DOE/EM-0283

CHARTING THE COURSE
THE FUTURE USE REPORT

APRIL 1996

UNITED STATES DEPARTMENT OF ENERGY
OFFICE OF ENVIRONMENTAL MANAGEMENT
OFFICE OF FIELD MANAGEMENT

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Dear Colleague:

In January 1994, Department of Energy (DOE) site managers were requested to collaborate with tribal, state, and local governments and stakeholders to develop recommendations concerning the future uses of land and infrastructure at 20 DOE sites. The Future Use Report reflects the results of two years of planning and provides land use recommendations developed by 16 sites. Additional recommendations from the remaining sites will be released as soon as they are completed.

Future use determinations can have a significant impact on environmental remediation and waste management decisions, capital asset management and reuse, and stewardship responsibilities. Land use recommendations are critical not only in guiding cleanup efforts, but also in helping to direct ongoing site activities and reuse initiatives. The Department must work to ensure that the recommendations presented in this report are incorporated into site cleanup strategies, comprehensive land use plans, reuse plans, and siting determinations, among other decisions.

Identifying appropriate future uses for DOE sites requires extensive public participation, as articulated by President Bill Clinton's National Performance Review and Secretary of Energy Hazel R. O'Leary's Land and Facility Use Policy. The recommendations presented in this report reflect significant input from a wide array of affected governments, citizens, advisory boards, interest groups, and others. We appreciate the tremendous contribution made by the many individuals, groups, and governmental entities who participated in developing recommendations.

Although the recommendations presented in this report help to set DOE's future course, the Department recognizes that planning is an iterative process and recommended uses may need revision in the future. Furthermore, some of the sites have not completed land use recommendations and others are still resolving differing input regarding specific parcels of land. We encourage you to participate in ongoing site planning efforts that will help DOE remain on a wise path.

In addition, we look forward to receiving your comments on this report during the next three months. Please contact Joan Glickman, Director, Future Use Project, or Cindy Kelly, Director, Office of Intergovernmental and Public Accountability, at (202) 586-5944 with any questions.

Thomas P. Grumbly
Assistant Secretary for
Environmental Management

Donald W. Pearman, Jr.
Associate Deputy Secretary for
Field Management

DOE/EM-0283

Charting the Course

The Future Use Report

April 1996

United States Department of Energy
Office of Environmental Management
Office of Field Management
Washington, DC 20585-0113

Table of Contents

Introduction *1*

Future Use: A Critical Factor in DOE Decisions *7*

Overall Findings and Next Steps *13*

Argonne National Laboratory - East *23*

Brookhaven National Laboratory *25*

Fermi National Accelerator Laboratory *29*

Fernald Environmental Management Project *31*

Hanford Site *37*

Idaho National Engineering Laboratory *43*

Kansas City Plant *49*

Lawrence Livermore National Laboratory *53*

Los Alamos National Laboratory *57*

Mound Plant *61*

Nevada Test Site *65*

Oak Ridge Reservation *69*

Paducah Gaseous Diffusion Plant *77*

Pantex Plant *81*

Pinellas Plant *85*

Portsmouth Gaseous Diffusion Plant *89*

Rocky Flats Environmental Technology Site *93*

Sandia National Laboratories/Albuquerque *99*

Sandia National Laboratories/California *103*

Savannah River Site *105*

Appendix A: Resource Guide and Points of Contact *111*

Appendix B: Submissions Memorandum *115*

Appendix C: Final Draft Memorandum *117*

Appendix D: Hazel O'Leary Memorandum *119*

Notes *120*

Notes *121*

Notes *122*

List of Figures

Figure 1. Participating Sites *2*
Figure 2. Future Uses' Influencing Factors *3*
Figure 3. Public Involvement in the Future Use Planning Process *4*
Figure 4. Future Use: Relationship to Key DOE Decisions *7*
Figure 5. Future Use and Community Involvement in the Cleanup Process *8*
Figure 6. Land Use Categories *13*
Figure 7a. Acreage Breakdown by Land Use Category *15*
Figure 7b. Site Distribution by Land Use Category *15*
Figure 7c. Typical DOE Site Future Use Recommendations *16*
Figure 8. Major Avenues Used to Develop Future Use Recommendations *18*
Figure 9. Argonne National Laboratory - East – Future Land Use Map *23*
Figure 10. Brookhaven National Laboratory – Future Use Map *25*
Figure 11. Fermi National Accelerator Laboratory – Future Land Use Map *29*
Figure 12. Fernald Site – Future Use Map *31*
Figure 13. Hanford Site – Future Site Uses Working Group Study Areas Map *37*
Figure 14. Idaho National Engineering Laboratory – Future Use Map, 100-Year Scenario *43*
Figure 15. Kansas City Plant – Future Use Map *49*
Figure 16. Lawrence Livermore National Laboratory – Future Use Map *53*
Figure 17. Los Alamos National Laboratory – Current General Land Use Map *57*
Figure 18. Mound Plant – General Future Use Map *61*
Figure 19. Nevada Test Site – Current General Land Use Map *65*
Figure 20. Oak Ridge Reservation – Future Use Map *69*
Figure 21. Oak Ridge Reservation – City of Oak Ridge Land Use Plan *75*
Figure 22. Paducah Gaseous Diffusion Plant – Future Use Map *77*
Figure 23. Pantex Plant – Future Use Map *81*
Figure 24. Pinellas Plant – Future Use Map *85*
Figure 25. Portsmouth Gaseous Diffusion Plant – Future Use Map *89*
Figure 26. Rocky Flats Environmental Technology Site – Future Use Map *93*
Figure 27. Sandia National Laboratory/Albuquerque – Interim Land Use Map *99*
Figure 28. Sandia National Laboratory/California – Future Use Map *103*
Figure 29. Savannah River Site – Future Use Map *105*
Figure 30. Savannah River Site – Citizens Advisory Board Future Use Recommendations *109*

Introduction

Identifying future uses for Department of Energy (DOE) sites and facilities has evolved as a central issue in recent years. The end of the Cold War compelled the Department to reexamine its current and future missions, identify ways to consolidate defense-related activities across the complex, and consider opportunities for expanding areas of technological research and environmental management. As DOE grappled with the challenge of refocusing its programs, the question of future land use crystallized as a major consideration for a number of reasons.

First, in addition to directing reconfiguration plans, land use determinations play a key role in guiding one of DOE's primary efforts — the remediation of contaminated properties and the disposition of Cold War legacy wastes. Second, land use considerations are essential in helping DOE and affected communities identify and implement beneficial reuse of federal land, facilities, and equipment that are no longer needed as a result of defense downsizing and changing missions. Finally, land use concerns are integrally tied to the Department's commitment to serve as a steward of national resources.

Summary Report: Purpose and Scope

This report is divided into two parts. Part I consists of three short sections. The introductory section provides an overview of the Future Use Project and describes the degree to which different sites have engaged in future use planning. The second section, entitled "Future Use: A Critical Factor in DOE Decisions," provides a context in which to consider land use by explaining the relationship between future use planning and four other key concerns: environmental management, public involvement, stewardship and comprehensive planning, and land and facility reuse. The third section, entitled "Overall Findings and Next Steps," discusses the sites' overall recommendations and lessons learned. In addition, this section analyzes some of the significant issues raised by the future use recommendations and outlines the next steps that DOE must take to ensure that its lands are used appropriately.

Part II consists of site summaries for each of the 20 sites involved in the future use planning process. Fifteen of the 20 participating sites completed recommendations by January 1996, and status reports are provided for the remaining five sites. The latter sites' recommendations will be released as addenda to this report when they become available. The 20 sites are listed and depicted geographically in Figure 1 on p. 2. Each summary includes the following information to the extent available:

- recommendations, including maps,
- site characteristics,
- cleanup implications,
- description of the site's public involvement process, and
- long-term implementation plans.

In most cases, the correlation between the future use recommendations and remedial decisions is not yet fully understood; therefore, detailed information on projected cleanup strategies is not provided. Unless otherwise stated in a particular summary, the site land use recommendations developed to date are consistent with the land use assumptions made in the anticipated *1996 Baseline Environmental Management Report's* (BEMR) baseline projection.

Of the 15 sites with completed recommendations, most have reconciled disparities among different internal and external interest groups and have arrived at future use recommendations to wisely guide cleanup decisions, reuse plans, and general planning efforts. In cases where consensus recommendations were not achieved, unresolved issues are highlighted and alternative maps are provided if available.

Sites meeting the following three criteria were directed to generate future use recommendations with significant public involvement:

1. *land and facilities are owned by DOE,*
2. *the site is required to conduct site development planning per DOE Order 4320.1B; and*
3. *the site has contamination that will require some level of cleanup.*

The twenty sites that met these criteria were requested to initiate site-specific planning processes and report their recommendations by December 1995.

The Department's **Forging the Missing Link: A Resource Document for Identifying Future Use Options**, *provided a framework to aid the sites in developing appropriate planning approaches.*

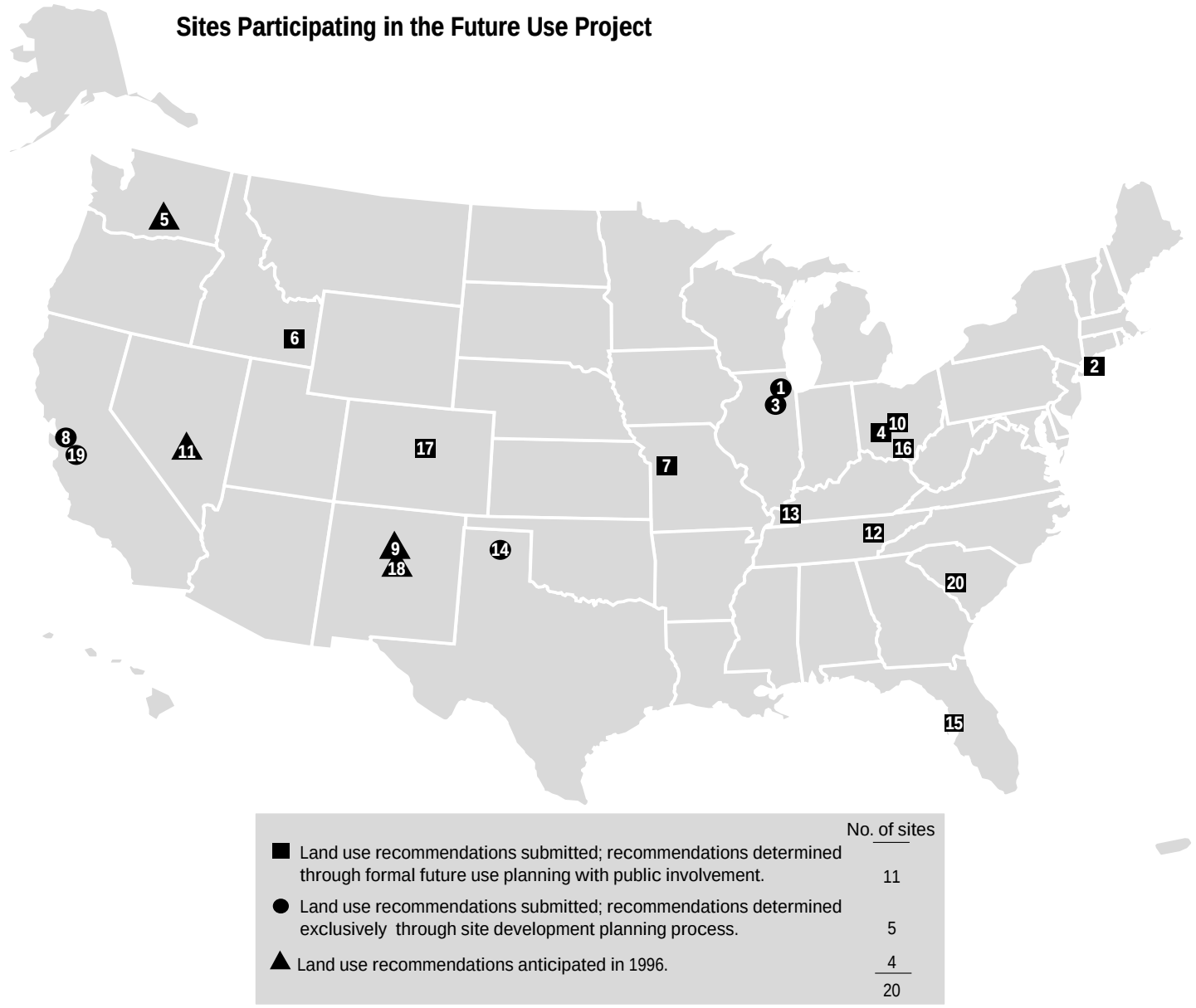

Figure 1. Participating Sites

1. Argonne National Laboratory - East (IL) p. 23
2. Brookhaven National Laboratory (NY) p. 25
3. Fermi National Accelerator Laboratory (IL) p. 29
4. Fernald Environmental Management Project (OH) p. 31
5. Hanford Site (WA) p. 37
6. Idaho National Engineering Laboratory (ID) p. 43
7. Kansas City Plant (MO) p. 49
8. Lawrence Livermore National Laboratory (CA) p. 53
9. Los Alamos National Laboratory (NM) p. 57
10. Mound Plant (OH) p. 61
11. Nevada Test Site (NV) p. 65
12. Oak Ridge Reservation (TN) p. 69
13. Paducah Gaseous Diffusion Plant (KY) p. 77
14. Pantex Plant (TX) p. 81
15. Pinellas Plant (FL) p. 85
16. Portsmouth Gaseous Diffusion Plant (OH) p. 89
17. Rocky Flats Environmental Technology Site (CO) p. 93
18. Sandia National Laboratories - Albuquerque (NM) p. 99
19. Sandia National Laboratories - California (CA) p. 103
20. Savannah River Site (SC) p. 105

Complete Site Reports. *Appendix A provides a list of relevant documents developed to date by each site as well as information on how to obtain these resources. Eleven sites submitted future use recommendations; a stakeholder group at Hanford formulated land use recommendations and submitted a report which will strongly influence the site's final recommendations. Additional recommendations from four sites are anticipated for completion during 1996.*

Background: The Future Use Project

In recognition of the importance of future use determinations to the diverse DOE planning and decision-making activities at both site and Departmental levels, the Department initiated the Future Use Project in 1994 to begin to evaluate future use options at its sites. In turn, DOE sites that met the aforementioned criteria were directed to institute future use planning and collaborate with their affected and interested communities to develop site-specific, future use recommendations.

The primary purpose of the Future Use Project is to develop stakeholder future use recommendations that can serve as input to efforts and decisions concerning environmental management, site comprehensive planning and stewardship responsibilities, and reuse of excess land and facilities. In light of these goals, the Future Use Project encourages sites to address a number of factors (see Figure 2) as part of their future use planning processes.

Broad and Meaningful Participation.

In order to develop recommendations that reflect both internal and external preferences, sites should undertake planning processes that include tribal and local governments, regulators, internal program representatives, advisory boards, and advocacy groups, among others (see Figure 3).

Consideration of Opportunities and Constraints.

Sites must work with interested individuals and groups to consider data that might influence the development of appropriate recommendations. Relevant information includes existing regulatory agreements, site characteristics, natural resources, cultural and historic resources, contamination profiles, technological feasibility, and cost implications.

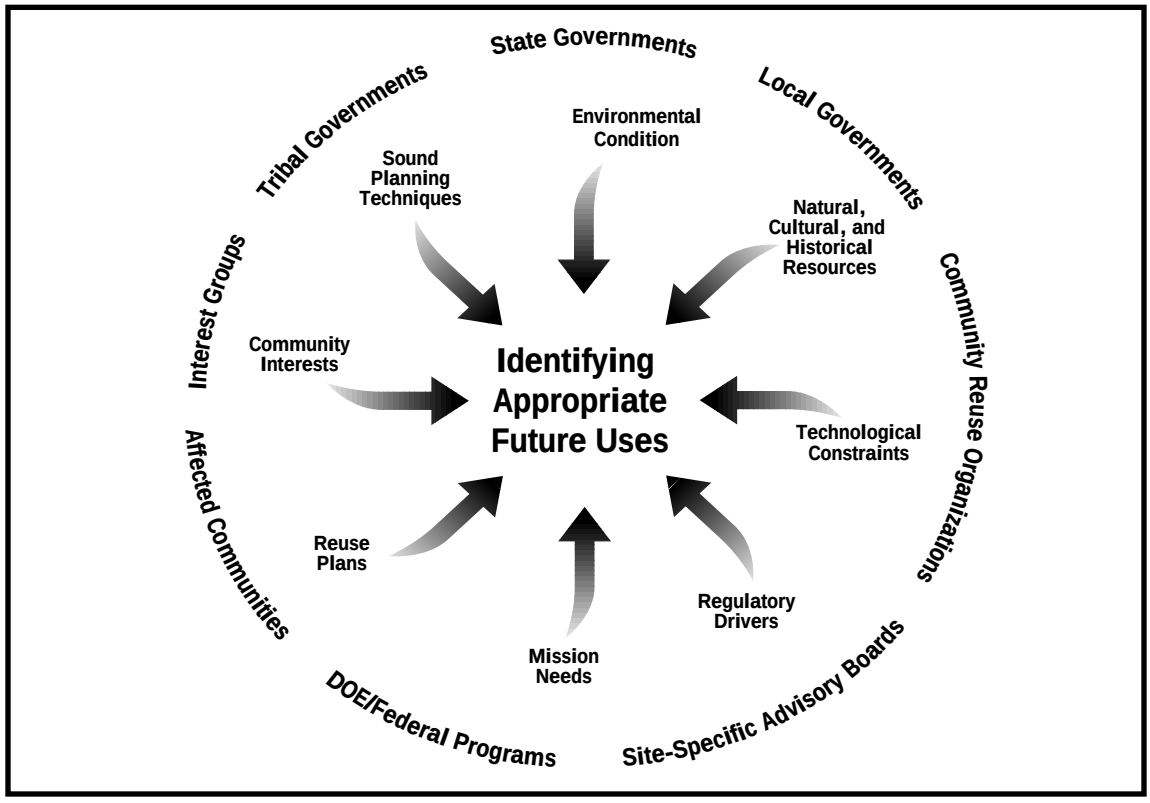

Figure 2. Future Uses' Influencing Factors

A number of different factors, including those depicted, must be taken into account when developing land use recommendations. Furthermore, many governmental entities, groups, and individuals should be involved in assessing these features and generating appropriate and feasible future use recommendations.

