewards and their responsibilities as outlined in Section 3.1 and detailed in Part II of this report. In collaboration with the stewards, their roles and responsibilities should be defined and incorporated into the DOE Long-Term Stewardship Plan; and

2. DOE implement, in cooperation with other DOE offices and other agencies, a stewardship research program designed to understand the ecological and social impacts of waste management and to devise new and improved long-term remediation methods.

Supporting details and supplemental recommendations are found in Part II and Appendix E of this report.

## 3.2 STEWARDSHIP INFORMATION REQUIREMENTS

Implementation of stewardship requires coordinated activity by numerous organizations over a sustained time period. Effective communication and accessibility of specific information is essential to the success of stewardship. Each steward will need information to perform its stewardship role and some designated stewards will need to manage information in perpetuity. Because so much information will be available, the specific information needs of the various stewards must be identified and the information made accessible.

Retention and archiving of information by each steward with information management responsibilities is of paramount importance. Information storage and retrieval systems must be safe from fire and natural disasters, and information must be cataloged in ways that ensure retrievability. Information pertaining to legacy materials and facilities remaining on-site after remediation must be maintained in useable form until potential risks to human health or the environment no longer exist. Which, in some cases, may require management in perpetuity.

The information required for stewardship can be organized into four categories—Regulatory Decision Information, Site Management Information, Land Use Control Information, and Public Education Information. These information categories and some specific information that must be maintained in each category are discussed in later sections of this report (Part II Section 4.1.6, Table 3.1, and Appendix F).

**Table 3.1. Categories of Information Essential to Long-Term Stewardship**

| Regulatory Information | Site Management Information | Land Use Control Information | Public Education Information |
|---|---|---|---|
| • Administrative Record [1]<br>• Post-decision documents[1] | • Residuals and hazards remaining on-site[1]<br>• Elements of site infrastructure (residual and active) [1]<br>• Operating systems for contamination control[2]<br>• Environmental information and monitoring data (historic and future)[2]<br>• Historic operations records and personnel records[2] | • Deeds where appropriate/ affidavits, notices specifying land condition[2]<br>• Land use restrictions due to contamination[2]<br>• Plat maps of contaminated land | • Public information pertaining to environmental conditions and land uses[2]<br>• Educational information appropriate for use in school curricula[3] |

[1]Records to date exist in the DOE information management system. Additional information will be created during the remedial action period.
[2]Some of the historic records are contained in the information management system and some are not.
[3]Information has not been developed to-date.

**Regulatory Information** includes documents that are prepared by DOE and its contractors as part of the CERCLA process to arrive at the remedial action decisions. Examples of the types of information in this category include Remedial Investigation reports, Feasibility Studies,

Proposed Plans, and Records of Decision. Some supporting documents not directly tied to decisions but setting policy for programmatic action may also be included as regulatory information. DOE has an existing information management system to retain regulatory information in a controlled configuration. Files that are directly related to the remedial action decisions are retained in the Administrative Record File. Other documents and information created after the Record of Decision that are essential to the site remediation and management under the CERCLA program are retained in the Post-Decision File.

**Site Management Information** is by far the most voluminous information category. Included in this category are: historic information pertinent to materials or facilities remaining on-site following remediation; design and as-built records of remedies or facilities (Copies of these may also reside in the Regulatory Information category as required deliverables.); historic and future environmental characterization and monitoring data both in raw form and in periodic published reports that document the effectiveness of remedial actions; and records that document the amount and location of contaminated material that was removed from the site for disposal off-site. (Appendix F includes a tabulation of the types of information expected to be available in the future to facilitate site management and support further research related to the sites.) As activities on the Reservation change, DOE needs to ensure that site information necessary for long-term stewardship is retained in useable form.

**Land Use Control Information** includes the Land Use Control Assurance and Implementation Plans prepared for each area of the Reservation that has contaminated land (these may be cross referenced in the Regulatory Information category) and the plat maps that identify the presence of contaminated lands. These documents support any land use restrictions designed to protect the public in case contaminated land is transferred from federal ownership. These records are expected to be prepared by DOE and will reside in the offices of Roane and Anderson counties where they will be readily identified in property title searches. Land use control records must accurately describe the acceptable and prohibited activities for each area in which land use controls are applied. Similar information is also expected to be included in the Tennessee Parcel Mapping System. In addition to the legal land records, information must be placed in the public sector to ensure that entities in the City of Oak Ridge government are knowledgeable about the areas where contamination remains within the city limits. As discussed in the 1998 report, the Oak Ridge Regional Planning Commission and the City Council should be asked to establish land zoning categories appropriate to the major restricted areas. DOE should request that contaminated lands be zoned accordingly. Additionally, information that assesses the effectiveness of environmental restoration of the contaminated lands must be made publicly available on a regular (annual) basis. Relevant environmental monitoring reports and the required five-year review (Section 3.3.3) documents must be placed in public reading rooms, at the Oak Ridge Public Library, and elsewhere. Information archiving systems must be maintained to prevent records' deterioration or inaccessibility because of technology changes.

**Public Education Information** is an important element of stewardship. DOE must facilitate the education of future generations as to the importance of properly managing land that contains residual contamination and to proper land use planning. As population increases, society must manage its waste and remain cognizant of the legacy of wastes from earlier generations.

Maintenance and retention of information pertinent to the Reservation is essential. All information required for site stewardship and future decision making must be maintained in a

system that includes regularly scheduled records rejuvenation. Paper records will require copying onto acid-free media to prevent deterioration. Electronic data storage systems must be maintained for accessibility on changing computer systems and data storage media. Examples of information loss because of neglect or technological obsolescence are abundant and DOE must be committed to retention of stewardship information for the Reservation in stable configurations that are maintained for as long as the information is needed.

### 3.2.1 Major Recommendations on Stewardship Information

The SWG reviewed available reference materials and interviewed potential stewards, DOE, and its contractors to determine the types of information that might be needed during the stewardship period and its availability. Information required for all known stewards to fulfill their roles and responsibilities has been identified in this report along with detailed lists of information that may be needed during the stewardship period (Appendix F).

Based upon review of information needs and availability, the SWG recommends that:

1. DOE collect, preserve, and integrate all information needed for long-term stewardship of the Reservation in its information management system. This should be accomplished through creation and use of a controlled-configuration information management system. This system must contain historic information and must incorporate new information, such as monitoring records, as long as residual contamination remains on-site. Information delivery standards for contractors working on the Reservation must ensure compatibility and consistency of data format and information deliverables in the future. This system should anticipate consolidation of information management functions as the Environmental Management Program completes its mission in Oak Ridge;

2. DOE incorporate stewardship activities in a management and tracking system to provide stewards with timely notification of stewardship activities. The tracking system must be created through agreements that specify the content of information to be provided and the time frame for information transfer;

3. DOE establish systems to inform and educate the public with regard to environmental quality and required land use controls on the Reservation. Public education must include public information meetings and collaboration with local schools in development of appropriate curriculum materials;

4. DOE institute effective procedures for filing and registering contaminated land notices to ensure that they are found in title searches when land is transferred. DOE needs to specify, through collaboration with other stewards, the information that will be placed in city, county, and state land use control functional areas. These items include plat maps and shadow zones that identify boundaries of areas where land use controls will be needed and the textual content of affidavits that describe the hazards on-site and the types of restrictions required to protect human health; and

5. DOE provide accurate information describing the conditions of contaminated land and associated restrictions on its use for inclusion in relevant city, county, and state information systems.

## 3.3 STEWARDSHIP REQUIREMENTS IN DOE DOCUMENTS

This section will (1) discuss the status of stewardship requirements in CERCLA documents, the Land Use Control Assurance Plan, and the proposed DOE stewardship plan; (2) provide guidance for stewardship requirements in interim and final decision documents; and (3) describe the importance of the five-year review to long-term stewardship.

### 3.3.1 CERCLA, Land Use Control Assurance Plan, and the DOE Long-Term Stewardship Plan

To date, the approach to stewardship on the Reservation, generally agreed to by DOE, EPA, and TDEC, does not require that specifics of stewardship be included in each CERCLA Feasibility Study, Proposed Plan, and Record of Decision. The practice has resulted in CERCLA documents, especially Records of Decision (some of which are interim), that include commitments by DOE that land use restrictions will be maintained and surveillance and maintenance activities continued, but defer decisions on long-term stewardship until final CERCLA documentation.

Although the SWG recognizes and appreciates that DOE is taking steps to include stewardship throughout its planning for remediation of contaminated areas on the Reservation, we find the existing approach to be inadequate. While comprehensive long-term stewardship commitments and planning must be incorporated in a final Record(s) of Decision for the Reservation, the DOE must implement a near-term process that is legally enforceable and guarantees a viable stewardship system with full public involvement. The approach preferred by the SWG includes incorporation of stewardship requirements and implementation in the ongoing CERCLA process. (See Section 2.3 and Appendix D of this report for description of the CERCLA process and documents.)

The recent advent of EPA's Land Use Control Assurance Plan policy[7] and its requirement for Land Use Control Implementation Plans[8] adds another layer of documents to the decision-making process. However, in contrast to CERCLA documents, Land Use Control Assurance Plan documents do not provide for public involvement (i.e., for public review and comment). In addition, the scope of the Land Use Control Assurance Plan and its accompanying Land Use Control Implementation Plans, as described in the EPA policy and the draft Land Use Control Assurance Plan for the Oak Ridge Reservation (DOE/OR/01-1824 & D0, May 1999) is too narrow. It is generally limited to description of land use controls along with conditions for their use (i.e., institutional and physical controls.) At this time, the relationship of the Land Use Control Assurance Plan/Land Use Control Implementation Plans to the CERCLA process is uncertain. However, it appears that DOE intends to include Implementation Plans as components of post-Record of Decision documentation for those waste areas requiring land use controls. As currently envisioned a Land Use Control Implementation Plan would be prepared following a project interim Record of Decision. The stewardship requirements in the Implementation Plan would then appear in the Remedial Design document. Because post-Record of Decision documents are not subject to public review and comment, this process effectively eliminates the public from stewardship decisions. Furthermore, because stewardship

[7] Assuring Land Use Controls at Federal Facilities, EPA Region 4, April 21, 1998.

[8] A Land Use Control Implementation Plan must identify specific actions required to achieve stated land use objectives for specific areas with residual contamination.

requirements would not be described in CERCLA Records of Decision, enforceability and ensured funding are open to question.

In addition, DOE is developing a long-term stewardship plan that proposes to show the overall interaction of the DOE Stewardship Program with the sequence of interim CERCLA documents and development of a final comprehensive CERCLA Record of Decision that will document long-term stewardship requirements and commitments (Figure 3.2). The SWG supports this approach in principle, but offers a number of specific recommendations to ensure completeness, enforceability, and public involvement in the stewardship process.

### 3.3.2 Stewardship Requirements in Decision Documents

The decision to remediate a site to less-than-unrestricted use or to otherwise restrict the use of a site must be balanced by the assurance that a stewardship system is in place. Language referring to stewardship in watershed level Records of Decision has not been adequate. Until the public is assured that an appropriate and legally enforceable stewardship program will remain in place following remediation, and that appropriate actions will be taken if stewardship is compromised, public acceptance of areas with residual contamination will not be possible.

Thus, it is critical that near-term stewardship decisions in interim documents achieve the goals desired by the public for long-term stewardship of the Reservation. To that end, the interim CERCLA documents, the Land Use Control Assurance Plan and its Land Use Control Implementation Plans, the DOE Long Term Stewardship Plan, and final CERCLA Records of Decision for areas with residual contamination must:

- clearly identify and define stewardship requirements and set forth their purpose and method of implementation;
- demonstrate how the stewardship plan and requirements are commensurate with the risk at the site;
- state that the federal government (i.e., the principal steward) ensures that the appropriate actions will be taken if human health or the environment is compromised;
- state that the stewardship actions will conform with the legal requirements of the state and/or local jurisdiction;
- describe who is responsible for monitoring the integrity and effectiveness of stewardship and the frequency of monitoring;
- ensure that the principal steward will verify maintenance of stewardship on a periodic basis and commit to verify reports on a regular basis if the monitoring function is performed by another party (e.g., a contractor);
- describe recording requirements in the jurisdiction where the site is located;
- describe which specific party or office is responsible for overseeing stewardship;
- describe the procedure to report violations or failures of stewardship to appropriate EPA and/or state regulator, or local government and include the designated party or entity responsible for reporting;
- describe the procedure to be used to enforce against violations of stewardship, identify the party or parties responsible for such enforcement, and describe the legal authority for such enforcement (e.g., state statutes, regulations, ordinances, or other legal authority including case law); and

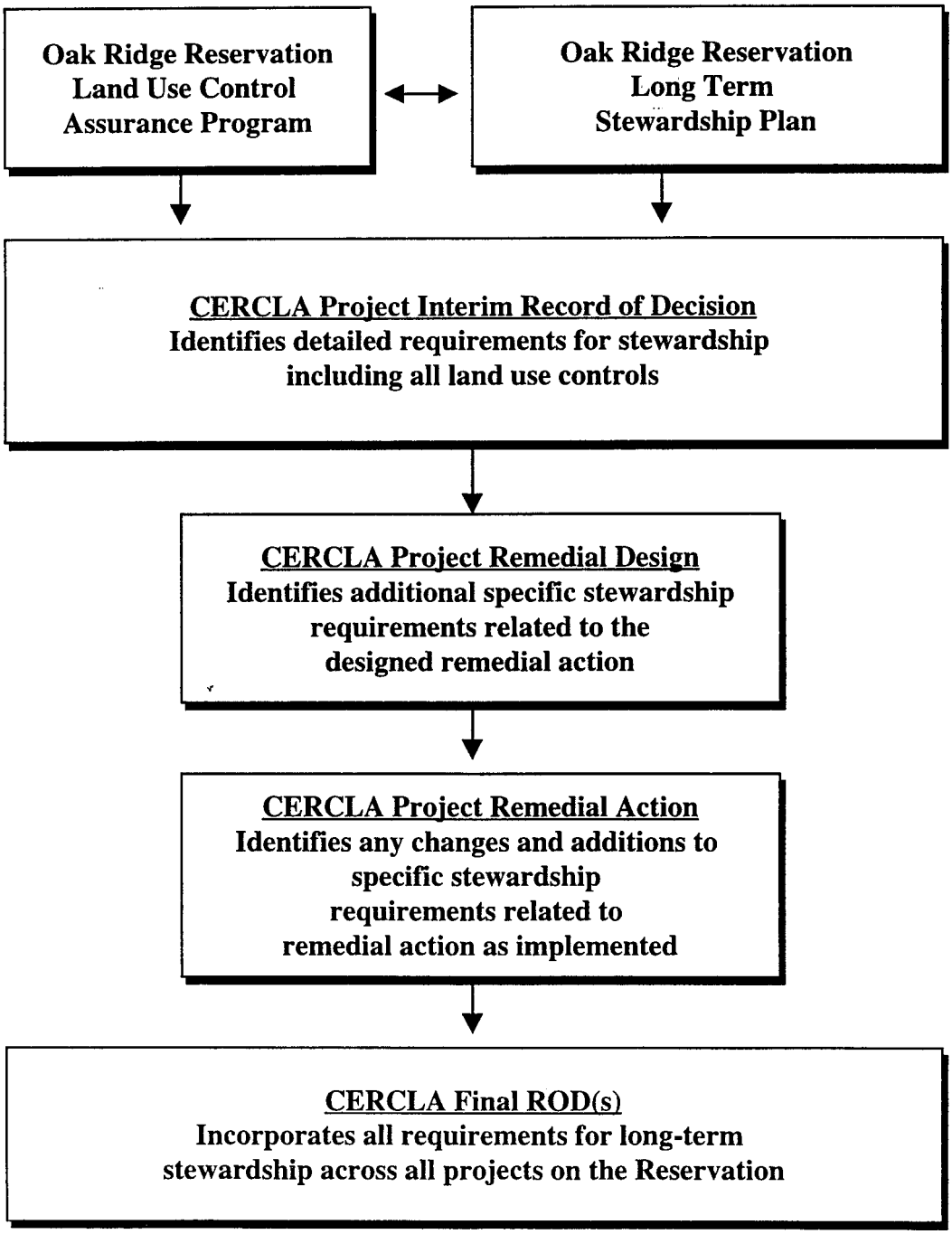


**Figure 3.2 Conceptual Stewardship Process for the Oak Ridge Reservation.**

- provide financial assurance scheduled to cover stewardship costs for the area for the life of the hazard.

The SWG recommends that DOE address each of the preceding stewardship requirements in all decision documents. If DOE finds that certain of the requirements cannot be addressed in an interim document, it must clearly state in the interim document where and when the public can expect to see the particular requirement addressed and implemented.

With the advent of a DOE Land Use Control Assurance Plan and a Long-Term Stewardship Plan and the approach of final watershed Records of Decision, a mechanism needs to be in place to ensure that the proper and publicly acceptable stewardship requirements are applied to each major remediation project and to the watersheds as a whole.

### 3.3.3 Five-Year Reviews

Five-year reviews, required under CERCLA, provide the community a way to evaluate long-term stewardship status for remediated sites. Five-year reviews are required for remedial actions that result in contaminants remaining on a site above levels that allow for unlimited use and unrestricted exposure. These reviews are to be continued until the contaminants of concern reach acceptable levels based on appropriate periods of monitoring. Under delegated authority in Executive Order 12580 (Superfund Implementation, January 23, 1987), DOE conducts the five-year reviews and EPA and TDEC concur on five-year review reports.

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. (Interim remedial actions, institutional controls, and monitored natural attenuation are considered remedies under CERCLA Section 121 and subject to the five-year review requirement.) When a Federal Facility Agreement is in place, it should include all site-specific five-year review requirements, such as provisions for reviews, public participation, and correcting deficiencies.

It is very important to note that public involvement in five-year reviews is not included in the Oak Ridge Federal Facility Agreement or the DOE Public Involvement Plan.

Guidance on community involvement is found in EPA's draft Office of Solid Waste and Emergency Response Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance*. It lists the following minimum, "community involvement" activities:

- notify the community that a five-year review will take place;
- notify the community that the five-year review has been completed (e.g., public notice) and what it found; and
- place a copy of the five-year report in the site repository and inform the community of its availability.

Section XXXI of the current *Federal Facility Agreement for the Oak Ridge Reservation* (DOE ORO/OR-1014, January 1, 1992) briefly describes the CERCLA requirement for a five-year review but fails to mention public involvement. The SWG concluded that the Oak Ridge Federal Facility Agreement must be amended to include the above notification requirements and public input to the scope of the evaluation for each five-year review, and provisions for a public

meeting at which DOE, EPA, TDEC, local government, and citizens discuss the status of long-term stewardship on the Reservation.

In addition, the DOE *Public Involvement Plan for the Oak Ridge Reservation* (DOE/OR/01-1676 & D1, November 1997) does not include discussion of the CERCLA five-year review. As previously noted, the five-year review may be the only way for future generations to evaluate the condition of remedial actions on the Reservation. Thus, the DOE Public Involvement Plan (i.e., Appendix A: CERCLA Involvement Requirements) must be revised to include the five-year review as a site activity and a requirement for public participation in the five-year reviews.

### 3.3.4 Major Recommendations for Stewardship Requirements in DOE Documents

The SWG carefully considered the CERCLA process and reviewed the DOE and EPA approach to integrating stewardship requirements into decision documents. Of most importance to stakeholders (other than accuracy of information and availability of documents) are public involvement, enforceability of stewardship requirements, and funding for long-term stewardship.

Overall, the SWG recommends that:

1. DOE include stewardship requirements in all interim and final CERCLA Records of Decision;
2. DOE establish Federal Facility Agreement milestones for the Reservation Land Use Control Assurance Plan and each project Land Use Control Implementation Plan, the DOE Long-Term Stewardship Plan, and the final Reservation Record of Decision for areas with residual contamination. Establishment of these documents as Federal Facility Agreement milestones should ensure public participation in their development (Section XXXIV, Public Participation in the *Federal Facility Agreement for the Oak Ridge Reservation*, January 1, 1992); and
3. Public involvement in the CERCLA five-year reviews be written into the Federal Facility Agreement and the DOE Public Involvement Plan.

## 3.4 PUBLIC'S ROLE IN OVERSIGHT OF DOE'S LONG-TERM STEWARDSHIP

Statutory oversight of remediation and ultimately stewardship now lies with EPA and TDEC. While the national public may continue to have general input into how stewardship is performed at DOE sites, centers of authority in Washington and Nashville are only remotely influenced by local residents. Long-term reliance on state and federal agencies to meet local concerns seems unwise. While local government can assist with the oversight of stewardship activities, the importance of stewardship may recede over time. These uncertainties and the need for public understanding and attention to long-term stewardship warrant the establishment of a citizens board expressly for stewardship.

Local citizens themselves will have to help ensure that long-term stewardship of contaminated areas on the Reservation is not bypassed because of ever-present budgetary shortfalls and evolving governmental priorities. Nearby residents need to feel that they have some control over conditions on the Reservation after remediation. However, future generations may not enjoy the

frequent opportunities for feedback to and interaction with federal landlords that are now experienced.

As remediation of the Reservation proceeds, the public is being asked to trust the long-term efficacy of remedial actions, but there must be a basis for that trust. It can be established by providing information and access to the Reservation, and by the creation and empowerment of a Citizens Board for Stewardship.

While the completion of remediation is currently scheduled for 2014, the SWG believes that it is essential for DOE to begin planning for a citizens board now. By 2002, most of the strategic remediation decisions for the Reservation will be made and formalized in CERCLA Records of Decision. Provisions for citizen involvement in long-term stewardship must be included in those decision documents to ensure future involvement.

DOE is currently developing a stewardship plan for the Reservation and the structure and function of a Citizens Board for Stewardship must be an integral part of that plan. The SWG will disband upon publication of this report. However, DOE's commitment to include public involvement in its CERCLA activities can be honored by the establishment of a Citizens Board for Stewardship.

### 3.4.1 The Functions of a Citizens Board for Stewardship

The anticipated functions of a Citizens Board for Stewardship are threefold: (1) primarily to assess stewardship performance, (2) next to ensure that stewardship requirements are clearly stated and activities effectively planned, and (3) finally to be responsible for assisting with public information. For decades and beyond, the Citizens Board for Stewardship would be expected to review every aspect of stewardship performance on the Reservation and to provide written reports to the public and to the agencies. Qualitative and quantitative performance data would be assessed to determine the status of remediation, including whether conditions external to a remedy have changed since the remedy was selected; whether the remedy has been maintained in accordance with decision documents; and whether remedial actions and stewardship performance continue to meet the remedial action objectives and the *Community Guidelines for End Uses of Contaminated Properties* (Appendix G for a copy of the Community Guidelines). Opportunities would be sought to improve overall performance through evaluation of stewardship conditions.

The Citizens Board for Stewardship would produce regular "reports to the public" to ensure that the Oak Ridge community was apprised of stewardship results and important developments. These reports would be routine when all aspects of the stewardship program were operating as expected. If problems were identified, however, the Citizens Board for Stewardship must be capable of knowing whether administrative remedies would suffice to correct deficiencies and influential enough to gain the political attention necessary when administrative remedies would not be enough.

### 3.4.2 Desired Characteristics of a Citizens Board for Stewardship

Regardless of its format and structure, the SWG believes that a citizens board must exhibit the following characteristics if it is to be sufficiently capable and influential to conduct its business:

- all activities open to the public;
- manageable size (approximately ten members at any time);
- long-term staggered appointments;
- diverse membership with broad-based technical backgrounds;
- quarterly to bi-annual meetings while stewardship is being designed and annual meetings thereafter;
- official status per the Federal Facility Agreement;
- *ex-officio* membership by DOE, TDEC, and EPA;
- federal funding for staff and technical support;
- access to reliable independent technical resources;
- access to stewardship performance data in a clear and understandable format; and
- access to areas essential to the monitoring of stewardship as well as to the individuals who are responsible for stewardship activities.

### 3.4.3 Attributes of a Citizens Board for Stewardship

In determining the appropriate structure, the SWG believes that the following attributes should be given primary consideration in establishing a citizens board:

1. The primary focus of the board is site stewardship;
2. State and federal regulators have a specific role and obligation to the board;
3. The Principal Steward, DOE, is committed to cooperate and support the board;
4. Board members understand remediation and stewardship activities on the Reservation;
5. Board size and length of terms facilitate member interaction and discussions and continuity;
6. Board membership is representative of affected communities;
7. Board structure and membership is seen as legitimate because it acts in the best interests of the community at large and is linked to existing local organizations; and
8. Board membership and focus is independent of undue political influence.

### 3.4.4 Analysis of Board Options Compared with Desired Attributes

Based on existing groups in the Oak Ridge community, the SWG identified the following four possible structures for a Citizens Board for Stewardship. In Table 3.2, these options are compared against each of the above attributes. Although some of the attributes can be built into each of the options, board membership and structure will vary greatly depending on the approach taken.

1. **A self-selected volunteer group,** such as the Stewardship Working Group, could be established to operate with staff support.

2. **An existing local group** could assume responsibility for stewardship with support and involvement from multiple jurisdictions.

3. **A locally-appointed board** with staff support and regulator and DOE cooperation. A variant might provide for appointment by the Governor of Tennessee based on nominations by the City of Oak Ridge, Anderson and Roane counties, EPA, and TDEC.

4. **A DOE-appointed board** operating under the Federal Advisory Committee Act with nomination of members by local governments.

**Table 3.2. Comparison of Board Options for Meeting Attributes**

| | Volunteer | Existing Local Group | Local Government Appointment | DOE Appointment |
|---|---|---|---|---|
| **1. Single focus** | Can be established | Not possible | Can be established | Can be established |
| **2. Regulator participation** | Can be built in | May not be possible based on existing structure of the group | Can be built in | Can be built in |
| **3. Primary steward cooperation** | Not likely to be a problem | May be a problem depending on existing responsibilities of the group | Not likely to be a problem | Not likely to be a problem |
| **4. Member knowledge** | Cannot control | Cannot control | Can be a factor in appointment | Can be a factor in appointment |
| **5. Size and tenure** | Cannot control | Cannot control | Can be a factor in appointment | Can be a factor in appointment |
| **6. Representation** | May or may not be representative | Unlikely to be representative unless group membership is modified | Can be made representative | Can be made representative |
| **7. Legitimacy** | May not have authority of an appointed board | Depends on the group, will not have automatic standing in stewardship, may have other limitations | Likely to be perceived as legitimate | May not be perceived as legitimate by some stakeholders |
| **8. Independence** | Will be independent | Not likely to be independent of local government interests | Will be perceived as independent only if not under control of local government | May not be perceived as sufficiently independent |

### 3.4.5 Major Recommendations for a Citizens Board for Stewardship

The analysis in Figure 3.1 is a starting point for the structure of an Oak Ridge Citizens Board for Stewardship. The SWG recommends that:

1. DOE immediately begin planning for a Citizens Board for Stewardship;
2. DOE work cooperatively with EPA, TDEC, and local organizations to identify the structure of a Citizens Board for Stewardship; and
3. the Citizens Board for Stewardship be established formally by June 2000.

To date, DOE and TDEC have supported citizen efforts to establish an acceptable stewardship program for the Reservation. It is now time that DOE, TDEC and the public get together to determine the structure of a Citizens Board for Stewardship to provide meaningful long-term public involvement to stewardship planning and implementation.

## 3.5 COST AND FUNDING OF STEWARDSHIP

Legacy waste and contaminated areas on the Reservation must be dealt with either by complete cleanup or with a long-term stewardship program that ensures protection of human health and the environment when remediation results in less than complete cleanup. Following study of the cost and funding of long-term stewardship, the SWG concluded that currently the cost of long-term stewardship following remediation is difficult to estimate. Arguments have been advanced that as a consequence, complete cleanup or as near to it as possible is necessary. However, based on costs developed for the End Use Working Group and current annual cost estimates for long-term stewardship, cleanup of the Reservation to unrestricted use would be more than an order of magnitude the cost of long-term stewardship over a 500-year period.[9] The SWG concluded that DOE must establish funding mechanisms for long-term stewardship before completion of remediation, if public trust in less-than-complete cleanup is to be maintained. The funding mechanism for long-term stewardship is yet to be determined because of our strong reluctance to rely on annual appropriations over so many decades.