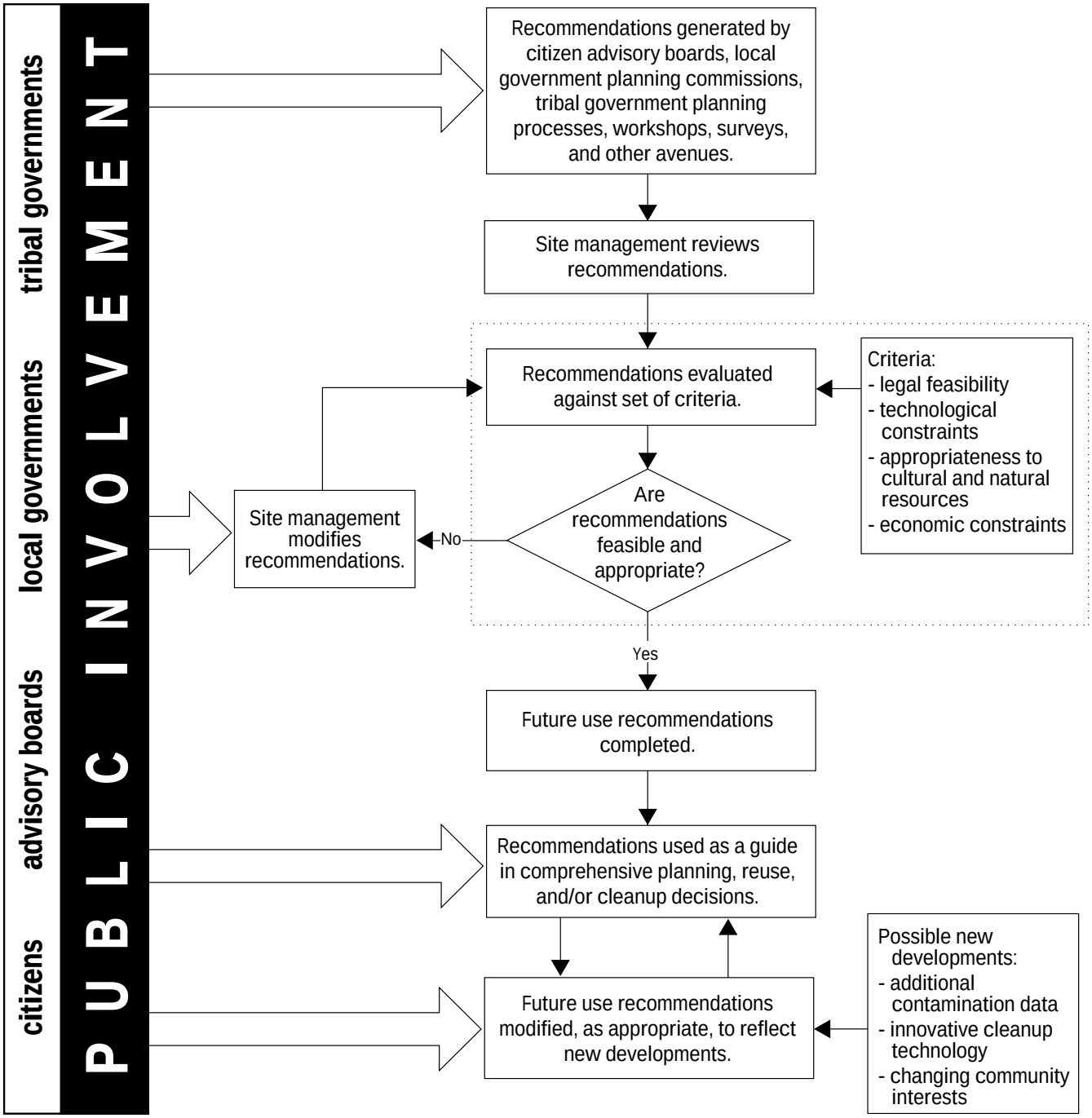

Figure 3. Public Involvement in the Future Use Planning Process

This chart describes a generic future use planning process as well as the different roles that affected governments, the public, the site, and DOE Headquarters play in the process. As the top of the chart indicates, future use recommendations should be generated with significant input from affected governments and the public. In some cases, DOE sites worked closely with affected communities and groups to develop land use recommendations. In other cases, citizen advisory groups generated and submitted land use recommendations to the site, and the site responded in turn with comments. In all cases, DOE sites, DOE Headquarters, and affected and interested communities and individuals must resolve differing preferences and develop future use plans to guide site activities. Furthermore, future use recommendations must be evaluated against appropriate criteria and modified if necessary to ensure technological and legal feasibility, among other issues.

Development of Clear Land Use Recommendations.

Sites must develop future use recommendations with corresponding maps and clear descriptions of intended future uses. Sites are encouraged to the extent possible to provide information concerning exposure assumptions, anticipated institutional controls, projected timing of cleanup, and any links to reuse efforts.

At this time, DOE is beginning to focus on the latter part of the planning process, that emphasizes application of future use recommendations to DOE environmental, facility planning, and reuse decisions, among others. However, many sites are still in the process of working with DOE Headquarters and interested constituencies to evaluate the appropriateness and feasibility of recommendations developed to date. Furthermore, as Figure 3 illustrates, future use recommendations and plans must be reviewed and updated periodically in order to adjust for new information or interests, such as additional site characterization data, innovative technological developments, and changing community goals.

Future Use Planning: An Iterative Process

The future use recommendations are meant to serve as a foundation for making Departmental and community decisions. The recommendations alone do not represent final decisions or an end to the need for ongoing planning efforts. Even in instances where sites have generated one set of land use recommendations with widespread community support, DOE recognizes that land use planning is a dynamic process in which plans must be refined to reflect new information or needs. Therefore, DOE is committed to undertaking long-term site comprehensive planning, with the significant involvement from affected governments and the public, to ensure implementation of the future use recommendations and further definition of appropriate specific land and facility uses. Final cleanup decisions that directly affect and reflect land use will be determined through the Superfund remedial investigation/feasibility study and the RCRA Facility Study/Corrective Measures Study (FS/CMS).

Future Use: A Critical Factor in DOE Decisions

During the years following World War II, the United States government created a sizable nuclear weapons and research complex — approximately 50 major sites, 2.4 million acres, and 20,000 facilities — that was largely devoted to weapons research and production, as well as nuclear energy and high-energy physics research. During this period, DOE installations generally operated independently of local and regional jurisdictions and oversight. For both safety and national security purposes, large buffer areas with restricted access were created around many of the production and research facilities.

With the end of the Cold War, DOE's nuclear weapons production ceased and nuclear energy development missions declined. The Department entered a new era with new responsibilities and philosophies. Four new areas of focus, in particular, compelled the Department to reconsider and define future uses for its sites with significant involvement by affected governments and the public.

As the first new focus, the Department adopted environmental management as a primary mission in response to growing recognition of the enormity of environmental contamination and legacy waste problems. Second, under the Clinton Administration, the Department has emphasized a new commitment to disclosing information to the public so that the public can make more informed decisions about our sites as well as actively involving governmental partners, organizations, and citizens in its decisions. Third, in 1994, the Department issued a secretarial policy on land use that formally recognized its responsibility to act as a steward of national resources. Finally, as defense activities declined and the Environmental Management program matured, the Department recognized the need to define reuse strategies for many of its facilities and buffer areas that are now or will be excess to Departmental mission needs. This section discusses how future use is linked to the Department's four central concerns.

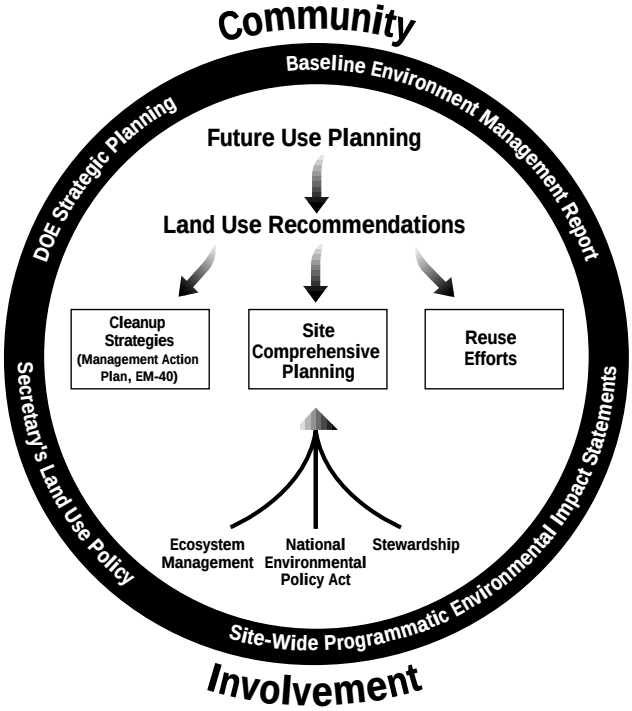

Figure 4. Future Use: Relationship to Key DOE Decisions

As this figure illustrates, the future use recommendations must be integrated into a number of critical DOE initiatives, including cleanup efforts, comprehensive planning, and reuse decisions. In fact, as the lines indicate, all of these efforts are interdependent.

The outer circle demonstrates that other factors also come into play. The Baseline Environmental Management Report (BEMR) analyses, Environmental Impact Statement (EIS) determinations, DOE's strategic plan, and other Departmental efforts should reflect and affect land use, cleanup, siting, and reuse, among other decisions. Finally, affected governments and communities must participate in an overall planning process with involvement in National Environmental Policy Act (NEPA) processes, strategic planning, remedial decisions, reuse determinations, and comprehensive planning.

Land Use: Factoring in Environmental Management and Cleanup

As remediation programs progressed into the 1990s, the Department recognized that future use determinations were critical in guiding environmental restoration and waste management

decisions. In fact, environmental regulations and guidance, including the National Contingency Plan, support the need to consider land use in conducting risk assessments and making remedial decisions.

The Environmental Protection Agency (EPA) recently reiterated the importance of land use in risk assessment and remedy selection with its 1995 Land Use Guidance [Office of Solid Waste and Emergency Response Directive No. 9355.7-04, Land Use in the Comprehensive Environmental Response, Comparison, and Liability Act (CERCLA) Remedy Selection Process]. The guidance promotes the consideration of relevant information in developing land use assumptions and clarifies how these assumptions should be factored into the baseline risk assessment, the assessment of remedial alternatives, and the remedy selection process. In particular, the guidance emphasizes the need to consult with local planning entities and citizens from affected communities early in the process in order to make reasonable assumptions about how a site will be used in the future.

The CERCLA remedy selection process specifically requires that future land use assumptions be factored into risk assessment (see Figure 5). With regard to Environmental Restoration programs conducted under the authority of the Resource Conservation and Recovery Act (RCRA), DOE Order 5400.4 requires that response actions to contaminant releases not be inconsistent with CERCLA. In addition, the proposed subparts to Part 264 of RCRA should have the effect of making the RCRA process consistent with the CERCLA process. According to OSWER Directive No. 9355.7-04, EPA intends to address the issue of future land use as it relates specifically to RCRA facility cleanups in subsequent guidance and/or rulemaking.

Future use categories are linked to specific assumptions about how people might be exposed to current levels of contamination and the probability that any residual contamination may remain after remediation occurs. For instance, if a property is intended for agricultural use, risk assessment would assume that exposure to contamination would occur through inhala-

Future Use and Community Involvement in the Cleanup Process

Cleanup Activity	Activity Description	Future Use Input
Scoping	Project planning and community relations.	Stakeholders begin process of identifying future use options.
Site Characterization	Field investigation, sample analysis/ validation, data evaluation, risk assessment, Remedial Facility Investigation/ Remedial Investigation (RFI/RI) report.	Baseline risk is estimated using exposure models that capture the appropriate range of stakeholder-preferred future use options.
Analysis of Alternatives	Establish remediation goals based on on acceptable exposure levels and/or Applicable or Relevant and Appropriate Requirements (ARARs). Evaluate remedial alternatives relative to their ability to achieve risk-based remediation goals and/or ARARs.	Risk-based remediation goals are estimated with intake models that reflect stakeholder-preferred land use scenario. The FS/CMS evaluates remedies that are consistent with stakeholders' future land use recommendations.
Remedy Selection	Present the preferred alternative to the public. After receiving stakeholder input and regulatory approval, issue record of decision.	Stakeholders evaluate the extent to which the preferred remedy attains future land use expectations.
Restricted Site Use	Residual contaminant levels that prohibit unrestricted land use require five-year review by the Department.	Stakeholders participate in five-year review and comment on the record of decision if it is modified.

Figure 5. Future Use and Community Involvement in the Cleanup Process

This table illustrates the various points at which land use assumptions must be considered in the remedial decision-making process.

For the purposes of the **1995 Baseline Environmental Management Report** *(BEMR), DOE analyzed different land use scenarios ranging from a maximum feasible greenfields case to an iron fence scenario. The maximum feasible greenfields case assumed aggressive removal or destruction of all contaminated areas on a site to the extent feasible. If current technologies were unavailable or an area was intended for active disposal, then containment and restricted land use strategies were assumed. Stringent cleanup standards apply under the greenfields scenario.*

On the other hand, the 1995 BEMR's iron fence case presumed containment for all contaminated areas rather than treatment or removal. Contaminated soil and buried waste sites would be capped; contaminated ground water would be controlled from spreading; and, facilities would be entombed in place.

As this document illustrates, most sites favor future uses that fall in between these two extremes. Therefore, a mix of containment and removal strategies will most likely be necessary to achieving these preferred uses.

tion of air, use and ingestion of ground and surface water, and consumption of crops. Under such a scenario, the assessment would further assume that inhabitants would be exposed 365 days per year for 30 years. On the other hand, if the property were going to be used as a controlled recreational area, the risk assessment might project only air and surface water pathways, with recreational users exposed only to residual contamination for a period of two weeks per year for a certain number of years. Since risk assessments are based in part on these exposure assumptions, conclusions may vary significantly depending on the land use assumptions used.

In general, as total exposure to hazardous substances decreases, the risk to human health decreases. Therefore, assuming the same level of contamination, a recreational user who visits the site 14 days per year will incur less risk than an individual who lives at the site and is exposed 365 days per year, as assumed under a residential scenario.

Because of its link to exposure, land use assumptions should weigh heavily not only in the selection of reasonable maximum exposure scenarios for risk assessments, but also in setting appropriate remediation goals and selecting suitable remedies. In addition to narrowing the scope of analysis, future use considerations can result in protective yet cost-effective decisions. For instance, if land use is taken into account, the feasibility study, through which remedial alternatives are developed, can focus on practicable, cost-effective remedies that attain appropriate cleanup levels protective of human health and the environment, and are consistent with future land use assumptions. Any strategy for implementing cleanup must, therefore, include a clear definition of land use alternatives.

The link between cost of cleanup and land use was magnified by the data and findings presented in DOE's 1995 BEMR. In fact, the 1995 BEMR asserted that assumptions regarding future land use had a greater impact on the estimated cost of cleanup than any other single factor. According to this analysis, the life-cycle cost for restoring all sites to "maximum feasible greenfields" condition would be approximately $500 billion; alternatively, the cost to restore sites to the "iron fence" condition would be approximately $175 billion. As these cost estimates confirm, selection of appropriate future land use assumptions will play a critical role in cleanup decisions that are protective of health; assure reutilization of land consistent with probable use; and preserve limited fiscal resources, making more resources available for cleanup. With this in mind, the 1996 BEMR adjusted its maximum feasible greenfields to a modified greenfield scenario, taking into account legal commitments, technical and practical constraints, site safety concerns, and safeguarding National, historical, and cultural resources.

As many of the recommendations in this report illustrate, however, land use planning is not just about achieving cost-effective cleanups. By considering ultimate use, remedial activities can take into account specific community interests such as preservation of cultural or natural resources, maintenance of certain infrastructure capabilities, or other particular concerns. Many of DOE's sites do, in fact, include large areas of undisturbed land with rare ecosystems and newly identified species. Unless DOE, its regulators, and communities decide up front to preserve these ecosystems, cleanup choices may be unnecessarily disruptive to these environments. In fact, large soil removals can destroy existing vegetation, ecosystems, and cultural artifacts.