### 3.5.1 Cost of Stewardship

Estimation of the cost of stewardship for contaminated areas on the Reservation is evolving. Until recently, the cost of long-term stewardship was estimated as a percentage of the total remediation cost, including capital costs of remediation.

Currently, DOE is preparing stewardship cost estimates based on the expected end uses of contaminated areas in five watersheds (Figure 2.1). Estimates are based on summation of the costs of stewardship consistent with the preferred alternatives described in the CERCLA proposed plans being developed for each watershed. Summation of costs consistent with remediation plans is clearly to be preferred over earlier methods of using a percentage of ongoing environmental management costs.

It is expected that, with experience, the accuracy of the estimates will improve and the long-term costs of stewardship will be continually refined. Stewardship costs based on this method will

[9] Data from reference material provided to the End Use Working Group by DOE, 1998.

appear in the FY 2001 version of the Oak Ridge Operations *Accelerating Cleanup: Paths to Closure* document.

Most of the long-term stewardship costs will be for water management (e.g., pumping and treating of ground water, including that collected in the sumps of buildings), monitoring, maintenance, and surveillance by the principal stewards, and oversight by the State of Tennessee and/or the City of Oak Ridge. The incremental costs of other stewards are modest and qualitative estimates are presented in Part II and Appendix F.

An estimate of $19 million per year for total stewardship costs for the Oak Ridge Reservation, after the fifteen-year period of remediation, is given in the May 1999 *Accelerating Cleanup Paths to Closure* document. These numbers are stated to be in escalated dollars (2.1 percent inflation) and are equivalent to $14 million in 1999 dollars. This total apparently does not cover all of the anticipated costs of water treatment. Recent guidelines provided to the SWG by DOE cite annual monitoring costs of $10 million ($7.3 million in present dollars); maintenance costs of $6.1 million ($4.5 million); and wastewater (including groundwater) treatment of $20 million ($14.6 million). The wastewater figure is particularly uncertain, because it involves an apportionment between costs of ongoing operations and environmental management. This is difficult to project a decade and a half from now. The groundwater costs are also difficult to predict until remediation results are evaluated.

### 3.5.2 Budgeting for Stewardship

In December 1998, DOE Headquarters stated its commitment to meeting its long-term stewardship obligations. DOE Environmental Management Headquarters recommended that sites with adequate information on activities and costs establish a project description and budget (i.e., Project Baseline Summary) for long-term stewardship (Appendix H for DOE Guidance). It was noted that much of the information needed to assess stewardship activities is available in Project Baseline Summaries for remediation activities and waste management. The type of information likely to be needed for a stewardship Project Baseline Summary includes:

- description of residual contamination;
- description of the controls being used to contain residual contamination;
- description of the future land use after remediation is completed, and
- itemization of costs.

Furthermore, the DOE Assistant Secretary for Environmental Management continues to urge "…field offices to explicitly account for these necessary long term stewardship activities in our formal budget submissions to Congress."[10]

In addition, DOE has been instructed by Congress to provide a report on existing and long-term environmental stewardship responsibilities for sites or portions of sites where remediation is expected to be complete by 2006. The report is due October 1, 2000, and must include a description of sites, long-term stewardship responsibilities (e.g., longer than 30 years), and a "reasonably reliable estimate of annual or long-term costs for stewardship activities." (See Appendix C for a description of the National Defense Authorization Act requirements for a long-term stewardship report.)

[10] Letter from Carolyn L. Huntoon, Assistant Secretary for Environmental Management, to Alfred A. Brooks, August 26, 1999.

The SWG believes that DOE has adequate information (excluding future water management costs) and should demonstrate its intent to meet stewardship obligations by identifying the nature, extent, and action-driven cost estimates for current and expected stewardship requirements in a Project Baseline Summary. A reliable Project Baseline Summary for stewardship contributes to a viable comparison of remediation and stewardship costs that can guide remediation decisions.

### 3.5.3 Funding of Stewardship

In Section 2.2.1 of the 1998 *Stakeholder Report on Stewardship*, several funding options are discussed. The 1998 committee preferred setting up a trust fund that would draw income to meet stewardship needs. (See Appendix I of this report for a description of trust funds, entitlements, and annual appropriations.)

Since publication of the 1998 Stewardship Report, DOE Headquarters has openly accepted responsibility for funding and management of stewardship activities and is slowly moving ahead with planning for stewardship. Currently, DOE is funding a study through Resources for the Future to identify "the full range of possible funding mechanisms that could be employed to finance stewardship activities." A final report is scheduled for June 2000.

A satisfactory trust fund must avoid the pitfalls of many current arrangements designated as "trust funds." The funds must be specific to the Reservation or to a specific remediation project to prevent diversion. They must be available for their intended purpose without further legislative action at the federal or state level. Some mechanism must be in place to ensure that the funds are not squandered. There must be provision for deciding which expenses are to be covered by the trust fund and for acquiring additional capital funds, if necessary. Fiscal planning must provide for cost inflation, specify how and from what source interest payments are to be credited to the account, and describe how the principal is insured against loss. There must be an assurance that the Office of Management and Budget and the Congress will not reduce ongoing budgets on the assumption that the trust fund is really an unobligated reserve. The current cost of accumulating the funds must not affect ongoing remediation.

Entitlements and annual appropriations are considered less desirable because of uncertainties associated with congressional funding of such mechanisms. Stakeholders want to avoid the political strain on the local community and its representatives in Congress that would result from continual bargaining for adequate stewardship funding. The local public, after accepting the burden of residual contamination, should not have to shoulder the burden of uncertain funding.

Although a trust fund of the nature described below falls outside the usual congressional actions, we believe its merits argue for adoption. It has the added advantage that in establishing a principal to cover costs, our generation is not passing all of the burdens of funding stewardship to future generations. Investments made during remediation that are relatively modest in comparison with Environmental Management budgets will dramatically reduce the need for reliance on annual appropriations, although future adjustments to compensate for inflation or unforeseen costs will continue to be needed.

The SWG limited its study of funding for long-term stewardship to routine stewardship operations, excluding the effects of natural disasters or extreme failure of engineered remediation systems. The decision was based on the difficulty of estimating the frequency of such

occurrences and the fact that the federal government has a long tradition of providing resources for these events. Periodic renewal or replacement of caps and access-restricting structures will however be necessary even if no disasters occur, and part of each remedial design should be documentation of the estimated life and approximate replacement cost.

A model for the trust fund concept is the recently finalized agreement by the State of Tennessee and DOE to set up a trust fund for long-term care of a proposed waste disposal facility to be located on the Reservation. The State insisted that before signing the Record of Decision, an agreement be made for financing care of the facility over the indefinite future. Negotiations resulted in a proposed dedicated trust fund administered by the State. The estimated cost of the waste disposal facility is about $200 million. The contractual agreement sets aside $1 million per year over the 14 year period projected for operation of the facility. The resulting $14 million trust fund (plus accumulated interest) is to be administered by the State. The estimated $750 thousand per year income is to be available to DOE for the expenses of monitoring and maintenance of the waste disposal facility after closure.

In the negotiations, funding was discussed in terms of a tipping fee for placing waste in the facility. In the consent order, a fixed annual fee was adopted as the method of payment. Although a tipping fee is not directly applicable to all remediation activities, the precedent is valuable. The accumulation of principal for the watersheds could be regarded as retroactive fees for past disposal practices.

With respect to the general Tennessee position on stewardship of the Reservation, in several letters and private discussions with DOE, the State has said it will not sign any CERCLA Records of Decision for pending remediation activities that leave contamination in place above health-related standards unless provisions are in place for long-term stewardship of the sites.

A trust fund for stewardship costs could be established as a one-time appropriation, accumulated as a percentage of the costs of ongoing remediation, or as a fixed cost per year based on the estimated stewardship costs following remediation. The advantage of the latter two over an appropriation at the end of remediation is that the public would be reassured that funding of long-term stewardship would in fact be available, and would be more comfortable with the prospect of residual contamination.

What might be involved in setting up a trust fund is illustrated by an example utilizing annual contributions. It is assumed that contributions start in 2000, they are made over a remediation period of fifteen years, and that interest accrues in the fund; monitoring and other costs are borne by the remediation program during this fifteen year period. In 2015, some of the income from the fund begins to be devoted to stewardship, and the balance adds to the principal to counteract erosion by inflation. This schedule approximates projections in *Accelerating Cleanup: Paths to Closure.*

In selecting a target for the trust fund, water-management costs were not included. These costs are highly uncertain, and it would be difficult to persuade Congress to prefund them. The remaining estimate for monitoring and maintenance provided to the SWG by DOE is $11.8 million per year in present day dollars. Because the estimate is approximate, it is rounded off to $10 million per year for this example.

A perpetual trust, which is intended to fund an inflating cost, is strongly dependent on the difference between long-term interest rates and long-term inflation rates. The initial principal of such a trust, just large enough to remain stable over a long period of constant interest and inflation rates, is given by: P=C/(I-i) where P is the initial principal; C is the initial cost; I is the interest rate and i is the inflation rate. When the inflation rate is zero, this is simply the annual return at the fixed interest rate. Principal is accumulated and interest accrued over the 15 years during which most remediation is expected to be completed. After 15 years, the trust fund at a given interest rate should receive sufficient annual contributions to yield $10 million (in present day dollars) annually "in perpetuity" for surveillance, monitoring, and maintenance plus an addition to principal to compensate for inflation. (See Appendix J for sample computations of annual contributions needed from 2000 to 2014.)

However, historically the difference between interest and inflation has ranged from 2 to 4 percent and the values in this range are shown in bold in Table 3.3. In actual practice, the interest and inflation rate will not remain constant and the trust administrator must be mindful of the extreme sensitivity of the fund to small changes in interest or inflation over the long term. To illustrate, take the 5 percent interest and 3 percent inflation case. If the interest and inflation rates remain the same, this case is stable for 500 years. If, on the other hand, the inflation rate is 3.1 percent, the trust fund reaches maximum in 138 years and collapses to zero in year 168 without a compensatory change in the interest rate.

**Table 3.3. Requirements for Trust Fund Contributions under Varying Rates[1]**

| | 2% Inflation | 3% Inflation | 4% Inflation |
|---|---|---|---|
| 5% Interest | **$450M principal requires $20M annual contribution** | **$784M principal requires $35M annual contribution** | $1822M principal requires $82M annual contribution |
| 6% Interest | **$337M principal requires $14M annual contribution** | **$523M principal requires $22M annual contribution** | **$911M principal requires $38M annual contribution** |
| 7% Interest | $270M principal requires $10M annual contribution | **$391M principal requires $15M annual contribution** | **$607M principal requires $23M annual contribution** |

[1] Historically, the difference between interest and inflation has ranged from 2 to 4 percent. Values in this range are shown in bold.

The income from the fund would be used by the entities responsible for implementation of stewardship (i.e., federal, state, or local ) with appropriate provisions for performance and financial audits, and fund enhancement, if needed. Periodic reviews (e.g., the CERCLA five-year review; Section 3.3), in addition to determining whether remediation at a site is protective of human health and the environment, could evaluate use of the fund and determine any needed additions or withdrawals from the fund. Provisions for changes to, or dissolution of the trust fund must also be provided because stewardship costs can be expected to decrease with time as a result of technology developments, natural attenuation, and radioactive decay. In view of the uncertainties in available cost estimates and inflation, the numbers here are cited only as an illustration of the magnitudes involved.

In summary, except at the highest inflation and lowest interest rates, the annual contributions are modest in comparison with actual remediation expenses, usually no more than five percent. Relatively small contributions during the remediation period can free the federal government from the bulk of monitoring and maintenance costs after 2015. The local public will be more likely to accept cost-effective levels of remediation if it is assured that stewardship activities are supported.

### 3.5.4 Major Recommendations on Cost and Funding of Stewardship

The SWG reviewed the cost of stewardship and considered several options for funding long-term stewardship on the Reservation. Although a trust fund alone may prove to be inadequate to cover all associated costs of stewardship, the SWG recommends that:

> DOE should aggressively explore mechanisms to reduce or remove the dependence on annual appropriations for stewardship, trust funds being the preferred approach.

One member of the SWG offered a minority opinion and recommendations on stewardship funding (Appendix N).

# PART II—THE STEWARDS: FUNCTIONS, INFORMATION REQUIRED, COSTS, AND IMPLEMENTATION STEPS

## 4. FUNCTIONS, INFORMATION REQUIRED, COSTS, AND IMPLEMENTATION STEPS

The purpose of this part of the report is to provide information about each steward in one place for the convenience of the stewards and implementers.

This section discusses the stewards[11] and their functions in the proposed stewardship plan. These stewards have been selected to make use of the current functions of city, county and state governments. There is deliberate redundancy in the retention of crucial data in order to ensure its preservation. These stewards will be active during the remediation phase to ensure a smooth transition into the post-closure phase when long-term stewardship is the principal function. The near-term steps are intended to occur over the next three years.

The following sections identify each steward, its function, the information required for that function, estimates of any significant costs, and the necessary near- and long-term steps to be taken to implement the function. When appropriate, detailed information supporting these sections has been placed in Appendices. The functions are based on interviews with most of the stewards. The summaries of the interviews contain detailed background information and can be found in Appendix E.

### 4.1. PRINCIPAL STEWARD—FEDERAL GOVERNMENT

The Federal Government, currently acting through DOE, is the legally required and the recommended principal steward responsible for the implementation and operation of the Reservation functions. The currently designated responsible agency is DOE Oak Ridge Operations. The principal steward has many functions that are described in the following sections. Many of them are well-established practices and the discussion will be limited to aspects of their use that are unique to stewardship. Many of these functions involve other stewards and more detail can be found in the descriptions of those stewards in Sections 4.2 and 4.3, and in the reports of their interviews provided in Appendix E. The functions of the Principle Steward are described in the following sections.

#### 4.1.1 Surveillance Function

Surveillance is defined as any effort made to detect untoward access to a restricted area. It comprises observation by humans and detection by instruments. Obviously the surveillance level must be compatible with the risk level that exists, which in turn is influenced by the nature of physical barriers, the existence of buffer zones, and proximity to the public and wildlife. Surveillance also includes the visual detection of actual or incipient failures of the remediation structures and physical barriers or other protective measures. DOE has considerable experience

[11] The terminology in this report follows the terminology of the 1998 report except that the implementation of the State Parcel Mapping System is regarded as a local responsibility of the counties and city and some of the peripheral stewards proposed earlier have been omitted.

in safeguarding waste sites and it is expected the methods will be extensions of the current practices. Policies and protocols for surveillance should be explicitly stated in the DOE Long-Term Stewardship Plan.

### Information Required

Site surveillance will require information as input to the action, and will generate information that documents the integrity of site access restriction measures. Information that may be required as input to site surveillance plans would include: description of the specific access restriction measures that are in place for the area(s) to be surveyed; operating procedures for any instrument-based surveillance systems; parameters that must be documented by the surveillance; and acceptable/unacceptable deviations of the parameters or conditions being surveyed. Surveillance requirements, and DOE's commitment to uphold the requirements, may be specified in broad terms in Records of Decision, which would be recorded as part of the Administrative Record file (Regulatory Information Database). Specific surveillance requirements (such as parameters to be monitored, acceptable parameter limits, operating procedures, and surveillance frequencies) are expected to be contained in Remedial Action Design documents that are subject to regulatory review and would be retained as part of the post-decision information management system.

Information that is expected to be collected or generated as a result of site surveillance may include qualitative observations of parameters such as fence integrity or presence/absence of erosion features or other indications of physical barrier integrity. If instrument-based surveillance methods are employed there would be some form of electronic information obtained. DOE must determine the amount and form of site surveillance data that are required for long-term documentation of the surveillance program and must store the information in safe/secure systems to ensure long-term accessibility.

### Cost Estimation

Data not available.

### Implementation Steps

These steps are well defined in the CERCLA guidelines and are reviewed by EPA and TDEC.

## 4.1.2 Monitoring Function

Monitoring is defined as any activity that is intended to determine the actual performance of the remedial actions in order to determine if public and environmental health are being protected and if the legal requirements are being met. This includes the determination of the quantity of contaminant leaving the Reservation or migrating within the Reservation.

### Function

Monitoring must be driven by the risks expected and by the expected mean time to failure of the remediation measures. The sampling design must detect incipient failures and not be limited to significant failures, which allow risks to become unacceptable. The prevention of off-site releases should be given the most emphasis.

Monitoring policies should be stated in the DOE Long-Term Stewardship Plan; specific performance objectives should be stated in the Records of Decision; and detailed plans specified in post-Record of Decision documents. There must be a specific provision for review to preclude both under and over monitoring based upon experience. There must be a routine analysis of the data to detect statistically significant trends and to determine the need for revised sampling design.

## Information Required

Monitoring activities will include environmental sampling and analysis as well as sampling and analysis performed to monitor the performance of constructed remedies and processes.

DOE must design and implement monitoring programs for each operable unit on the Reservation to show that, for the duration of potential risk related to contaminants on-site, remedial actions in place are protective of human and ecological health. Environmental media that require monitoring vary among the Reservation sites, as do appropriate monitoring parameters. Because of climatic and geologic conditions at the Reservation, contaminant transport by water pathways is a predominant problem. Certainly one of several measures of the effectiveness of remedial actions will be monitoring of contaminant releases via water. In areas where biota are exposed to radiological or hazardous contaminants that remain in place, the long-term monitoring program must include bioassay on plants and/or animals along with ecological health indicators to show that residual contaminants do not compromise environmental quality.

Information that will be required for DOE to adequately design the Reservation environmental monitoring programs includes identification of human health and ecological contaminants of concern for each environmental medium. Much of this information is identified in human health and ecological risk assessments required in CERCLA Remedial Investigation/Feasibility Studies. In addition to the published contaminant summaries, baseline environmental monitoring data are presumed to be contained in the Oak Ridge Environmental Information System electronic database. Monitoring system design must utilize the pre-remedial action contaminant concentrations or release histories to benchmark the environmental conditions prior to remedial action. Remedial actions are designed to remove or contain the contaminants of concern, thereby making them inaccessible to humans or biota. Monitoring plans must be based on measuring contaminants of concern in the relevant environmental media in the future, after remedial actions are in place, to show the degree of protection that is afforded to humans and ecological receptors.

It is expected that the Reservation monitoring program will include the Clinch River, tributary streams such as Poplar Creek and its Lower East Fork, as well as streams on federally owned land such as Bear Creek, White Oak Creek, and the Upper East Fork of Poplar Creek. Legacy contaminant releases from the Oak Ridge facilities have left contaminants in streambed and riverbed sediments in these areas that require monitoring in the future. Each administrative watershed area on the Reservation is located on a tributary to the Clinch River. DOE surface water monitoring strategy must sensibly integrate contaminant monitoring in the tributary watersheds with the downstream contributors to express the total DOE contaminant burden to the Clinch River.

Information that is generated from the ongoing monitoring program must be archived in safe/secure facilities, and electronic monitoring results included must be archived in the Oak Ridge Environmental Information System data management system. Monitoring results are

expected to be published annually for dissemination to the Reservation stewards and to the public to provide ongoing awareness of environmental quality related to DOE sites and activities.

Operational monitoring requirements to ensure proper performance of constructed remedial actions, processes, or facilities will be specified in the Remedial Designs for individual projects. Such monitoring may include process monitoring as well as localized or broad area environmental monitoring that is indicative of the effectiveness or state of performance of remediation facilities. DOE must maintain the operational monitoring records and results to determine the cost-effectiveness of implemented remedial actions. Such records will be of use locally and nationally in remedial action planning.

### Cost Estimation

The cost estimate of this project is $10 million per year after 2015 (Personal communication with DOE from Life Cycle Baseline); the cost may decline with time.

### Implementation Steps

These steps are well defined in the CERCLA guidelines and are reviewed by EPA and TDEC.

NOTE: TDEC carries out independent Reservation monitoring.

## 4.1.3 Maintenance Function

The general purpose of maintenance is self-explanatory: to maintain and/or restore the performance of remediation structures.

### Function

Maintenance is defined as any action required to restore the original effectiveness of a remediation structure not including unpredictable, catastrophic, natural disasters such as major earthquakes, major floods and the like. It does include the restoration of caps, drains, treatment systems, and other structures required by normal use and operation. It assumes that any structure whose initial performance is sub-standard is repaired by remediation funds prior to it becoming a stewardship responsibility.

### Information Required

Maintenance is a function that both requires and provides information. Information required for maintenance includes the system operating requirements that are defined in the Remedial Action Design. For active systems such as water treatment plants these requirements are related to a facility operation, while for remedial action components such as large area hydrologic caps the maintenance function may be vegetation control. The maintenance function would also include any repairs to access control features such as fences.

For the maintenance function to operate as required, DOE must create an information collection and feedback system that includes basic operating procedures for active facilities and the integration of information collected by the surveillance function. The feedback mechanism is required to ensure that as surveillance activities identify deficiencies in site physical conditions or performance, the maintenance functional organization will be alerted to implement corrective

actions. The feedback system also needs to incorporate annual updates on environmental monitoring to verify remedial action systems effectiveness.

DOE must ensure that information from Remedial Action Designs, from surveillance activities, and from environmental monitoring are integrated on a regular basis to evaluate the overall remediation system performance. The scales of measurement for surveillance and environmental monitoring must be capable of identifying and localizing the onset of deficiencies in performance of individual components of the overall remedial action within watershed scale areas. This requirement is essential to maintain effectiveness.

### Estimated Costs

The estimated cost of this project is $6 million per year after 2015. The waste water processing estimated cost is $20 million per year. These estimates are from the DOE Life Cycle Baseline.

### Implementation Steps

A specific policy for maintenance should be stated in the DOE Long-Term Stewardship Plan. The Records of Decision must continue to estimate maintenance costs, with refined estimates in the post-Record of Decision documents. This is necessary to ensure ample funding for this vital function in a timely manner. The cost estimation based on experience must continue for the long-term stewardship phase.

## 4.1.4 Stewardship Transaction Database

An effective stewardship program requires a means to schedule and monitor critical events in order to ensure that they are done on time and that all related subsequent and dependent events also take place. This is especially true in a long-term stewardship program, as some events may occur only at very long intervals (e.g., re-evaluation of remediation results).

Very loosely, a transaction database automates the codified procedures of an organization in a manner that automatically issues notices to the appropriate individuals to perform scheduled events. These may be explicit schedules designated by a definite date, or implicit schedules based on the occurrence of some preceding event. Once scheduled and past its activation date, an event remains active until the responsible individual(s) indicate to the system it has been satisfactorily completed. Since the data base contains all past, active and scheduled events, many types of status reports can easily be generated, or the stewardship personnel or their managers can query the database. Daily work lists by individual offices can be automatically issued. Delinquent tasks can be flagged for review. One tremendous advantage of such a system is that it forces a critical review of all important operational procedures. However, it must be stated that it requires innovative software design for a transaction system to be open ended and effective.

### Function

One method to ensure performance of complex repeated events is to construct a database containing a schedule of all critical events as well as fields in which completion information is recorded. This database is maintained by software that, upon completion of an event, schedules all necessary subsequent events, allowing a reasonable interval for completion. Another program detects which events are past due and notifies the appropriate persons. An event can also schedule the next scheduled occurrence of itself after the appropriate time period. Thus the

scheduling becomes self-perpetuating. The database should also record the occurrence of appropriate non-recurring events. In addition to scheduling information, the database should contain other useful information about events. Properly designed and implemented, this type of database system can be of great assistance in ensuring complex responsibilities are carried out. It also provides a resource for historic review purposes and management oversight purposes.

This transaction system should be constructed in the very near term so as to contribute to the management of the Reservation remediation phase and permit a smooth transition into the stewardship phase, ensuring that all necessary steps are taken.

The transaction system would be based on a standard relational database[12] management system and should experience no problems other than defining all the applicable transactions, which requires the cooperation of many people. The secret to the success of a transaction system is to define a small set (preferably one) of generic transactions, which, by means of a database of defining parameters, can be individualized to process all the necessary actual transactions. The same approach can be used for the report generators and batch query programs used to report out the status of scheduled events. Using a standard database management system will allow ad hoc queries to be phrased in the standard query language, allowing great flexibility. It will require an experienced and competent database designer.

## Information Required

The items of interest for tracking in the transaction database can include a wide range of events, such as using the system for triggering sample collection events, issuing periodic reports of various types, and verifying that documents and notices have actually been delivered to the appropriate recipients. DOE should consider utilizing multiple, linked transaction tracking systems that can be used to trigger and verify completion of various levels of activities throughout the stewardship system. The information contained in this system can only be determined after the operation protocols of the organization are defined. The following is a suggested list of possible information by type:

Scheduled event

- Person responsible
- Date initiated
- Date of scheduled completion
- Date of completion
- Defining document
- Completion document
- Subsequent scheduled events

Subsequent scheduled events have the same form as a scheduled event providing a tree structure. Unscheduled events simply have no initiation or scheduled completion date.

[12] A relational database is a collection of one or more flat files conforming to accepted standards, coupled with the appropriate software for queries and report generation. Many of the commonly used database management systems are of this type (e.g., ORACLE, Rbase, Dbase, etc.).

### Estimated Cost

At this time, the estimated cost is considered to be modest and incremental.

### Implementation Steps

Immediate steps should be taken to define the remediation process and the resulting stewardship process. The database and software can then be defined and implemented as described above in the "Information Required" section.

## 4.1.5 Stewardship Information Repository

An effective stewardship program must retain the information that is essential to its long-term responsibilities and it must be stored in a manner accessible to several audiences: the stewardship personnel, the technical users and the lay public. This is important to the future understanding of the hazards that exist on the land, to the planning of and future remediation or maintenance of the protective systems, and to the consideration of any changes in land uses. The current DOE information managers are performing much of this work. Appendix K provides an annotated list of the current DOE information repositories.

### Function

The Perpetual Stewardship Repository is the mainstay of the record retention system. Its primary purpose is the support of the Stewardship System but some of its components can be made available to the public. Some of its contents will be kept in perpetuity and some until the first five-year review of the subject remediation unit or other predetermined anniversary date. The failure to retain the correct information will necessitate very expensive fieldwork in the future.

It is very important that this repository has a simple but effective electronic access system that will enable users to locate the necessary information without having to peruse all the documents to locate one. The planning of the system should bear in mind that the corporate memory may disappear.

### Information Required

The list of information to be archived is extensive. The following is a partial listing by type:

1. Complete administrative record
2. Post-Record of Decision record
3. Waste characterization data; location and components
4. Monitoring data and analysis reports
5. Research reports
6. Oak Ridge Environmental Information System

A complete listing of the repository contents is found in Section 4.1.6 and in Appendix F.

### Estimated Costs

The estimated costs for this project are modest, with incremental-to-normal document retention.

### Implementation Steps

The recommended repository is an extension of the current DOE document management systems. DOE should establish the stewardship repository within the framework of the current DOE information repositories to take advantage of the trained staff and existing procedures and provide for its perpetual care including media rejuvenation as needed. This includes a review of stewardship needs and formally establishing the stewardship repository in terms of the current repositories, as well as ensuring that the needs of stewardship are reflected in the electronic access methods. DOE must implement a comprehensive document checklist for the repository and ensure that a copy of each document is placed in the repository before it is lost or destroyed. At the same time, an electronic indexing system must be created.

NOTE: There is a supplemental, partially redundant, repository function carried out by the indexing and distribution stewards who supply a portion of this function (Section 4.3.3).

## 4.1.6 Summary of Reservation Repository Information Required and Available

The following are detailed descriptions and listings of information necessary to the operation of a successful long-term stewardship repository and program. The information required for stewardship is broadly divisible into the following four categories: (1) Regulatory Decision Information, (2) Site Management Information, (3) Land Use Control, and (4) Public Education Information.

### 4.1.6.1 Regulatory Information

This information includes documents that are prepared by DOE and its contractors as part of the CERCLA process to arrive at the remedial action decisions. Examples of the types of information in this category include Remedial Investigation reports, Feasibility Studies, Proposed Plans, and Records of Decision. Some supporting documents not directly tied to decisions but setting policy for programmatic activities may also be included as Regulatory Information. Files that are directly related to the remedial action decisions are retained in the Administrative Record File (Table 4.1). Other documents and information created after the Record of Decision that are essential to the site remediation and management under CERCLA are retained in the Post-Decision File (Table 4.2). DOE is responsible for preparation of all the information described in Tables 4.1 and 4.2. DOE has an existing information management system at the Reservation to retain regulatory information in a controlled-configuration.

**Table 4.1. Criteria for Inclusion in the Administrative Record File**

| Document Type | Inclusion Code | Comments |
|---|---|---|
| FFA Primary Documents | Automatic | Released to Regulators (D1+) |
| FFA Secondary Documents | Automatic | Released to Regulators(D1+) |
| DOE Signature Correspondence | Automatic | |
| EPA Signature Correspondence | Automatic | |
| TDEC Signature Correspondence | Automatic | |
| Federal Facility Agreement | Automatic | DOE/OR-1014 |
| Community Relations Plan for the Reservation | Automatic | DOE/OR/01-XXXX |
| Public Information Fact Sheets | Automatic | OU Specific |
| Public Notices/Newspaper Announcements | Automatic | OU Specific |
| Transcript from Proposed Plan Public Meeting | Automatic | OU Specific |
| Data Summary Sheets | Automatic if identified by site program staff | |
| Sampling and Analysis Data | Automatic if identified by site program staff | Pointer/Referenced |
| Chain-of-Custody Forms | Automatic if identified by site program staff | Pointer/Referenced |
| Site-Specific Background Docs | Automatic if identified by site program staff | If Applicable |
| Approved/Signed Regulator Meeting Minutes | Included by exception if identified by site program staff | If Applicable |
| Regulator telephone Conversations | Included by exception if identified by site program staff | If Applicable |
| Contractor Telephone Conversations | Included by exception if identified by site program staff | If Applicable |
| Internal Contractor Communications | Included by exception if identified by site program staff | If Applicable |

**Table 4.2. Criteria for Inclusion in the Post-Decision Files**

| Document Type | Inclusion Code | Comments |
|---|---|---|
| FFA Primary Documents (Post-Record of Decision) | Automatic | Released to Regulators (D-1+) |
| DOE Signature Correspondence | Automatic | |
| EPA Signature Correspondence | Automatic | |
| State Signature Correspondence | Automatic | |
| Community Relations Information | Automatic | If Applicable |
| Public Information Fact Sheets | Automatic | If Applicable |
| Public Notices/Newspaper Announcements | Automatic | If Applicable |
| Site Specific Background Documents | Automatic if identified by site program staff | If Applicable |
| Approved/Signed Regulator Meeting Minutes | Included by exception if identified by site program staff | If Applicable |
| Regulator Telephone Conversations | Included by exception if identified by site program staff | If Applicable |
| Contractor Level Telephone Conversations | Included by exception if identified by site program staff | If Applicable |
| Contractor Level Internal Correspondence | Included by exception if identified by site program staff | If Applicable |

#### 4.1.6.2 Site Management Information

Site management information is by far the most voluminous information category. Among the contents of this category are: historic information pertinent to materials or facilities that are left on-site at the end of remedial actions, design and as-built records of constructed remedies or facilities (copies of these may also reside in the Regulatory Information category as required deliverables), historic and future environmental monitoring data both in raw form and in periodic published reports that document the effectiveness of remedial actions, and records that document the amount and location of contaminated material that was removed from the site for disposal off-site. Appendix F includes a tabulation of the types of information expected to be available in the future to facilitate site management and support further research related to the sites.

DOE has existing information management systems that contain site management information described in Appendices F and K. As activities on the Reservation change in the future, DOE needs to ensure that site information necessary for long-term stewardship is retained in useable form.

#### 4.1.6.3 Land Use Control and Public Education Information

Land use control and public education information consists of several types of information beginning with DOE's Land Use Control Assurance and Implementation Plans for each area of the Reservation that contains contaminated land. (These may be cross referenced in the Regulatory Information category also.) Land use control information also includes plat maps with associated information that identifies the presence of contaminated lands to support the implementation of institutional controls related to land use restrictions for protection of the public. These records are expected to be prepared by DOE and will reside in the offices of Roane and Anderson counties, where they will be readily identified in property title searches. Similar information is also expected to be included in the Tennessee Parcel Mapping System. In addition to the legal land records, information must be placed in the public sector to ensure that entities in the City of Oak Ridge government are knowledgeable about the areas where contamination remains within the city limits. Additionally, information that assesses the effectiveness of environmental restoration of the contaminated lands must be made publicly available on a regular (annual) basis (e.g., relevant environmental monitoring reports and the required five-year Record of Decision review documents in public reading rooms, at the Oak Ridge Public Library, and elsewhere). Another information dissemination and educational function DOE must facilitate is the creation of environmental science educational materials to be provided to local school systems. As population steadily increases and Americans produce more waste that must be managed, education of subsequent generations about the requirement that society manage its waste and remain cognizant of the legacy of wastes from earlier generations becomes more and more important. Through education, we will alert our children to the importance of properly managing land that contains residual contamination and to proper land use planning.

Retention and archiving of information by each steward with information management responsibilities is of paramount importance. Information storage and retrieval systems must be safe from fire and natural disasters, and information must be cataloged in ways that ensure retrievability. The duration of retention of information may vary with the nature of the information. Information pertaining to legacy materials and facilities that remain on-site after remediation must be archived in perpetuity if they present long-term potential human health or environmental risk factors.

### 4.1.7 Use of Institutional Controls

Institutional Controls (*Stakeholders Report on Stewardship, 1998,* Appendices F and G) include registered deeds with or without restrictions, land easements, registered notices of land contamination and required continuing treatment, required notices of land contamination to buyers by sellers, and plat maps and zoning information contained in the state, county, and city mapping systems. Since this land information is vital to the prevention of future accidental intrusion into waste areas, this plan recommends a multi-faceted approach to the retention of this information so it will be available to many phases of land use and control. These multiple copies also provide the desired redundancy in case of loss (Sections 4.3.1 and 4.3.2).

Institutional controls, especially restrictions on the use of the property, and requirements to maintain methods that prevent the spread of contamination, can create an actionable interest on the part of past landowners and current neighboring landowners. In a similar manner, institutional controls should be able to create an actionable interest based on risks to the public health on the part of the general public. Under these conditions not only the adjacent landowners could seek redress in the form of damages but so could the general public. This would provide a very strong deterrent to violating restrictions, as damages are usually larger than fines. An example of the federal and state requirements for institutional controls is in Appendix L.

## Function

At the core of the system is the registering of property deeds and related land notices with the county register of deeds. In this manner the essential information becomes an integral part of the land record to be retained in perpetuity under state law. The information is also entered into the county property assessors mapping system and into the county portion of the State Parcel Mapping System. Such information becomes available through normal property title searches and the wide public access to the county and state systems.

**Cautionary Note**: There is concurrence (TDEC, Anderson County Register of Deeds, interviewer), based on the difficulty that TDEC had in finding them, that the current registered notices are not readily found in a search. This may be due in part to the lack of a deed for the Reservation. (It is held under a court ruling.) Alternatively, it may be due to the document indexing and search methods, which are designed for title searches, or to the manner in which the document is entered into the system. In any event, this apparent problem in the accessibility of the primary land document, which is the foundation of the long-term, publicly available contamination information, should be corrected by DOE in consultation with the registers of deeds.

The second portion of the institutional control system is the introduction of the information into the city's planning and land use control system. This system allows the formation of a “shadow” land use zone within a current land zone and the registration of a plat map with the city even though that land is not actually subdivided and sold. These two constructs can be used to place the information on the presence of waste directly into the city's planning and land use control functions. In addition the city will be using the State Parcel Mapping System which will also contain the information. The city planning office also uses the Oak Ridge tax office records as a quick source of land information. Therefore, the notation field of the tax record should contain a brief notice of waste.

In addition to the information function, the institutional control functions can form the basis of a strong deterrent to violating restrictions.

## Information Required

The required information includes: property deeds or contamination notices for registration, plat maps to define the location and character of contaminated land, shadow land use zones, appropriate Geographic Information System information to populate the State Parcel Mapping System, and proper Notices to Buyers of Property Contamination. The details of this data are shown in Appendix F.

### Estimated Costs

The estimated costs of this project are modest and incremental.

### Implementation Steps

Much of this information is now required to be placed on deeds, or registered as notices by federal and state law. DOE is responsible for initiating documents and requests to the city to implement these functions. However the state requirement for a Notice to Buyers must be created by the state legislature. Representative Gene Caldwell is willing to sponsor a private act for Oak Ridge for this purpose (Section 4.3.2.4). Although this land may not pass into private hands for many years, it is paramount that these steps be taken now while the potential problems are fully appreciated.

DOE should investigate what it would take to create an actionable interest on the part of the general public in the enforcement of land restriction and containment maintenance requirements based on issues of public health. These should be devised and implemented if feasible.

## 4.1.8 Use of Physical Controls

Physical controls include fences, gates, barriers, and signs. The need for physical controls is proportional to the risk of serious exposure to intruders and this is related to the levels of surveillance and the existence of buffer zones, which isolate the area from its neighbors.

### Function

It is impossible to stipulate the design of physical barriers in detail until the remediation plans are firm. However, the long-term stewardship plan should set specifications for types of areas in terms of risk levels that are acceptable to the concerned public. Each Record of Decision can then commit to a performance-based physical control goal and range of actual plans to be detailed when the necessary information becomes available. It is very important that these plans consider scenarios that are probable in the future and not limit themselves to the current scenario in which the entire Reservation appears to be a very large buffer zone (Section 4.3.5).

### Information Requirements

Information that is required includes risk analysis and design information.

### Estimated Costs

Estimated costs are operating costs included under maintenance.

### Implementation Steps

DOE must establish the policy and guidelines for use in the preparation of performance-based specifications to be included into Proposed Plans, Records of Decision and other appropriate documents determining remedial actions. The later documents will effect the performance-based specifications of the Record of Decision.

#### 4.1.8.1 Use of Buffer Zones

The current land uses of the Reservation provide a wide buffer zone adjacent to the current waste sites. However, it would be a grave error to assume that this situation will exist in the distant future. As the remediation proceeds it may become possible and desirable to permit a wide range of recreational or even residential uses. Therefore, it is necessary to establish policies and guidelines for future buffer zones based on reasonable future uses. The policies should be such that no reasonable future use is preempted by the lack of a suitable buffer.

### 4.1.9 Stewardship Internet Site

An effective stewardship program needs to reach out to the public beyond the immediate region to instill confidence and faith in its integrity. The recommended plan proposes to do this by having an Internet site dedicated to and oriented to the topic of Reservation stewardship.

#### Function

The goal for this function is much the same as for the public schools but with the Internet audience. The function is an extension of the current DOE Environmental Management web pages with a view to presenting the topic of stewardship to a broad public both near and far from the Reservation. This function also supports the public education and public library functions.

#### Information Required

The information on the web site would include maps, graphics, fact sheets, short discussion papers, progress reports, contaminant status reports, etc. Much of this can be accomplished by the use of links to appropriate existing pages. There is a demonstration stewardship web page at: http://user.icx.net/~brooks/stu_indx.html

#### Estimated Costs

Estimated costs are modest and incremental.

#### Implementation Steps

The near- and long-term steps that should be taken by DOE are to extend its current web pages to include the topic of stewardship. This is an extension of current DOE web activities.

### 4.1.10 Stewardship Research Program

A long-term program on biological monitoring could be invaluable to the Oak Ridge area as we try to verify that the contamination has not devastated the health of the public or the environment. Clearly contaminated sites can be dangerous, but if controlled and monitored, the impacts can be minimized.

The lack of reliable information about the environmental systems in which the Reservation waste resides may cause either unneeded expense or worse, excessive risks to the public. Of particular interest are the rates of contaminant migration, the effectiveness of remediation methods used, the rate of contamination of and impact on wildlife, and the subsequent mobility of contaminated species. For these reasons, it is recommended that an environmental research program be instituted on the Reservation to provide for a more accurate understanding and future modeling

of environmental phenomena. This information also will be useful for addressing the increasing national problem of technological waste disposal.

Preserving a contaminated site for long-term Research and Development may seem counter-productive; however, there are several advantages to such an activity. Site preservation must occur in an area where the contaminants are not risk drivers and in an area where there is a low priority for site remediation. Well-constructed basic research activities on low-risk sites may be applicable to the design and implementation of remedial strategies at neighboring high-risk sites. Experimental tracer techniques can be employed on the low-risk sites in order to quantify how coupled hydrological, geochemical, and microbial processes influence the fate and transport of contaminants. Organic, inorganic, and short-lived radioactive tracer technologies can be employed at the low-risk sites so that the mechanisms of contaminant migration can be assessed at the appropriate scale relevant to the problem. Numerical simulation of experimental tracer data may allow for prediction of contaminant fate and transport processes at neighboring high-risk sites. These predictions quantify the severity of the problem and the choice of an appropriate remedial strategy. This activity has been instrumental with regard to prioritizing site remediation efforts on the Reservation. The Reservation currently has sites suitable for research and will have more when watersheds are placed in stewardship status.

### 4.1.10.1 Elements of Research Program

A stewardship research program should be made up of the following:

1. Basic research that will provide an understanding of the fundamental mechanisms that determine the impact of radioactive and other wastes on the environment and ecosystem. That the Reservation provides a unique opportunity for such an effort has been recognized for many years as is evidenced by the prototypal program suggested in Appendix M. It should also be noted that DOE has not taken full advantage of these opportunities.

2. Applied research that will lead to an understanding of old and new remediation procedures and thus to the implementation of improved remediation procedures. A current example of such a program involving bio-remediation studies is presented in Section 4.1.10.2 and Appendix M. It should be noted that this program, if awarded to Oak Ridge National Laboratory, will be funded by the DOE Office of Science and Technology.

3. Public health research that will decrease uncertainties about effects to human health and the environment, thus leading to better acceptance of remediation methods. Such an effort should be conducted in cooperation with the several public health agencies now working in Oak Ridge. The current public discussions of the Reservation Public Health Agenda, coordinated by the Agency for Toxic Substances and Disease Registry, include these topics.

(NOTE: *Additional minority recommendations are included in Appendix N.)*

### 4.1.10.2 Bioremediation Research Proposal

The following is excerpted from a proposal to the U.S. DOE Office of Biological and Environmental Research Office to establish a Field Research Center for Natural and Accelerated Bioremediation Research by David Watson and Gary Jacobs of the Environmental Sciences Division, Oak Ridge National Laboratory, dated June 1, 1999. Appendix M provides more detail.

*The Environmental Sciences Division (ESD) at Oak Ridge National Laboratory (ORNL) offers to establish a Field Research Center (FRC) on the U.S. Department of Energy (DOE) Oak Ridge Reservation (Reservation) in Tennessee for the DOE Office of Biological and Environmental Research (OBER). The FRC would provide a site for investigators in the Natural and Accelerated Bioremediation Research (NABIR) program to conduct research and obtain samples related to in situ bioremediation. An Environmental Analysis describing the background information on the environment of the proposed site for the FRC was submitted to OBER prior to April 13, 1999.*

*The proposed FRC includes a field site to be used for conducting experiments on a plume of contaminated groundwater, a control area that provides for comparison studies in an uncontaminated area, and ancillary structures that are located within a 3.2-mile (5.2-km) radius of each other on the Reservation. The field site and control areas are located on DOE land in Bear Creek Valley (BCV), which is within the Y-12 area of responsibility boundary. However, Bechtel Jacobs Company, Limited Liability Corporation (BJC) has primary contractual responsibility with DOE for Environmental Management (EM) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup activities in BCV. Both of these sites are well characterized, well instrumented and should be available for the duration of the NABIR FRC (5 to 10 years).*

*The proposed FRC contaminated field site includes the commingled groundwater plume found in the shallow unconsolidated sediments (<10 m depth), Nolichucky Shale, and Maynardville Limestone that originated a combination of the S-3 Ponds and the Bone Yard/Burn Yard (BY/BY). However, the primary focus of Natural and Accelerated Bioremediation Research investigations will be on the easily accessible shallow unconsolidated sediments that overlie the Nolichucky Shale. Contaminants in this plume and in the shallow saturated and unsaturated soils include uranium, Tc-99, strontium metal, nitrate, barium, cadmium, boron, mercury, chromium, volatile organic contaminants (VOCs) and other inorganics and radionuclides believed to be of interest to the NABIR investigators.*

*The proposed ORNL FRC project team has extensive experience conducting hydraulic testing (e.g., pumping and point dilution tests), tracer tests, sampling, and in situ research on the Reservation and specifically on both the control and contaminated field sites. Eight of the proposed FRC staff have been Principal Investigators (PI) for projects where subsurface characterization (including microbial characterization) and injecting tracers at field sites was a major component of the project. Permission has been obtained to inject a diverse group of tracers on the Reservation and FRC field sites including bromide, dyes, dead bacteria ice nucleating agents (INA), microspheres, noble gases, sulfur hexafluoride, short half-life radionuclides, and guar gum. In addition to these tracer study tests, pumping tests, sampling, and in situ research have also been conducted on the control and contaminated field sites. The existing NEPA categorical exclusions and the current regulatory environment should allow these activities to continue through the life of the FRC.*

*Most of the historic environmental restoration data from the FRC field site is available on the Oak Ridge Environmental Information System. The remainder of the existing site characterization data is available from ORNL researchers that have conducted investigations at the site, most of whom are researchers within ESD and are part of the FRC project team.*

#### 4.1.10.3 Estimated Costs

Estimated costs depend upon the scope and nature of the program. Costs may be shared with other DOE offices.

### 4.1.11 Support of Other Stewards

Supporting other stewards consists largely of supplying them with the documents and information necessary for them to meet their responsibilities to the total system. These requirements are discussed in the description of the stewards (Section 3.1).

There may be some nominal costs associated with the original implementation of some stewards, such as the contaminated land overlay for the State Parcel Mapping System. DOE may wish to provide some small one-time grants to defray the startup costs to some of the stewards.

## 4.2 REGULATORY STEWARDS

The regulatory stewards comprise both federal (EPA, Tennessee Valley Authority, U.S. Army Corps of Engineers) and the state (TDEC). The Tennessee Valley Authority and the Corps of Engineers have control over several aspects of bodies of water adjacent to the Reservation but the most direct responsibilities for contaminated land fall to EPA and TDEC. These responsibilities are defined by federal and state laws and form a very important part of the stewardship function. Only a brief description of their stewardship duties will be given below.

### 4.2.1 Environmental Protection Agency

The responsibilities and duties of the EPA are prescribed in CERCLA and other federal law. This plan anticipates that the EPA will remain active on the Reservation until such time as there is a clean release of the land. During this period, they will participate in many stewardship functions.

#### Function

See above.

#### Information Required

The EPA is involved in the environmental restoration of the Reservation in a regulatory/ administrative capacity. To fulfill its role, the EPA must be involved in all remedial action decision making. All required CERCLA documents receive mandatory review and concurrence by the EPA. The EPA also must have access to environmental data either through receipt of monitoring reports, through direct access to the Oak Ridge Environmental Information System database, or both. The EPA must receive copies of all monitoring reports and must participate in five-year reviews of all Records of Decision for the Reservation for as long as CERCLA or follow-on regulations remain in effect.

### Estimated Cost

The estimated costs for this project are borne by EPA.

### Implementation Steps

CERCLA defines the implementation steps**.**

#### 4.2.1.1 Land Use Control Assurance Plan

After examination of the EPA Region IV guidelines for the Land Use Control Assurance Plan and attending the EPA Land Use Control Assurance Plan presentation, the SWG believes that the proposed stewardship plan is both supplementary and complimentary to the Land Use Control Assurance Plan.

However, the Land Use Control Assurance Plan should be augmented by several site-specific requirements before it can be considered complete. The requirements of the Reservation Land Use Control Assurance Plan will then need to be expressed in a project-specific Land Use Control Implementation Plan and codified in the Record of Decision to completely define the stewardship plans for each project. Many of the elements needed to augment the Land Use Control Assurance Plan are defined throughout this report.

### 4.2.2 Tennessee Department of Environment and Conservation

TDEC plays a dual role in stewardship of the Reservation. The DOE Oversight Office under the Federal Facility Agreement has direct oversight and approval authority for remedial actions on the Reservation and this presumably extends to the stewardship period. TDEC also, through the state permitting process, exercises control over emissions from the site, including emissions to surface waters. The proposed stewardship plan assumes that TDEC will continue its present activities into the stewardship period and will continue to be funded by DOE as a part of its perpetual responsibility for the waste stored on the Reservation.

In addition to the above roles, the Commissioner of TDEC is the Natural Resources Trustee for the state of Tennessee. This role is independent of the CERCLA and DOE involvement and will continue independently of them. This authority can be brought to bear on Reservation problems.

### Function

TDEC stewardship functions will be negotiated by the state in continuing Federal Facility Agreement revisions. The current TDEC functions are too diverse to be detailed here but its current role is well documented in the Federal Facility Agreement. It is expected that TDEC will play an equally strong role during the stewardship period as long as any potential threat to human and environmental health remains, even in the presence of DOE or other agency. TDEC draws its authority not only from the Federal Facility Agreement but also from a wide range of other federal and state laws, such as the National Resources Protection Act and the Tennessee Water Quality Laws, which the federal government has agreed to recognize.

### Information Required

TDEC is involved in the environmental restoration of the Reservation in a regulatory/ administrative capacity. To fulfill its role, TDEC must be involved in all remedial action

decision making. All required CERCLA documents that lead to remediation decisions and remedial action design and construction reports receive mandatory review and concurrence by TDEC. TDEC also must have access to environmental data either through receipt of monitoring reports, through direct access to the Oak Ridge Environmental Information System database, or both. TDEC must receive copies of all monitoring reports and must participate in five-year reviews of all Records of Decision for the Reservation for as long as CERCLA or follow-on regulations remain in effect.

### Estimated Cost

TDEC costs are now borne by DOE and it is recommended that this practice continue into the stewardship period and be justified as a part of the federal government's perpetual responsibility for Reservation waste.

### Implementation Steps

The implementation steps specific to TDEC's stewardship role will be negotiated under the continuing Federal Facility Agreements.

## 4.3 COMMUNITY STEWARDS

### 4.3.1 Land Use Stewards

#### 4.3.1.1 City of Oak Ridge

The principal authority for land use within the City of Oak Ridge (which includes all of the contaminated land) is vested in the City Council and is implemented through the Oak Ridge Regional Planning Commission. All land that passes out of federal ownership comes under its regulations. The only important exception is the state highway system. Therefore, it is most important that plans be made so that adequate control over contaminated lands is immediately obtained.

### Function

The stewardship function of the city is to exercise its current authority over the contaminated land especially if and when the land passes from federal ownership. To this purpose, it is recommended that the necessary information be captured, before it is lost, in the following manner: (1) a shadow land use zone for waste disposal within the current federal use zone and/or (2) a special plat map within the current federal parcel. These would be prepared by DOE, which would bear the cost of preparation. The plat would be registered with the county. In this manner, the presence of contamination will be entered into the land use planning process. The information would also be incorporated into the State Parcel Mapping System when the city participates.

### Information Required

The information required is the location and nature of the contaminants and any restriction placed on the land. The information is the same as that required by the land registration steward.

### Estimated Cost

The estimated costs of this project are modest and incremental. The data needed is contained in the Oak Ridge National Laboratory Geographic Information System.

### Implementation Steps

The steps needed to implement this function are to prepare the necessary zone and plat information and documents to meet the city's requirements and to make the proper request of the city.

**City Tax Office —** The notation field of the City Tax Office records is frequently used by the city planning office to quickly determine the characteristics of land. At the city's request, it was agreed that this function should be implemented. The implementation details are minor and are left to the city to determine.

## 4.3.1.2 Tennessee Department of Transportation

The Tennessee Department of Transportation can potentially become a steward of contaminated lands during a future road construction project. The risk to construction workers could be high and contaminants could be released in an uncontrolled manner.

### Function

Since the Tennessee Department of Transportation examines the land records seeking the current owners of properties, they will become aware of contamination if it is incorporated in to the sequence of deeds. The Tennessee Department of Transportation will also be using the Tennessee State Parcel Mapping System and will be aware of information in the waste overlay for the Reservation.

### Information Required

The information required for this project is the same as for the Contaminated Land Overlay.

### Estimated Costs

The estimated costs of this project are modest and incremental.

### Implementation Steps

DOE should ensure that contaminant information is placed on the federal quitclaim land deeds and on subsequent land deeds (Section 4.3.2).

## 4.3.2 County Land Records Stewards

The function of these stewards is to preserve all contamination-related documents submitted to them in a manner similar to that currently used for property deeds so they will be found in a property title search. The required documents describing the residual waste and its locations may include: restrictive deeds, legally required notices of waste issued at site closure, waste-related easements, deeds severing surface and subsurface ownership, plat maps, affidavits, and other documents. In addition to placing this information into the county property systems, it is

expected that it will also be placed into the State Parcel Mapping System as a residual waste overlay. Thus, the information will be available to the city, county, and state land use and planning systems as well as realty planners.

#### 4.3.2.1 County Register of Deeds

The County Land Record Stewards are the current Anderson and Roane counties Registers of Deeds.

##### Function

The function of these stewards is to preserve all contamination-related documents submitted to them in a manner similar to that currently used for property deeds so they will be found in a property title search.

##### Information Required

The information required will be property deeds, easements, notices of closure, plat maps, locations of contaminants, restrictions of use, requirements for continued stewardship, affidavits of contamination, etc.

##### Estimated Costs

The registration fees cover the incremental costs.

##### Implementation Steps

DOE should ensure that the necessary documents are prepared and submitted to the Registers offices in a timely manner. The intent to file these notices should be declared in the CERCLA Proposed Plans and all subsequent documents. These documents should also be prepared for Resource Conservation and Recovery Act closures and remedial actions when there is significant residual contaminant.

##### Implementation Steps

The near-term steps DOE needs to take to implement this portion of the stewardship program are to:

1. ensure that the currently issued notices of residual contamination give complete coverage of the remediated operable units, including a notice or affidavit of clean closure.
2. ensure that these notices supply adequate information to fulfill the stewardship responsibilities. This includes: identification and location of the land, location and identification of the residual waste and its probable prognosis, requirements for continuing treatment, maintenance, and monitoring, and any other pertinent information.
3. include these notices in the post-Record of Decision document collection and place in the electronic retrieval systems.

The long-term steps to be taken are:

1. at the time of the watershed "final" Records of Decision, ensure that the land records are complete and accurate.
2. during the after closure phase, ensure that the systems are updated to reflect any changes and are kept operational.

#### 4.3.2.2 County Property Assessor's Office

These County Land Record Stewards are the current Anderson and Roane counties Property Assessors. The information is preserved in the current county mapping system. There is a supplemental function using the State Parcel Mapping System.

##### Function

The function of these stewards is to preserve all contamination-related map information submitted to them by the register's office in a manner similar to that currently used for property deeds that effect map changes. These should be recorded so they will be found by anyone using the county mapping system for land use planning purposes.

##### Information Required

The information is the map-related subset of the information submitted to the Register's office.

##### Estimated Cost

The registration fee covers the incremental costs.

##### Implementation Steps

If the use of the State Parcel Mapping System is realized in the near term, then the DOE effort should be to create the contaminated land overlay. If this does not happen, then DOE should negotiate with the county assessors offices to have the land contamination entered on the current county/state map system.

#### 4.3.2.3 Tennessee State Parcel Mapping System

The State Parcel Mapping System will be the principal tool for managing the county cartographic information comprising property boundaries, roads, utilities, etc. The county system will be a cooperative effort among many users including the City of Oak Ridge. This system will support a contaminated-land overlay or theme.

##### Function

The contaminated-land overlay will make the presence of contamination known to all users of the State Parcel Mapping system.