Future Uses: Governmental and Public Involvement

Although DOE initiated its future use planning effort before the issuance of EPA's guidance, DOE's sites adhered to many of the EPA principles on public input when developing future use recommendations. As part of the future use process, sites worked with existing advisory boards, new committees, chambers of commerce, environmental groups, community reuse organizations, local planning commissions, tribal governments, local governments, and state and EPA regulators, among others, to solicit input and develop recommendations jointly with affected and interested communities. While some sites relied predominantly on the work of specific advisory groups, other sites conducted surveys or held special meetings to work

through future use issues. In most cases, sites used a combination of methods to involve citizens, governments, and organizations in developing recommendations.

DOE recognizes that the question of future land use can only be answered responsibly with local input. Affected communities and interested organizations must provide their perspectives so that cleanups can lead to results that are consistent with intended uses. It would be difficult, if not impossible, to define and uphold future land uses without local support. In fact, in some cases, local governments and their communities will be in charge of maintaining institutional controls that go hand-in-hand with defined land uses.

In addition to being a critical issue that calls for public input, land use is a tangible topic that provides a basis for engaging the public in a meaningful debate of a wide range of concerns, all affected by land use decisions and constraints. As opposed to technical measures such as "magnitudes of risk" or "contaminant levels," land use issues can be more easily debated and can help focus cleanup decisions. Envisioning an industrial or residential zone is generally simpler than understanding the significance of a 10^{-4} risk or "minimum contaminant levels." Therefore, the topic of future use provided a good basis on which to begin a dialogue with the public and affected governments concerning DOE's activities and upcoming decisions.

The future use planning efforts build upon the Clinton Administration's commitment to disclose information to the public and actively involve governmental partners, organizations, and citizens in DOE decisions. The Department recognizes that public involvement is not only a responsibility of good government, but also a practice that can help it reach better decisions.

Linking Future Use to Site Comprehensive Planning

Land use planning is central to guiding DOE's current and future activities. Like local, state, and tribal governments, and private companies, the Department must consider land use issues when siting new projects and dismantling old facilities. The Department's commitment to conducting long-term comprehensive planning was emphasized recently in the Secretary of Energy's Land and Facility Use Policy, issued on December 21, 1994, and the Life-Cycle Corporate Asset Management (LCAM) Order (DOE Order 430.1), issued on August 24, 1995.

The Land and Facility Use Policy explains DOE's commitment to act as a steward of the vast national resources under its management. The policy states that DOE sites must undertake a comprehensive planning process at its sites in order to consider how best to use and preserve natural and cultural resources, diverse ecosystems, and cultural and historical artifacts while conducting scientific research and maintaining high technology manufacturing facilities, among other assets. Site comprehensive planning processes provide a vehicle for integrating mission, economic, ecologic, social, and cultural factors; guiding land and facility use decisions; monitoring results; and revising management decisions as necessary.

The Secretarial policy employs ecosystem management principles as its basis. As part of these principles, sites must manage resources in the context of the larger regional areas, and involve the public, especially in developing long-term land use visions which reflect broader tribal and public values. Many of these principles are reiterated as part of the Life-Cycle Cor-

Ongoing Comprehensive Planning

As with environmental restoration activities, future land use assumptions should serve as input into the Department's comprehensive planning efforts and guide ongoing activities. Some sites have already initiated comprehensive planning efforts that include significant governmental and public involvement; these sites are using the future use recommendations, where available, to serve as a foundation for evolving their planning process. The site comprehensive planning process offers a vehicle for working through the details of future use issues and ensuring that land use recommendations serve as an input in making land and facility decisions.

DOE's Office of Environmental Restoration (ER) recently initiated the **Management Action Process** *(MAP) to ensure a collaborative and thorough review of ER activities at each site. The MAP will serve as a tool for identifying site-specific ER accomplishments, strategies, and issues; and it will be used to justify programs during DOE and EM's budget process. The integration of future use recommendations into remedial strategies is a critical part of the MAP. Involving DOE, contractors, and stakeholders in the MAP will provide another opportunity for refining future use decisions as they relate to remedial strategies and cleanup levels. Ultimately, the MAP will enhance integration and coordination between multiple organizations, plans, and activities related to ER; improve internal and external relationships; and enhance the management of ER projects.*

Working with Community Reuse Organizations

Many communities affected by DOE sites have formed community reuse organizations (CRO) to assist in reuse and workforce transition efforts, and promote economic development of the surrounding communities. In general, the future use recommendations were developed by considering the interest of existing community reuse organizations; recommendations are generally consistent with the economic development goals of the surrounding areas.

porate Asset Management Order, which requires comprehensive planning with significant community involvement.

By stressing public involvement and other ecosystem management principles, future use planning efforts began much of the work that is encouraged by DOE policies and orders. While development of sound future use recommendations is the first step of good land planning and management, DOE recognizes that the future use recommendations must be refined, unresolved issues must be addressed, and land use preferences must be implemented.

Future Use: A Foundation for Implementing Beneficial Reuse

As mentioned previously, significant portions of DOE's facilities, equipment, and buffer areas are becoming excess to its needs because of changing missions, budget priorities, and defense downsizing. DOE sites include manufacturing facilities, rare ecological and cultural resources, large open spaces, and other assets. As excess properties are identified, the Department is interested in putting them to their most beneficial use, either to serve new mission needs or to be used in the future by outside parties. Some parcels are suited to economic development while other areas are more valuable as conservation or recreational reserves.

In order to evaluate reuse alternatives effectively, DOE must consider the broader framework of future use preferences of affected and interested communities. For instance, if a community has expressed an interest in preserving an area's rare ecology, a commercial or industrial reuse proposal would be inappropriate.

As with environmental restoration and comprehensive planning, the development of broad future use recommendations is once again critically important in this case for the purpose of guiding reuse efforts. Most of the future use recommendations do not direct sites toward specific uses but provide instead general land use categories on which to frame more detailed plans. As reuse opportunities continue to evolve, alternatives should be evaluated within the context of the long-range vision provided by the future use recommendations.

Overall Findings and Next Steps

Although DOE sites vary tremendously in terms of size, current use, physical and natural features, demographic trends, and other characteristics, the sites' planning efforts led to many common results. This section summarizes the sites' future use recommendations developed to date, discusses some of the common themes noted across sites, and describes some of the lessons learned from the sites' planning initiatives. Finally, this section outlines some of the next steps that DOE and affected communities must take to resolve outstanding issues.

Cumulative Results

Each DOE site created specific land use categories that suited its particular situation and best represented its recommendations; therefore, terminology among sites varies considerably. Nevertheless, all of the sites' recommendations generally fall within six major land use categories: agricultural, industrial/commercial, recreational, residential, open space, and storage and disposal.

For the purposes of comparison, the site recommendations were categorized according to the six land uses, as described in Figure 6. These definitions are based on criteria described in EPA's Office of Solid Waste and Emergency Response (OSWER) *1991 Human Health Evaluation Manual* (Supplemental Guidance: Standard Default Exposure Factors – OSWER Directive 9285.6-03), with the exception of the open space and storage and disposal categories which were not included in the EPA guidance. These terms and definitions apply to this report's summary exhibits, as well as to the land use maps

Land Use Categories

Land Use Category	Typical Uses	Receptor	Exposure Pathway	Access Restrictions
Agricultural	crops	resident farmer	Receptor is exposed to contamination through ingestion of potable water, ingestion of soil and dust, inhalation of contaminants, and consumption of homegrown produce.	unrestricted
Residential	permanent and temporary housing, dormitories	resident	Receptor is exposed to contamination through ingestion of potable water, ingestion of soil and dust, and inhalation of contaminants.	unrestricted
Recreational	parks, playgrounds, hiking, biking, fishing, hunting	visitor fisherman/ hunter	Receptor is exposed to contamination through ingestion of potable water, ingestion of soil and dust, inhalation of contaminants, and consumption of locally caught fish and/or other wildlife.	restrictions may apply
Industrial/ Commercial	research and development facilities, manufacturing plants, utility systems, waste management facilities, offices	worker	Receptor is exposed to contamination through ingestion of potable water, ingestion of soil and dust, and inhalation of contaminants.	restrictions may apply
Open Space	protected wildlife areas, buffer zone, resource management, ecological research, grazing, controlled hunting	worker visitor	Receptor is exposed to contamination through ingestion of soil and dust and inhalation of contaminants.	restrictions may apply
Storage and Disposal	secure storage, disposal of nuclear materials and waste	worker	Receptor is exposed to contamination through ingestion of soil and dust and inhalation of contaminants.	restricted
Open Space/ Recreational	This category represents areas where both open space and recreational uses will occur, but specific breakdowns between the two categories are not yet defined. (See Open Space and Recreational categories above.)			

Figure 6. Land Use Categories

Land Use vs. Cleanup Level

It is important to note that the projected future use categories, depicted in the summary charts and throughout the report, refer only to the site or stakeholder recommendations for future uses. These "future uses" imply only that the level of residual contamination (if any is present) would allow at least the intended future use. However, in some areas, residual contamination will be low enough to allow less restricted uses as well, although such uses are not preferred. For instance, an area that is clean and usable for residential or agricultural purposes may also be designated as open space/wildlife management area due to its ecological value. Therefore, the "projected future use" for a particular parcel should not be interpreted to mean the actual level but rather the minimum level of cleanup that will be attained. As previously explained, the projected future use should guide cleanup activities of contaminated areas to an appropriate level.

pictured at the beginning of each site summary. In addition, these common terms and definitions were used to analyze and categorize future land uses in generating DOE's *1996 Baseline Environmental Management Report*.

Different types of uses fall under each major land use category. Although general exposure assumptions are provided, exact exposures vary depending on the specific uses selected within each category. As part of the risk assessment process, the specific intended uses must be delineated to define exposure assumptions accurately. In a few cases, sites' recommendations called for uses that fall in both the recreational and open space categories. In these instances, the summary charts as well as the maps indicate a mix of these two categories.

Figure 7 presents three charts that divide future use recommendations according to the six general land use categories. The charts reflect information derived only from the 16 sites with completed future use recommendations.

Figure 7a provides a breakdown of the recommendations in acres. This graph does not account for the relative size of different sites; therefore, recommendations from proportionately larger sites, such as Idaho and the Savannah River Site, skew the chart's acreage breakdown considerably. As the chart illustrates, most of the land is recommended for open space and industrial/commercial. Very few acres are recommended for residential, agricultural crop land, or storage and disposal future uses.

Figure 7b indicates that certain land use categories are commonly preferred across the sites, while other land uses are recommended at very few sites. In particular, 15 sites included industrial/commercial uses as part of their recommendations, while only two sites called for grazing on any portion of their sites. Therefore, although Figure 7a indicates that a large number of acres are targeted for open space - grazing use, only a few sites recommend such use.

Figure 7c depicts the average or typical land use recommendations for large, medium, and small sites. Fifteen of the 16 sites analyzed recommended industrial/commercial uses for at least a portion of the land. The largest sites generally called for open space uses for the majority of their lands. The medium-sized sites tended to favor open space and recreational uses for the non-industrialized portions of their sites.

Each of the large sites recommended that only about 10 percent of their site's total acreage be targeted for industrial/commercial uses in the future. This common finding reflects the fact that the largest sites include vast areas that are unlikely to be developed in the future. Furthermore, these sites tend to be located in remote areas.

The degree to which medium-sized sites recommended industrial/commercial uses varied considerably, ranging from six to 70 percent of the site. Relative to the large sites, medium-sized sites generally targeted a larger percentage of total site acreage for industrial/commercial uses. Finally, the three geographically smallest sites exclusively recommended industrial/commercial uses for their sites.

Common Themes

In addition to mapping out future uses for their sites, participating tribal and local governments, advisory boards, and other interested

Information based on recommendations received from 16 sites.

Argonne National Laboratory - East

Brookhaven National Laboratory

Fermi National Accelerator Laboratory

Fernald Environmental Management Project

Idaho National Engineering Laboratory

Kansas City Plant

Lawrence Livermore National Laboratory

Mound Plant

Oak Ridge Reservation

Paducah Gaseous Diffusion Plant

Pantex Plant

Pinellas Plant

Portsmouth Gaseous Diffusion Plant

Rocky Flats Environmental Technology Site

Sandia National Laboratories/California

Savannah River Site

Future Use Recommendations: Cumulative Results from 16 Sites

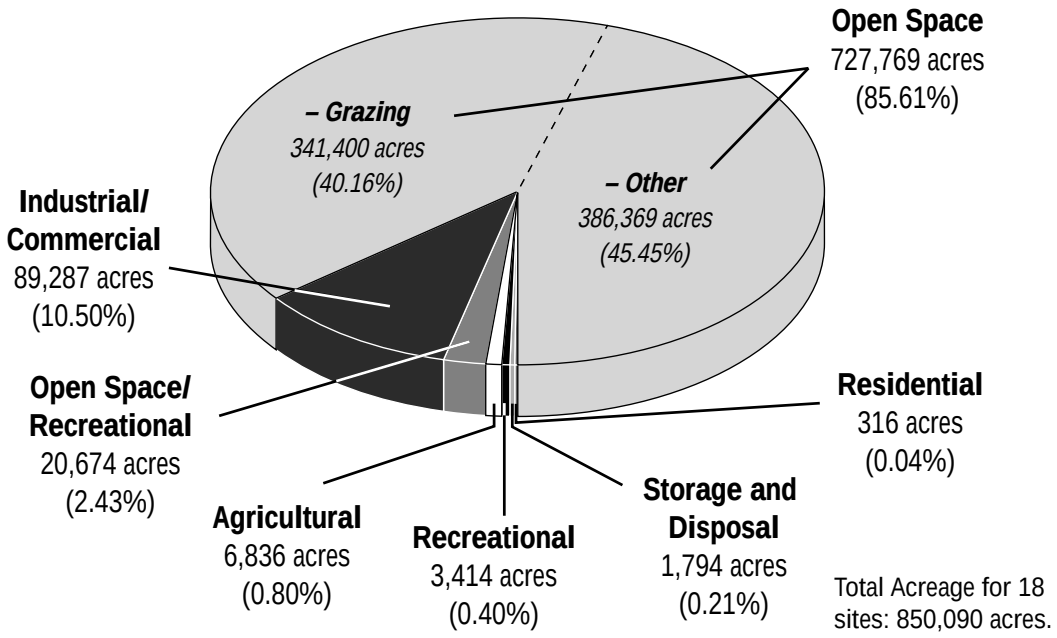

Figure 7a. Acreage Breakdown by Land Use Category

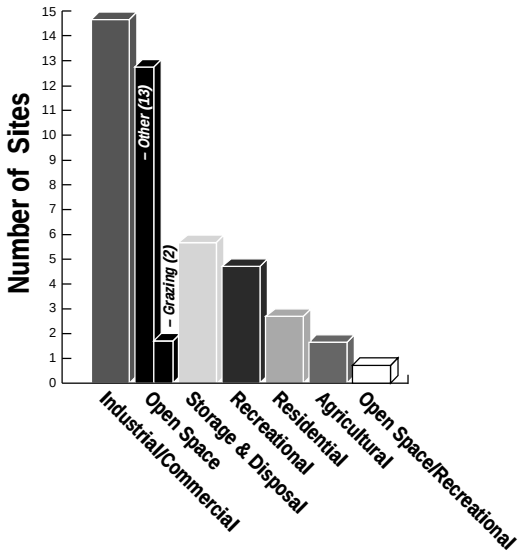

Figure 7b. Site Distribution by Land Use Category

individuals provided direction regarding cleanup priorities, planning principles, and other concerns related to land use. The following key concerns, among many others, were raised by several site planning efforts.

Protection of Existing Resources.

As part of their planning efforts, sites and surrounding communities considered the resources present on the lands that support DOE facilities. Many sites and participating communities took greater note of the wealth of resources that exist as part of the DOE complex, including valuable ecosystems and habitats; varied geologic settings; cultural and historical resources; world-class research and scientific facilities and equipment; and valued scientific researchers, craftsworkers, and skilled technicians. Consequently, at many sites, recommendations promoted the preservation of ecological, cultural, and historical resources, in particular. With the exception of a few small sites located in largely industrial areas, recommendations called for green space, open lands, resource management areas, and specific practices to ensure the protection of cultural resources. Sites and participating individuals noted that DOE and affected communities must find methods for preserving and using these resources most effectively.

Protection of Groundwater Critical to Water Supply.

Several sites recommended containing contamination to reduce impacts to groundwater. In instances where groundwater was already contaminated, some recommendations called for remediation while others did not. In particular, future use recommendations advocated preservation or cleanup of groundwater in areas where the resource is critical to water supply needs.

Less Intrusive Cleanups.

In light of the interest in preserving existing ecological and cultural resources, some future use recommendations specifically stated that DOE should undertake intrusive remedial efforts only in instances where an imminent risk exists. Risks to workers, the public, and the environment posed from packaging and transfer of wastes generated through cleanups can also be greatly diminished with less intrusive processes. Although not all recommendations articulated this principle explicitly, many stakeholder and site recommendations noted the goal of minimizing the impact of remedial and other activities on the existing environment.

Governmental Control of the Land.