##### Information Required

The required information is now in the Oak Ridge National Laboratory Geographic Information System and comprises the location and description of all contaminated DOE land.

### Estimated Costs

The estimated costs are modest and incremental. Since most of these functions have some precedent in current practice, there are no serious problems expected. The Oak Ridge National Laboratory Geographic Information System is compatible with the state system. There will be some modest cost associated with the creation of the waste overlay.

### Implementation Steps

Create a residual waste overlay for the Reservation in the State Parcel Mapping System by transferring the required data from the current Reservation Geographic Information System. NOTE: These data are not placed on the property assessor's maps at this time.

## 4.3.2.4 Local Realtors

An effective stewardship program requires (*Stakeholders Report on Stewardship, 1998* for examples of Notices to Buyers). that the purchaser of contaminated land be informed of the presence of the residual waste lest the waste be inadvertently disturbed, exposing humans or the environment. The state currently imposes similar requirements, Notices to Buyers, upon realty transactions, in that the seller must acknowledge to the buyer certain conditions of the property (e.g., the presence of lead). The local realty agents usually perform this function. The extension of this function to include the residual contaminants on the Reservation would ensure that the buyer, having acknowledged receipt of the notice, was aware of the contamination. The state has imposed penalties for non-performance and the procedure is a standard part of realty transactions.

### Information Required

The location of residual contamination on any land parcel that is sold must be identified.

### Estimated Costs

The estimated costs of this project are modest and incremental.

### Implementation Steps

The near-term steps to implement this function are to request the state representative to sponsor a private act in the state legislature making a Notice of Land Contamination a requirement for the Reservation lands within the City of Oak Ridge and to make this requirement a part of the land transfer procedure. There should also be a requirement that all subsequent deeds contain a warning of land contamination. There are no serious obstacles expected. Representative Gene Caldwell has stated he would sponsor such a bill.

## 4.3.3 Document Abstracting and Distribution Stewards

It is important that a selected subset of the Stewardship Repository be made available to the nation's and world's technical audience so that the knowledge gained on the Reservation can benefit all technological waste problems and be available to the public. These stewards, described below, provide access to a selected subset of the stewardship information in a manner totally consistent with current practices.

#### 4.3.3.1 DOE Office of Scientific and Technical Information

##### Function

This technical awareness function will be met if the proper subset of documents is forwarded to the Office of Scientific and Technical Information, which currently indexes, abstracts, and stores a master copy and makes it available to federal workers and contractors. This function also enables redundant storage of the selected subset. The Office of Scientific and Technical Information also routinely forwards documents to the National Technical Information Service for public distribution and the selected subset should follow this practice.

##### Information Required

A selected subset of the perpetual repository suitable for the technical and public audience must be identified.

##### Incremental Costs

Estimated costs for this project are modest and incremental.

##### Implementation Steps

There are no implementation steps other than submitting the proper subset to the Office of Scientific and Technical Information. A checklist should be prepared for this purpose.

#### 4.3.3.2 National Technical Information Service

The public availability function is met by this steward. This function is identical to the current National Technical Information Service function. The Office of Scientific and Technical Information routinely supplies the documents. No implementation problems or costs are anticipated.

### 4.3.4 Public Education Stewards

An effective stewardship program requires that the citizens of the adjacent communities that may be affected by the residual wastes remain aware of the potential hazards and the steps that are being taken to protect them. It is particularly important that young people be as aware of the significance of the posted warning and physical barriers on the Reservation as they are of similar safety precautions in their neighborhoods. Failure of the public to fully appreciate these matters can result in the neglect of some or all of the stewardship functions listed below:

- Funding support
- Unnecessary exposure of individuals to hazards
- Inappropriate use of released lands
- Unnecessary fears of negligible hazards when the protections are properly respected

The following stewards are dedicated to public education and are discussed below:

- Public schools
- Public libraries

There is an additional public education function—the stewardship Internet site—carried out by the principal steward (Section 4.1.9).

#### 4.3.4.1 Public Schools

### Function

The objective of this steward should be to inform students of the presence of contaminated land in their community, its hazards and to inculcate the students with a respect for the protection methods and the necessity of maintaining an effective perpetual stewardship program. The following ideas were discussed with the Oak Ridge Public Schools, but a similar effort should be made in surrounding school systems.

At the primary or middle school level, the stewardship program can be discussed within the environment and science areas, possibly combined with a waste site tour. At the senior level, the concepts of stewardship responsibility can be included in the "civics" curriculum and the technical aspects of stewardship can continue to be discussed in the environmental science and other science classes.

This is an extension of current DOE activities in the support of the schools. Most of the effort falls to the school system and no problems are expected because the Oak Ridge schools are aware of their responsibilities related to this function.

In addition to the public schools, DOE should seek to establish similar programs at the appropriate levels at Roane State Community College and at the University of Tennessee at Knoxville.

### Information Required

Copies of reports, visuals, and other materials that can be used by the schools in the stewardship curricula. The details are to be negotiated with the public schools.

### Estimated Costs

The estimated costs are modest and incremental.

### Implementation Steps

The near- and long-term steps that DOE can take to implement this function are to proactively cooperate with the school systems to help them construct the necessary additions to the curriculum, to supply supporting documents and visuals specific to the Reservation, and speakers as necessary.

NOTE: It is suggested that the Oak Ridge schools be scheduled first, to be followed by other regional schools.

#### 4.3.4.2 Public Libraries

##### Function

The role of the public libraries is very similar to that of the public schools, except that there is an adult component in the intended audience, some of whom are technically trained. The library currently carries out such a function as an extension of its reference facilities.

##### Information Required

The information required should be worked out with the staff of the library but should include appropriate annual status reports, visuals, selected technical reports, appropriate videos, etc.

##### Estimated Costs

The estimated costs of this project are modest and incremental.

##### Implementation Steps

The near- and long-term steps that should be taken by DOE are a proactive role in aiding the libraries to establish the appropriate content and then to supply the libraries with copies of the selected materials. No problems are expected because this is an extension of DOE and the library's current activities.

### 4.3.5 Environmental Resources Stewards

Currently the Reservation environmental resources are managed jointly by the Oak Ridge National Laboratory and the Tennessee Wildlife Resources Agency under the guidance of DOE. Their combined duties include the general management of the Reservation environment and the management of any hunting and fishing that may occur on or adjacent to the site. These duties are well defined elsewhere and will not be repeated here. It is recommended that these duties continue with an in-depth review to be performed at the time major areas of land are remediated and transition into their long-term stewardship status when other recreational activities may become possible.

Several concerns of the stewards about access and trespass are discussed in Sections 4.1.1 and 4.1.8.

##### Function

Substantially identical to current duties until the review date.

##### Information Required

Information regarding access control and allowed uses is necessary.

##### Estimated Cost

These costs can be estimated from the current costs**.** A fee system for the recovery of part of these costs should be considered at the review date.

##### Implementation Steps

None, other than a continuation of current duties until the review date.

# Appendices

# LIST OF APPENDICES

# APPENDIX A

# Summary of Recommendations of the 1998 Stewardship Report

## Recommendations

- DOE (acting as an agent of the federal government) must acknowledge and accept its responsibility as principal steward of the ORR.
- By the end of 1999, DOE should develop a stewardship plan with the cooperation of the implementation and oversight stewards.
- DOE must make stewardship an integral part of all CERCLA decision documents.
- DOE should establish an annual budget for stewardship.
- DOE should request stewardship funding, until such time as independent funding is established, as a line item in annual appropriations.
- Congress should establish a fund that will generate the required annual budget for stewardship.
- DOE should establish a Stewardship Transition Team in 1998 and a Citizens Oversight Board for Stewardship for long-term public involvement in stewardship.
- DOE should identify the stewards required for implementation of the stewardship plan.
- DOE should ensure that all potential stewards accept responsibility for implementation of their portions of the stewardship plan.
- DOE should initiate a Stewardship Coordinating Committee by the end of 1999 with representatives from each organization that has stewardship responsibility.
- DOE should establish a Stewardship Information System.
- DOE should establish a stewardship research program that contributes to better assessments of the exposure and risks of contamination, remedial technologies, and stewardship requirements.
- The Oak Ridge City Council should assign responsibility for the City's oversight of the stewardship program to the Environmental Quality Advisory Board or to a similar group.
- The Oak Ridge City Council should establish any additional land use category(s) required for land used for long-term disposal of "hazardous" wastes.
- The State should add long-term waste disposal and residual waste categories to the list of required "Notice to Buyers."

# APPENDIX B

# About the Stewardship Working Group

# STEWARDSHIP WORKING GROUP

In February 1999, the public was invited to participate in a Stewardship Working Group (SWG; see the list of SWG participants at the end of this appendix). Structure of the SWG was similar to the End Use Working Group (EUWG). A volunteer steering committee assisted in integrating and facilitating committee activities while monthly meetings of the entire SWG maintained the focus of the group. The steering committee also was responsible for integrating committee reports and writing a final report for submittal to DOE after approval by the full SWG. Early on, the SWG established the following goals:

- ensure that DOE takes steps toward an effective stewardship program for the Oak Ridge Reservation;
- promote local involvement in stewardship for the Oak Ridge Reservation; and
- further a national commitment to environmental stewardship across Department of Energy sites.

Since the group was building on work previously done, it was able to quickly form three committees devoted to in-depth evaluation of stewardship costs and funding, steward identification and roles, and information needs for long-term stewardship. The emphasis was on components that are important to stakeholders and that require attention by DOE in the near-term. The SWG committees and the components of stewardship decided upon for study and evaluation are shown in Table B.1

**Table B.1. Committees and their Study Scopes**

| Stewards | Information | Costs and Funding |
|---|---|---|
| • Identification of stewards<br>• Roles of stewards<br>• Flow of information among stewards<br>• Role of a citizen oversight committee | • Types of site information<br>• Preservation of information<br>• Flow of information | • Costs of stewardship<br>• Source(s) of funding<br>• Trust funds |

Each committee was responsible for collecting data and information needed to perform a technical evaluation of the stewardship components by application to the test case of Melton Valley (a 1,062-acre watershed containing all manner of radioactive and chemical waste disposal). The process is shown in Table B.2.

**Table B.2. Stewardship Working Group Process for Evaluating the Components of Stewardship**

| | | | |
|---|---|---|---|
| **Step 1**. Committees select components from Stakeholder Report requiring further evaluation | **Steward Components** | **Information Components** | **Cost and Funding Components** |
| **Step 2.** Components are evaluated against Melton Valley | **Melton Valley Test Case** | | |
| **Step 3**. Committees produce reports on components | **Committee Report** | **Committee Report** | **Committee Report** |
| **Step 4**. Steering Committee coordinates compilation of committee results into Integrated Final Report | **Integrated Final Report to DOE** | | |

The activities of the SWG were supported by the DOE Oak Ridge Operations Environmental Management Program under the auspices of the Oak Ridge Site Specific Advisory Board.

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Johnson, Tyler
Ketelle, Dick
Kopp, Steve
Lever, Claudia
Macklin, Roger
McCoy, Doug
Mosby, Dave
Mulvenon, Norman
Pardue, Bill
Peelle, Bob
Peelle, Elizabeth
Redus, Ken
Schappel, Bert
Sigal, Lorene
Skinner, Ralph, DOE
Smith, Ellen
Tennery, Vic
Washington, Charles
Weeren, Herman

Doug Sarno, of Phoenix Environmental Inc. facilitated the process of developing the report and provided editorial support. Dennis Hill and Julie Pfeffer, Bechtel Jacobs Company LLC provided technical and administrative support. Susan Fisher, Bechtel Jacobs Company LLC served as technical editor.

# APPENDIX C

# Excerpt: FY 2000 National Defense Authorization Act Conference Report

The following is excerpted from the *Congressional Record,* August 5, 1999, page H7855.

## DOE is now required to look at Long-Term Stewardship issues

The conferees direct the Secretary of Energy to provide to the Armed Services Committees of the Senate and House of Representatives, not later than October 1, 2000, a report on existing and anticipated long-term environmental stewardship responsibilities for those Department of Energy (DOE) sites or portions of sites for which environmental restoration, waste disposal, and facility stabilization is expected to be completed by the end of calendar year 2006. The report shall include a description of what sites, whole and geographically distinct locations, as well as specific disposal cells, contained contamination areas, and entombed contaminated facilities that cannot or are not anticipated to be cleaned up to standards allowing for unrestricted use. The report shall also identify the long-term stewardship responsibilities (for example, longer that 30 years) that would be required at each site, including soil and groundwater monitoring, record keeping, and containment structure maintenance. In those cases where the Department has a reasonably reliable estimate of annual or long-term costs for stewardship activities, such costs shall be provided. The Secretary shall attempt to provide sufficient information to ensure confidence in the Department's xxx commitment to carrying out these long-term stewardship responsibilities and to undertake the necessary management responsibilities, including cost, scope, and schedule.

The conferees recognize that in many cases residual contamination will be left after cleanup or will be contained through disposal, and that such residual contamination and wastes will require long-term stewardship to ensure that human health and the environment are protected.

# APPENDIX D

# CERCLA Documents Related to Remediation and Stewardship

## Federal Facility Agreement (FFA)

The Oak Ridge Reservation Federal Facility Agreement is an umbrella agreement signed by DOE, EPA, and TDEC. It contains procedures for the submission and review of documents, schedules of "cleanup" activities, and provisions for dispute resolution. Cleanup priorities and milestones are based on human health and environmental risks and are negotiated annually.

Appendix E of the FFA contains the timetables and deadlines established for submittal of all deliverables, documents, and reports.

## Remedial Investigation (RI)

A Remedial Investigation gathers necessary data to determine the nature and extent of the threat to human health and the environment caused by the release or potential release of contaminants and to support the corresponding feasibility study.

## Feasibility Study (FS)

A Feasibility Study identifies, evaluates, and develops remedial action alternatives to prevent and/or mitigate the migration of contaminants.

## Proposed Plan (PP)

A Proposed Plan describes the recommended remedial actions and presents DOE's preferred alternative.

## Record of Decision (ROD)

A Record of Decision is the final remedial action plan. It must contain the basis and purpose for the selected remedy, a summary of the problem(s) at the site, an analysis of the alternatives evaluated, an explanation of how statutory requirements were met, and a summary of responses to public comments received on the PP, RI/FS, and other documents in the administrative record.

## Administrative Record

The Administrative Record consists of technical and decision documents leading to a Superfund decision. The database of CERCLA documents that can be accessed electronically by EPA, TDEC, DOE, and the public. Hardcopies of the documents are made upon request. The current index to the Administrative Record and the documents are available at the Information Resource Center, 105 Broadway Avenue, Oak Ridge, telephone (423) 241-4582.

## Remedial Action Plan (RAP)

A Remedial Action Plan follows the ROD and describes the remedy selected for "cleanup" of a site.

## Remedial Design Work Plan (RDWP)

A Remedial Design Work Plan (RDWP) is a detailed set of plans and specifications for implementation of the selected remedial action. It describes how the CERCLA Applicable or Relevant and Appropriate Requirements (ARARS) will be met.

## Remedial Design Report (RDR)

A Remedial Design Report provides executive summary level information on the design(s), drawings, and specifications for the selected remedial action.

## Remedial Action Work Plan (RAWP)

The Remedial Action Work Plan lays out the remediation schedule and references ARARs described in the RDWP. It discusses changes/additions identified during the design process and lists any and all other plans needed to perform the remedial action.

## Remedial Action Report (RAR)

A Remedial Action Report describes the remediation activities and any deviations from the interim ROD. Any waste management and transportation activities are included. As required, operations and maintenance plans and monitoring schedules are described.

## Remediation Effectiveness Report (RER)

The annual Remediation Effectiveness Report presents monitoring data required under CERCLA for completed remediation actions.

## Five-Year Review

The five-year review, required under CERCLA, evaluates the implementation and performance of a remedial action. It determines if the remedy is protective of human health and the environment and it may recommend a remedy be reevaluated when a contaminant source or pathway has not been sufficiently addressed.

## Public Involvement Plan

A Public Involvement Plan for the Reservation was prepared by DOE in accordance with the CERCLA and the FFA. It specifies community activities DOE expects to undertake during the remediation. It ensures the public opportunities for involvement in site-related decisions, including site analysis and characterization (RI/FSs), and alternatives analysis and selection of a remedy (PPs). The current plan (November 1997) does not include public involvement in five-year reviews.

# APPENDIX E

# Reports of Steward Interviews

# INTRODUCTION

These interview reports are a summary of discussions with potential ORR stewards. They contain detailed information that may be of interest to implementers especially the names and phone numbers of the individual interviewees who have been introduced to the stewardship concepts. In so far as possible the interviews are in the same order as the description of the stewards' functions provided in Chapter 4.

These interviews have been carried out to determine the best manner in which the individual local steward can support the stewardship plan proposed in the Stakeholders Stewardship Report, to ascertain the existence of any barriers and incremental cost, and to ascertain the willingness of the steward to participate. The interview proper is augmented by the types of information to be processed by the steward, any significant incremental costs, and any actions required to implement the function by the steward and DOE as well as comments by the interviewer. They also include notes where attention by other Stewardship Working Group (SWG) committees is required.

# 1. THE PRINCIPAL STEWARD — DEPARTMENT OF ENERGY

## 1.1 INTERVIEW WITH DOE/EM MANAGEMENT

### Regarding Information Management by the Principal Steward, A. A. Brooks Interview with Lester Price (576-0730) and Margaret Wilson, both of DOE/ORO/EM

### 1.1.1 Stewardship Web Pages

Les and Margaret agreed that the concept of a set of stewardship web pages should be considered as a portion of a stewardship program. These web pages would contribute to public outreach, would be an extension of the current EM Home Page, and would describe and support the concept of stewardship. Possible contents of the pages could be: stewardship concepts, the ORR stewardship system, progress toward cleanup, links to existing related pages and maps, monitoring summaries, etc. Much of this could be in concise tabular form.

ACTION REQUIRED: DOE would have to extend the function of the EM Home Pages by defining their content. The links to other pages are simple to implement and most of the other material is available in machine-readable form that can easily be edited into web pages with a modest effort.

INFORMATION REQUIRED: The web pages should comprise information (maps, fact sheets, progress reports, summaries) of a summary nature to keep the public informed of the current status of the contaminated land and the need for continued stewardship.

INCREMENTAL COSTS: There are nominal incremental costs associated with the web pages.

## 1.1.2 Stewardship Long-term Repository

Les and Margaret agreed that the long-term repository is a necessary stewardship concept that DOE will be considering. It was considered equivalent to the current Administrative Record and post-Record of Decision (ROD) document collection augmented by the "as built" information necessary for the discharge of the future stewardship responsibilities. If adopted, there would need to be a thorough review of the information required and the means of its preservation.

At the Information Committee meeting (6/16/99 - IRC) with a large number of members of the DOE & M&I information managers, it became apparent that the retention of information in a manner that would meet the needs of stewardship was fully possible under the existing programs. It was agreed that the needs and scope of stewardship needed to be defined to ensure that the scope and retention requirements of stewardship documents would be met. Further, it became apparent to this interviewer that the necessary trained staff and procedures were currently in place and that it would be an error to establish a separate stewardship repository at this time. (This is a change from my previous position. AAB)

INFORMATION REQUIRED: The repository should comprise all the information that may become relevant to the stewardship of the contaminated lands, including any further future remediation and maintenance.

ACTIONS REQUIRED: DOE should establish the stewardship repository within the framework of the current DOE-ORO repositories to take advantage of the trained staff and existing procedures and provide for its perpetual care including media rejuvenation as needed. This includes a review of stewardship needs and formally establishing the stewardship repository in terms of the existing repositories as well as ensuring that the needs of stewardship are reflected in the electronic access methods.

## 1.1.3 Stewardship Transaction Database

After discussion of lapses in the current system to retain and record the existence of some documents, it was agreed that a transaction database system could reinforce the current manual system and ensure an automated notice to stewards that their actions were necessary. It could also document that crucial actions were indeed carried out and would provide a searchable record of the critical steps in the stewardship process. This would be particularly useful when the ORO/EM corporate memory is retired.

INFORMATION REQUIRED: The transaction database serves as a searchable tracking system for the remediation and stewardship process. The transaction database should document the initiation and completion of all significant steps in the cleanup and stewardship process of all significant operable units. Each transaction should initiate any subsequent actions that should be taken at that time.

ACTION REQUIRED: DOE needs to specify, design, and establish the transaction database system. (See the Stakeholders' Stewardship Report for a prototype.)

INCREMENTAL COSTS: There are incremental costs associated with the transaction database.

For all three of the above topics, it was agreed that the Stewardship Working Group should develop more detail associated with the concepts and include them in their submission to DOE.

NOTE: The Information Committee should determine the detailed information necessary for these functions. See above for some suggested information.

## 1.2 INTERVIEW WITH RALPH SKINNER AND JULIE PFEFFER

**By Bob Peelle and A. A. Brooks — June 30, 1999**

Julie Pfeffer has been appointed as the Bechtel Jacobs Stewardship Manager (a welcome addition).

DOE/ORO/EM is formulating a plan for the interface and interaction of a Long Term Stewardship program with the ROD and post-ROD activities so that there will be a smooth segue from the remediation phase into the perpetual stewardship phase (see Fig. C.1). A great deal of time was spent exploring how this would function. DOE accepted a number of comments for the interviewers. Although there is a great deal of detail to be defined, the interview found no inconsistencies in the plan with the SWG current thinking. The following is a brief description of the current draft of the plan.

The National EM LTS and the SWG input will be used to structure an ORO/EM LTS plan along with any applicable input from GJO. The LUCAP requirements and the ORO/EM LTS plan will set the total stewardship requirements for an integrated ORR Stewardship Program as well as all the project RODs and post-ROD activities through the periodic Remediation Effectiveness Review (RER) review steps. This plan will be applied to each project as it is initiated and will culminate in a unified, perpetual Long-Term Stewardship Plan for the entire reservation. As experience is gained in the earlier projects including their stewardship phases, it will feed back into the planning for subsequent projects and into the ORO LTS itself. This feedback mechanism will become the feedback of long-term monitoring into the long-term maintenance program. LUCAP continues on into the perpetual stewardship era. Formal reviews will occur initially at five-year intervals but projects will be included in them on an “as-needed” basis. Public input is provided (1) by the SWG input to help define the process, (2) by input at the normal CERCLA hearings on each project, and (3) by input into the five-year review process. The framework proposed by DOE/ORO/EM appears capable of including any reasonable details. Attached to this interview is a rendition of the DOE plan including the ideas discussed in the interview.

The interview then turned to the SWG report outline in a search for discussion topics. Only one topic turned up, The Use of Buffer Areas. The SWG had been thinking of scenarios in which the surrounding land had reverted to one of a variety of uses in the distant future while DOE had thought of the present scenario to determine the need for buffer zones. Both scenarios were pursued with the conclusion that the need for buffers will be time dependent as attenuation occurs, as remediation benefits are realized, as surrounding land is diverted to future uses, on the effectiveness of physical barriers and signage, and on the level of surveillance. It was agreed that the alleviation of access problems should be specified early in terms of risk and performance to be turned into practice at a later time.

We agreed to keep Ralph informed of our thinking and he agreed to inform us if he saw any problems or inconsistencies.

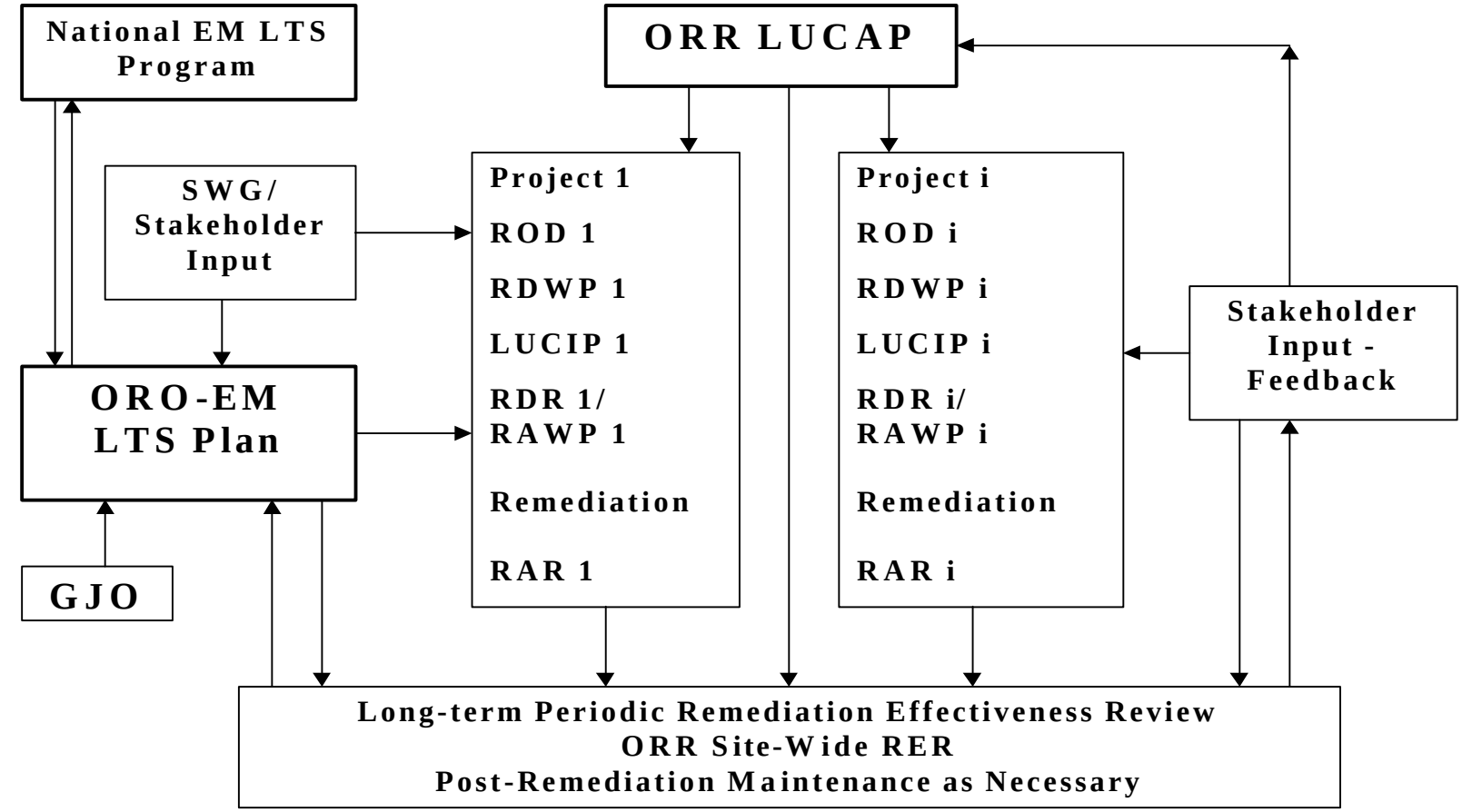


**Figure E.1. Interaction Diagram for DOE/ORO/EM LTS Plan with the Post-ROD Processes.**

## 1.3 DOE REALTY OFFICE

This was a phone interview with Ms. Caty Kates, who is the current DOE Realty Officer responsible for preparing the Land Notices required in the RODs. She provided two examples of notices, one for contaminated groundwater at the South Campus and one for asbestos in a Y-12 landfill. Apparently this office in not in the EM mainstream and has been filling certain requirements unknown to the EM program. However, not all required notices are being filed or at least have not been found in the Register's Office by TDEC except repeated searches when they were found in another section of the archives.

## 1.4 DOE DOCUMENT MANAGERS

### 1.4.1 General Document Management and Stewardship Repository

Attendees: Dick Ketelle, Cathy Marciante, Charlie Earlywine, Andrea Masvidal, Rodger Holt, Julie Pfeffer, Hossein Ghodrat, Barbara Kron, Paula Cox, Ralph Skinner, Lorene Sigal, Al Brooks

At the Information Committee meeting (June 16, 1999 – IRC) with a large number of members of the DOE and M&I information managers, it became apparent that the retention of information in a manner that would meet the needs of stewardship was fully possible under the existing programs. It was agreed that the needs and scope of stewardship needed to be defined to ensure that the scope and retention requirements of stewardship documents would be met. Further, it became apparent to this interviewer that the necessary trained staff and procedures were currently in place and that it would be an error to establish a separate stewardship repository at this time. (This is a change from my previous position. AAB)

### 1.4.2 Repository Needs

INFORMATION REQUIRED: The repository should comprise all the information that may become relevant to the stewardship of the contaminated lands, including any further future remediation and maintenance.

ACTIONS REQUIRED: DOE should establish the stewardship repository within the framework of the current DOE-ORO repositories to take advantage of the trained staff and existing procedures and provide for its perpetual care including media rejuvenation as needed. This includes a review of stewardship needs and formally establishing the stewardship repository in terms of the existing repositories as well as ensuring that the needs of stewardship are reflected in the electronic access methods.

# 2. THE REGULATORY STEWARDS

## 2.1 ENVIRONMENTAL PROTECTION AGENCY: REGION 4 FEDERAL FACILITIES BRANCH — JUNE 30 1999

### Interview with Ed Carreras by Bob Peelle

The purpose of the interview was to learn the interviewee's thoughts about the role of the Environmental Protection Agency (EPA) with respect to long-term stewardship of the Oak Ridge Reservation (ORR).

The EPA would have a continuing interest in the site under CERCLA if laws do not change too much. The Federal Facilities Agreement (FFA) could have a shorter life if one of the parties (DOE, TDEC, or EPA) decided to terminate it, or if the agreement is "satisfied" by completion of remediation activities and a finding that all remedial action objectives have been met. In the case of FFA termination, EPA's activities would proceed under CERCLA, presumably in a less coordinated manner. All remediated sites where contamination was left in place at levels that did not allow for unrestricted access and unlimited exposure under CERCLA must be monitored.

As remediation construction work is completed, the present annual RER is expected to become a five-year site-wide comprehensive review. The three FFA parties are revising the content of the RER such that DOE will essentially complete a "five-year review" annually. This annual reporting may change to the more typical five- year reporting cycle after all (or most) of the remediation projects are completed. EPA is now working on in-house review of a draft guidance document ("Comprehensive Five-Year Review Guidance," dated April 1999) from EPA headquarters covering such reviews. Study teams would thoroughly review results, communicate with the public, and determine whether site remediation is performing satisfactorily. (The SWG Stewards Committee should try to obtain a study copy from ORO.) Corrective actions could be initiated, and by inference any unnecessary precautions could be abated. (?) Under the FFA, the RER is a "primary document" that is subject to review and approval by TDEC and EPA. This report is available to the public at the IRC. DOE, EPA, and TDEC are discussing giving an annual presentation to the SSAB or to a sub-committee to present the results of the RER.

Should nuclear activities of DOE come under external regulation, for example by NRC, remediation construction efforts might have to be modified; however, under CERCLA the scrutiny of the remediated site would still be controlled by EPA/TDEC.

The primary role of the LUCAP would be to give visibility to required land-use controls.

Ed was unsure about any possible role of EPA with citizen oversight of stewardship or how such a role might be impacted by FACA. However, Ed and I decided that the public-input aspects of a comprehensive five-year review might mesh with citizen oversight at the review intervals. (This is a motivation for SWG study of the EPA draft guidance.)

# 2.2 TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION: TDEC/DOE-O — JUNE 24, 1999

## Interview with Earl Leming et al.

Present were Earl Leming, John Owsley, Doug McCoy, and Randy Young, all from TDEC DOE-O. Stewards Committee members present were Alfred Brooks, John Griess, and Bob Peelle.

(NOTE: The statements below are what the recorder believes was intended, subject to review.)

Peelle suggested that the principal topics of interest for this interview are:

1. The role that TDEC or a successor state agency can expect to play in the era when the main issues become stewardship; that is, when the planned remediation is complete and satisfactory and attention turns to maintenance and effectiveness reviews.
2. The public oversight role during that period, when the statutory status of public involvement is presently murky.

Relative to Question 1, assuming statutes are not greatly changed, TDEC expects strong involvement in CERCLA remediation. Relative to both points, Earl, Doug, and sometimes John and Randy made the following points:

a. There is no automatic termination of the Federal Facilities Agreement so long as contamination and a threat to human or environmental health remain. This assures access to monitoring data, input on monitoring plans, and input on levels of monitoring and maintenance on CERCLA sites.

b. The strength of the DOE-O depends on pressure by state government, and indirectly on community support. Up to now the costs are borne by DOE, and the state has no commitment to continue the current level of locally based attention on its own. AAB pointed out that the TDEC stewardship function and funding could be considered as part of the federal government's perpetual responsibility for waste on the ORR; everyone concurred. Support by the state to obtain funds has been strong since 1983 or so, even before the Tennessee Oversight Agreement was signed. (By implication, the SWG must consider DOE-O as a stewardship cost.) [Query: Does DOE also support EPA Federal Facility Branch costs?] RWP commented that the access to data guaranteed by FFA would be meaningless without staff interest and expertise to interpret the data. Everyone present concurred.

c. The Natural Resources Trustee status of the Commissioner of TDEC also provides authority for the state to obtain access to data. TDEC also has authority under the state environmental laws such as the Clean Water regulations.

d. DOE-O obtains authority over handling of radwaste at CERCLA sites through FFA. If DOE were to become regulated by NRC, coverage on nuclear matters would likely shift to the TDEC Division of Radiological Health. Thus, the current TDEC DOE/O involvement would likely be spread more widely.

e. Relative to the citizen role in oversight, Earl did not directly address whether he thought a strong role would be necessary. He agreed that a citizen group could be attached to the state effort. He asked if this would be different from LOC. (RWP: We need to share our thoughts on citizen oversight with Earl before they are finalized.)

f. The discussion turned to a third topic, the current needs for stewardship organization at DOE/ORO. (The discussion recognized that organizational attention to this topic is increasing.)

g. Doug noted that DOE-ORO not only needs to plan, but needs (now) to develop an infrastructure capable of a correlated response to current stewardship actions for areas where actions have been completed. Otherwise, no one would be aware whether past commitments are being met. Brooks noted that the transaction database we proposed in part played the role of a commitment database. (As envisaged by the 1998 Stewardship Committee, everybody would know when actions are completed.)

h. It was agreed that how the Ralph Skinner position responsibilities develop will be important. There was diverse opinion as to the ultimate role of this position. FOLLOW-UP: Al Brooks has contacted four/five levels of DOE/ORO/EM management and has been assured that it is the goal of DOE that this position is intended to produce and implement an ORR stewardship plan.

i. The recorder noted assent to the underlying position of the SWG that ROD commitments on stewardship are important.

# 3. THE LAND USE STEWARDS

## 3.1 THE CITY OF OAK RIDGE

### 3.1.1 City Planning Staff — June 11, 1999

#### Interview with Bill Issel and Kahla Gentry, City of Oak Ridge Department of Community Development, by Al Brooks and Ellen Smith

GOAL: The Community Development Department provides professional staff support for the planning and zoning functions of the Oak Ridge Regional Planning Commission. The goals of this interview were to identify information needs related to future land use planning and zoning that the stewardship information system should be designed to meet and find out whether and how the city could establish new zoning categories for lands subject to contamination-related land use controls.

INTERVIEW: The interview addressed several topics:

1. **Deed records.** Mr. Brooks explained the expected process for including information about contamination in the deed record filed with the county register of deeds and said that a data repository would be established for information on site conditions and contamination. Mr. Issel stated that the deed record would provide sufficient notice to a prospective purchaser of the affected land, but noted that it would not be effective in notifying a present land owner who was considering changing the land use. He also recommended that the deed record should refer the user to the data repository for more information. Mr. Brooks asserted that it would do so.

2. **Land parcel records used and maintained by the City.** The City currently maintains several types of records related to land parcels. These include zoning records, a zoning map, and subdivision plats. Subdivision plats are on file at the city's offices and in the office of the register of deeds; the plat map is one place to record waste management information. Mr. Issel stated that it is not necessary to subdivide a parcel to create a new plat map; plat maps can be created for special purposes, such as the closure, cleanup, or formal delineation of a waste site. The city expects to transfer its land records to a geographic information system (GIS) within the next few years (dependent on funding) and plat maps would be included in the GIS. However, Mr. Issel noted that the GIS record is unlikely to include all of the notes marked on a plat map. Ms. Gentry said that City staff is currently working on setting up a database for land parcel information. The data structure for land-use information is expected to be based on a land-use classification system being developed by the American Planning Association. Land-use plan information will be included in the new system, and the GIS could reference both to the deed record and to the data repository.

3. **New zoning categories.** Both Mr. Issel and Ms. Gentry said there should be no difficulties in creating new zoning categories for waste management areas. This probably could be established either as a base zone (comparable to "Residential" or "Industrial") or as an

overlay zone (overlaid on a base zoning district). The merits of these two alternative approaches would need to be studied. Application of new zoning categories to DOE lands would, however, require DOE's cooperation. The City cannot rezone or replat land without a request from the property owner, so DOE would have to formally request that a parcel be replatted to reflect the boundaries of a waste site and rezoned to a waste management category. Mr. Issel noted that DOE or another property owner might object to a proposed rezoning (as a "taking") if they perceived that the zoning designation reduced the property's value more than the actual conditions of the property warranted. Mr. Brooks pointed out that the city records should be considered as merely recording the condition of the land and its restrictions that were imposed by federal laws and thus would not in any way be a "taking."

4. **Value of including waste-related information in City tax office records.** Ms. Gentry said that the city staff relies heavily on the city tax records as an information resource, even if the public does not. These records are available electronically for city staff, so this is a primary source of information on properties within the city. Mr. Issel noted that both the city's future GIS (when established) and the state parcel mapping system probably will be built from the existing tax records database. Therefore, they recommended that contamination information should be included in the city's tax records in addition to being recorded with the register of deeds.

5. **Information requirements to support future City land use decisions.** Ms. Gentry asked about the types of information that would be included in the data repository. Specifically, she wanted to know whether there would be information on expected waste inventory over time as result of continuing radioactive decay. She noted that the City would need people with technical capabilities to evaluate the waste inventory information, and she said that there would be a need for a good synopsis of the data for a site in order to inform future decision-makers.

6. **Monuments to mark contaminated properties.** The City has specific minimum requirements for concrete monuments to mark the corners of plats. The City staff members suggested that, to ensure permanence, the marking of contaminated properties would require much more substantial monuments than are needed for routine subdivision plats (the marking of which is more stringent than the marking of individual properties within the plat). For example, they suggested that it might be a good idea to include brass plaques in the concrete monuments. Mr. Brooks noted that global positioning system (GPS) tools would reduce the need for monuments in the future, since GPS data could be used to locate buried waste based on the recorded position coordinates.

INFORMATION REQUIRED: Contamination information recorded on City property tax office records, as well as with the county registers of deeds. Data repository to include information synopses appropriate for the needs of local land-use decision-makers. When the City GIS is established or the State Parcel Mapping System is adopted, transfer of Oak Ridge National Laboratory (ORNL) GIS data for the contaminant overlay to the State system.

ACTION REQUIRED: DOE must request rezoning and creation of special plat maps for areas where contamination is present (or where the presence of contamination on adjacent property makes it necessary or desirable to restrict future land use).

## 3.1.2 Oak Ridge Tax Office

### Interview with Ms. Kay Gonzales by A. A. Brooks

GOAL: To determine how the stewardship program might best use the function of the City Tax Office to provide redundant information on the presence of contaminated land.

INTERVIEW: Ms. Kay Gonzales (482-8300) Ms. Gonzales confirmed that the annotation field of the city tax records could be used to note the presence of contamination. She also stated that there would have to be an extra effort made to acquire that information from the counties or from the state records. The City Tax Office now receives the Anderson County and Roane County information by different routes, one involving the state. She also stated that their records were not as extensively searched on land transfers, as were the County records. In spite of all this, Ms. Gonzales was quite willing to participate if it should be necessary.

In a subsequent interview with Bill Issel and Kahla Gentry, it was stated that the City planning staff frequently used this file as a source of information. It was agreed that this use justified the recording of information in this record.

RECCOMENDATION: The notation field city tax records should record the presence of contamination on a land parcel. The details of this are to be established with the city.

## 3.1.3 Oak Ridge Environmental Quality Advisory Board

### Possible role of Oak Ridge EQAB in stewardship program; interview by Ellen Smith

The Environmental Quality Advisory Board (EQAB) is appointed by the Oak Ridge City Council and its official function is to advise the City Council on matters related to environmental quality in the city. Historically, this has included initiatives brought to the Board's attention not only by City Council, but also by EQAB members, citizens, city staff, and others. EQAB's work plan (approved annually by City Council) has authorized this broader latitude.

EQAB has established a record of continuity and relative longevity. The board was first established as a temporary board in 1970 (it was made permanent in 1973), before environmental contamination was a significant community concern. The board has met monthly for essentially its entire existence. There has seldom been any difficulty in finding citizen volunteers to serve, and a significant fraction of board members have always had some sort of technical background. There are twelve members (including two high school students who share a single voting membership), most of whom are appointed for three-year terms (one-third of which expire each year).

Review of reports and other information and investigation of public concerns related to environmental conditions on federal land within the City (which includes all known contaminated areas on the ORR, but not the off-site contamination in Watts Bar Reservoir) is within the scope of EQAB's historic activities and current work plan. Thus, long-term overview of ORR-contaminated lands, review of annual reports, and evaluations of the site itself would not require an expansion of EQAB's scope.

One potential limitation on EQAB's oversight role is that environmental conditions on federal land are not the board's sole focus. Furthermore, historically there has been some reticence to aggressively pursue concerns about environmental aspects of federal lands and activities, except where those activities were perceived to affect nonfederal portions of the city. Several reasons appear to exist for this reticence: (1) the city's deference to federal government sovereignty; (2) city officials' concern that criticism of federal authorities by EQAB might jeopardize economically important programs and projects; and (3) in the past few years, a deliberate choice to focus EQAB's agenda more on locally generated issues because the activities of the Local Oversight Committee (EQAB is represented on the LOC board of directors) and Site-Specific Advisory Board have been perceived as reducing the need for EQAB's involvement in federal issues.

As a city advisory board, EQAB does not have any special status with respect to DOE (the principal steward). Indeed, since the establishment of the SSAB, DOE has shown diminished interest in interacting with EQAB and responding to the board's inquiries and comments. For a period of several years, however, DOE-ORO has assigned a staff member to coordinate DOE's interactions with EQAB. Several DOE staff members have served in this role at different times. This assignment has typically been a minor part of the staff member's job, primarily involving facilitation of communications between EQAB and DOE.

Another possible source of difficulty for EQAB in providing stewardship oversight is the board's limited resources (both money and staff). Board members are not compensated for their service. City support for the board's activities is in the form of limited staff support and administrative support from the Community Development Department. EQAB has no budget for information acquisition or publicity, and the City does not currently have any staff members assigned specifically to environmental matters.

Although all of EQAB's meetings and activities are open to the public, public visibility is a potential problem for an expanded role in stewardship. Formerly, EQAB's activities were well publicized by the local newspaper, but since the early 1990s there has been little media attention to the board. As a result, Oak Ridge citizens are less aware of the board and are, therefore, substantially less likely to bring matters to the board's attention. Also, it requires special efforts on the part of board members to publicize efforts and programs that the board wants to publicize. This reduced media coverage is not unique to EQAB, but is related to larger trends in society, and likely will be a challenge for any public oversight board.

## Conclusions

1. EQAB could carry out most or all of the proposed oversight functions and has a good chance of providing the organizational continuity required for effective stewardship.

2. To ensure effective representation for stakeholders outside Oak Ridge and to overcome the City's historical reticence about EQAB's addressing matters involving federal lands, an effective stewardship oversight role by EQAB would require an explicit expansion in EQAB's charter to direct the board to address stewardship and to consider concerns related to areas outside the City's boundaries.

3. Other matters would always compete with stewardship for EQAB's attention. (However, the board's broad charter also helps assure its continuity, relative to a single-purpose board that

might have difficulty maintaining the necessary level of interest during periods when there are few issues for the board to address.)

4. The board likely would require some additional resources to effectively carry out its stewardship responsibilities and publicize its efforts and findings.

5. To effectively provide oversight for stewardship, EQAB probably would need some sort of formal recognition or designation from the principal steward (presumed to be DOE).

6. New strategies may be needed to promote public awareness of stewardship oversight activities, regardless of what entity is responsible for the citizen oversight function.

## 3.2 TENNESSEE DEPARTMENT OF TRANSPORTATION

### Interview on May 27, 1999, with Hal Clemmons and Harold Jackson of the Tennessee Department of Transportation by A. A. Brooks

GOAL: To determine how the Tennessee Department of Transportation (DOT) would become aware of contamination of land being considered for highway construction.

INTERVIEW: Hal Clemmons (423-574-9384) DOT Knoxville (Design & Engineering). DOT searches the County register records for the current owner of a land parcel and thus might not find a notice of contamination unless it were on the latest deed. This would be corrected if the contamination notice or, at least its existence, were made part of the deed. DOT will also be using the Tennessee State Parcel Mapping System and would be expected to become aware of any contamination overlay in the system.

Harold Jackson (1-615-741-2613) DOT Nashville (Environmental Office). This DOT office runs down every clue about the existence of contamination using field studies. In the case of Roane and Anderson counties, the reputation would cause a thorough examination of the record including the registered documents. They will be using the State Parcel Mapping system but rely heavily on their own GIS system. Their concern would be more for workers than for travelers. DOE should consider asking DOT to place the contamination overlay in the DOT system.

# 4. COUNTY LAND RECORD STEWARDS

## 4.1 COUNTY REGISTER OF DEEDS

### 4.1.1 Anderson County

#### Phone Interview with Rick Meredith on April 27, 1999, by Al Brooks

GOAL: The interview goal was to determine how best the Register's office could maintain in the deed registry a record of waste disposition and resulting land restrictions.

INTERVIEW: Since Mr. Meredith had been interviewed before by Josh Johnson, this interview was restricted to confirming the following details:

1. The AC Register's Office operated under the same rules and procedures as the Roane County office. Deed information is transferred to the Property Assessor's office to be entered into the Anderson County mapping system.
2. Descriptions of the land in the form of affidavits, waste notices, and deeds (with restrictions as needed) can be registered. He believes the some waste notices are required by law and sees no reason why DOE contaminated land could not be under such a requirement.
3. He sees no barrier to accomplishing the objectives of stewardship in his office.
4. He referred questions about the State Parcel Mapping System to Vernon Long at 457-6225

INFORMATION REQUIRED: Land deeds with deed restrictions as needed, affidavits, and other related documents describing contaminants and their locations, maps for registration, and other land-related documents.

ACTION REQUIRED: None by steward. DOE must issue and register affidavits, deeds, and other appropriate documents when appropriate. Affidavits describing contaminated lands should be issued now.

### 4.1.2 Roane County

#### Interview with Marlene Henry on April 23, 1999, by Al Brooks and Bob Peelle

GOAL: The interview goal was to determine how best the Register's office could maintain in the deed registry a record of waste disposition and resulting land restrictions.

INTERVIEW: Discussions with Ms. Henry (1-423-376-4673) revealed that any legal documents related to property meeting conditions (signature, notarized) can be registered. This includes deeds (with restrictions as needed), affidavits, contracts, mortgages, notices of the presence of contamination (see attached notice registered by TDEC), etc. She suggested that an "affidavit" seemed appropriate to stewardship needs.

Documents are indexed by the name or names of the grantor, grantee, owner, etc. An affidavit would refer to the court decree filed at the time of condemnation, and that paper would be stamped to refer to the affidavit. This forward and reverse referencing ensures that all documents pertaining to a land parcel may be found in a title search. The documents are retained in perpetuity.

A copy of each deed is forwarded to the Property Assessor and entered into the (presently hand-drawn) county mapping system and thence to the state system on Mylar, which is updated every two years. Microfiche of county map updates are registered, although the county owns no reader.

ATTACHMENT TO REPORT: Notice of Hazardous Substance Site. Date: 1/5/89. We must learn whether law requires such notices, and under what circumstances they may be formulated and registered. Note that Marlene Henry recalled this example and suggested its importance!

FOLLOW-UP REGARDING WASTE NOTICE: Mr. Earl Leming, Director, TDEC/ORO, stated that TDEC could issue a Waste Notice, which places land on the Tennessee Contaminated Property list but this had not been done with DOE land as it was on the NPL (Superfund) list. He stated that this could be done for the DOE ORR and notice of RCRA closures of ORR landfills had been filed with the register of deeds. Mr. Leming is seeking examples of such documents.

## Interviewer Conclusions

In the opinion of the interviewers the most effective route to the recording of essential data is to have DOE register an affidavit describing each contaminated area providing the essential stewardship information and referencing other documents for detail. A new affidavit could be registered as conditions change, but each would be preserved. If the land is ever transferred, information could be on the deed

SUGGESTED FURTHER ACTIONS: Study the registered court decree covering the reservation. Determine whether there is any valid reason DOE might hesitate to offer such an affidavit (on a “best efforts” basis).

NOTE: The Information Committee should determine the content of an affidavit (or other document including a restricted deed) describing the land contamination.

INFORMATION REQUIRED: Land deeds with deed restrictions as needed, affidavits, and other related documents describing contaminants and their locations, maps for registration and other land related documents.

ACTION REQUIRED: None by steward. DOE must issue and register affidavits, deeds, and other appropriate documents when appropriate. Affidavits describing contaminated lands should be issued now.

# 4.2 OFFICE OF THE COUNTY PROPERTY ASSESSOR

## 4.2.1 Anderson County

### Interview with Vernon Long on April 29, 1999, by Al Brooks

GOAL: The interview purpose was to understand the Anderson County Property Assessor's maps to judge how to add the description of contaminated land into the present or future system and to determine the interest in the State Parcel Mapping System.

INTERVIEW: Vernon Long, Anderson County Property Assessor (457 6225), reaffirmed the information found at the Roane County Property Assessor's Office. The two offices operate much the same. The required information and actions are identical. We also discussed the State Parcel Mapping System and his remarks are included under the interview topic. See the required actions under that interview.

INFORMATION REQUIRED: Deed information acquired through the register of deeds, contaminant information corresponding to the affidavits or other documents. When the State Parcel Mapping System is adopted, transfer of ORNL GIS data for the contaminant overlay of the State system.

ACTION REQUIRED: No new action by steward other than to maintain the waste overlay. DOE must make the waste overlay available to the Property Assessor.

## 4.2.2 Roane County

### Interview with Barbara Normand and Melvin Moore of the Roane County Property Assessor's staff on April 23, 1999, by Al Brooks and Bob Peelle

GOAL: The interview purpose was to understand the Roane County Property Assessor's maps to judge how to add the description of contaminated land into the present or future system.

INTERVIEW: Discussions with Barbara Normand and Melvin Moore (1-423-376 4362) (in the absence of office-holder Teresa Kirkland) revealed that the County System will likely transfer from the current paper system to a computerized system when financial and other arrangements are complete. The proper persons, Teresa and mapper Danny Smith, were in a training class and will be contacted later. However, the current paper system could accommodate a "contaminated site" map if DOE would supply the necessary information. The information would be added to the county base map and progress to the state's Mylar map on the regular two-year update cycle. The additions to the map would have to correspond to the registered affidavit. The new computerized system, the State Parcel Mapping System, could accommodate the contamination information in a "contaminated site" overlay. The mapping system is in the requirements definition stage of planning. Meetings between Anderson and Roane counties are just starting.

### Interviewers Conclusions

DOE should introduce its requirements into the process and its data into the new system. DOE should plan to update the State System as needed. No real obstacles appear to exist but DOE should fund any extra effort for Roane County. Information about the plans has been conveyed to Marianne Heiskel, Chuck Moons, and Dave Carden with the suggestion that DOE participate in the planning meetings. DOE should be encouraged to participate to ensure that the new system comes to fruition.

SUGGESTED FURTHER ACTIONS: Al Brooks might attend a map-planning meeting to indicate the citizen interest. Try to find a current map that contains any qualifying information. Does the DOE reservation show at all on the present Roane property maps?

NOTE: (1) The Information Committee should determine the minimum content of a contaminated site map to be filed with the county property assessor's office. (2) The Information Committee should detail the information to be stored on the "base map" (site and watershed boundaries) and stored on a "contaminated land" thematic overlay.

On April 30, 1999, Teresa Kirkland (Roane County Property Assessor at 1-423-376-4362), confirmed that Roane County is planning to convert its mapping functions to the State system. She is very enthusiastic to have the cooperation of DOE and sees no barrier to the stewardship functions. See further discussion under the State Parcel Mapping System interviews.

INFORMATION REQUIRED: Deed information acquired through the register of deeds, contaminant information corresponding to the affidavits or other documents. When the State Parcel Mapping System is adopted, transfer of ORNL GIS data for the contaminant overlay to the State system.

ACTION REQUIRED: No new action by steward other than to maintain the waste overlay. DOE must make the waste overlay available to the Property Assessor.

## 4.3 TENNESSEE PARCEL MAPPING SYSTEM

### Phone Interviews with Participants in the State Parcel Mapping System by Al Brooks

GOAL: The interview goal was to determine how best the State Parcel Mapping System can participate in the information component of a stewardship program, to ascertain the existence of any barriers, and to ascertain the willingness of the local participants to participate further in such a program. To this end, the objectives of the information component of the stewardship program were briefly explained. The role of the parcel mapping is to electronically store and make available the location and nature of the ORR contaminants.

INTERVIEWS: See comments under the Roane County Tax Assessor's office.

Pat Luther, SAIC (482-9031), on April 26, 1999. Pat indicated that Rick Meredith (Anderson County Register of Deeds) was actively pursuing the implementation of the SPMS in Anderson County and discussions with municipalities were under way.

Chuck Moons, DOE (241-5864), on April 26, 1999. Chuck was informed of the SPMS meetings and promised he would look into them and DOE's attendance. Likewise for Dave Carden.

Vernon Long, Anderson County Property Assessor (457-6225), on April 29, 1999. Vernon states that Anderson County is eager to start using the State Parcel Mapping System and has verbal commitments for the local 1/4 costs from a wide range of users. It now depends upon the state supplying its 3/4 share. (I have sent an E-mail to Caldwell, McNally, Davis, Ferguson, Baird, Sundquist.) I outlined our thoughts to Vernon and he sees no problems assuming the state comes through with its funding. This would be a property outline in the base system and a contaminant overlay to be supplied by DOE from current map data. All he needs for the property and watershed outline is the data; the land does not have to be deeded. He would like to be talking with DOE about the details. He sees no barrier to meeting the stewardship needs.

Teresa Kirkland, Roane County Property Assessor (1-423-376-4362), on April 30, 1999. Ms. Kirkland states that while she has not sought commitments for local funding, she has had several meetings with state staff and local organizations who are interested in making use of the system. Roane County was in the process of implementing a county-specific system but delayed plans to participate in the state system. She sounded anxious to get under way but has concerns about the current state financial crisis.

Bill Issel, Oak Ridge Community Development Staff (482-8320), on May 6, 1999. Mr. Issel stated that the City of Oak Ridge is very anxious to participate in the State Parcel Mapping System and had budgeted $80,000 for hardware, software, and a coordinating position. Unfortunately, these funds were cut from the budget (on April 3, 1999) for purely funding reasons. He hoped that other funds could be obtained this year or that the project would be funded next year.

Ms. Katy Kates, DOE Realty Officer, on March 5, 1999. Ms. Kates said that DOE was aware of the current efforts of the two counties and was interested in their progress but no decision to participate has been made or considered. She further said that DOE would consider any suggestion by the SWG to utilize the State system as a component of a stewardship program but the final decision would depend on many factors. She was fully aware that Notices of Closure had been registered with the county for landfills and agree to supply copies of some as examples. She has concerns about filing an affidavit describing the location and nature of contaminants due to missing data, inaccuracies, and the need for update due to changing conditions. See summary of interview comments on "notices of contaminants." See ISSUES.