As part of the future use planning efforts, DOE and participating individuals and groups considered the likelihood of on-site DOE activities in the future. Several sites that have no definitive or imminent closing date expressed the preference that DOE or another federal government entity continue managing the sites. In part, this recommendation stemmed from an interest in maintaining federal and contractor employment as well as secondary economic benefits. Moreover, in some cases participants advocated continued federal management in the interest of protecting federal lands, particularly at sites rich in ecological resources.

Recognition of Regional Context.

All of the sites recognized the importance of planning future uses of DOE sites within the larger regional context. In particular, some sites noted the need to coordinate infrastructure development and called for better integration of DOE sites into the surrounding environment. In most cases, future use recommendations reflected the adjacent land uses as well as the interests of surrounding communities. The communities' needs for particular types of land were balanced against other influencing issues and helped to guide recommendations.

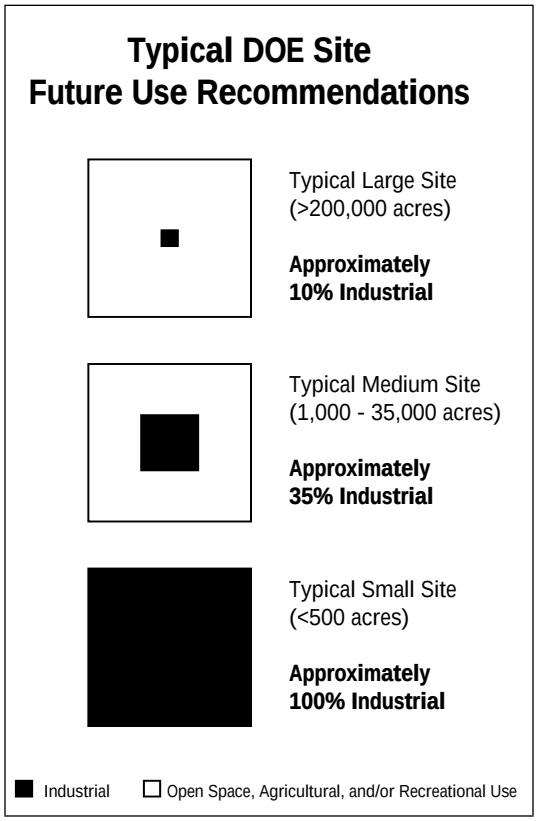

Figure 7c. Typical DOE Site Future Use Recommendations

Need for Ongoing Planning Efforts.

Most of the site recommendations noted the importance of sustaining planning efforts beyond the development of future use recommendations. First, ongoing efforts are critical to ensure integration of future use recommendations into facility planning, cleanup, and reuse decisions, among others. Second, a continual planning process allows revision of future use recommendations in the event that new developments such as technological advances, new community needs, or additional contaminant information arise. In general, tribal and local governments, advisory boards, and others involved called for continued community involvement in these ongoing planning efforts and site decisions.

Lessons Learned

DOE sites encountered a number of challenges in undertaking future use planning. Many sites had to overcome problems involving the enlistment of affected governments and the public effectively in developing recommendations. This following discussion summarizes some of these obstacles as well as lessons learned from the site experiences.

Public Participation Challenges.

Sites grappled with the issue of how to involve the public most effectively in formulating future use recommendations. Some sites had difficulty identifying all of the affected and interested citizens and groups as well as the internal DOE offices that would be affected by future use determinations. Figure 8 describes the types of public participation mechanisms used by each site to involve interested and affected individuals and groups. Some sites relied heavily on existing citizen boards, while other sites sought public input through workshops, meetings, or a combination of these approaches.

In instances where a site did not rely significantly on an advisory board's input, it was necessary to find a way to balance input from different groups and individuals. When surveys were used to gather ideas, sites had to identify and explain the method for interpreting input and synthesizing it into future use recommendations. Regardless of whether boards were used, most sites encountered some difficulty reaching complete consensus. The key to working through this issue was admitting that divergent opinions existed and agreeing to resolve conflicting opinions. Furthermore, while consensus recommendations may not have been attainable for an entire site, the public often agreed on recommendations for a large percentage of the site; therefore, commonalities were stressed and the dialogue continued.

Where advisory boards were widely accepted as diverse groups, they were particularly effective vehicles for considering land use alternatives and working through differences in preferences. Boards that met frequently discussed the future use issue in depth over a period of time. Finally, DOE site-specific advisory boards sought involvement of regulators as well as DOE management. This method of involvement facilitated ongoing interaction between these different players and often resulted in the development of future use recommendations that already had buy-in from DOE and regulators. At the same time, sites encouraged board members to discuss the issues and seek wider input from their communities and constituencies.

Internal DOE Involvement and Buy-In.

Just as affected tribal, state, and local governments, interest groups, and community members must be fully involved in the future use planning process, internal DOE programs and offices must participate and provide feedback regarding public input. Some sites are still in the process of working through disparities between site perspectives and community input. Planning efforts that allowed site representatives to work collectively with advisory groups, governmental leaders, or individual citizens to develop recommendations generally met with greater success. However, even in cases where DOE was involved, recommendations from tribal and local governments, advisory boards, and others were not always fully accepted by all relevant parts of the Department. In the future, DOE must ensure that all relevant and affected programs and offices are involved in the planning process from the beginning.

Clear Process and Purpose of Effort.

Those sites that were able to describe the planning process and its purpose were generally more successful in developing meaningful future use recommendations. In order for affected governments, the public, and site representatives to be fully engaged in developing recommendations, the planning process, the roles of different players, and the importance of the effort must be clearly articulated.

Prompt Response to Stakeholders.

Sites that responded promptly to stakeholder input met with greater community acceptance, even if the site disagreed with portions of the public recommendations. DOE sites must explain their rationale for accepting or modifying stakeholder input; furthermore, just as differences between various stakeholders must be resolved in the future, DOE must resolve its

Major Avenues Used to Develop Future Use Recommendations						
Sites	**Advisory Board, Task Force**	**National Environmental Policy Act, Environmental Impact Statement**	**Site Development Planning, Comprehensive Planning**	**Internal DOE Group**	**Public Meetings, Workshops**	**Survey**
Argonne National Laboratory - East (IL)			X			
Brookhaven National Laboratory (NY)				X	X	X
Fermi National Accelerator Laboratory (IL)			X			
Fernald Environmental Management Project (OH)	X					
Hanford Site (WA)	X	X	X		X	
Idaho National Engineering Laboratory (ID)	X			X		
Kansas City Plant (MO)					X	
Lawrence Livermore National Laboratory (CA)			X			
Los Alamos National Laboratory (NM)				X		
Mound Plant (OH)*						
Nevada Test Site (NV)	X	X				
Oak Ridge Reservation (TN)				X	X	X
Paducah Gaseous Diffusion Plant (KY)				X	X	
Pantex Plant (TX)			X			
Pinellas Plant (FL)	X					
Portsmouth Gaseous Diffusion Plant (OH)				X	X	
Rocky Flats Environmental Technology Site (CO)	X				X	
Sandia National Laboratories/ Albuquerque (NM)	X			X		
Sandia National Laboratories/ California (CA)			X			
Savannah River Site (SC)	X			X	X	

** As explained in its letter, the City of Miamisburg determined future use for the site through its city planning process.*

Figure 8. Major Avenues Used to Develop Future Use Recommendations

differences with stakeholders. In some cases DOE was slow to respond to advisory groups or others for the sole reason that it had not yet formulated its perspective on future use. While the land use issue is complex, DOE recognizes that progress must be made and that ongoing communication between the sites and affected communities must be maintained, even if final land uses are not yet determined in some cases.

Clear Terminology.

As discussed in the chart above, each site planning effort used different land use terms to delineate future use preferences. While specific terms can be useful in explaining site-specific assumptions and goals, land use categories must be explicitly defined and understood by all involved. In particular, land use terms should be consistent with tribal and local government planning categories if possible, to ensure better understanding and coordination within the surrounding geographic region. By defining generic

land use terms, this report seeks to enhance understanding of terms and improve consistency across the DOE complex in interpreting different land uses.

Land Use Recommendations' Broader Impacts.

As a result of the analyses conducted prior to developing future use recommendations, sites and affected communities gained a greater understanding of the implications associated with different land use preferences. For instance, many sites recognized that while cleanup to residential standards may be desirable from a contamination perspective, this type of cleanup often requires extensive soil removal and can be destructive to existing ecosystems. Furthermore, large soil removals result in the creation of additional wastes that must be stored and disposed either on-site or in another community or state. Many individuals recognized that cleanup to pristine conditions may not only be tremendously costly, but also may transfer the problem of legacy waste from one place to another. Some sites agreed that in certain cases the risk to workers, the public, and the environment associated with moving wastes from one site to another site may outweigh the benefits gained from relocation.

Outstanding Issues

The future use recommendations presented in this report are intended to serve as a guide in directing DOE activities, including environmental cleanup, facility siting, infrastructure development, waste management, stewardship, and reuse initiatives. At the same time, DOE recognizes that although future use recommendations have now been developed by many sites, affected governments, and communities, these recommendations must be revisited periodically as new information becomes available and new developments arise. Future use planning, like most planning efforts, is an iterative process that must be flexible and responsive to future needs, capabilities, and circumstances.

Development of future use recommendations is only the first step in ongoing planning efforts that DOE Headquarters and sites must take with continued involvement of tribal, state, and local governments; interest groups; and affected citizens. In light of the fact that the future use recommendations represent a beginning rather than an end of planning and decision-making, the following discussion outlines some of the outstanding issues that need further attention as well as the next steps that DOE and affected communities must take to implement and advance these recommendations.

Issue 1: Review Recommendations.

Although most of the future use recommendations have been reviewed by DOE sites and programs, regulators, affected governments, and interested stakeholders, DOE must follow up in some cases with additional discussions that explain differences in perspectives. As stated above, ongoing discussions will allow resolution of differences and problems, particularly as new information becomes available.

Issue 2: Resolve Non-Consensus Recommendations.

As several of the site summaries point out, certain issues still need resolution at some sites. Although sites were generally able to reach agreement with affected governments and stakeholders on the majority of future land uses, future uses of specific parcels are still disputed. DOE must continue to discuss these unresolved issues with constituents who disagree with the proposed future use recommendations. Although every individual may not agree with each component of DOE's plans, DOE plans to work with major affected governments and stakeholder groups to ensure their buy-in to final plans.

Issue 3: Analyze Implications for Cleanup, Cost, and Other Issues.

Sites are striving to coordinate cleanup decisions with future use recommendations; however, at many sites significant areas are still being characterized and studied. Most sites have not yet selected specific cleanup technologies for all contaminated areas. Therefore, as more information on contamination becomes available and DOE conducts risk assessments and begins to consider remedy selection, sites must take into account future use recommendations and ensure coordination with cleanups.

In addition, DOE has not yet evaluated the feasibility, both in terms of technology and cost, of the proposed future use recommendations. DOE sites must work to better translate the recommendations into viable cleanup remedies and articulate what future uses are not attainable or likely at this time. DOE also must assess whether future use recommendations are consistent with the terms of existing regulatory agreements.

Issue 4: Assess Implications for Waste Management.

In addition to helping direct cleanup strategies, the sites' future use recommendations must reflect DOE's waste management decisions. Land use considerations are critical to all stages of DOE's waste management functions, including siting, operating, maintaining, and closing treatment, storage, and disposal facilities.

Several different Departmental initiatives are intended to help DOE evaluate options for long-term storage and disposal of its wastes. DOE's Waste Management Programmatic Environmental Impact Statement assesses various strategies for storage, treatment, and disposal of the Department's high-level, transuranic, low-level, low-level mixed, and hazardous wastes. Records of decision will result for each waste-type. In addition, the Department is using systems engineering to assess the low-level waste disposal system as a result of a recommendation from the Defense Nuclear Facilities Safety Board. Furthermore, DOE is working with tribal and state governments among others to consider disposal options for its mixed wastes.

Decisions about where to locate treatment, storage, and disposal facilities must be made in the context of the future use recommendations. In addition, since operating and closed facilities usually require certain types of institutional controls, land use restrictions must be put into place and maintained to ensure protection of human health and the environment. Particularly in instances where long-term controls are needed for storage and disposal sites, DOE must work with tribal, state, and local governments to ensure that land use restrictions are fully understood and enforced.

Issue 5: Assess Relevant 1996 BEMR Data.

As the 1996 BEMR results become available, DOE must reevaluate how future use recommendations align with site projections of remedial activities, waste management, and overall cost. To the extent that future use recommendations were available, the 1996 BEMR relied on these land uses as one set of assumptions in formulating the baseline cost estimate. However, DOE must reexamine the degree to which intended future uses correlate with projected environmental management activities. Furthermore, the 1996 BEMR will include sensitivity analyses concerning land use that may illuminate issues surrounding the future use recommendations as well.

Issue 6: Initiate Site Comprehensive Planning.

As previously discussed, future use recommendations should serve as the basis for site comprehensive planning efforts. As DOE plans and undertakes its functions, such as infrastructure projects, siting of new facilities, and decommissioning of other facilities, future use recommendations should guide these decisions.

As part of the **1996 Baseline Environmental Management Report** (BEMR), sensitivity analyses are being conducted at the five sites with the highest total 1995 BEMR costs (i.e., Hanford, Idaho, Oak Ridge, Rocky Flats, and Savannah River). Relative to the currently projected base case, the sensitivity analyses estimate the environmental management costs associated with attaining four different land use cases: modified greenfields, industrial, recreational, and iron fence. These cases represent a continuum of future land uses ranging from a least restricted land use case where agricultural uses would be appropriate to a most restricted case where only storage and disposal uses would be allowed.

In addition to providing comparative costs, the 1996 BEMR analyses will offer greater qualitative information about the various land use scenarios. These analyses will help clarify the extent to which the results achieved by pursuing the modified greenfields case differ from the results achieved under different land use scenarios. For instance, because technological constraints, site specific assumptions regarding ongoing missions, legal assignments, and other land use considerations prohibit DOE from remediating all of its lands to green fields conditions, the modified greenfields case may not lead to a significantly greater number of pristine acres than under other land use scenarios. Furthermore, given that a large percentage of DOE land is relatively uncontaminated, many acres may be unrestricted even under the iron fence scenario.

To facilitate beneficial reuse, the Future Use Project recently developed guides on property reuse for both internal DOE representatives and interested governments and stakeholders. These guides entitled **Resourceful Reuse** *explain the laws that regulate sales, leases, and transfers of real and personal property. In addition to delineating the process that DOE sites and outside parties must go through to pursue property reuse, the guides raise questions to help DOE and interested property users evaluate specific properties, determine the best reuse alternative, and select the most appropriate transfer mechanism.*

DOE sites must now bring together all relevant Departmental programs and affected tribal and local governments, advisory boards, regulators, interest groups, and others to participate in an open, iterative, comprehensive planning process. In conjunction with the comprehensive planning process, DOE and its sites must work with affected governments and communities to determine budget priorities, cleanup scenarios, and beneficial reuse alternatives, among other decisions.

Thus far, DOE's Office of Field Management (FM) has not formally defined the objectives of comprehensive planning. However, FM plans to release a guide to assist in identifying developmental opportunities and constraints, optimizing disposition of and use of land and facilities, and maintaining its structures efficiently, cost-effectively, and safely. As part of this effort, DOE FM and DOE programs with landlord responsibilities (the Offices of Environmental Management, Energy Research, and Defense Programs) are working on a joint definition of comprehensive planning so that sites can approach their landlord responsibilities effectively and consistently.

The future use recommendations will provide the underlying end goals for the comprehensive planning processes. The iterative comprehensive planning process will allow adjustment of projected future uses if new information or interests warrant change. For those sites where future use planning is not yet under way, the comprehensive planning process, if appropriately implemented, will be a useful vehicle for generating future use recommendations.

The **National Contingency Plan** authorizes the use of institutional controls based on a recognition that "...certain technological, economic and implementation factors may make treatment impracticable for certain types of site problems. Experience has shown that in such situations, remedies that rely on control of exposure through engineering and/or institutional controls to provide protection generally will be appropriate... (NCP) reflects the principle that protection of human health and the environment can be achieved through a variety of methods, including treatment, engineering and/or institutional controls, and through combinations of such methods." (55 *Federal Register* 8701. March 8, 1990).

Issue 7: Clarify Future DOE Missions at Individual Sites.

As sites and affected communities grapple with the issue of future use, the question of DOE's future mission at sites surfaces repeatedly. In many cases, communities favor a continued DOE presence because of employment concerns. However, DOE's future work at many sites has become unclear as a result of defense downsizing.

DOE must engage its sites, affected communities, and the country in contending with the difficult issue of consolidating DOE's work efficiently, while preserving strategic capabilities to serve future national needs. Unless sites have a clear understanding of their future activities, planning future uses and initiating beneficial reuse can be problematic endeavors. DOE's 1995 and 1996 BEMR provide substantial information on the timeframe for environmental management activities at each site. However, other DOE programs must undertake similar analyses and map out their futures across the complex with greater definition on which sites will be closing and when such closures are anticipated.

DOE must define which sites will pursue environmental management missions exclusively as opposed to which will continue other DOE activities as well. In terms of its environmental management functions, DOE must clarify whether it will remain at individual sites to monitor and control secured or contaminated areas. As information concerning DOE's long-term future activities becomes clearer, sites and communities can work together not only to plan but also to implement preferred future uses.

Issue 8: Undertake Additional Reuse Efforts.

As DOE continues to assess which facilities and parcels are excess or temporarily unneeded, the sites and Headquarters use future use recommendations to guide reuse initiatives. For instance, if a specific parcel is recommended as a wildlife management area, the land should not be sold off for commercial development unless the recommendations are revisited and revised for appropriate reasons. DOE, as well as affected governments and communities, must recognize

that the future use recommendations call for a vast range of reuse options, including industrial development, conservation areas, and recreational parks, among other uses.

In order to realize proposed future uses as quickly as possible, DOE must develop better information concerning the current and imminent availability of existing facilities. Furthermore, the Department must also evaluate which lands and facilities can ultimately be returned to other federal entities, sold, or leased, as well as when these parcels will be available for appropriate reuse.

At sites that do not foresee closure in the near future because of long-term environmental management or continued mission activities, DOE and communities should consider dual use scenarios where appropriate. Dual use can range from leasing a manufacturing facility to a private company to opening up parcels of DOE's property for recreational use by the wider community.

Issue 9: Identify Appropriate Institutional Controls.

Most of the sites' future use recommendations imply some type of restricted use of certain parcels for reasons of residual contamination, security, or protection of natural or cultural resources. In such cases, DOE or another entity must ensure that physical measures or other mechanisms are put into place to notify potential trespassers, owners, and others of the restricted use as well as the location of contamination, if necessary.

Institutional controls include structural barriers and legal protections ranging from warning signs, fences, and elaborate security devices to deed restrictions, covenants, zoning ordinances, water use controls, well construction prohibitions, and easements. Some of these devices are intended to limit exposure to existing contaminants, while other controls merely restrict access and prohibit particular uses. The type of mechanism chosen may depend upon the nature and location of contaminants, the targeted land use, habitat conservation goals, cost considerations, maintenance and enforcement implications, tribal and local government involvement, and the length of time for which use is to be restricted. DOE currently is working to evaluate different types of controls and establish mechanisms that will be protective over extreme periods of time.

In instances where a site or a parcel with restrictions on use is intended to be transferred to a non-federal entity, DOE will work with tribal, state, and local governments, as well as regulators, to ensure that appropriate and enforceable controls are implemented by at least one other governmental entity. DOE will provide necessary information on use limitations as well as a description of residual contamination or protected resources to the governing authority that takes on responsibility for controlling use. Roles and responsibilities concerning maintenance and enforcement of the institutional control should be clearly delineated and articulated as part of the negotiated lease or sale. Even if the parcel is being acquired by a private company, the local government may play a key role in enforcing controls. Tribal and local governments should be consulted in the design and implementation of controls on any land and facility transfers.

Some DOE sites have unique concerns because of the long-term nature of the radioactive contaminants that may remain active for thousands of years. For that reason, institutional controls must be developed, implemented, maintained, and enforced through administrative procedures for as long as the contamination remains a health hazard. The issue of defining the most effective long-term controls for use by the DOE is still the subject of debate; furthermore, the question of whether DOE or the future owner or user should be responsible for ensuring the continued viability of these controls must be resolved on a case-by-case basis. In general, DOE does not intend to release these particular parcels to non-federal entities. In such cases, DOE or another federal entity will most likely maintain institutional controls, possibly in concert with local and tribal governments as well.

Argonne National Laboratory - East

Argonne, Illinois

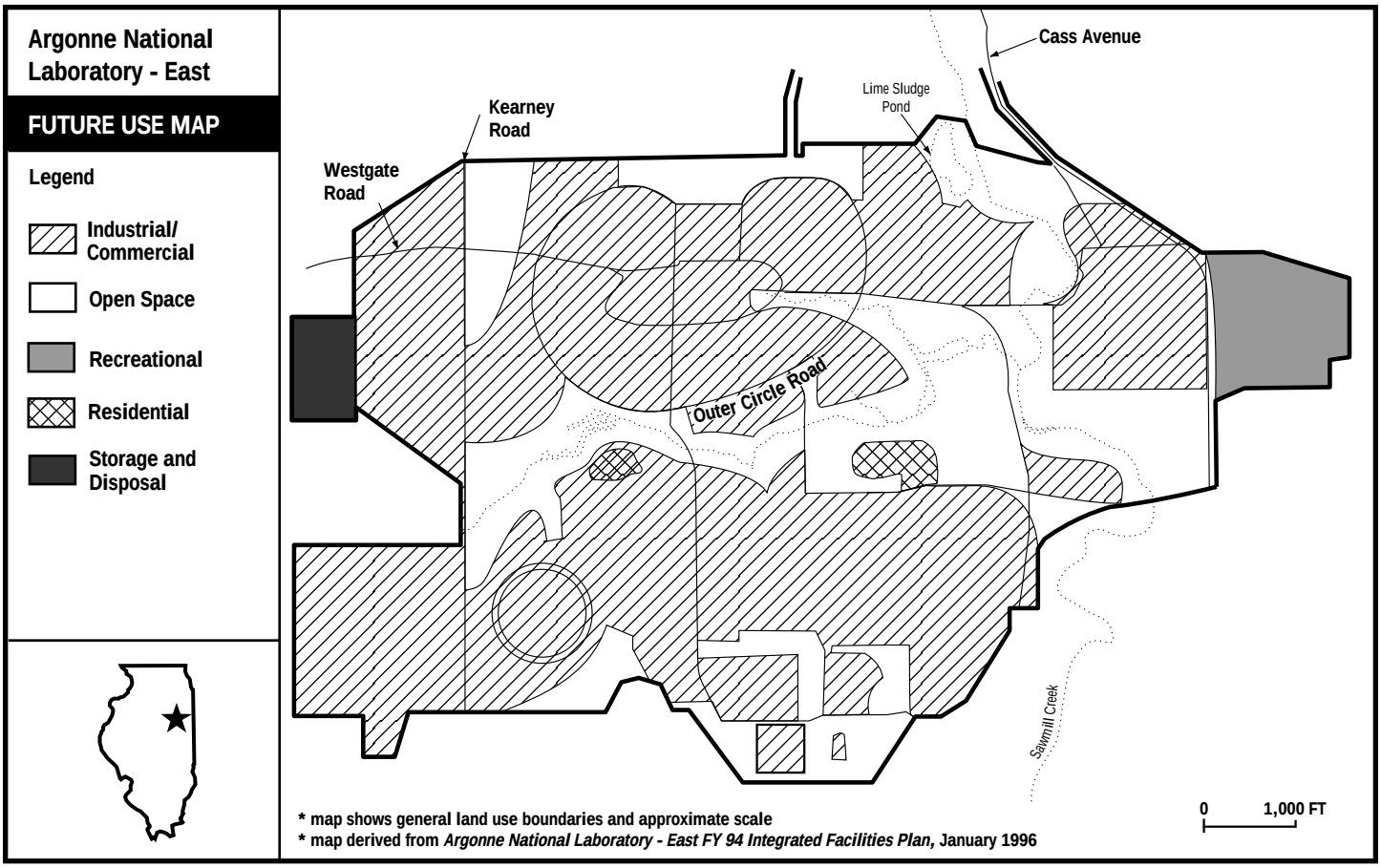

Figure 9. Argonne National Laboratory - East – Future Land Use Map

Argonne National Laboratory - East Future Use Facts

Future use recommendations for Argonne National Laboratory - East (ANL) were determined through the site development planning process. It is expected that ANL will continue operating as a multi-program national laboratory dedicated to research and development.

Future uses of the site include industrial/commercial (i.e., research and development and supporting activities), open space, residential, recreational, and storage and disposal uses. In general, existing developed areas will continue to be used to support activities compatible with the site's mission; additional areas have been set aside for future development. Environmentally sensitive areas and other existing natural areas will be preserved as open space. Existing facilities for visiting scientists will be maintained for temporary housing purposes. The Argonne Park, a 55-acre parcel on the site's eastern boundary, will continue to be used for recreational activities.

Future use of the 800 Area landfill will be reserved for potential storage and disposal activities.

Future Use Recommendations

As Figure 9 illustrates, the future use recommendations for Argonne National Laboratory - East (ANL) call for industrial/commercial, open space, recreational, residential, and storage and disposal uses. Future use plans for the site were determined through the site development planning process. ANL is expected to continue operating as a multi-program national laboratory dedicated to research and development for the foreseeable future.

According to the Site Development Plan, areas currently supporting research and development and other mission activities will continue to be used for such purposes. Certain areas have also been delineated to permit expansion of existing research areas. In addition, environmentally sensitive areas and other natural open spaces will be preserved as permanent green space or transition zones between developed areas. Areas currently used to house visiting scientists will be maintained for residential purposes, and a 55-acre parcel in the eastern section of the site, Argonne Park, will continue to be used for recreational activities.

Future use of the 800 Area landfill site on ANL's western boundary will be limited by restrictions prohibiting permanent buildings, residential use, drinking water wells, and other unrestricted uses.

Site Characteristics

Argonne National Laboratory-East is situated on 1,700 acres in DuPage County, Illinois, approximately 25 miles southwest of downtown Chicago. The site includes 117 buildings comprising more than four million square feet of space. Major facilities include the Intense Pulsed Neutron Source, the Advanced Photon Source, Argonne Superconducting Tandem Linear Accelerator System, and the High Voltage Microscope.

ANL is an important member of the DuPage County High-Technology Corridor, considered an economic and research resource to the Chicago area and a major force in the recent and planned growth of DuPage County. ANL's mission is a contributing factor to the economic welfare of the area.

ANL is surrounded by the Waterfall Glen Forest Preserve, a 2,040-acre public recreational area that serves as a buffer for the site. Most of this land was formerly part of the ANL site but was deeded to the DuPage County Forest Preserve District in 1973 for use as a public recreational area, forest preserve, and demonstration forest.

Cleanup Implications

Environmental areas of concern have been identified at twelve locations on the ANL site. The soils and groundwater at ANL have been contaminated as a result of accidental spills, past material management practices, and former waste disposal practices. Contaminants of concern include volatile and semi-volatile organic compounds, metals, polychlorinated biphenyls, and a variety of radionuclides. At present, these contaminants do not pose an immediate threat to the workforce or the general public.

Specific cleanup requirements will be established by the Illinois Environmental Protection Agency through the Resource Conservation and Recovery Act Part B permit and approval of a corrective action plan. A modification to the original permit is being prepared and will be issued during the first half of calendar year 1996.

Environmental cleanup issues include decontamination and decommissioning of old facilities such as the Experimental Boiling Water Reactor, and Chicago Pile 5 Reactor and removal of radioactive equipment and hot cells used in experimental programs. In addition, water softener lime sludge presently stored onsite will be removed, and areas used to store radioactive contaminated materials will be remediated. Continuous monitoring will be conducted at the landfill. Other areas where waste handling has occurred will continue to be investigated to determine whether remediation is required.

Public Involvement
Although the general public has not provided input into the development of the Site Development Plan, ANL coordinates closely with the two organizations responsible for local and regional planning in the area—the DuPage County Regional Planning Commission and the Northeastern Illinois Planning Commission. Both planning commissions classify the ANL site in the office/research/development land use category.

Long-Term Implementation
Future use decisions will continue to be made within the context of site planning functions, currently performed through the site-development planning process.

Brookhaven National Laboratory

Upton, New York

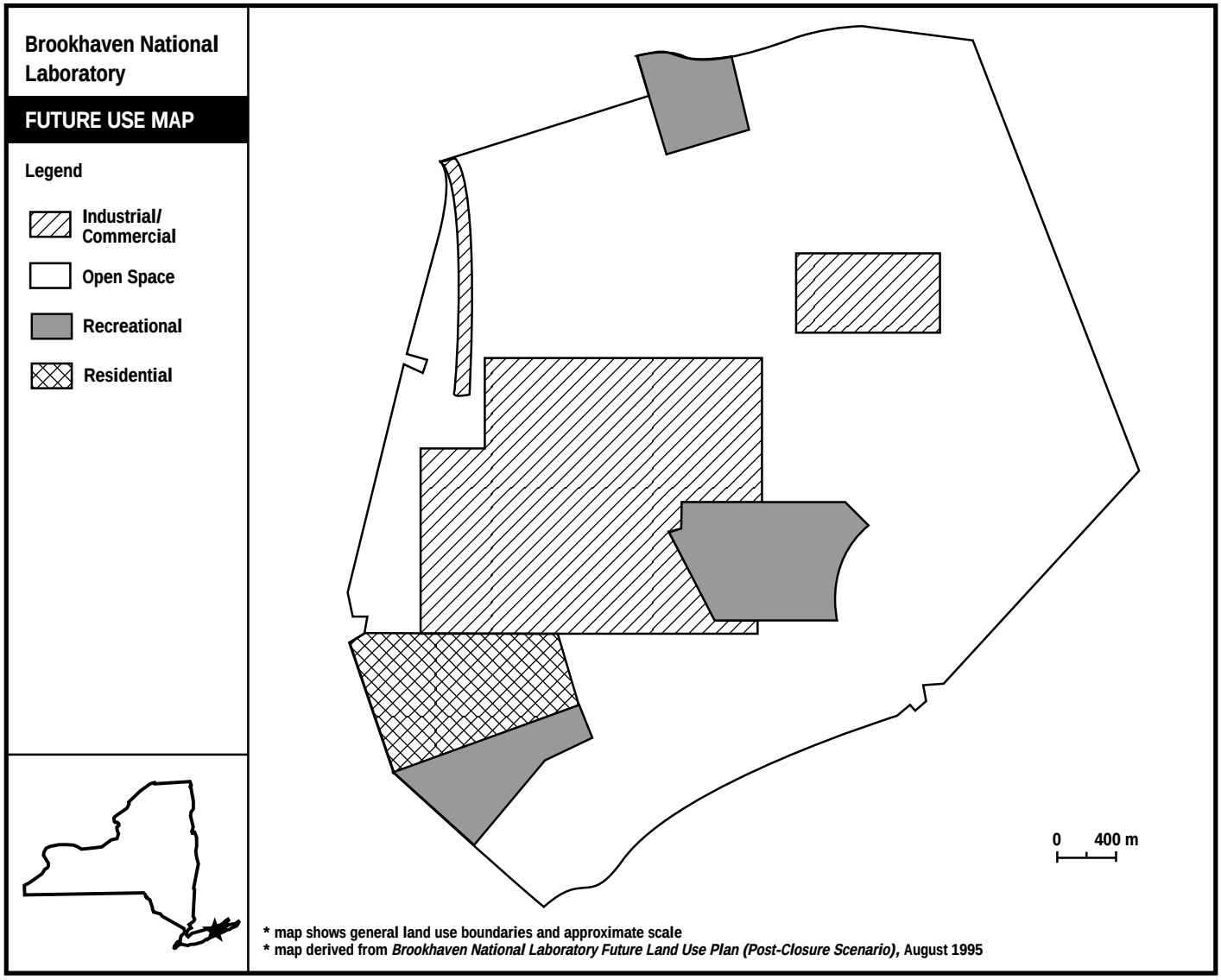

Figure 10. Brookhaven National Laboratory – Future Use Map

Brookhaven Future Use Facts

Community stakeholders support continuation of Brookhaven's current mission as a national scientific research facility. If the current mission is discontinued, stakeholders recommend privatization of the ongoing research mission, along with development of several commercial/industrial and recreational areas. Under a post-closure scenario, current areas zoned for industrial/commercial use would continue to be used for such purposes. The majority of the land would be maintained as open, undeveloped area. Small parcels could be used for residential and recreational purposes.

Future use recommendations were strongly influenced by such factors as maintaining the local economy and preserving significant natural resources. Recommendations recognize the vital impact of the Laboratory on the Long Island economy, as well as the measurable community benefit offered by technology transfer and educational support programs. Future use recommendations also call for preservation of much of the existing undeveloped areas in their natural state in accordance with the Pine Barrens Act.

Future Use Recommendations

As Figure 10 depicts, the future use recommendations for Brookhaven National Laboratory (BNL) include open space, industrial/commercial, recreational, and residential uses. Future use recommendations for the site are described in the BNL Future Land Use Plan (Plan) and are based primarily on the Site's 20-year Master Plan and the results of a broad public outreach effort. The Plan foresees continuation and potential growth of BNL's current scientific research mission. Stakeholders expressed strong support for the Laboratory and its work.

The Plan identifies future use scenarios for two planning horizons:

- future development over the next 20 years (the Master Plan), and
- a post-closure scenario, describing community preferences in the event that BNL ceases operations.

The 20-year scenario is based on future programming and space requirements as identified in the Site's Master Plan, and it assumes that scientific missions will continue at the BNL site for the next 20 years. Under this scenario, specific areas of the site have been designated and are being held in reserve for future programmatic and infrastructure development. An additional 20 percent of the property currently used as open space could be zoned for industrial purposes to accommodate construction of proposed scientific machines, including future Relativistic Heavy Ion Collider experimental support facilities, a linear accelerator, and a muon-muon collider. Areas of the site currently used for industrial and agricultural research would continue to be used for such purposes. The current residential area, which comprises only three percent of the site, could be slightly expanded to accommodate increased housing needs for Laboratory users, visitors, and other staff with temporary assignments.