NOTE: The Information Committee should detail the information to be stored on the "base map" (site and watershed boundaries) and stored on a "contaminated land" thematic overlay. A minimal configuration to merely describe the presence and a more robust configuration should be developed. See ISSUES.

NOTE: The Cost and Funding Committee should estimate the cost of placing the required data into the State Parcel Mapping System. This is not anticipated to be large as they both are based on ArcInfo Systems and the coordinate conversions are readily available as needed.

INFORMATION REQUIRED: The minimal information required to establish the ORR contaminated areas in the State Parcel Mapping System is an outline of the ORR and each contaminated watershed. To establish the waste locations will require the transfer of the contaminant information from the ORNL GIS systems to a Contaminant Overlay in the State system.

INCREMENTAL COST: There may be incremental cost for this function, to be determined.

ACTIONS REQUIRED: DOE should transfer the required contamination information to the county in the form of a completed overlay. ALSO, DOE SHOULD REQUEST THE STATE TO FUND THE ANDERSON COUNTY AND ROANE COUNTY IMPLEMENTATION OF THE STATE PARCEL MAPPING THIS YEAR (TIME URGENT).

ISSUES TO BE ADDRESSED: DOE has raised the issue of maintaining the contaminant overlay or affidavits in the face of missing data, inaccurate data, and the changing conditions of contaminants. It should be noted that DOE now issues Notices of Closure for RCRA Landfills and the "closure" of a CERCLA remediation site has many of the same characteristics.

## 4.4 LAND TRANSACTION STEWARD

### Interview with Ms. Nancy Stanley, Realty Executives Corporation, on April 27, 1999, by Al Brooks

GOAL: The interview goal was to determine how best the several realty offices can participate in the information component of a stewardship program, to ascertain the existence of any barriers, and to ascertain the willingness of the OSTI to participate further in such a program. To this end, the objectives of the information component of the stewardship program were briefly explained. The role of the realty agent is to process the legally required seller to buyer notices.

INTERVIEW: The first interview with Ms. Nancy Stanley (483-1400) was conducted in depth and this interview was to confirm some new details. The following opinions are noted:

1. The Notices to Buyers seldom become a part of the registered land record unless they are made part of the deed.
2. A recorded affidavit, being tied to the land, will be found in a title search.
3. The "Notice of Contaminated Land" should be established as a legal requirement and as a part of the deed record.

### Interview with Dr. Gene Caldwell, State Representative, on May 1, 1999, by Al Brooks

Dr. Gene Caldwell, State Representative, stated that it should be no problem to address waste notices and registration for ORR contaminated land in a private act should this be desired. He did feel that it should be limited to the special problems of the ORR contaminated lands.

INFORMATION REQUIRED: Contaminated land descriptions, which should be available from the registered deeds, affidavits, and parcel map contamination overlays to be converted to Notices to Buyers.

ACTION REQUIRED: The steward will have one more notice (one or two pages) to buyers to process. The local state legislatures should be asked to sponsor a private act requiring for the City of Oak Ridge that a Notice of Contaminated Land should be passed from the seller to the buyer and that it become a part of the property deed. DOE should assist in drawing up the text of any private act.

# 5. DOCUMENT ABSTRACTING AND DISTRIBUTION STEWARDS

## 5.1 DOE OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION

GOAL: The interview goal was to determine how best the Office of Scientific and Technical Information (OSTI) can participate in the information component of a stewardship program, to ascertain the existence of any barriers, and to ascertain the willingness of the OSTI to participate further in such a program. To this end, the objectives of the information component of the stewardship program were briefly explained. The role of OSTI is ensuring indexing and abstracting to facilitate future access to the contaminated site information.

### Interview with Mr. Chuck Morgan, Manager of OSTI (576-1188), on April 27, 1999, by Al Brooks

INTERVIEW: Mr. Morgan stated that the proposed indexing and abstracting requirements of stewardship are completely within the current OSTI functions. Any document produced at federal expense and submitted to OSTI by EM will go into the system. It will be indexed and abstracted and placed in the electronic database. Stewardship access terms are currently applied to EM documents. The documents are stored in perpetuity at OSTI as a satellite national archive (NARA). They are issued to DOE and its contractors and are forwarded to National Technical Information Service (NTIS) for public distribution. Mr. Morgan sees no barriers to continuing these functions.

INFORMATION REQUIRED: All pertinent stewardship-related DOE reports, which are of interest to the technical or public community.

ACTION REQUIRED: No new actions by steward. DOE/EM must take pains to see that all pertinent documents are sent to OSTI for processing.

## 5.2 NATIONAL TECHNICAL INFORMATION SERVICE

No interview was believed necessary (see OSTI).

# 6. PUBLIC EDUCATION STEWARDS

## 6.1 OAK RIDGE PUBLIC SCHOOLS

GOAL: The interview goal was to determine how best the Oak Ridge Public Schools can participate in an education component of a stewardship program, to ascertain the existence of any barriers, and to ascertain the willingness of the school system to participate further in such a program. To this end, the objectives of the public education component of the stewardship program were briefly explained to each contact person. The role of the schools is to educate each generation about the existence of waste in Oak Ridge and the care it requires.

### Interview with Dr. McCoy, Director, Oak Ridge Public Schools (482-6300), on April 27, 1999, by Al Brooks

INTERVIEW: Dr. McCoy agrees that the Oak Ridge public and school children need to be informed about the existence of contamination in Oak Ridge and the requirements for its long-term care. He is agreeable to having the school staff work with the implementation planners to determine how such an activity could be best included into the school curriculum.

### Interview with Dr. James Duncan, Principal, Oak Ridge High School (482-8508), on April 27, 1999, by Al Brooks

INTERVIEW: Dr. Duncan was most enthusiastic about the schools participating. He suggests that the freshman Civics course would be the correct place to introduce it at the high school level, followed by topics in the Environmental Science program or other sciences. He suggested that teachers should have training in the topic. He is most enthusiastic in having his school participate in the implementation of such a program.

### Interview with Dr. Burris, Assistant Superintendent for Curriculum and Instruction, Oak Ridge Public Schools (482-6324), on April 27, 1999, by Al Brooks

INTERVIEW: Dr. Burris believes that the topic should be included in the educational curriculum, that it should have been started earlier, and that discussions can start this year and some course work be in place for next year. He will talk with Dr. Duncan about planning for it. He may well be far ahead of us.

### Interview with Sue Diehl, Librarian, Oak Ridge High School (482-8536), on April 27, 1999, by Al Brooks

INTERVIEW : Ms. Diehl stated that the school library could support the activity described either at the library level or the classroom materials level. She also saw no great barriers to this function, as it is an extension of current activities. She would be willing to participate in further discussions of an implementation plan with DOE. The school would expect DOE to provide

appropriate site-specific instructional materials. School-wide Library Contact: Marianne Vose, 482-8540

### Interview with Dr. Nita Ganguley, Environmental Science Teacher, Oak Ridge High School (482-8508), on April 27, 1999, by Al Brooks

Dr. Ganguley, who included stewardship material in the Advanced Placement class last year, is an ardent supporter of the stewardship public education concept and sees no barrier to its implementation.

NOTE: DOE must cooperate with the Oak Ridge School System to supply meaningful educational support for the stewardship program.

NOTE: There are a large number of non-Oak Ridge students visiting ORNL each year. ORNL should add a "stewardship" topic to these presentations. The program should also be extended later to surrounding school systems.

INFORMATION NEEDED: Stewardship-related materials suitable for a K–12 curriculum, including a freshman civics class and environmental science class. Future speakers may be desirable. The details are to be coordinated with the Assistant Superintendent for Curriculum and Instruction (Dr. Burris).

ACTIONS REQUIRED: Steward will create an additional sub-topic in the school curriculum. DOE will coordinate with schools and supply supporting instructional materials as agreed upon.

## 6.2 OAK RIDGE PUBLIC LIBRARY

### Interview with Kathy McNeilly, Director, Oak Ridge Public Library (482-8455), on April 23, 1999, by Al Brooks

GOAL: The interview goal was to determine how best the Oak Ridge Public Library can participate in the public information and education component of a stewardship program, to ascertain the existence of any barriers, and to ascertain the willingness of the library to participate further in such a program. To this end, the objectives of the public information and education component of the stewardship program were briefly explained. The role of the library is to provide public access to the contaminated site information and the care it requires.

INTERVIEW: Ms. McNeilly immediately recognized this as a simple extension of the current public review and reference service provided by the library, DOE reports, and other material. This service can include both text and visual materials on either a circulation or non-circulation basis.

Ms. McNeilly stated that this additional service appeared not to present any unusual problems and that the library would discuss the detailed implementation plans with DOE should DOE wish to include this service in a stewardship plan.

INFORMATION REQUIRED: Textual and visual information suitable for a public library reading and circulation function to inform the public of the status of the ORR stewardship program and the need for it continuance. The details to be coordinated with the public library.

ACTION REQIURED: No new actions by steward. DOE must ensure that stewardship materials are sent to the library on a regular basis.

## 6.3 CURRENT ORR WILDLIFE MANAGEMENT STEWARDS

GOAL: The goals of this interview were to acquaint the wildlife management stewards with their potential role in the stewardship program, obtain their advice on methods for preventing human exposures to contamination via wildlife during long-term stewardship, and identify any financial or other issues involved with a potential long-term Tennessee Wildlife Resource Agency (TWRA) role in managing wildlife (including hunting) on or near contaminated lands.

### Interview with Jim Evans (TWRA), Jim Donnelly (DOE-ORO), and Warren Webb (ORNL) on May 3, 1999, by Ellen Smith

INTERVIEW TOPIC: Preventing Access by People and Wildlife

A strong consensus statement from the group was that fences and warning signs by themselves will not work to keep people out of a restricted site, unless there is also a wide buffer zone to ensure that people (especially children) are not habitually present anywhere near the fence. This is based on DOE and TWRA experience with undeveloped areas of ORR, as well as TWRA experience in other areas. Even with fencing and warning signs, children and adults often trespass in restricted areas for casual recreation, particularly near their residences. Recreational access can and should be permitted in the buffer zone; the objective is to ensure that no one lives or operates a commercial establishment near the contaminated zone. Width of the buffer zone needed to deter casual access is probably a function of how far kids are likely to go under their own power in order to trespass. No one could provide a solid basis for defining the critical buffer width (maybe a mile?).

A security system could exclude people in the absence of such a buffer zone, but only if the security system is comparable in intensity to the security for the highest security area at the Oak Ridge Y-12 Plant (or a maximum-security prison).

Fencing also will not ensure that wildlife is excluded from the waste sites. Some animals burrow or climb, so fences are generally ineffective on them. Deer-proof fencing can be built, but as soon as the fence is damaged (e.g., after a storm) it is likely that deer will enter the enclosed area, and it can be difficult to get them out of the area again. All in all, it is not reasonable to assume that wildlife can be excluded or can be prevented from acting as transport vectors.

Although cleanup is likely to be effective in preventing wildlife exposures to contaminants in the Melton Valley area, biology and DOE's past experience indicate that this cannot be depended upon (because of unexpected effects of plant roots and burrowing animals). Some periodic wildlife monitoring therefore will be needed during long-term stewardship to ensure that animals are not acting as transport vectors for contamination; the interviews did not offer an opinion on the necessary frequency for this monitoring.

## Special Requirements for Wildlife Management

Current management of hunting on ORR involves special management requirements and costs not associated with managing hunting in a "normal" hunting area, due to security requirements and monitoring needs. Similar requirements probably would exist for managing future hunting in clean areas in the vicinity of a contaminated area, such as the Melton Valley Watershed.

Four to six DOE contractor security guards are present at all times during public hunts on ORR to ensure that hunters do not enter restricted areas or violate other hunt-related rules. (These guards are in addition to the security guards regularly present at DOE facilities on the ORR.) Compliance during hunts has been good.

Currently, animals killed by hunters are screened for radioactive contamination, and approximately 2% are retained due to radioactivity. This monitoring would need to continue for a period of years after site remediation to confirm that the remediation was effective in preventing wildlife exposures to contaminants. After that, periodic monitoring probably would be needed to verify that animals were not acting as vectors for contaminant transport. TDEC was identified as a source for recommendations on the appropriate monitoring frequency.

There was consensus that hunters would be willing to bear the added costs for managing hunting in the ORR area, if the hunting resource were considered to be of sufficiently high quality (which it is now and is likely to be in the future). These costs could be paid through a higher-than-normal fee for a license to hunt in the area, for example. Hunters have not been charged the added cost for past hunts on the ORR, mostly because the organizations have not been able to work out institutional mechanisms to make this financing scheme work. (This has to do with the fact that TWRA, which could collect hunting license fees, is a state agency, while DOE is a federal agency.) As a result, these costs are currently paid out of the overhead for DOE's operating facilities on the ORR.

ISSUES TO BE ADDRESSED: CERCLA decision documents should address requirements for fencing, buffer zones, and other physical deterrents to site access. Desired levels of protection and how to best obtain it must be described. A mechanism is needed to allow hunters to be assessed fees that can be used to defray the unusual costs of managing wildlife and hunting in the vicinity of contaminated sites on federal property.

SUGGESTED FURTHER ACTIONS: Follow up with TDEC regarding recommendations for post-cleanup wildlife monitoring.

ACTIONS REQUIRED: This function will require several future actions by the Principal steward.

COSTS INCURRED: This function will incur costs in addition to what would normally be spent on wildlife management in the absence of remediated waste sites.

NOTE: The cost committee should address the fiscal aspects of the function.

# 7. ROANE COUNTY ENVIRONMENTAL REVIEW BOARD

GOAL: To determine how best the Roane County Environmental Review Board (RCERB) might contribute to the ORR Stewardship Program and to determine what issues, if any, must be addressed.

### Interview with Ed Strain, chair of the Roane County Environmental Review Board (1-423-376-5287), by Al Brooks

INTERVIEW: Mr. Ed Strain indicated that the RCERB current workload makes it improbable that they could accept the full stewardship overview responsibility for the Roane County portion of the ORR. However, he feels that they could participate in problems that overtly affect Roane County. In any event, he (and RCERB) would have to have a detailed list of responsibilities before they could make a case for approval by the County executive and the commission. It was left that we would get back to him if other possibilities do not pan out.

ISSUES TO BE ADDRESSED: Assuming that EQAB, for any reason, cannot function as being representative of the greater Oak Ridge area, there is an issue of whether or not a citizens oversight group specifically related to stewardship should be formed.

In the event this occurs, the participation of the RCERB must be coordinated with the Oak Ridge EQAB and any other pertinent appointed environmental review board in regions affected by the ORR. Currently, this would include the ORR Local Oversight Committee and its Citizens Advisory Panel and the Oak Ridge Site Specific Advisory Board.

# 8. COMMENTS ON "NOTICES OF LAND CONTAMINATION"

### Comments received during interviews, by Al Books

These interviews reveal that the DOE remediation system does not ensure that all actions specified in RODs and Permits do not necessarily take place. This suggests the system is not self-validating and needs reforms. Further, the instructions given are not consistent with the existing circumstances in that there is no "deed" for ORR land.

During interviews with stewards, three "notices of land contamination" of different types issued under different circumstances and filed with a county register of deeds have been received. All of these notices identify the location of the property concerned. These comments by the interviewer are over and above those made by the interviewee concerned. The notices and a cover letter for the DOE documents are attached. These notices are:

1. **Notice of Hazardous Substance** – Site filed under T.C.A. 68-46-212 giving notice that the property has been placed on the Tennessee List of Hazardous Substances Site. This was private industrial property in Roane County.

2. **Notation on Ownership Record for Closure of Industrial Solid Waste Disposal Facility Containing Asbestos** – Issued by DOE Realty Office under Tennessee Rules 1200-1-7-04(8}(f), 1200-3-11-.02(2)(1)5 and 1200-3-11-.02(5)g requiring a notation on the deed to the

facility and any other instrument that would normally be examined during a title search. The subject property was the Y-12 Sanitary Landfill II and the site is a closed RCRA landfill.

3. **Notation on Ownership Record for Notification to Potential Owners of Contamination in Soils and Groundwater** – Issued by DOE Realty Office under CERCLA 42 USC, Section 9601 et seq. The instrument states that it fulfills the legally binding requirement in the site ROD to place a statement in the property title notifying potential owners of contamination upon the site. This notice also stipulates requirements that must be met for surveillance and maintenance.

Note that the two DOE filings give specific reference to the court action that gave the U.S. government title to the land, where it is filed at the county register's office, and specifically how the land was identified. They also include a registered plat map defining the location of the land described.

I believe that these three instruments indicate that there are several current legal mechanisms by which notice of land contamination is required to be placed in the property deed record with the county register of deeds.

On May 19, 1999, an attempt to find the South Campus Notice in the IRC electronic database proved fruitless. Therefore, Norm Mulvenon and A. A. Brooks talked with Martha Knowles and others (Rebecca & Eva) on the IRC staff and found the following to be the case:

1. Notices are first mentioned in the applicable ROD and again in the Remediation Effectiveness Report but it does not occur as a document either in the Administrative File, sealed Administrative Record, or among the post ROD documents. We have all the documents for the South Campus case.
2. The reason for this appears to be that the existence and contents of the Administrative Record up to and including the ROD is required by law but the post-ROD documents are retained and processed by IRC under administrative instructions. The Notice documents are not on the current approved list and thus exist only in the register's office and in the files of the DOE Realty Office.
3. Simply placing the Notices on the approved post-ROD document list could rectify this situation by DOE administrative action.
4. Currently, the locations of the contaminated areas are not placed on the Anderson County Property Assessor's maps. This could be done if necessary but waiting for the parcel mapping system is preferred. This effort is also hampered by the lack of a DOE ORR plat map.
5. AAB will pursue this lead and what occurs in the Removal Action process inquiring at TDEC for its role. TDEC is trying to find the status of RCRA closures.

NOTE: The information committee should determine if the information contained on the instrument is sufficient for long-term stewardship needs and if it could also be the basis for a waste overlay in the parcel mapping system.

ISSUE TO BE EXAMINED: It is not apparent that DOE has filed all appropriate notices. The SWG should suggest that the RODs of all remediated operable units contain the requirement to file an appropriate contaminated land notice.

CONTINUATION: Interview with TDEC regarding the Registered Closing Notices.

Bill Childress (TDEC) attempted to find registered notices for the closure of the Y-12 S3 ponds and the New Hope pond and was unsuccessful. The problem has been referred by TDEC to Dave Adler (DOE). TDEC also supplied copies of the pertinent section of the relevant closure permits, the State RCRA regulations, and the Federal regulations (all attached). The requirements are briefly:

1. State: Record a notice on the deed to the facility property – or on some other instrument which is normally examined during title search – that will in perpetuity notify any potential purchaser of the property that (details of notice).
2. Federal: Same wording as state.

The relevant permits require that the above notices be provided as well as that notice shall be submitted "to the local zoning authority…"

There is some confusion in the circumstances:

There appears to be no single specific deed for the ORR. Rather federal ownership is held by virtue of a court decision and it is that decision that is recorded (See the filed notices for the South Campus and the Y-12 Sanitary Landfill II.). Mr. Bill Issel (Oak Ridge City staff) states the to the best of his knowledge that notices are not filed with the city. They receive public closure announcements through EQAB. He also stated that although the city had zoning authority over ORR that, for all practical purposes, nothing much was done on the federal reservation.

There is also no evidence that these permits get into the post-closure records.

Clearly, there is a need to bring regulations into line with circumstances and practice into line with regulations. These circumstances were made known to Ralph Skinner (DOE).

Circa July 1, 1999, TDEC, after talking with DOE, made a second attempt to locate notices that were known to be filed. At the register of deeds office, a different employee took them to another part of the records where the specific notices were found. It was the opinion of TDEC (Bill Childress) that the procedures need to be established so that there is a high probability that a routine title search would find this information.

On July 16, 1999, Rick Meridith, Anderson County Register of Deeds, stated that the court record granting the federal government title to the property is treated for registration purposes just like a deed. He believes that the current indexing system should enable a person to find land notices but stated that there may be some question in how the document is registered (e.g., DOE, USA, Federal government). He agreed that if there were any questions he would be glad to review the process with DOE. He also mentioned that Roane County should be involved

# APPENDIX F

# Detailed Information Requirements

Table F.1 presents a brief summary of the stewards, their functions, the information required, the implementation steps, and their ongoing costs. The ongoing costs have been estimated assuming the startup costs of stewardship are subsumed into the remediation costs. The costs of monitoring, maintenance, and surveillance are by far the predominate costs with the cost of the TDEC DOE-O being a distant fourth. Most of the remaining costs are modest, or are a part of the normal operation of the steward and thus are an incremental cost.

**Table F.1. Tabular Summary of Stewardship Information Functions**

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| **Principal Steward – Federal Government (Currently DOE)** | | | | |
| DOE Stewardship Manager | Plan for the interface and interaction of Long-Term Stewardship program with ROD and post-ROD activities | National EM LTS, SWG input, GJO input to be used to structure an ORO/EM/LTS plan. Then LUCAP and ORO/EM/LTS to be used to set total stewardship requirements for integrated ORR Stewardship Program through the RER reviews. Establish the need for buffer areas at present as well as in the future, the effectiveness of physical barriers & signage, and level of surveillance. | DOE to prepare the plan | Startup |
| DOE/EM Management (See also DOE Document Managers below) | Stewardship Long-Term Repository | Information related to stewardship of contaminated land for further future remediation and maintenance and all other necessary functions. | DOE must formally establish repository within framework of current DOE/ORO document repositories including requirements for subcontractors. Ensure needs of stewardship are reflected in electronic access. | Startup |
| | Stewardship | Automate and document the initiation & | DOE to specify, design, | Modest, |

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| | Transaction Database[1] | completeness of all significant steps in cleanup and stewardship process of all significant operable units. | establish transaction database system. Provide searchable record of the stewardship process. | incremental |
| | Stewardship Web Pages | Summary information: maps, fact sheets, progress reports, summaries. | DOE extend function of EM Home Pages b defining content to keep public informed of current status of contaminated land | Modest, incremental |
| DOE Realty Office | Property Deeds and Land Notices required in the RODs and closure permits | Property description including location of contaminants, use restriction and required continuing treatment | Ensure that documents are retrievable by normal title searches | Modest, incremental |
| DOE Document Managers | Stewardship Repository within framework of current DOE/ORO repositories | All the information that may be relevant to the stewardship of the contaminated lands including future remediations and maintenance. | Establish the repository & provide for perpetual care including media rejuvenation. Ensure electronic access methods meet stewardship needs. | Modest, incremental |
| **Regulatory Stewards** | | | | |
| Environmental Protection Agency | Review of remediation effectiveness | Required land-use controls and corrective action under CERCLA | Continued preparation of guidance plan | Modest, incremental |
| TDEC/DOE-O | Involvement in CERCLA remediation | Access to monitoring data, input on Monitoring Plans and level of monitoring and maintenance on CERCLA sites under FFA | Planning premature at present | Modest, incremental |

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| **Land Use Stewards** | | | | |
| City Of Oak Ridge | | | | |
| • Regional Planning Board and Planning Staff | Use of contamination information to apply zoning to property | Contamination information recorded with the county register of deeds, as well as on city property tax office records. Data repository to include information synopses appropriate for needs of local land use decision-makers. Transfer ORNL GIS data for contaminant activity to the City GIS or the State Parcel Mapping System whenever & whichever is eventually adopted. | DOE to request rezoning and creation of special plat maps and shadow zones for contaminated lands (or where contamination on adjacent property necessitates restricted land use. | Modest, incremental |
| • Oak Ridge Tax Office | Indication of presence of contamination on land. | Does not apply | The City tax records should record the presence of contamination on a parcel | Negligible, incremental |
| • O.R. Environmental. Quality Advisory Board | Effective representation for stakeholders inside of O.R. and oversight for O.R. environmental issues | Awareness of and access to stewardship information | EQAB should seek formal recognition or designation from principal steward (DOE) | Modest, incremental |
| Tennessee. DOT | Avoidance of waste site disturbance by road construction | Awareness of and access to stewardship information necessary for road construction | DOT should place contamination overlay on the DOT mapping system | Modest, incremental |
| Anderson County Register of Deeds | Recording of contaminated waste | Land deeds with deed restrictions as needed, affidavits and other related | No action required by steward. DOE must issue | Modest, incremental |

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| | description and deed restrictions | documents describing contaminants and their locations; maps for registration and other land related documents. | and register affidavits, deeds, and other appropriate documents when appropriate. Affidavits on contaminated lands should be issued now. | |
| Roane County Register of Deeds | Recording of contaminated waste description and deed restrictions | Land deeds with deed restrictions as needed, affidavits and other related documents describing contaminants and their locations; maps for registration and other land related documents. | No action required by steward. DOE must issue and register affidavits, deeds, and other appropriate documents when appropriate. Affidavits on contaminated lands should be issued now | Modest, incremental |
| Anderson County Property Assessor Office | Addition of description of contaminated land onto present/future mapping system | Deed information acquired through register of deeds contaminant information correspondence to the affidavits or other documents. When the State Parcel Mapping System is adopted, transfer of ORNL GIS data for the contaminant overlay of the State system. | None by steward other than maintain the waste overlay. DOE must make the waste overlay available to the property assessor. | Modest, incremental |
| Roane County Property Assessor Office | Addition of description of contaminated land onto present/future mapping system | Deed information acquired through register of deeds contaminant information correspondence to the affidavits or other documents. When the State Parcel Mapping System is adopted, transfer of ORNL GIS data for the contaminant overlay of the State system. | None by steward other than maintain the waste overlay. DOE must make the waste overlay available to the property assessor. | Modest, incremental |

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| State of Tennessee | Tennessee Parcel Mapping System | Outline of the ORR and each contaminated watershed. To establish the waste locations will require transfer of contaminant information from the ORNL GIS systems to a contaminant overlay in the State system. | DOE is responsible to transfer the required contaminant information to the county as a completed overlay. Also DOE should request the State to fund the implementation of the State Parcel Mapping System. | Modest, incremental |
| Local Realtors | Notice of contaminated land | Contaminated land descriptions (from registered deeds), affidavits and parcel map contamination overlays to be converted to Notices to Buyer. | The steward will have one more Notice to Buyers (1 or 2 pages) to process. The state legislatures should be asked to sponsor a private act requiring for the City Of Oak Ridge that a Notice of Contaminated Land be passed from seller to buyer and that it become a part of the property deed. DOE should assist in drawing up the text of any private act. | Modest, incremental |
| **Document Abstraction and Distribution** | | | | |
| DOE Office of Scientific and Technical Information | Indices and abstraction of relevant documents, | All pertinent stewardship-related DOE reports which are if interest to the technical or public community | No new actions required by steward. DOE/EM must take measures to | Modest, incremental |

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| | federal and public (NTIS) repositories. | | see that all pertinent documents are sent to OSTI for processing. | |
| **Public Education** | | | | |
| Oak Ridge Public Schools | School Curriculum | Stewardship-related materials suitable for a K-12 curriculum including a freshman Civics class and an environmental science class. The details are to be coordinated with the AST's. Superintendent for curriculum and instruction. | Future speakers may be desirable.[1] Steward will create an additional topic in the school curriculum. DOE will coordinate with schools and provide supporting instructional materials as agreed upon. | Modest, incremental |
| Oak Ridge Public Library | Publicly available contaminated site information | Textual and visual information suitable for a public library reading and circulation function to inform the public of the status of the ORR stewardship program and the need for its continuation. | No new actions by the steward. DOE must ensure that stewardship materials are sent to the library on a regular basis. | Negligible, incremental |
| Tennessee Wildlife Resources Agency | Wildlife management | Access precautions and management of wildlife hunting base on TDEC and DOE recommendations. | Monitoring of wildlife taken during hunts. DOE must maintain information on numbers of animals taken, locations where animals were taken, and levels of contaminants detected. | Modest, incremental |
| Roane County Environmental Review Board | Environmental management for Roane County areas outside the Oak Ridge City limits. | Information on environmental contamination in the Clinch/Tennessee Rivers from historic and ongoing contaminant releases from the Oak Ridge facilities. Information on the | Roane County Environmental Review Board, Oak Ridge EQAB, and other regional governmental | Negligible, incremental |

| Steward | Stewardship medium/function/ goal | Information Required | Action Required | Cost |
|---|---|---|---|---|
| | | cleanup/residuals from any DOE offsite projects that occur in Roane County. | environmental review organizations must communicate and share information on policy-making as related to contaminated lands. | |
| **Notices of Contaminated Land** | | | | |
| DOE-ORO | 1) Notice of Hazardous Substance<br>2) Notation on Ownership Record for Closure of Industrial Solid Waste Disposal Facility<br>3) Notation on Ownership Record for Notification of Potential owners of Contaminated in Soils and Groundwater. | Notices must contain sufficient information on contaminants (location, types, levels, restrictions and continuing treatments) and be filed in a manner such that a normal property search will find them. [It is not clear that this is now occurring, the procedure should be reviewed.] | Sufficient and complete information to meet stewardship needs should be placed in post-closure records. The information committee should determine if the information on the Property Assessors Map is sufficient for long-term stewardship needs and if it could be the basis for the waste overlay in the parcel mapping system. All RODs of remediated operable land units should contain the requirement to file an appropriate contaminated land parcel. | Negligible, incremental |

Footnote:

[1] DOE must cooperate with the Oak Ridge and other school systems to supply meaningful educational support. ORNL should add a “stewardship” topic to ORNL presentations to non-Oak Ridge students visiting the facility. The program should be extended to surrounding school systems.

## Description of Stewardship Information by Category

The information provided in Table F.2 is adapted to the ORR site from the Kaiser report. It tabulates the information by category and provides a brief description of the information, its users, and its archival location. The users are encoded in the following manner:

P = Principal Steward
L = Land Use Control Stewards
Em = Emergency Response Stewards
Ed = Education and Public Information Stewards
R = Regulatory Stewards
N = Natural Resource Protection Stewards
Rs = Research Stewards

**Table F.2. Stewardship Information, Key User Stewards, Information Location**

| **Hazards and Controls** | | |
|---|---|---|
| **Description of Information** | **Key Users*** | **Location** |
| **A. Existing hazards.** This information includes the location, type, condition, and vulnerability (e.g., to fire, rain, earthquakes) of radioactive and chemical hazards left onsite after cleanup is complete. This information also includes the likelihood that these hazards will migrate or otherwise move either within the site or to offsite areas. At the point of site closure/Transfer, this information essentially provides a "baseline of the state of each onsite hazard at the start of long-term stewardship. A few examples are listed below. | | |
| Site map(s) that provide locations of hazards. | P, L | Active DOE files |
| Hazard vulnerabilities to external events (fire, rain, flood, etc.). Likelihood of movement, vulnerability to external events. Given a natural accident (fire, flood, earthquake, etc.) what impact would that have on the persistent hazard? | P, Em | Active DOE files |

| Hazards and Controls | | |
|---|---|---|
| **Description of Information** | **Key Users*** | **Location** |
| Relationship between a physically located external event and all of the nearby hazards that would be directly affected. If an external event has occurred, what is the likelihood of it causing a larger event because of a persistent hazard? Link location, external event, persistent hazard. | P | Active DOE files |
| Records related to dispersion pathways and the progress of releases along each pathway. | P | Active DOE files |
| Location, direction, etc. of the hazard, especially if there's an exposure risk. Generally these are input parameter for dispersion or other models. Normally this is real time data. However, may use historic data for modeling purposes, especially for groundwater, etc. | P, Em, L | Active DOE files |
| Knowledge of relationships between persistent and external hazards. Will a flood cause a different bigger hazard? Link between external event and persistent hazard, especially vulnerability information | P, Em | Active DOE files |
| Existing inventories of hazardous materials above and below ground. Information provides simple, lay description of short term and long term hazards remaining at site. | P, Em | Active DOE files |
| Emergency type for a co-dependent event. Instructions for first responders. Is it explosive, does it create an exposure hazard. | P, Em | Active DOE files |
| Information about likelihood and magnitude of potential emergency events. Information summarizes "final" site conditions and future monitoring commitments. Information is authoritative, clearly delineates post-DOE roles and responsibilities as they related to above hazards. | P, Em | Active DOE files |
| Documentation of break through in risk assessment science. Confine requested information to publicly available, published (referenceable) material. | P, R | Active DOE files |
| Baseline Hazard Identification at Closure. Record copy of Site Closure documentation including details of basis for determining remaining hazards at closure. | P, R, L | Active DOE files |

| Hazards and Controls | | |
|---|---|---|
| **Description of Information** | **Key Users*** | **Location** |
| Shipments of materials to/from other DOE/DOD sites (e.g., irradiated fuel from one site shipped to another). | P, R | DOE Archives |
| Environmental monitoring data for onsite and offsite environmental media (air, soil, groundwater, surface water, vegetation, animals (wild species) foodstuffs (crops, meat, milk, eggs, etc.). | P, R, Ed | Active DOE files |
| **B. Past and present releases and accidents.** This information includes reports and other related data on past and present releases and accidents; radioactive and chemical contaminants or materials released during these events: who or what was known or suspected to be exposed to these contaminants of materials; and any documented or suspected exposure levels. A few examples are listed below. | | |
| Occupational health standards and requirements in effect throughout the life of the site. Occupational health standards change over time. A complete historical record may be difficult to assemble | P, Rs | DOE Archive |
| Medical records for workers | P, Rs | DOE Archive |
| Exposure records for workers | P, Rs | DOE Archive |
| Facility use patterns (work locations, activity patterns, shift records, job task assignments) | P | DOE Archive |
| Personnel records (e.g., dates of employment) | P | DOE Archive |
| Individual perspectives on the work - workers survey comments, worker interviews, management interviews, as Future Congressional input. Information summarizes or otherwise relates staff, management, or stakeholder attitudes or concerns related to site operations. | P | DOE Archive |

| Hazards and Controls | | |
|---|---|---|
| **Description of Information** | **Key Users*** | **Location** |
| Radiological Control Records. Record Copy, Approved by Management, Most Recent Version, Publicly Available. | P | DOE Archive |
| Radiological Incident Reports. Record Copy, Approved by Management, Most Recent Version, Publicly Available. | P | DOE Archive |
| Records of releases (both "planned" and accidental) to the environment from site activities prior to site closure. | P, R, Rs | DOE Archive |
| Records related to all accidental releases of contaminants that affected occupational workers. | P, Rs | DOE Archive |
| Reportable Events. Record Copy, Approved by Management, Most Recent Version, Publicly Available | P, R, Ed | DOE Archive |
| HEPA Filter Characterization Records. Record Copy, Approved by Management, Most Recent Version, Publicly Available. | P | DOE Archive |
| Discharge point analysis dye tests. Record Copy, Approved by Management, Most Recent Version, Publicly Available. | P, R | Active DOE files |

# APPENDIX G

# Community Guidelines for Determining End Uses of Contaminated Land and Water on the Oak Ridge Reservation

OAK RIDGE RESERVATION
END USE
WORKING GROUP

## COMMUNITY GUIDELINES FOR DETERMINING END USES OF CONTAMINATED LAND AND WATER ON THE OAK RIDGE RESERVATION



The End Use Working Group believes end use decisions for the Oak Ridge Reservation, and associated remedial activities, must include consideration of the community's values. The public and the Department of Energy (DOE) have a mutual responsibility to deal with each other openly and honestly. To enable stakeholders to comment responsibly on end use and remediation options, DOE must provide accurate and timely information.

DOE's Environmental Management Program should be guided by end use recommendations that are provided by the stakeholder community, are endorsed by the City of Oak Ridge and can accommodate changing circumstances. Once end use recommendations are provided by the community, the federal government should commit to completing all remediation to meet recommended end uses and should provide opportunities for meaningful public involvement. The federal government's goal should always be the protection of human health and the environment. In its decision making, the federal government should use the best available science and technology, while taking into account cultural, social and economic factors, environmental justice and risks to workers.

The End Use Working Group developed the following guidelines for DOE to use in making future use decisions for contaminated land and water. The guidelines for contaminated land are presented in order of priority. Each guideline for contaminated water carries equal weight. DOE should explain how the guidelines are incorporated or cannot be incorporated into each of its decisions.

### Guidelines for Contaminated Land

1. All owners and operators of property must, at a minimum, comply with applicable state and federal regulations to provide safe working conditions and to protect nearby residents and the environment.
2. Contaminated material left on site, regardless of the site's end use, must be controlled to prevent further spread.
3. The federal government should work with state and local governments, in consultation with the public, to establish and fund a long-term stewardship program for contaminated lands.
4. DOE and its contractors should minimize impacts on the environment during remediation and maximize restoration of the environment after remediation.
5. End uses for lands containing residual contamination should include buffer zones that protect current and future nearby populations.
6. End use decisions for contaminated lands should allow for the safe use and development of Oak Ridge Reservation lands, future employment, and research opportunities.
7. When siting additional facilities, DOE should use brownfield sites instead of greenfield sites.
8. Structures unsuitable for future uses should be demolished expeditiously.
9. Waste should be relocated only to reduce total risks to human population and the environment.

## COMMUNITY GUIDELINES FOR DETERMINING END USES OF CONTAMINATED LAND AND WATER ON THE OAK RIDGE RESERVATION



10. Institutional controls in lieu of remedial actions should be used only in cases where DOE has satisfied the community that further restoration is not feasible.
11. DOE's program offices must coordinate their activities and end use decisions and should provide for meaningful, broad-based public involvement.
12. End use decisions should be reevaluated as better technologies become available.
13. End use decisions should strive to reduce the amount of land requiring long-term control.
14. End use of contaminated sites should be compatible with projected uses of adjacent properties.

**Guidelines for Contaminated Water**

1. The federal government must assure the unrestricted use of groundwater exiting the boundaries of the Oak Ridge Reservation.
2. The federal government must control contaminated groundwater resulting from Oak Ridge Reservation activities such that the use of currently uncontaminated groundwater is not impacted. Where it is necessary to restrict the use of uncontaminated groundwater to prevent the expansion of contaminant plumes, the goal of remediation should be to expeditiously eliminate those restrictions.
3. If contaminated groundwater remains after remediation, the federal government must restrict its use and prevent the contamination from spreading.
4. Where contaminated groundwater exists beneath otherwise uncontaminated land, the goal should be to restore that groundwater to health-based standards.
5. Surface waters on the Oak Ridge Reservation must eventually meet State water quality standards. In the interim, water quality must not pose an unacceptable risk under actual current use.

It should be noted that these Community Guidelines complement, but do not alter, the nine CERCLA (Comprehensive Response, Compensation and Liability Act) criteria that must be considered by DOE, the U.S. Environmental Protection Agency and the Tennessee Department of Environment and Conservation. These CERCLA criteria are:

Overall protection of human health and the environment
Compliance with ARARs
Long-term effectiveness and permanence
Reduction of toxicity, mobility or volume
Short-term effectiveness
Implementability
Cost
Regulatory acceptance
Community acceptance

# APPENDIX H

# Excerpt: DOE Oak Ridge Accelerating Cleanup: Paths to Closure

The following is excerpted from: *Accelerating Cleanup: Paths to Closure*, Oak Ridge Operations Office (FY 2001)

## 7.3 Stewardship

When cleanup is completed at many sites, some work will remain. The work after cleanup, often called "long-term stewardship", includes monitoring of residual contamination, and maintenance of closed landfills, capped sites, and entombed buildings/reactors. In many cases, these activities are required as part of the remedies selected (e.g., post-cleanup monitoring and five-year reviews). These stewardship activities encompass all actions required to maintain an adequate level of protection to human health and the environment posed by residual contamination. Many organizations, including state regulatory officials, Tribal Nations, and the EM Advisory Board have urged the Department to increase its efforts to meeting its obligation to ensure that these stewardship tasks are carried out fully after completion of site cleanup activities. The Department is committed to meeting its long-term stewardship obligations, which become increasingly important as more sites are cleaned up.

One step towards demonstrating EM's intent to meet stewardship obligations and to improve management of this critical activity is to identify the nature, extent, and cost of current and expected stewardship scope. To this end, EM Headquarters is recommending, but not requiring, that, at each site where substantial cleanup work has been completed (including long-term facility stabilization and landfill closure), Operations/Field Offices establish a PBS for long-term stewardship activities.[1] A small amount of required information is described at the end of this section.

While managers at some sites may deem it appropriate to establish a PBS for long-term stewardship now, other sites may wish to wait until more cleanup is completed, information is available, or more clear and consistent guidance is developed. A separate working group on long-term stewardship will be continuing to consider this, among other issues, through regular conference calls and a meeting in Salt Lake City in February 1999. EM understands that the experience at many sites is that the personnel most knowledgeable about the information required for a stewardship PBS may not be available when the PBS is funded. Hence, it may be preferable to establish a PBS before it is funded so that the information may be included while the expert personnel and required information are still readily available.

Although the details of how information on long-term stewardship should be collected have not been resolved, it is clear that more information on long-term stewardship is needed. First and foremost, there is growing pressure from state and federal regulatory agencies (voiced nationally by the State and Tribal Governmental Working Group and the EM Advisory board as well as the National Association of Attorney's General) to

[1]This recommendation differs from the draft guidance, which directed that each Operations/Field Office develop a PBS on long-term stewardship. The change reflects the comments received by a number of Operations/Field Offices indicating that a mandatory PBS for long-term stewardship was premature at this time, but that such a PBS might be appropriate later.

articulate and address our long-term stewardship obligations. Second, Congress is increasingly seeking details of interim cleanup progress rather than waiting until cleanup at an entire geographic site is completed. Third, EM needs information to evaluate management options for ensuring that the long-term stewardship obligations are being met in a cost-effective manner. Finally, the Department recently settled a lawsuit with a variety of non-governmental organizations. One aspect of the settlement is a requirement that DOE prepare a study on long-tem stewardship, with full scoping and public participation. This study will require additional information on long-term stewardship in more detail than on the geographic site level. Collecting this information may require a separate data call, if it is not provided adequately as part of data collected from this guidance.

The following guidance is for site managers who chose to develop a separate PBS for long-term stewardship. The type of information to be included in a stewardship PBS is generally expected to be the information necessary to assess the level of stewardship activity, and describe it in a comprehensive manner. Much of the information is expected to be simply transferred from PBSs for active remediation or waste management. The information would likely include:

- Description of residual contamination;
- Description of the controls being used to contain the residual contamination; and
- Description of the "afforded" future land use after cleanup is completed (i.e., what is the land use that is possible, given the level of cleanup attained).

The “unit of activity” to be transferred to a new PBS should be determined based on the needs of the site management. A PBS for long-term stewardship will reflect cleanup work that is completed, and, thus, site manager should include as much completed cleanup as soon as possible. Stewardship should not be confused with ongoing remediation or waste management of operating facilities, and establishing a PBS for long-term stewardship will help separate this work from ongoing active cleanup. Moreover, establishing a PBS for stewardship should not necessarily wait until all of the cleanup associated with an entire PBS is completed. However, it would be unworkable to transfer each individual release site to a new PBS upon completion of cleanup. EM recommends that site managers establish a PBS for stewardship when a discrete and significant management unit within a PBS (e.g., watershed, valley, or geographic area) has been cleaned up.

Pending the development of a more detailed consensus on long-term stewardship, EM Headquarters requests Operations/Field Offices first to describe the end state and future use plans for each geographic site, second to place each geographic site into one of seven categories, and third to provide stewardship-related information for each geographic site specific to its appropriate category. Table H.1 presents the seven categories and the requested information for each.

**Table H.1. Information Requirements for Geographic Site Stewardship Categories**

| No. | Stewardship Planning Category | Information Requested |
|---|---|---|
| 1 | The geographic site is completed and EM is actively funding long-term surveillance and monitoring (LTS&M) activities, which are reflected in one or more PBSs. | Identify PBS(s)[1] with LTS&M activities and describe the activities. Ensure breakout of costs by category shows LTS&M costs. |
| 2 | The geographic site is completed and another (non-EM) entity is actively funding LTS&M activities, which are not reflected a PBS. | Identify the entity funding LTS&M activities. |
| 3 | The geographic site is completed and no LTS&M is required. | None. |
| 4 | The geographic site is not yet completed but EM has determined stewardship activities and costs, which are reflected in one or more PBSs. | Identify PBS(s) with LTS&M activities and describe the activities. Ensure breakout of costs by category shows LTS&M costs. |
| 5 | The geographic site is not yet completed but EM has determined that stewardship activities and costs are the responsibility of another (non-EM) entity which are not reflected in a PBS. | Identify the entity funding LTS&M activities and when such activities are scheduled to begin. |
| 6 | The geographic site is not yet completed but EM has determined that stewardship activities and costs are the responsibility of another (non-EM) entity but the costs are reflected in one or more PBSs. | Identify the entity funding LTS&M activities, which PBS(s) include the activities and how much of each PBS cost is attributable to LTS&M. |
| 7 | The geographic site is not yet completed and stewardship activities are so far off and/or uncertain that the costs are not fully understood. No estimate is included in a PBS. | Estimate the annual potential costs (or range of costs) for stewardship activities starting at site completion. If such activities are not reasonably estimable, describe the required activities. |

[1] PBS = Project Baseline Summary.

# APPENDIX I

# Funding Mechanisms for Long-Term Stewardship

# DEFINITIONS

There is a wide variety of term definitions commonly used in the description of U.S. Government funding mechanisms. The following definitions are the ones used by this committee.

## Annual Appropriations

An act of Congress that provides the legal authority for federal agencies to incur obligations and make payments from the Treasury for specified purposes. An appropriation is the most common means of providing budget authority and usually follows the passage of an authorization. The two major types of appropriations are regular and supplemental.

This funding type is comprised of what Congress can be enticed to provide in the yearly budgetary process. Intentions for future funding can be expressed, but they are not binding on subsequent Congresses or even subsequent sessions of the same Congress. Funds come from the discretionary fraction of the budget, which does not include entitlements or interest on the national debt. This fraction of the budget is shrinking and stewardship, if funded by this mechanism, would compete with other government functions.

## Entitlements

A program that requires the payment of benefits to all who meet the eligibility requirements, which are established in law. Examples of entitlement programs are Social Security, Medicare, and veterans' pensions. Although entitlement funding is more stable than annual appropriations, funding levels can be restricted. Entitlements require annual appropriations unless the appropriation is permanent.

## Trust Funds

Federal funds collected and spent to carry out specific purposes and programs under trust agreements or statutes, such as Social Security, highways, airports, nuclear waste, and unemployment. Trust funds ostensibly cannot be spent for purposes other than those for which they are specified by law. However, the receipts, such as Social Security taxes, are included in the general budget and expenditures, unless for entitled programs like Social Security, they have to be allowed by Congress. The practical effect is that programs supposed to benefit from unentitled trust funds have little more stability than those funded by annual appropriations. There is no assurance that Congress will, in any given period, authorize spending the incoming money for a stated purpose. The definition the committee adopts for stewardship trust funds is analogous to that implied by the state of Tennessee for the waste disposal facility: a principal drawing sufficient annual interest to cover stewardship costs.

# APPENDIX J

# Sample Computations of Annual Contributions Needed from 2000 to 2014

# Sample Computations of Annual Contributions

**Sample computations of annual contributions or setasides needed from 2000 to 2014 to reach a trust fund yielding 10 million per year in year 2000 dollars for stewardship, plus additions to principal to compensate for inflation. Assumed inflation rate, 3 percent per year.**

| Interest rate, I | P, 2015 (in millions, 2015 $) | ΔP | Trust Fund (P+ΔP) in 2015 | Annual Setaside, 2000-2014,R to reach trust fund in 2015 (in million $, current to year) |
|---|---|---|---|---|
| 0.05 | 313.6 | 470.4 | 786.7 | 35.2 |
| 0.06 | 261.3 | 261.3 | 522.6 | 21.5 |
| 0.07 | 224.0 | 168.0 | 391.0 | 14.8 |

30NOV99EASI01111

The assumed inflation rate (i) is 3% per year. In 2015, $15.68 million dollars will be equivalent to $10 million in 2000, and the principal necessary to earn this is $15.68/I. An addition, ΔP, is needed at that time to draw interest needed to compensate for the effect of inflation after 2015 on the trust fund; the addition is given by [i/(I - i)] times the principal in 2015. The sum of principal in 2015 and ΔP gives the trust fund that must be accumulated by annual setasides and accrued interest from 2000 to 2014. The annual setaside, R, is given by the equation:

$$R = I\,(P + \Delta P)/(\exp\{15\,I\}-1)\ .$$

# APPENDIX K

# DOE Oak Ridge Document Management Systems

# INFORMATION LOCATION ROADMAP

Information management for the DOE-ORO enterprise includes records management: (1) DOE, (2) Bechtel Jacobs Company LLC (records related to environmental cleanup), (3) ORNL, and (4) Lockheed Martin Energy Systems. Each of these four records management entities has established records management procedures and policies to ensure maintenance and retention of existing and newly generated information and records.

## 1. DOE RECORDS MANAGEMENT

The DOE-ORO Records Holding Area contains approximately 6,126 cubic feet of retired records. The majority of these records include General Administrative, Environmental Protection, Waste Management, FOIA and Litigation records, Project Files, contracts, Purchase Orders, Audits, Finance records, Defense Program, Visits, and Security Files. Records generated since 1995 are searchable using an electronic indexing system, while those older than 1995 are searched using manual forms.

There are currently 3,667 cubic feet of active DOE-ORO records located at the Federal Records Center in Atlanta, Georgia, 288 cubic feet in Suitland, Maryland, 15 cubic feet in St. Louis, Missouri, 36 cubic feet in Chicago, Illinois, and 12–15 documents at College Park, Maryland.

Approximately 3,307 cubic feet of DOE-ORO records are held at the National Archives in Atlanta, including approximately 928 records transferred for declassification review.

## 2. BECHTEL JACOBS COMPANY RECORDS MANAGEMENT

Bechtel Jacobs Company Records Management and Document Control (RMDC) manages a comprehensive and compliant records management and document control system for current and legacy records of Environmental and Enrichment Facilities (EMEF) activities at Oak Ridge East Tennessee Technology Park (ETTP), Portsmouth, Ohio, and Paducah, Kentucky. RMDC maintains approved National Archives and Record Administration (NARA) record retention and disposition schedules. RMDC develops and implements compliant RMDC policies and procedures and provides guidance to record generators. RMDC provides oversight for the operation of the Document Management Centers (DMCs), Facility Drawings and Records (FDR), Project Document Control Centers (PDCCs), and Inactive Records Centers at these locations. An annual inventory of all records is performed and maintained.

**Retrieval Tool:** Electronic Document Management System (EDMS) is the central index of active records with a scanning process to capture electronic files, and it was implemented in 1994 at Portsmouth, in 1998 at Oak Ridge, and in 1999 at Paducah. Documents are stored in electronic media with hard copy to meet DOE turnover requirements. Attributes captured to aid retrieval include: date, document number, author, title, location, clearance/classification, and key words. Some records, such as subcontractor submittals, are currently managed under indexing systems other than the EDMS. In most cases, the older information indexing systems are being converted to the EDMS for consistency throughout the EMEF information management system.

# 2.1 ACTIVE RECORDS

The following materials are maintained in the Active Records files.

## 2.1.1 Administrative Record

### Description

Contains documents that form the basis for selection of a particular response action for an Operable Unit (OU) as required by Section 113 of the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA).

### Volumes and Locations

There are approximately 52 Administrative Record files and approximately 2600 documents at Bldg. K-1002 at ETTP and the public Information Resource Center (IRC) at 105 Broadway, Oak Ridge, Tennessee.

There are approximately 28 Administrative Record files and approximately 1200 documents at the Kevil Building and the public IRC at 175 Freedom Boulevard Kevil, Kentucky.

There are approximately 33 Administrative Record files and approximately 3600 documents at Bldg. X-3012 and the public IRC at 3930 U.S. Route 23, Piketon, Ohio.

- Audit/Review/Inspection Reports
- Calculations
- Correspondence
- Waste Operations Data
- Engineering Drawings
- Engineering Design Documents
- Facility/Criticality Safety Documents
- Field Operating Work Logs
- Procurement Records (Scope of Work, Specifications, Material Requisition)
- Permits
- Presentation Material
- Public Affairs Documents
- Technical Reports
- Photographs
- Training Documentation
- Vendor Material Documentation

### Volumes and Locations (Summer 1999)

- Approximately 5,000 cubic feet at Bldg. K-1002 (ETTP)
- Approximately 12,000 cubic feet at Bldg. K-1001 and K-303-4 (ETTP)
- Approximately 1,450 cubic feet at Paducah, Kentucky, Kevil Bldg.
- Approximately 176 cubic feet at Portsmouth, Ohio, Bldg. X-3012

## 2.1.2 Subcontractor Submittals

The Subcontractor Submittal Collections consist of records identified by Bechtel Jacobs Company LLC to the subcontractors to be submitted for concurrence in meeting the commercial or technical aspects of the subcontract. These records document job activities at start-up, during, and closeout of contracts. They consist of Safety and Health plans, requirements and training verifications, Work Force transition documentation, and project-related documents for completion of the job. The project-related documentation includes: drawings, specifications, calculations, schedules, training programs, procedures, and technical reports. These records remain active until closeout of a contract. At the time of contract closeout, they are transferred to the Inactive Records Center.

All Bechtel Jacobs Company Request for Proposals (RFPs) are reviewed by the Administration Group to ensure that appropriate language is included regarding turnover of records to subcontractors and instructions for receipt of records from subcontractors.

### Volumes and Locations (Summer 1999)

- Functional ETTP Projects – approximately 30 cubic feet stored at Bldg. K-1004-D (ETTP).
- Y-12 Projects – approximately 30 cubic feet stored at Bldg. 9983 (Y-12).
- ORNL Projects – approximately 20 cubic feet stored at Bldg. 7078-B (ORNL).
- Waste Operations and Legacy Waste – approximately 20 cubic feet stored at Bldg. K-1400 (ETTP).
- Portsmouth – approximately 10 cubic feet stored at Bldg. X-3012 (PORTS).
- Paducah – approximately 30 cubic feet stored at the Kevil Building (PAD).

**Retrieval Tool:** Subcontractor Submittal Register (SSR) – will be incorporated into EDMS.

## 2.2 INACTIVE RECORDS

The Inactive Records Center at ETTP holds boxed records, reports, and technical notebooks that describe the scientific and technical activities of the K-25 site for the past 56 or more years. The boxed records consist of operations, administrative, technical, and historical records of operations of site and central organizations. Also included are records of Environmental Restoration and EMEF activities. The reports consist of scientific, operational, and technical subjects. Some of these are also available at OSTI. The technical notebooks have served as operational or data-gathering logs for site and site-related activities. The collection is mostly boxed and stored in K-1034-A. A good percentage of the three groupings is classified information. There is also a sizeable percentage of records in the three categories that are epidemiological records. Holdings also include Privacy Act records.

### Volumes and Locations (Summer 1999)

- Boxed Records – approximately 16,000 cubic feet stored at ETTP Bldgs. K-1034-A and K-1600. Retrieval tool is SMART Electronic Information Content Management System (EICMS) database.

- Technical Reports – approximately 8,500 reports (1,673 cubic feet). Retrieval tool is the card catalog or microfiche index. An electronic index is being built and will be linked to EICMS.

- Technical Notebooks – approximately 12,330 (mostly boxed). Retrieval tool is the card file index by author, number, and subject.

- Portsmouth – approximately 1,070 cubic feet stored at Bldg. X-3012.

- Paducah – approximately 1,160 cubic feet stored at the Kevil Building.

- Federal Records Center (Atlanta) – approximately 1,000 cubic feet of records.

# 3. ORNL RECORDS MANAGEMENT

Information created at ORNL includes administrative, financial, health and safety, and quality records in addition to research and development records. Records exist in a variety of formats including paper and electronic media. Information produced at ORNL related to weapons programs is housed at Y-12. ORNL's internal procedure for Records Management and Document Control provides for the management of information from creation to final disposition and contains the requirements set forth by the National Archives and Records Administration (NARA) and DOE.