Although stakeholders overwhelmingly agree that BNL should continue operating as a national laboratory, the Future Land Use Plan also considers the possibility of closure. The post-closure scenario envisions that currently developed areas would continue to be used by other agencies or the private sector to support scientific research or related activities; they also could be converted to industrial/commercial or light manufacturing uses. The core area would be suitable for offices as well as chemical, biology, clinical, electronic, and applied-science laboratories. Current open space areas could be used for passive recreation, environmental studies, hiking or greenbelt trails, limited recreation, and canoeing (navigable portions of the Peconic River), or be preserved as ecologically sensitive areas. Recreational and residential uses for specific portions of the site were also identified in the post-closure scenario.

The Master Plan was developed primarily through internal work—meetings, program reviews, interaction with DOE employees, and contributions from Laboratory staff, collaborators, and visitors.

Influencing Factors.

Post-closure land use recommendations were influenced by several factors, including an interest in maintaining the local economy and preserving significant natural resources.

An economic study entitled "The Impact of Brookhaven National Laboratory on the Long Island Economy" conducted by the Suffolk County Planning Commission concluded that BNL is vital to Long Island and Suffolk County's economic health. The study also reported that BNL's technology transfer efforts are key to offsetting job losses in the declining defense sector of the local economy.

Maintaining the high quality of environmental resources was another critical goal in establishing post-closure land use recommendations. The Peconic River on BNL's property is designated a "scenic river" under New York State's Wild, Scenic, and Recreational Rivers Act. The aquifer underlying BNL is designated a "sole source aquifer" by the U.S. Environmental Protection Agency. The town of Brookhaven has adopted a master plan, based on the Long Island Comprehensive Wastewater Management Plan, that zones land use to ensure preservation of the aquifer. Additionally, the Laboratory is considering a proposal that would designate portions of BNL as a National Environmental Research Park.

Furthermore, the Long Island Pine Barrens Act of 1993 requires the local government to develop a comprehensive management plan for

approximately 60,000 acres in Suffolk County that include BNL. The Act designates certain areas as "core preservation" and other parcels as "compatible growth." Within the core preservation area, the principal goal is to preserve its natural state; development, construction and other activities are limited or prohibited. Development, construction or other activities within both areas is governed by NEPA. Under the Pine Barrens Management Plan for non-federal entities, more than 1,330 acres fall within the core preservation area. The compatible growth area encompasses the central portion of the site where most of the buildings and structures are situated. While DOE's position is that the Act confers no jurisdiction to the state of New York over the BNL site as a federal property, the Laboratory has agreed to use the Pine Barrens' Management Plan as input in site development and future use planning.

Finally, the New York Office of Parks, Recreation, and Historical Preservation has recommended three areas of the BNL site for historic preservation: the Old Graphite Reactor Building, the old Cosmotron enclosure (Building 902), and a small area of World War I trenches approximately 30 meters by 30 meters. The Laboratory will consult with the state office for any future proposals that affect these three areas.

Site Characteristics

BNL is located in central Long Island, New York, approximately 60 miles east of New York City. It consists of 5,262 acres, most of which are wooded.

The site encompasses significant natural resources. The wetlands in the northern and eastern sections of the site are part of the Peconic River headwaters. The Peconic River both recharges to, and receives water from, the groundwater aquifer, depending on the current hydrologic condition. The aquifer beneath BNL comprises three water-bearing units that are hydraulically connected and make up a single zone of saturation with varying physical properties. In addition, a wildlife survey has identified two endangered species protected by federal and/or New York state law.

Current use of the BNL site is classified into four categories: industrial/commercial, open space, agricultural, and residential. The primary industrial area comprises 1,655 acres near the center of the site. Approximately 500 acres of this developed area is a legacy from the former Camp Upton, and many of the original buildings, roads, and utilities are still used. Of the remaining land, 260 acres are occupied by various large specialized research facilities.

Contamination Profile

Contaminants associated with Brookhaven National Laboratory include radionuclides, organic compounds, and metals. The facility is subdivided into five operable units (OU) as described below:

- Two closed landfills and two storm water recharge basins have acted as sources of groundwater, soil, and surface water contamination by plutonium, cesium-137, strontium-90, tritium, uranium, organic compounds, and metals at OU I/VI. This OU also comprises the areas where Laboratory and town sewage were applied to various natural environments in the Upland Recharge Experiment. Suspected contaminants include tritium, ethylene dibromide, pesticides, herbicides, metals, and other radionuclides;
- A graphite reactor, waste concentration facility, scrapyard, and sewage system have been sources of cesium-137, strontium-90, cobalt-60, organic compounds, and metal contamination of soil and groundwater in OU II/VII. This OU also includes areas potentially contaminated with cesium-137 by landscaping soil derived from the Hazardous Waste Management Facility.
- Tritium, strontium-90, cesium-137, cobalt-60, organic compounds, and metals are associated with a transfer line, underground storage tanks, a site sewage system, and other potential sources that have contaminated soil and groundwater at OU III;
- Uranium, plutonium, europium isotopes, strontium-90, cesium-137, radium-226, tritium, organic compounds, and metals derived from the Central Steam Facility, the Reclamation Facility, the site sewage system, and a recharge basin have contaminated soils and groundwater at OU IV;
- A sewage treatment plant, the Satellite Disposal Area, and the site sewage system have released cesium-137, strontium-90, tritium, organic compounds, and metals into the soils and groundwater at OU V.

Outlying facilities occupy about 550 acres and include the sewage treatment plant, research agricultural field, housing, and fire breaks.

BNL is home to four national user research facilities — the Alternating Gradient Synchrotron, the High Flux Beam Reactor, the National Synchrotron Light Source, and the Scanning Transmission Electron Microscope. The Relativistic Heavy Ion Collider, now under construction, will be a unique national user facility within this land use category. The remaining 75 percent of the site is largely wooded and in its natural state except for utilities rights-of-way, recreation fields, and environmental monitoring wells and stations. Wooded buffer areas form the perimeter of the BNL property. The undeveloped areas contain floodplains and wetlands. Approximately 70 acres are used for growing crops for biological research.

The residential area comprises 170 acres in the southwest portion of the site. The housing inventory is composed of summer cottages, mobile homes, apartments, efficiencies, guest rooms, dormitory rooms, and houses.

Cleanup Implications

The Future Land Use Plan will be considered in making future cleanup decisions such as baseline risk assessments, feasibility studies, and records of decision.Based on the current program baseline, project cleanup activities are expected to extend to 2013.

Public Involvement

Future use planning for the BNL site was led by the Future Land Use Committee. This committee was headed by BNL's Associate Director for Management and Physical Plant including representatives from the Office of the Associate Director for Reactor Safety and Security.

The Committee sought to involve a broad cross-section of the Long Island community in the future use planning process and invited governmental entities, regulatory agencies, businesses, academia, elected officials, civic organizations, organized labor, environmental groups, and other organizations to participate. The general public was also invited to participate through announced, open meetings and review of the Plan during its development.

The stated goal of public involvement was to gather ideas and comments from the community on future land uses. All views were summarized and categorized in the final report. Although the site did not seek consensus, most participants agreed on the future uses presented here.

In January 1995, BNL hosted a roundtable meeting for the presidents of 12 local civic associations to apprise them of the Future Use Project and seek input. Participants clarified local concerns, discussed specific future use options, and voiced their strong support for the Laboratory. As a result of this roundtable meeting, BNL officials made presentations to two civic associations and a local Rotary Club session.

BNL also hosted a workshop in March 1995 for stakeholders with specific interests to provide their input. The discussion focused on four areas:

- environmental/ecological/open space,
- governmental/scientific/academic,
- industrial/commercial/residential, and
- utilities and transportation.

Subsequently, BNL published a Preliminary Draft Plan (April 1995) that was presented to the general public at a meeting in May 1995. A final Future Land Use Plan was presented to the public at an open meeting in August 1995.

The New York State Department of Environmental Conservation, Brookhaven Town Environmental Protection Agency, Brookhaven Town Planning Board, Suffolk County Planning Board, the Long Island Regional Planning Board, and many other community groups attended meetings and provided written comments. Environmental Protection Agency-Region II and New York State Environmental Protection Agency received copies of the future use planning materials and were aware of the Committee's work but did not participate in the process.

Long-Term Implementation
BNL officials are currently developing a process to integrate stakeholder-preferred future uses into site comprehensive plans.

Fermi National Accelerator Laboratory

Batavia, Illinois

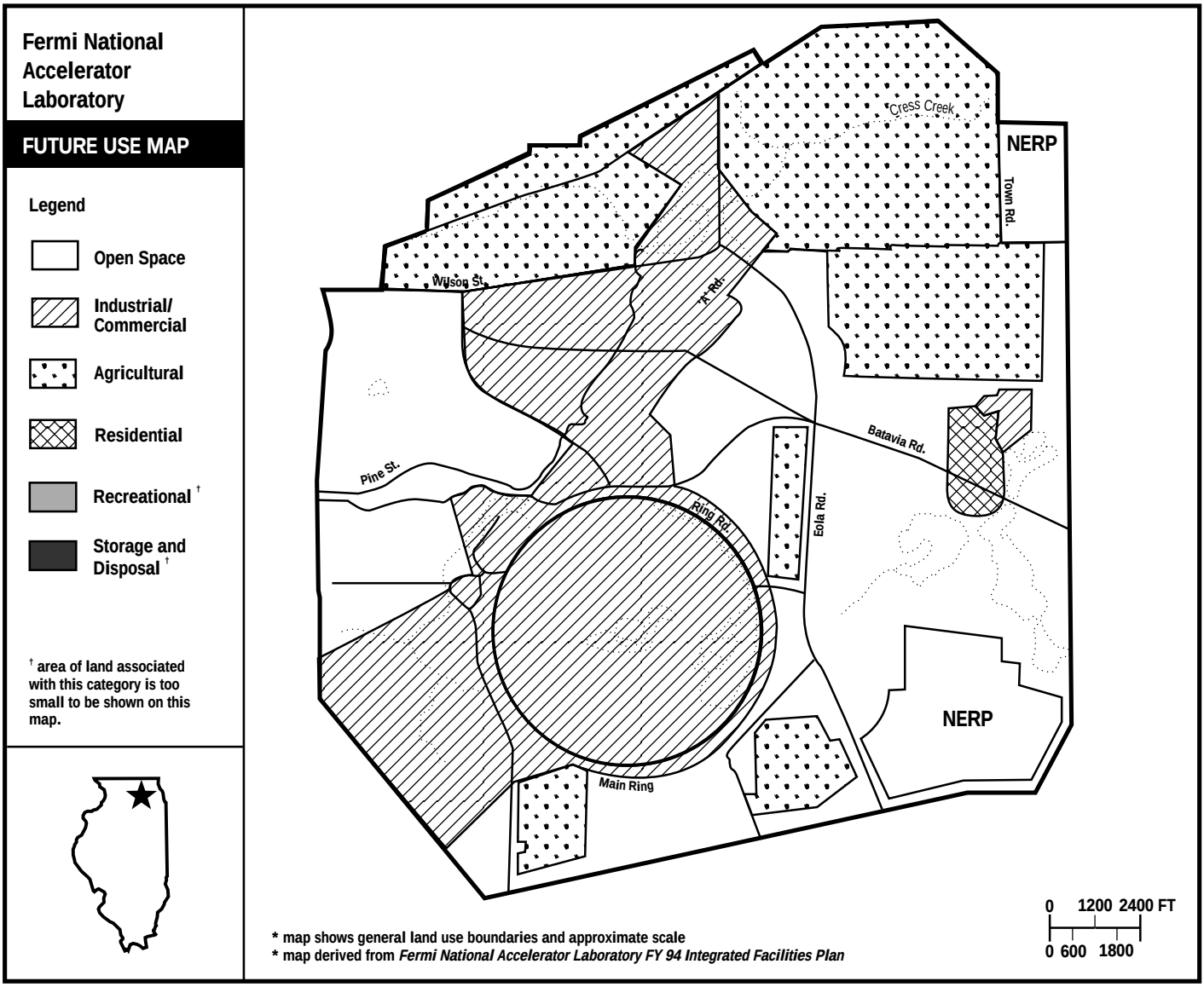

Figure 11. Fermi National Accelerator Laboratory – Future Land Use Map

Fermilab Future Use Facts

Future use recommendations for the Fermi National Accelerator Laboratory site were defined through development of the Site Development Plan. It is expected that the site will continue to be used to support current missions, primarily particle physics research.

Future site uses include industrial/commercial (i.e., research and development and supporting functions), open space, agricultural, residential, recreational, and storage and disposal areas. In general, developed areas will continue to be used to support activities compatible with the Fermilab mission. Open space areas will be preserved in the form of wetlands, prairie remnants and reconstructed prairies, woodlands, and National Environmental Research Park areas. Certain parcels will continue to be leased for growing crops. A housing area will be maintained to serve Laboratory visitors. Recreational, cultural, and educational programs will also continue.

Future Use Recommendations

As Figure 11 illustrates, the future use recommendations for Fermi National Accelerator Laboratory (Fermilab) call for open space, industrial/commercial, agricultural, residential, recreational, and storage and disposal uses. Future uses for the site were determined through the site development planning process. No programmatic changes are anticipated for Fermilab in the foreseeable future; the use of the site for particle physics research will continue.

Current land use at the site will remain unchanged. In general, developed areas will continue to support activities compatible with the Fermilab mission. The site Master Plan has also identified a number of additional facility and infrastructure needs to support new Laboratory projects in currently undeveloped areas.

Other future uses of the site will include open space, agricultural, and residential uses. Open space areas will be preserved in the form of wetlands, prairie remnants, reconstructed prairies, and woodland areas. The National Environmental Research Park areas in the northeast and southeast sectors of the site will also be retained. Certain parcels will continue to be available for lease to local farmers as cropland. The present Village Housing Area will be maintained as a continuing on-site facility. Finally, the neighboring population will continue to use designated areas for recreational, cultural, and educational programs.

Site Characteristics

Fermilab is located in Batavia, Illinois, about 30 miles west of Chicago. The 6,800-acre laboratory site is situated in a mixed use area of farmland, residential use, and business park. The Laboratory site itself lies in an unincorporated area, but the site is surrounded by incorporated areas. Immediately to the east is the town of Warrenville (11,333 population), to the west is Batavia (15,357 population), to the north is West Chicago (14,796 population), and to the south is Aurora (99,581 population).

Fermilab contains many acres of relatively natural areas, including wetlands, remnant prairies, reconstructed prairies, and woodland. Presently, about 1,650 acres have been leased to local farmers as cropland.

Cleanup Implications

Fermilab is currently undertaking a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for 17 solid waste management units that may represent potential releases to the environment from former operations at the site. In addition, Fermilab has minor soil contamination related to testing and refilling electric transformers containing polychlorinated biphenyls (PCBs). The RFI commenced in 1992 as a condition of a RCRA Part B permit issued by the Illinois Environmental Protection Agency to store hazardous wastes on-site. Two Phase II studies, currently in progress, are investigating organic solvents in the Village Machine Shop and chloride, iron, and chromium in the Central Utility Building Tile Field. PCB contamination identified at 22 transformer service buildings located around the circumference of the Main Ring is being addressed during the time the Main Ring is shut down each year for routine maintenance if shutdown is of long enough duration.

Milestones and remediation goals for contamination at Fermilab will be established by the Illinois Environmental Protection Agency within the framework of the RFI process. Site remediation is being accomplished according to a schedule determined by operational and funding constraints.

Public Involvement
Based on the assumption of continuing Departmental missions, as well as minor contamination considerations at Fermilab, a substantial public involvement effort to define future site uses was not warranted. Future use recommendations were made exclusively within the context of generating the Site Development Plan.

Long-Term Implementation
Future use decisions will continue to be made within the context of site planning functions, as currently performed through site development planning.