Approximately 80,000 cubic feet of records (active and inactive, non-electronic) exist at ORNL. Of the total, 9,750 cubic feet of records are housed in the ORNL inactive records storage facilities and 1,329 cubic feet are located at the Federal Records Center in Atlanta.

The ORNL Central Files Collection consists of over 200,000 records dating from 1940. The collection consists of scientific and technical-related reports, conference papers, foreign trip reports, presentations, and various ORNL-related records. The Central Files Database contains bibliographic information for unclassified and classified publications dating from 1940 to 1974. The Central Publications and Presentation Registry contains information on over 100,000 records dating from 1985 to the present and contains 350 scientific documents held as record copy. The Research Notebook Collection consists of approximately 100,000 classified and unclassified notebooks. The Research Notebook Database contains information on 6,123 notebooks. The Engineering Design Information System and Project Records Information System provide configuration and revision control, project number assignment, and quick access to engineering documents. The Photographs and Drawings Collection consists of approximately 15,000 photographs, negatives, drawings, slides, aperture cards, and work slides that are managed using the Information Retrieval and Information System.

# 4. Y-12 RECORDS MANAGEMENT

The Y-12 Plant is currently operated by Lockheed Martin Energy Systems, Inc., for DOE. Facility drawings, infrastructure information, environmental protection and monitoring data, permits, procedures, medical records, radiation exposure records, plant production records, and plant reports are tracked using the System for Managing Archives, Records, and documents (SMART). This software manages the retention disposition table and record inventories, and provides tools to mange records and controlled documents and enables rapid retrieval. The software also captures metadata concerning the records and documents.

Some historical and legacy records maintained by LMES cover activities relevant to other contractors and sites (Paducah and Portsmouth) because those sites were previously managed under the same contract as Y-12. The LMES records collection is estimated to be 50,000 cubic feet plus numerous electronic information systems. This total includes approximately 28,000 cubic feet of inactive records, approximately 3,710 cubic feet of inactive records stored off-site (approximately 2,758 cubic feet at the Federal Records Center in Atlanta, 916 cubic feet at the BA records center in Neosha, Missouri, and 36 cubic feet at the Washington National Records Center). Approximately 22,000 active records are maintained in offices and in the Document Management Centers through Y-12.

# APPENDIX L

# Examples of Requirements for Institutional Controls

The following are examples of requirements for institutional controls and the section of a RCRA Closure permit resulting from them.

# 1. EXCERPT FROM FEDERAL REQUIREMENTS FOR INSTITUTIONAL CONTROLS

## Section 264.119, Post-closure notices

(a) No later than 60 days after certification of closure of each hazardous waste disposal unit, the owner or operator must submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Regional Administrator a record of the type, location, and quantity of hazardous wastes disposed of within each cell or other disposal unit of the facility. For hazardous wastes disposed of before January 12, 1981, the owner or operator must identify the type, location, and quantity of thc hazardous wastes to the best of his knowledge and in accordance with any records he has kept.

(b) Within 60 days of certification of closure of the first hazardous waste disposal unit and within 60 days of certification of closure of the last hazardous waste disposal unit, the owner or operator must:

(1) Record, in accordance with State law, a notation on the deed to the facility property – or on some other instrument which is normally examined during title search – that will in perpetuity notify any potential purchaser of the property that:

(i) The land has been used to manage hazardous wastes; and
(ii) Its use is restricted under 40 CFR Subpart G regulations; and
(iii) The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or other hazardous waste disposal unit of the facility required by Sections 264.116 and 264.119(a) have been filed with the local zoning authority or the authority with jurisdiction over local land use and with thc Regional Administrator; and

(2) Submit a certification, signed by the owner or operator, that he has recorded the notation specified in paragraph (b)(1) of this section, including a copy of the document in which the notation has been placed, to the Regional Administrator.

(c) If the owner or operator or any subsequent owner or operator of the land upon which a hazardous waste disposal unit is located wishes to remove hazardous wastes and hazardous waste residues, the liner, if any, or contaminated soils, he must request a modification to the post-closure permit in accordance with the applicable requirements in Parts 124 and 270. Thc owner or operator must demonstrate that the removal of hazardous wastes will satisfy the criteria of Section 264.117(c). By removing hazardous waste, the owner or operator may

become a generator of hazardous waste and must manage it in accordance, with all applicable requirements of this chapter. If he is granted a permit modification or otherwise granted approval to conduct such removal activities, the owner or operator may request that the Regional Administrator approve either:

(1) The removal of the notation on the deed to the facility property or other instrument normally examined during title search; or
(2) The addition of a notation to the deed or instrument indicating the removal of the hazardous waste.

# 2. EXCERPT FROM THE NEW HOPE POND CLOSURE PERMIT

## E. NOTICES AND CERTIFICATIONS

(1) No later than 60 days after certification of closure of New Hope Pond and Eastern S-3 Ponds Units, the Permittee shall submit to the local zoning authority, or the authority, with jurisdiction over local land use, and the Commissioner (if applicable):

(a) In accordance with 40 CFR 264.116 incorporated by reference in Tennessee Rule 1200-1-11-.06(7)(a), the Permittee shall provide a survey plat indicating the locations and dimensions of hazardous waste disposal units with respect to permanently surveyed benchmarks. This plat must be prepared and certified by a professional land surveyor. The plat filed with the local zoning authority or the authority with jurisdiction over local land use, must contain a prominently displayed note stating that it is the owner's or operator's obligation to restrict disturbance of the hazardous waste disposal unit.

(b) In accordance with 40 CFR 264.119 incorporated by reference at Tennessee Rule 1200-1-11-.06(7)(a), the Permittee shall maintain a record of the type, location and quantity of hazardous waste disposed of within each cell or other disposal unit of the facility. For hazardous waste disposed of before March 2,1981, the owner or operator must identify the type, location, and quantity of the hazardous wastes in accordance with disposal records and to the best of his or her knowledge.

(2) In accordance with 40 CFR 264.119 incorporated by reference at Tennessee Rule 1200-1-11-.06(7)(a), and within 60 days of certification of the unit, the owner or operator must:

(a) Record, in accordance with Tennessee Law, a notation on the deed to the facility property or on some other instrument normally examined during title search that will in perpetuity notify any potential purchaser of the property that:

(i) The land has been used to manage hazardous wastes;
(ii) Its use is restricted under Tennessee Rule Chapter 1200-1-11 regulations; and
(iii) The survey plat and record of the type, location and quantity of hazardous wastes disposed of within each unit has been filed with the local zoning authority and with the Commissioner.

(b) Submit a certification signed by the owner or operator that he has recorded the notations specified in Permit Condition IIIE.2(a), and a copy of the document in which the notation has been placed, to the Commissioner.

(3) If the Permittee or any subsequent owner or operator of the land containing the hazardous waste disposal unit wishes to remove hazardous waste and hazardous waste residues, the liner, and all contaminated structures, equipment and soils, he must request a modification to the Post-Closure Permit in accordance with the applicable requirements of Rule 1200-1-11-.07

(4) No later than 60 days after completion of the post-closure care period, the owner must submit to the Commissioner, by registered mail, a certification that the post-closure care period was performed in accordance with the specifications in the approved post-closure plan. The certification must be signed by the owner or operator and an independent, registered professional engineer. Documentation supporting the independent registered professional engineer's certification must be furnished to the Commissioner upon request.

# APPENDIX M

# Reservation Environmental Stewardship Research Program

# 1. BIOREMEDIATION RESEARCH

The following is excerpted from a proposal to the U.S. Department of Energy Office of Science Biological and Environmental Research Office to establish a Field Research Center (FRC) for Natural and Accelerated Bioremediation Research, June 1, 1999, by David Watson and Gary Jacobs, Environmental Sciences Division, Oak Ridge National Laboratory.

## Introduction to Research Plans

The proposed FRC meets all specifications for NABIR research. The site has varied sediments, contaminants, redox conditions, flow regimes and depths of interest. Because our sites are well characterized, shallow and easily accessible through inexpensive push-probe and other innovative sampling technologies we will be able to cost-effectively meet NABIR objectives. Our characterization and research approach will entail recommending what we feel are most appropriate research efforts in addition to meeting PI and NABIR expectations. The site is well suited for intrinsic bioremediation studies as these have been performed in nearby areas and will continue over ensuing years. Accelerated bioremediation is appropriate to the area as demonstrated by the increased microbial activity observed at the reactive barrier research sites located immediately down-gradient and lateral to the proposed FRC, when guar gum was used to excavate the trench. Bioaugmentation has been successfully performed, even with GEMS in the adjacent lysimeters (OBER-funded research), and so our personnel are well acquainted with bioaugmentation and biostimulation and toxic waste issues related to these activities. Biostimulation and novel microorganism activities/persistence were performed in the lysimeters and are likewise appropriate for the FRC. We have experience with injecting hydrocarbons, methane, air, nutrients, gases, volatile acids, various ionic and inert tracers, and microorganisms in this and/or nearby environments that will be directly transferable to FRC research. In addition we will transfer ORNL skills and expertise in research and development, management, and investigative approaches developed from our extensive collaborations with EM, RTDF, USGS, current NABIR PI's, and other OBER field research activities.

## Proposed Approach to Experimental Use of the FRC Field Sites

Our general approach to the use of the FRC field sites will be two fold, with an emphasis on initiating activities involved with intrinsic bioremediation and an effort to anticipate and accommodate future needs in accelerated bioremediation research (e.g., injection of materials to stimulate bioremediation). For example, we envision employing various bioremediation strategies to reduce mobile U(VI) to the sparingly soluble, highly immobile U(IV) species. This may involve biostimulation of indigenous metal-reducing bacteria at the site, or direct injection of metal-reducing into the groundwater. Along with these activities, early efforts will be made (e.g., during the characterization phase) to provide investigators with subsurface material from contaminated and control sites for laboratory studies. The characterization activities are largely outlined in other sections of the document. Researchers will need to know extent of the plumes, detailed data on contamination, groundwater hydrodynamics and geochemistry, and the spatial and temporal distribution of microbial activity. Much of

this information already exists for the field facilities and we discuss this as well as additional site variables that will be measured by the FRC staff. Additional measurements will be made by FRC staff upon consultation with PIs and program management. Also, samples shipped to PIs, upon request, during the initial characterization activities will provide opportunities for other measurements important in examining *in situ* bioremediation.

Existing NEPA Categorical Exclusion documents will allow for many activities that may be needed in studies of accelerated bioremediation. The nature of the site will allow for research in several zones of the contaminated site in which different alterations can be made with minimal or no impact on other zones where other subsequent alterations are made. Still, care will be take to achieve consensus at the program level to determine what alterations will be made so that the field site is still usable for subsequent activities. This issue is also addressed by having an active research advisory panel to the FRC.

## NABIR GOALS and the Proposed Approach

In order to achieve the goals of the NABIR program, the chosen field site must accommodate a range of bioremediation activities that serve to test scientific hypothesis on clean up and offer opportunities for multiple investigator and stakeholder interactions. The proposed field site will meet these expectations. The site offers an easily accessible subsurface environment that will facilitate the scientific research in NABIR in both vadose zone and saturated zone environments.

As stated in the NABIR request for proposals (quotes that follow), the site will accommodate the critical activities that must occur to allow for research that will "develop cost-effective bioremediation approaches for radionuclides and heavy metals and mixtures of contaminants . . ." This goal must be achieved by the testing of bioremediation approaches in the field. The approach proposed allows for multiple tests of different bioremediation approaches, as the site is large enough to accommodate these.

The site will offer opportunities for studies aimed at the second strategic goal "understanding intrinsic bioremediation as well as opportunities for manipulated, accelerated bioremediation using chemical/microbial amendments" and the third strategic goal, "integrate bioremediation with conventional physical-chemical remediation . . ." Intrinsic remediation can be examined due to the presence of well documented contaminants and particularly important is a well documented source area. Thus, processes contributing to the current distribution of the contaminants can be traced back to the origins of the contaminants. The previous characterization activities and previous experience with injections on the ORR give us confidence that injections and manipulations can be performed at the site and that these goals can be met. The site has varied sediments, contaminants, redox conditions, flow regimes and depths of interest. The major research area comprises shallow, easily accessible, unconsolidated sediment lying in the vadose and saturated zones. The site is well suited for intrinsic bioremediation studies as these have been performed in nearby areas and will continue over ensuing years. Accelerated bioremediation is appropriate to the area as

demonstrated by the barrier research immediately upgrading and lateral to the proposed FRC. Bioaugmentation has been successfully performed, even with GEMS in the nearby lysimeters (OBER-funded research) and so our personnel are well acquainted with bioaugmentation and biostimulation and toxic waste issue related thereto. Biostimulation and novel microorganism activities/persistence were performed in the lysimeters and are likewise appropriate for the FRC.

Potential manipulations at the site might include the injection of required nutrients, identified from site characterization studies, for the biostimulation of metal reducing activity for the purpose of immobilizing U(VI). Subsequent sampling activities intended to delineate changes in plume characteristics would provide samples that could be available for characterizing the community dynamics/microbial ecology of the manipulated site. Alternatively, if the manipulation includes the injection of GEMs or enriched native strains from the site, sampling regimes would allow investigators to delineate the bacterial plume and accompanying geochemical and microbial changes.

An important goal of NABIR is to "coordinate research activities with other DOE research programs. . ." and the multiple interactions of the proposed FRC team with other DOE research programs will facilitate this goal. For example, P. Jardine and S. Brooks are funded by EMSP and A. Palumbo is funded by EM-50. Also, many of the team members collaborate with investigators, within DOE and academia, in other DOE research programs. The management structure proposed for the site will also facilitate this coordination. The work of the team on NABIR, earlier OBER subsurface science programs, and other DOE research programs provides a wealth of valuable experience and contacts that can be used to facilitate the coordination.

The experience will also allow the team to effectively address the goal "allow regulators, local communities, and other stakeholders the opportunity to evaluate bioremediation." The team has experience in planning for injecting hydrocarbons, methane, air, nutrients, volatile acids, various ionic and inert tracers, and microorganisms in this and/or nearby environments that will be directly transferable to the FRC research and has involved stakeholder interactions.

## 2. BASIC ENVIRONMENTAL RESEARCH

The following three pages contain the original outline for an environmental research program recommended in 1957 by S. I. Auerbach and K.Z. Morgan. The recommendations are still applicable today.

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OAK RIDGE NATIONAL LABORATORY
Operated by
UNION CARBIDE NUCLEAR COMPANY
Division of Union Carbide Corporation
Post Office Box X
Oak Ridge, Tennessee

External Transmittal Authorized

ORNL
CENTRAL FILES NUMBER
57-12-25

DATE: December 4, 1957 COPY NO. 46

SUBJECT: Need for Reserving Melton Valley for Long Range Ecological Studies.

TO: A. M. Weinberg

FROM: K. Z. Morgan and S. I. Auerbach

Distribution

see pages i and ii

NOTICE

This document contains information of a preliminary nature and was prepared primarily for internal use at the Oak Ridge National Laboratory. It is subject to revision or correction and therefore does not represent a final report.

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Need for Reserving Melton Valley for Long Range Ecological Studies 1

I. Introduction

The increased interest in the large-scale environmental effects of radioactivity has presented us with an unusual research opportunity. Because of varied interests in the location of research projects in the area, I have requested S. I. Auerbach of the Ecology Group to study and suggest the area most suited for the Ecology Program of the Laboratory. This area is the valley immediately south of the Laboratory lying between Haw and Copper Ridges and commonly known as Melton Valley (Plate 1 - A, B). It is a unique, almost made-to-order ecological research area which has no duplicate anywhere in this country.

II. Uniqueness of Melton Valley for Ecological Studies

A. The valley contains a large variety of forest and field (Plates 2, 3) habitats; most of these undisturbed since the acquisition of the property by the Federal Government.

B. These habitats are divided between two drainage systems (Plate 1 - A,B). One of these, which is uncontaminated (Bearden Creek) drains into the Clinch River from the eastern portion of the valley. The other, which is contaminated (White Oak and Melton Creeks) drains into the Clinch River from the west part of the valley.

C. Draining of the White Oak Lake impoundment has resulted in 40 acres of terrain contaminated with strontium-90, cesium-137, and other fission products, to a degree which would be almost impossible to duplicate upon demand.

D. Additional terrain is also being contaminated by seepage from the radioactive waste pits, by burial areas, and contaminants put into the creeks. These contaminated areas include both disturbed and undisturbed habitats.

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II. (continued)

E. The eastern, uncontaminated and undisturbed portion of the valley is ideal for a control area:

1. The geological formations are the same.
2. The vegetation and habitats in the eastern half of the valley (Plate 3) are, in general, the same as those in the western half (Plate 2).

F. The size of the valley (approx. 5 sq. mi.), the variety of habitats, and the fact that it is partially contaminated makes it suitable for:

1. Long-term, large-scale field environmental studies.
2. Controlled field experiments where particular areas can be contaminated with individual fission products or combinations of fission products.

III. Uniqueness of Melton Valley in Contrast to the Remainder of the Controlled Area.

A. It is the only valley in which the major part has been left undisturbed since acquisition.

1. There has not been the mass reforestation (pine plantings) typical of the rest of the reservation and which has rendered those planted areas less suitable for ecological studies.
2. There was little or no selective timbering of the large trees in this valley under the now discontinued forestry program.

B. It is bounded by the Clinch River at either end, and thus has a natural boundary.

IV. Conclusions.

Because of the current and growing interest in environmental problems and environmental research related to radioactive contamination, the eastern half of Melton Valley should be preserved in its present relatively undisturbed condition and no laboratory facilities should be established this area.

# APPENDIX N

# Minority Recommendations

# Minority Cost and Funding Recommendations

These recommendations are based on a minority cost and funding report included in this appendix. Based on it, the following alternative cost and funding recommendations are highlighted.

1. Two PBS accounts should be established for stewardship, one for trust fund(s) account and one for stewardship annual costs. The USDOE-OROO should transfer completed remediation projects to stewardship as soon as completed.
2. Stewardship costs should be carefully analyzed and defined for the period of remediation and early stewardship, through 2050. A study should be made of projected stewardship costs—routine and emergency—for long-term stewardship, 2050 to 2300.
3. In addition to the Waste Maintenance Cell trust fund, a Stewardship Emergency Trust Fund (SETF) should be established to achieve $50 million by 2050, to cover long-term monitoring and fence line repair from interest costs. Congress should appropriate $1 million per year FY 2001 to FY 2050. The fund should be administered by USDOE-ORO O as the principal steward.

# Additional Minority Recommendations on Stewardship Research

One member of the Stewardship Working Group recommended that the following two items be added to Section 4.1.10.2, “Elements of Research Program.”

4. Quantify risk and risk management, and relate to surveillance, maintenance and water treatment functions/funding fore stewardship as a function of time periods. Specifically quantify for ORR, Sr-90, Hg, and uranium risk and risk management as recommended by D. M. Axelrod at the Stewardship PEIS Scoping Meeting.

5. Stewards and public awareness for the long term, especially intergenerational.

*NOTE: The minority recommendations and other material included in this appendix were submitted by Daniel M. Axelrod.*

3.5A ALTERNATIVE COST & FUNDING REPORT by Daniel M. Axelrod

COSTS OF STEWARDSHIP

3.5A1 STEWARDSHIP COSTS are reported in OROO Paths to closure report (draft) May 1999, as approximate annual escalated costs of : Y-12 $10Million
ORNL $ 8Million
ETTP $ ¼Million
ORR off-site $0.8Million, total about $19Million.

3.5A2 COSTS UNSUBSTANTIATED in the report; although some indication is given of scope. The Cost & Funding Committee did see an uncosaordinated compilation of cost bases and costs for ORNL (BethEL Valley/Melton Valley). Because Stewardship costs over the long term can be quite large, USDOE-OROO should assure that a carefully prepared report on stewardship costs is prepared for each site.

3.5A3 SURVEILLANCE stewardship costs were reported orally at $10Million/yr, similar to current costs. This could/ should be reduced to $2MM/yr by reducing 50,000water samples/year to 5000 water samples/year. A savings of $128Million! over the 16 years of remediation, FY2000-2015. Releases are reported at about 1mr/yr air and 1 mr/yr water, or less than 1% of 300mr/yr natural background radiation.
If each water sample/analysis costs $2500, eliminating excess sampling/analysis could pay $2500/newer higher mile per gallon automobile to replace all Oak Ridge area old, gas-guzzling, clunker automobiles.

3.5A4 MAINTAINANCE is reported at $6Million/year, variable with time. Maintainance costs need to be determined by actual experience and need as a function of time frame:
2000-2015: Remediation era
2016-2050: Early stewardship
2050-2300: Longterm stewardship
By 2050 Sr90/Cs137, both with about 30 year halflives, will have decayed from about 3x drinking water standard to about drinking water standard, at White Oak Lake. This is before about 2000fold dilution factor byClinch River. By 2300 decay would be to 1/1000th of current.

3.5A5 WATER TREATMENT amounts to several/many $million/year. Water treatment costs could/should be divided simplistically, between stewardship (Melton Valley BearCreek Valley) and operating costs (ORNL/ Y-12).

3.5A6 PBS ACCOUNTS should be started for stewardship as follows:(1) Trust Fund(s) for Stewardship both accumulation and if used for emergency expenses.
(2) Annual appropriations for Stewardship, including trust fund annual interest if used for annual expenses.

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3.5A7 LONG TERM COSTS OF STEWARDSHIP SIGNIFICANT

USDOE ORO0 should determine when the PBS stewardship annual appropriations account is opened. For now, the Bechtel Jacobs budget baseline FY2000-2015 includes stewardship during ongoing remediation and the FY2015 stewardship for the first year after remediation. This IS an acceptable approach.

If stewardship runs $15-20MM/year, the total costs for 2016 to 2050 are well over $500MILLION total.

Similarly stewardship of $15-20MM/year, the total costs 2050-2300 are well over $4500 MILLION ($4.5Billion!)

Just the change in monitoring costs, noted above 3.5A3, significantly reduce these estimates.

For 2050-2300 USDOE should aim for about $2MM/yr for surveillance and fenceline maintaince, giving about $500Million total; plus annual appropriation for actual needs, competitively determined by experience. (The $2MM/yr would be covered by interest from SETF, see below.)

3.5A7 SHORT TERM 2000-2050: WHAT CAN GO WRONG

THe conventional and newer technology used in remediation can be evaluated to about 30 years after installation, and form the basis for stewardship cost estimates.

3.5A8 LONG-TERM 2050-2300: WHAT CAN GO WRONG

As noted above by 2050 Sr90 and Cs137 should be down to drinking water level in White Oak Lake (cf input by Dick Ketelle). For the long-term there is a need for USDOE sponsored studies of what can go wrong and what impact such breakdowns or catastrophes may have. Cap repair may not be warranted after 2050 if Sr90/Cs137 is already down to drinking water level, and the cap is better (although deteriorated) than current status.

On the other hand fundamental causes might require emergency actions, and these should be evaluated, e.g.:

| Fundamental Cause | What Can Go Wrong |
|---|---|
| Earthquake | White OakLake Dam Fails |
| 10-24"Rain/24-48Hrs | Waste Cell cover cracks |
| Human destruction | Water treat pump destroyed |

3.5A9 VERY LONG TERM; MANY THOUSAND YEARS: Uranium, TRU, etc.

Uranium and some TRU isotopes have halflives many thousand years long. Similrly some metallic and chemical wastes may also be very long lived.

So far the uranium and Bear Creek Valley, and the smaller amounts in Melton Valley, have not created a problem. With planned in-situ vitrification they should be stabil-

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ized for very long times in glasslike/melted and resolidified structures. The C&F committee has not attempted to contemplate the very long term (Many thousands of years) costs for stewardship.

FUNDING FOR STEWARDSHIP

3.5A10 TRUST FUND FOR ORR WASTE MANAGEMENT CELL
I support the innovative State of Tenn proposed tipping fees to accumulate about a $14Million Trust Fund for the ORR waste management cell. I support Tennessee state government administering the trust fund.

3.5A11 ANNUAL APPROPRIATIONS are appropriate for the stewardship function, based on need and competition with other needs of the community. However, the SETF $2+MM/yr interest after 2050 should about cover the surveillance= warning and fenceline maintainance functions.

3.5A12 SETF: STEWARDSHIP EMERGENCY TRUST FUND ($50MILN IN 2050

I propose the SETF: Stewardship Emergency Trust Fund, based on annual Congressional appropriation of $1Million/year from FY2001 to 2050. At 4% annual earning it would provide in 2050etseq $2+MM/year toward surveillance and fenceline maintaince, minimum needs for the long term.

In addition, by 2016 the trust fund would be about equal to near term (2016-2050) annual stewardship. The SETF could/should be used to meet emergencies, and be replenished by an annual Congressional appropriation.

3.5A13 STF; STEWARDSHIP TRUST FUND
Most of the Cost & Funding Committee favored a "fully-funded" $360Million STF, which at 5%/year interest would pay for about $18MM/yr of stewardship. It would be accumulated at about $16MM/year, including reinvestment of interest in the trust fund principal through 2015.

I oppose the "fully-funded" STF, on the following key grounds:

1. Stewardship costs are not substantiated (eg 3.5A3)
2. I favor annual appropriations to compete for need.
3. I favor "Tradeoff Cleanup $1 Billion for Constructive Action" (per my Oak Ridgers 25August 1999 article.
4. ORR environmental releases are already,before further remediation, only about 1% of natural background
5. In any case I favor USDOE-OROO as the designated prime steward to administer the STF, not the State.

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# Trade off cleanup $1 billion for constructive action

Guest column

**Daniel M. Axelrod**

At the Aug. 9 meeting of the Oak Ridge Site-Specific Advisory Board Budget and Priority Project Team, Rick Ferguson of Bechtel Jacobs Co. presented a US-DOE-ORO environmental management program lifecycle baseline briefing.

He reported that the lifecycle baseline Oak Ridge Reservation budget for FY2000 to FY2015 was $5.1 billion.

Oak Ridge stakeholders should look at the total Oak Ridge needs, not just the environmental management baseline.

Accordingly, I propose trading off $1 billion of cleanup baseline for higher value constructive action projects.

It is estimated that with aggressive cost control management 10 percent ($1/2 billion) can be saved from current budget baseline estimates, and 10 percent ($1/2 billion) can be saved by eliminating the least desirable cleanup activities.

Further savings can be had, as currently being discussed in the Stewardship Working Group, by supporting a Stewardship Emergency Trust Fund of $50 million by 2050, rather than a Stewardship Trust Fund of $360 million by 2016 (at about $20 million/year) for a savings of $350 million, approximately by 2016.

What are examples of more desirable constructive action projects that the $1+ billion savings can be applied to:

1. Spallation Neutron Source Support — $100 million.
2. ORNL 10 percent added funding for a decade — $400 million.
3. Economic development west end infrastructure.
4. Oak Ridge Theta Pinch Studies toward a proposed first fusion demonstration plant.
5. OR college complex, adding to the Roane State Community College campus (and ORICL) an Oak Ridge adult education college, a federal R&D technical college, and a University of Tennessee graduate school extension.
6. ORNL/Bethel Valley Road public outreach: SNS visitor center, good restaurant, public access library with computer access to ORNL, X-10 historic reactor site and west end environmental stream simulation public access.
7. An environmental center at Freels Bend and environmental summer camp.

The EPA has noted that ORR environmental releases are now already minuscule at 1 millirem per year air and about 1 millirem per year water for a 1/10,000 cancer risk.

By comparison the OR Methodist Medical Center Regional Cancer facility has several hundred cancer cases per year. This is current radiation releases before another $5 billion cleanup effort over the next 15 years, baseline.

It would be very shortsighted for Oak Ridge stakeholders to put so much excess money into environmental management and cleanup and overlook so many constructive action opportunities for better spending federal taxpayer dollars.

*Daniel M. Axelrod is an Oak Ridge resident.*

**Words are sacred. They deserve respect. If you get the right ones in the right order, you can nudge the world a little.**

**— Tom Stoppard**
The Real Thing