Fernald Environmental Management Project

Fernald, Ohio

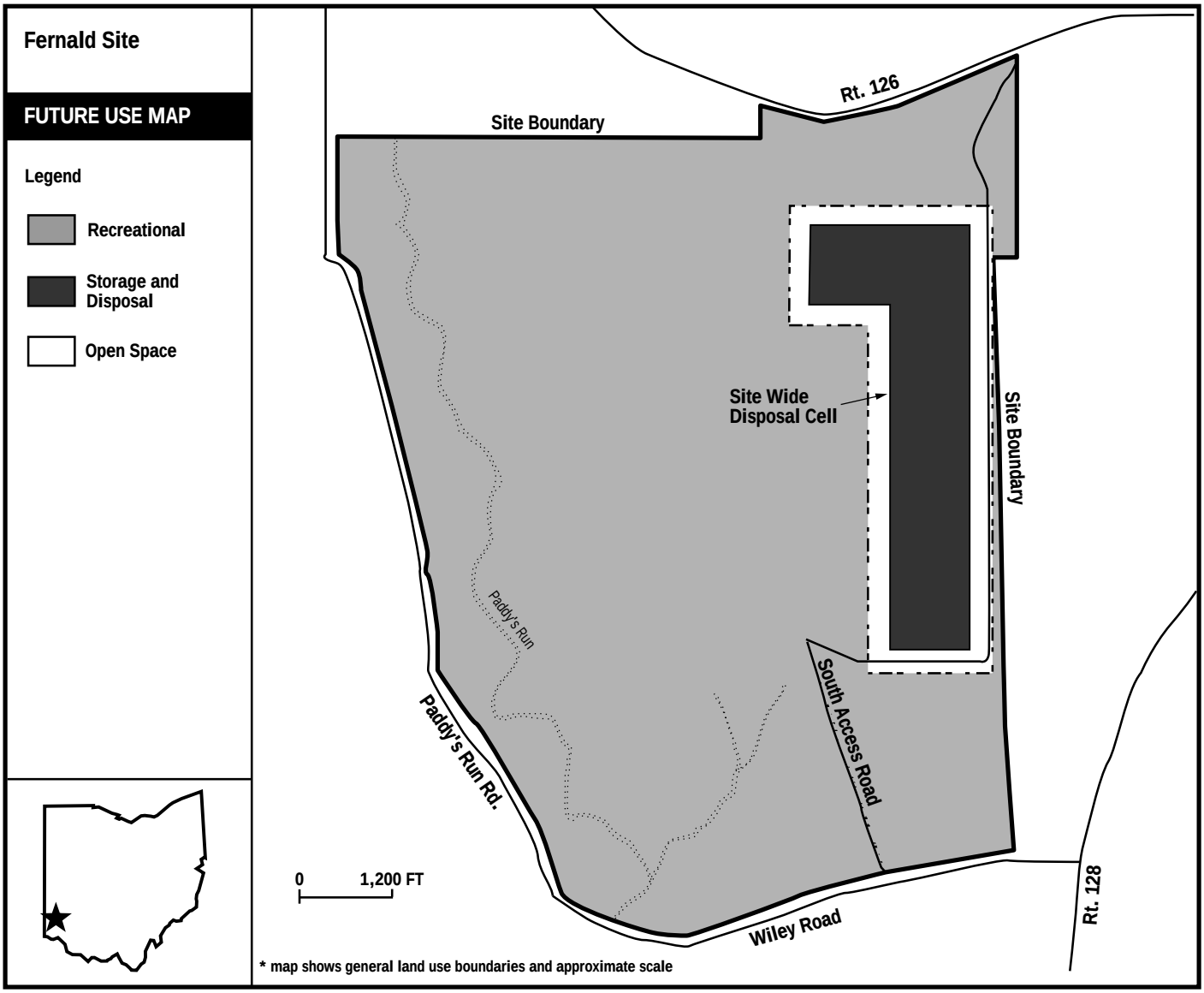

Figure 12. Fernald Site – Future Use Map

Fernald Future Use Facts

Future use, as determined by the Fernald Citizens Task Force, will include an on-site disposal facility to accept only materials from the Fernald site that contain low levels of contamination. The disposal cell will be surrounded by a 300-foot buffer zone. The remaining property will be made available for any use that benefits the community, except agricultural or residential use or any use that involves hazardous, radioactive, or mixed wastes.

The Task Force advocates remediating the entire Fernald site to the level of open recreational use. To mitigate adverse impacts to the Great Miami Aquifer, the aquifer will be completely and rapidly cleaned up to the proposed maximum concentration level of 20 ppb for uranium.

Recommendations reflect consensus opinions of the Task Force. The general public and regulatory officials were fully involved in the process.

Future Use Recommendations

As Figure 12 depicts, the future use recommendations for the Fernald Environmental Management Project advocate open space, recreational, and storage and disposal areas. Future use recommendations for the site were determined through the Fernald Citizens Task Force, a site-specific advisory board convened by the U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Ohio Environmental Protection Agency. The Task Force focused its recommendations on creating a broad understanding of how the Fernald site could best be used after remediation, rather than identifying specific land uses.

Conceptually, Task Force recommendations divided the Fernald property into three zones as depicted in Figure 12:

1. the land containing the proposed on-site disposal cell and supporting facilities,
2. a transition zone surrounding the cell on all sides, and
3. all remaining property at Fernald. The following recommendations were developed in support of this concept:
   - The on-site disposal facility (zone one) should be integrated into the natural environment to the greatest extent possible.
   - The disposal facility should be isolated from the public to protect its cover system. Barriers should be unobtrusive, yet still be clearly marked and protected from intrusion.
   - A 300-foot buffer immediately surrounding the disposal cell (zone two) should be reserved for limited use, including undeveloped green space and natural habitats. Public access should be clearly discouraged.
   - The remaining property (zone three) should be made available for uses most beneficial to surrounding communities. Agricultural and residential uses and any uses involving the import or generation of hazardous, radioactive, or mixed waste should be prohibited.
   - DOE must not commit to any future uses of the property after remediation until community input has been gathered.
   - Sufficient space should be provided for the permanent relocation of any Native American burial sites exhumed in the vicinity of the Fernald property.
   - The on-site disposal cell (zone one) and surrounding green space (zone two) must remain under government control and ownership in perpetuity.
   - The remaining property (zone three) must remain under federal control and ownership until remediation is complete.
   - All future uses must protect and enhance existing natural resources, with particular emphasis on the Great Miami Aquifer, Paddy's Run, and forested wetlands.

Consensus/Nonconsensus Issues.

The recommendations reflect the Task Force's deliberations as well as input from the general public, other stakeholders, DOE and regulatory officials, and technical analysis and feasibility studies. EPA and the Ohio EPA have signed letters of commitment to use the Task Force recommendations. Also, in a letter dated September 28, 1995, the Fernald site manager stated, "DOE is committed to adopting the recommendations of the Citizens Task Force and using the Task Force Report as a blueprint for the ultimate remediation of the Fernald site."

However, the recommendation to locate a low-level waste facility on-site was opposed by a segment of the public. To hear and evaluate all points of view on this issue, the Task Force provided extra publicity for meetings, met with community members, and conducted a special workshop to present materials and information used for decision-making. One Task Force member was unable to support the recommendation to locate a disposal facility on the Fernald property, but ultimately approved the considerations and conditions.

Site Characteristics

The Fernald facility is located on a 1,050-acre tract that overlaps the boundary between Hamilton and Butler counties near the southwest corner of Ohio approximately 20 miles northwest of Cincinnati. The Great Miami River flows nearby in a southerly direction, approximately one mile east of the site. Paddy's

Run, a small stream, runs southward along the western site boundary.

The soil immediately beneath the Fernald site consists of a clay-rich glacial overburden which is up to 50 feet thick at the northeast corner of the site and thins to zero feet near Paddy's Run. This clay layer contains silty sand lenses which contain a perched aquifer system that is not used as a source of drinking water. Beneath the clay layer is a thick sand and gravel layer containing the Great Miami Aquifer.

The Great Miami Aquifer, designated by EPA as a sole-source aquifer, flows beneath the entire Fernald site. Groundwater from this aquifer is a major source of drinking water in the region. The Great Miami Aquifer covers much of southwestern Ohio and is one of the largest drinking water aquifers in the nation, containing almost 10 trillion gallons of water.

Significant natural features of the site include the northern wetlands and Paddy's Run, an intermittent stream which is inhabited by an endangered species of crayfish. In addition, Paddy's Run provides habitat for endangered species of cave salamander and Indiana bat. At certain intervals, Paddy's Run enters the Great Miami Aquifer, carrying contaminants from surface runoff. It also feeds into the Great Miami River.

The Fernald Feed Materials Production Center, later renamed the Fernald Environmental Management Project, was built in the early 1950s to convert uranium ore into uranium metal, which was then converted into target elements for reactors that produced weapons-grade plutonium and tritium. Production was suspended in 1989, and the facility was shut down in 1991. Five operable units have been designated for environmental restoration on site; a storage area for legacy production waste also exists. The former production facilities and supporting infrastructure comprise approximately 136 acres (or 13 percent) of the site. The remainder of the site is undeveloped. To the west of the production area lie several large open waste disposal pits. In addition, some open fields at the site's perimeters are currently leased for cattle grazing.

The area surrounding the Fernald site is primarily agricultural and residential with some light industry.

Cleanup Implications

Because contaminated soils both on and off the Fernald property could potentially contaminate the aquifer and pose a risk to human, animal, and plant life in the area, the Task Force evaluated a range of alternatives for soil cleanup. The Task Force used "Future Site," a modeling exercise they developed, to help envision the volume of soil that would have to be removed to attain various levels of risk for alternative use scenarios. For instance, one scenario would require removal of 5,200,000 cubic yards of off-site soil. This scenario would "rob" 11 square miles of surrounding homes and farmlands of vital topsoil, mature trees, and vegetation; and would cause enormous disruption during construction to lives and livelihoods and for future generations. Similar ecological damage would occur to areas on-site if they were remediated to pre-operation site conditions.

As a next step, the Task Force identified specific remediation levels based on total uranium in soil and groundwater as these comprise the bulk of contamination at Fernald. In establishing these remediation levels, the Task Force was most concerned with protecting the Great Miami Aquifer and human health across a range of potential exposure pathways and land uses. Task Force members worked to balance the requirement to protect human health with the desire to minimize adverse impacts on the environment and surrounding communities during remediation.

Remedial Actions.

The Task Force concluded that the most viable alternative for protecting the aquifer would be to clean it up quickly to meet Safe Drinking Water Act standards (maximum contaminant level of 20 parts per billion for uranium). Task Force members believed that remediating the aquifer to a stricter level would not be technologically or practically achievable and would offer little additional benefit to human health and the environment.

Remedial actions include removing 17 million pounds of special nuclear (non-waste) materials, 70,000 drum equivalents of legacy waste, and 12,000 drum equivalents of mixed waste from the Fernald property as soon as possible. These materials have been in temporary storage for years awaiting shipment to appropriate storage facilities which already exist within the DOE system. Timely removal of these materials will significantly decrease the cost of surveillance, maintenance, and security, thereby freeing funds for remedial activities.

The low-level waste disposal facility will be sealed with an environmental cap to minimize seepage and the potential for leaching contaminated materials into groundwater. In addition, isolating the disposal site from public access will help prevent damage to the environmental cap and ensure that contaminants do not migrate into the Great Miami Aquifer.

Institutional Controls.

The on-site disposal facility will be established as a continuing restricted-access area. In addition to discouraging access with natural and man-made barriers, DOE will maintain the integrity of the disposal site by conducting surveillance and monitoring it for leakage and damage. DOE will retain ownership of the disposal area and a surrounding 300-foot buffer zone. High security measures such as fencing or armed guards will not be used. In the remainder of the site, no other institutional controls will be required other than typical zoning procedures.

Cost and Schedule of Remedial Actions.

Previous projections for soil remediation at Fernald involve a 25-year timeline with an estimated cost of $5.7 billion, including ongoing expenses for security and monitoring of hazardous materials, landlord functions, and administrative support during remediation.

In support of the future use recommendations, DOE has dedicated additional funds; this timeline has been reduced to ten years, representing significant monetary savings. The shortened timeline is made possible by accelerating the removal of hazardous materials: 17 million pounds of special nuclear (non-waste) materials, 70,000 drum equivalents of legacy waste, and 12,000 drum equivalents of mixed waste to the appropriate off-site storage areas. This measure will free significant DOE resources (funds formerly needed for storage and monitoring) to be applied to remediation work. Placing the priority on remediation instead of maintenance could reduce the estimated cost to $2.9 billion.

The 10-year remediation plan will include removal of nuclear materials from the site, construction of the waste disposal facility, removal of soils, construction of a vitrification pilot plant and decontamination and decommissioning of several facilities. The Great Miami Aquifer is scheduled to be remediated and returned to full beneficial use by fiscal year 2028.

Public Involvement

In the summer of 1993, DOE, the U.S. Environmental Protection Agency (EPA), and the Ohio Environmental Protection Agency (Ohio EPA) convened a site-specific citizens advisory board to develop detailed recommendations for the remediation and future use of the Fernald Environmental Management Project. This board, known as the Fernald Citizens Task Force, included 14 stakeholders and two alternates, all of whom were residents of the area affected by previous operations of the Fernald facility. The board members included professionals, educators, and government officials representing a variety of local interest groups. In addition, the Fernald site manager and representatives of EPA and Ohio EPA provided guidance as ex-officio members of the Task Force.

The Task Force met monthly for two years, holding discussions, workshops, site tours, and technology demonstrations; and using an extensive packet of background information and the "Future Site" modeling exercise.

From the beginning the Task Force recognized that no single group could represent every viewpoint of the public. Task Force members conducted their own outreach efforts to stress their independence from DOE and to obtain specific input from the public on issues. Particular emphasis was placed on public input on controversial issues such as waste disposition. To ensure that all sides were heard, the Task

Force mailed personal invitations to stakeholders identifying issues and decisions to be addressed in upcoming meetings. The Task Force sponsored two workshops to enhance public understanding and involvement on issues including remediation levels, future use, and waste disposition.

Regulatory, Local Government, and Tribal Participation.

EPA and Ohio EPA ex-officio Task Force members advised and assisted the Task Force on regulatory and technology issues, as well as provided access to documents, information, and administrative support. EPA and the Ohio EPA have signed letters of commitment to use Task Force recommendations.

The Task Force included representatives of local governments in the two counties surrounding the Fernald facility. One member is a practicing attorney and the president of the Hamilton County Commission, the governing body for that county. Another is an area businessman and chairman of the Morgan Township Zoning Board. A third member is a machine tool operator who is also an elected trustee in Crosby Township.

DOE has begun working with local tribal officials as a result of a recent discovery of prehistoric native-American remains and artifacts during pipeline construction near the site, some of which dated back as far as 3,500 B.C. Of primary concern were intact remains of five humans from the Late Woodland period. DOE is working with the Native American Alliance of Ohio and the Cincinnati Museum of Natural History to determine the appropriate handling and disposition of the remains. The Federal Miami Tribe has filed a claim for a determination of cultural affiliation and desires that the remains be re-buried on Fernald property. Once a final decision has been made, DOE will re-inter the remains. Reburial on Fernald property will require additional land use restrictions to ensure the burial site will not be disturbed.

Long-Term Implementation

Although the Fernald Citizens Task Force completed the work for which it was originally chartered, their success has resulted in a continued mission to help implement and oversee the future use options.

DOE site managers are now forming a community reuse organization (CRO) of local elected officials and citizens to build upon the work of the Task Force in recommending future uses for the Fernald property.

Membership of the CRO should be finalized in February 1996, and the committee will start work shortly thereafter.

Contamination Profile

Approximately 100 contaminants of concern have been identified at Fernald—primarily solvents, asbestos, polychlorinated biphenyls (PCBs), and heavy metals. In addition, the site is heavily contaminated with radioactive compounds, including uranium, thorium, radium, and radon.

Uranium is the most prevalent contaminant found in the soil and groundwater. Very high concentrations of uranium exist in soils to maximum depths of 20 feet in the former production area. Airborne uranium has also resulted in widespread contamination of surface soils outside the former production area. Most contaminants fell to the ground nearby, but enough were carried away to exceed background levels over an area of 11 square miles.

The highest level of radioactivity is found in three concrete storage silos to the west of the former production area. Two silos contain wet waste residues with a high concentration of radium, resulting in production of a high level of radon. The chronic production of radon has been temporarily controlled by placing a thick clay layer at the top of each silo. The third silo contains dry residue with much lower concentrations of radium.

North of the silos are six waste pits containing solid and semi-solid wastes of various types and concentrations. Fly ash and sludges were also disposed in landfills west and south of the former production area. In the former production area, numerous contaminated structures and equipment require decontamination and disposal. In addition, thousands of drums of legacy waste still await off-site disposal.

A large contaminant plume is present in the Great Miami Aquifer beneath the Fernald site and extends beyond the site boundary to the south.

Hanford Site

Richland, Washington

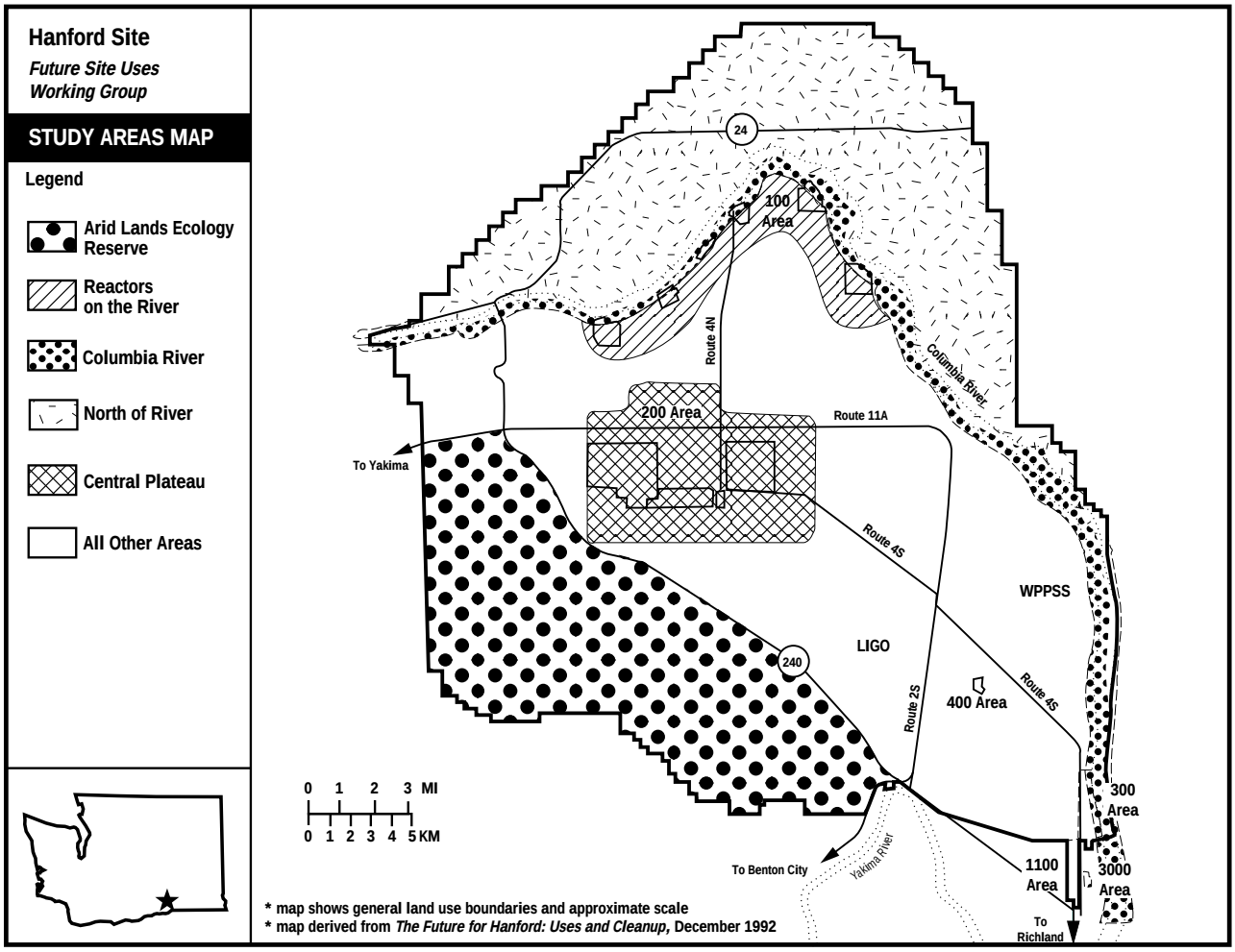

Figure 13. Hanford Site – Future Site Uses Working Group Study Areas Map

Hanford Future Use Facts

Several initiatives are contributing to the development of future use recommendations at the Hanford site, including the Hanford Future Site Uses Working Group (Working Group), the Hanford Remedial Action Environmental Impact Statement (HRA EIS), and the Comprehensive Land Use Plan (CLUP).

The Working Group was convened in April 1992 by federal, tribal, state, and local governmental entities to identify a range of future land use options. These options and associated cleanup scenarios are documented in the Working Group report, "The Future For Hanford: Uses and Cleanup."

The Department of Energy is currently preparing the HRA EIS to evaluate potential land use scenarios and select a preferred alternative to be used as the basis for site cleanup. With a record of decision anticipated in summer 1997, the HRA EIS will define future use in terms of unrestricted, restricted, and exclusive categories.

The CLUP is being prepared in conjunction with the HRA EIS. Within the broad categories of land use described by the HRA EIS, the CLUP will define current land use, designate land use to support future missions for the Hanford site, evaluate ongoing land use opportunities, and implement land use decisions for the next 30–50 years. The CLUP is currently being developed in coordination with Benton County's Land Use Plan under the state of Washington's Growth Management Act and with voluntary assistance from key stakeholders.

Future Use Recommendations

Although future use recommendations for the Hanford site are still being developed, several initiatives at the site are contributing to the process. In December 1992, the Hanford Future Site Uses Working Group (Working Group) developed an array of options outlining ways that different parts of the site could be used in the future. These options and associated cleanup scenarios were documented in their report, "The Future For Hanford: Uses and Cleanup." Figure 13 delineates the different study areas considered by the Working Group.

More recently, DOE has been preparing the site-wide Hanford Remedial Action Environmental Impact Statement (HRA EIS) and the Comprehensive Land Use Plan (CLUP). The purpose of the HRA EIS is to evaluate potential land use scenarios and select a preferred alternative for site cleanup. The Working Group document is being used as a resource in preparing the HRA EIS and has been included in the scoping record. The CLUP will also be used as a resource in preparing the HRA EIS and will provide an on going process for implementing the broad categories of land use established the HRA-EIS. The draft CLUP/HRA EIS is scheduled for release by summer 1996; final adoption is expected by summer 1997. (See "Long-Term Implementation" on the CLUP and HRA EIS.)

Hanford Future Site Uses Working Group.

The Working Group was convened in April 1992 to identify a range of potential future uses for the site and to select appropriate cleanup scenarios which would make these future uses possible. A prime contributing factor in convening the Working Group was that DOE was in the midst of developing the HRA EIS to chart the course for cleaning up much of Hanford. DOE, the state of Washington, and the EPA committed to using the Working Group's recommendations to inform and guide all relevant aspects of their cleanup decisions. In general, the Working Group provided a range of future land use options rather than selecting a single use for specific areas of the site. In some cases the group agreed on one preferred land use; for a number of on-site areas, the group suggested a range of alternatives.

The Working Group recommended that the Arid Lands Ecology Reserve, the North Slope, and the Columbia River adhere to an unrestricted cleanup scenario, with the most likely future uses for these areas identified as agricultural, wildlife refuge, Native American, and recreational uses. Suggesting that the area will likely be used to consolidate waste management activities for the foreseeable future, the Working Group agreed that the 200 Area at Hanford should fall under an exclusive cleanup scenario. The group also agreed that the 300 Area should be cleaned up to meet restricted/industrial standards.

Three potential cleanup scenarios were identified for the 100 Area. One scenario calls for the entire surface area, soil, and groundwater to be cleaned up for unrestricted use. A second calls for mostly unrestricted use, except for some restricted buffer area around each of the reactor buildings (which would remain in place). The third scenario calls for remediation of all surface areas, soil, and groundwater to unrestricted use, except for the B-Reactor complex, which would remain in place as a museum/visitor center.

For the remaining areas, the Working Group identified two cleanup scenarios. One calls for the 1100 Area and all other uncontaminated areas to be unrestricted, while all contaminated areas would be restricted for industrial or recreational uses. The second scenario calls for the surface, subsurface, and groundwater to be cleaned up for unrestricted/agricultural use.

Existing Agreements.

The entire Hanford site lies within the boundaries of lands ceded to the U.S. government in 1855 in exchange for settlement on reservation lands. The Yakama Indian Nation and the Confederated Tribes of the Umatilla Indian Reservation were the signatories to these treaties. These treaties reserved specific rights to the tribes, including those related to hunting, fishing, gathering foods and medicines, and pasturing livestock on the open and unclaimed lands. Additionally, the Nez Perce Tribe claims these treaty rights in the Hanford area. The Working Group recommendations

acknowledged these rights by identifying specific future use options relating to Native American uses for areas of the site.

Site Characteristics

The Hanford Site in south-central Washington state occupies approximately 560 square miles of semi-arid shrub and grasslands located just north of the confluence of the Snake and Yakima rivers with the Columbia River. This isolated, sparsely populated site which has restricted public access includes large buffer zones surrounding the smaller areas historically used for the production of nuclear materials and associated waste storage and disposal. About six percent of the land area has been disturbed and is actively used.

The Columbia River crosses the northern portion of the site and forms its eastern boundary. The nearest communities are Richland (population 35,000) at the southern border of the site; Kennewick (pop. 46,000), 15 miles to the southeast; and Pasco (pop. 22,000), 11 miles to the southeast.

The site is characterized by generally flat topography, rising gently from the 20- to 50-foot banks along the river and cresting at a gentle plateau in the central portion of the site. Significant topographic features are Rattlesnake Mountain, which forms the southwest site boundary, and Gable Butte and Gable Mountain, northwest-trending basalt outcrops in the northern portion of the site.

Site geology is characterized by surficial fluvial and glacial flood sediments underlaid by a thick sequence of layered basalt. The depth of the unconfined aquifer varies from zero to a few feet near the river's edge to as much as 250–300 feet deep in the central plateau area of the site. Groundwater movement is predominantly west to east across the site. Infiltrating surface water from the watersheds west of the site is the principal source of natural recharge for the unconfined aquifer.

Current Use.

The Working Group divided the Hanford Site into six geographic areas for the purpose of discussing future use and remediation goals:

- The Arid Lands Ecology Reserve, an open space wildlife refuge along the southwestern portion of the site;
- The North Slope, an open space area north of the Columbia River;
- The Hanford Reach of the Columbia River;
- The 100 Area, a restricted-access area in the northern portion of the site where former production reactors are located along the Columbia River;
- The 200 Area, a restricted-access area on the central plateau area of the site that includes chemical processing plants and waste management facilities; and
- All other areas, including the 300, 400, 600, and 1100 Areas. The 300, 400, and 1100 Areas are largely industrial areas while the 600 Area is mostly undisturbed open space.

Ecological Resources.

The Hanford site comprises one of the largest areas of undisturbed shrub-steppe habitat in the northwestern United States. This habitat, along with the site's long, free-flowing stretch of the Columbia River, comprises many prized natural resources particularly rare in the northwest. In 1994, the National Park Service identified the Hanford Reach of the Columbia River for consideration as a designated recreational river under the Wild and Scenic Rivers Act. The type of designation will help define many aspects of future uses of the Hanford Reach and its adjacent land.

Cultural/Historical Resources.

The Hanford Site contains an abundance of cultural resources, including both prehistoric and historic sites. Several archeological properties located on the site have been identified and listed in the National Register of Historic Places. The site historically served as a resource for gathering native plant and animal foods for tribal ceremonies and traditions. Certain landmarks, such as Rattlesnake Mountain, Gable Butte, Gable Mountain, and various sites along the Columbia River are considered sacred to

several tribes. Numerous Native American burial sites along the Columbia River are also considered sacred.

Cleanup Implications

The recommendations of the Working Group, with subsequent refinements by the Hanford Advisory Board, have contributed significantly in defining appropriate exposure scenarios for site risk assessments, proposed plans, and records of decision produced during the past three years. Although not yet formalized into a final, legal, decisional site document such as the HRA EIS and the CLUP, the recommendations are still considered to be extremely valuable as stakeholder input and interim land use goals. Until such a site-wide land use decision document is developed and signed, the Working Group recommendations will continue to be considered strongly in all environmental restoration activities and records of decision.

The Working Group identified four levels of land use relating to potential cleanup levels.

- Unrestricted – Contamination does not preclude any human uses. Other reasons may exist to control or limit certain uses or activities, such as to preserve cultural features and wildlife/natural values.
- Restricted – Limits are imposed on use because of contamination to the surface, subsurface, or groundwater. Restrictions may apply to groundwater in the interim with the expectation that it would ultimately be cleaned up to unrestricted status.
- Exclusive – Access would be limited to personnel trained and monitored for working with radioactive or hazardous wastes and materials.
- Buffer – Part of the site that surrounds an exclusive area is treated like an exclusive area because of the potential risk from the exclusive area. Environmental restoration activities can occur in buffer areas but waste management activities would not. A buffer area is not expected to remain a buffer area forever.

DOE, regulators, and many Hanford stakeholders had difficulty translating the Working Group land use categories into standard Environmental Protection Agency cleanup exposure scenarios (i.e., agricultural, residential, industrial, recreational); however, this issue is a major subject of ongoing discussions in the HRA EIS and the CLUP.

In the 100 Area, significant remedial actions including excavation and disposal will be required to release the reactor areas for any reuse other than recreational. Active measures are planned to limit the flux of contaminated groundwater into the adjacent Columbia River, but these actions will likely not restore some portions of the aquifer for unrestricted (residential or agricultural) use.

In the 300 Area a more selective excavation and disposal option is planned to meet the consensus industrial future use goal. Groundwater in the 300 Area is expected to meet cleanup goals through institutional control and natural attenuation.

In general, affected communities and DOE agree that the 200 Area should serve as a long-term waste management area; therefore, the area will not require extensive source or soil restoration but will require substantial containment and waste stabilization as part of its long-term mission. The 200 Area groundwater is already the focus of several interim actions and will require substantial work to contain existing contamination and extract as much of the contaminant mass as possible. Restoration of the unconfined aquifer in the 200 Area is likely to be technically impracticable.

Timing.

Remedial investigations, feasibility studies, expedited response actions, and interim remedial measures have dominated the recent and current Hanford remedial action projects. Based on stakeholder input through the Working Group and the Hanford Advisory Board, the Hanford Environmental Restoration Program has placed a strategic priority on expediting cleanup in areas along the Columbia River, primarily the 100 and 300 Areas.

Limited field investigations and focused feasibility studies are complete for most 100 Area operable units (OUs), with the first interim record of decision signed for high priority sites in three 100-Area source OUs in September

1995. Even though remedial actions began in fiscal year 1995, the 100 Area restoration effort is expected to extend to 2018 and beyond, particularly for the reactor buildings. With the exception of individual reactor sites, most of the 100 Area could be available for beneficial reuse in 2018.

The 300 Area is at a similar point in the Comprehensive Environmental Response, Compensation, and Liability Act process, with a proposed plan issued to the public in January 1996 and a record of decision expected later in 1996.

Institutional Controls.

If desired, much of the site could be made available for other use in the next few years, with most of the remainder made available around 2018. However, active institutional controls, such as fences and other access restrictions, will likely be required in the immediate areas surrounding the 100-Area Reactor Buildings for a longer period of time, possibly through 2055. Finally, active institutional controls will be required for the 200 Area indefinitely.

Public Involvement

Hanford future use planning to date has benefited from extensive and active stakeholder participation. Like the Working Group, the current Hanford Advisory Board is a broad-based stakeholder group that includes representatives from federal and state regulatory agencies; state, county, and city governments; environmental activist groups; local business, economic development, and labor interests; civic groups; and the public-at-large. The Working Group held open public meetings and comment opportunities at several points during the nine-month period in 1992 during which they developed consensus recommendations. The monthly Hanford Advisory Board meetings are open to the public and include allotted times for public comment. Specific environmental restoration plans, including the development of land use options and remediation goals, are typically discussed in detail by the environmental restoration subcommittee of the Hanford Advisory Board. This subcommittee then makes a recommendation to the full board, which issues formal consensus advice on given topics.

Contamination Profile

The Arid Lands Ecology Reserve and the North Slope were fully remediated for unrestricted use in fiscal year 1994. Concerns about contamination in the Columbia River are focused primarily on cleaning up or halting the flow of contaminated springs and groundwater into the river and the shoreline ecosystem; because of dilution, the river itself does not have any contamination above drinking water standards (i.e., unrestricted use).

Contamination in the 100 Area is generally localized around the nine reactors and associated waste management facilities, with each reactor complex typically separated from others by undisturbed and uncontaminated land and groundwater. Contamination in the reactor areas stems largely from the release or discharge of contaminated reactor coolant water into the ground via cribs, trenches, and French drains. Burial grounds were often constructed nearby for the disposal of associated solid waste. Primary contaminants in the 100 Area include radionuclides (tritium, strontium-90, cobalt-60, cesium-137, europium-152, -154), and heavy metals (chromium).

Contamination in the 200 Area stems from the waste storage and disposal facilities associated with the chemical processing plants. The 200 Area are the home of many solid waste burial grounds, liquid effluent cribs, and trenches. Primary contaminants of concern are a variety of radionuclides (including tritium, uranium, technetium, iodine, strontium, cesium, and transuranics), carbon tetrachloride, other volatile organic compounds, and heavy metals in overlapping plumes within the vadose zone, saturated soils, and groundwater.

Contamination in the 300 and 400 Areas includes uranium, other radionuclides, and heavy metals in soil and groundwater. Contaminants in the 1100 Area include organic compounds, heavy metals, and polychlorinated biphenyls (PCBs). Contamination in the 600 Area primarily involves a very large tritium groundwater plume migrating east-southeast from the 200 Area.

Regulatory, Tribal, and Local Government Participation.

Representatives from the U.S. Environmental Protection Agency Region X and the Washington State Department of Ecology have been active and supportive participants in the Working Group and the Hanford Advisory Board. Representatives from Native American tribal governments and city and county governments have also been active and integral parts of the Working Group, Hanford Advisory Board, and CLUP processes. Local governments represented on the Working Group included Benton County, Franklin County, Grant County, City of Richland, Benton-Franklin Regional Council, Kennewick City Council, and Pasco City Council.

Long-Term Implementation

The CLUP effort was initiated in May 1995 in an attempt to integrate Working Group recommendations, the HRA EIS, and separate local government land planning initiatives. The Hanford Advisory Board has been asked to participate in the CLUP process. This effort is intended to advance the site's work in developing final land use recommendations with significant input from tribal and local governments, the Hanford Advisory Board, and the public. Coordination with the National Environmental Policy Act process will allow DOE to codify the land use recommendations in a record of decision.

In early 1995, Benton County and the City of Richland began leading a local land use planning effort as required under Washington's Growth Management Act. The County expects to have a draft comprehensive plan by fall 1996. The County has pointed out that the scope of its planning effort is somewhat different from that of the CLUP. The County's plan first considers designations of critical biological habitat and then designates uses best suited to the area's particular characteristics; DOE mission needs and federal ownership issues are not considered. Local plans would be binding if the lands were to be transferred from federal ownership. The land use plan being developed by the County will be enacted as a County ordinance and will be a legally binding document. It will be enforced like all other land use and zoning regulations.

Reuse Issues.

The DOE-Richland Office of Economic Transition works closely with local communities and the Tri-City Industrial Development Council (TRIDEC) to promote activities and programs that will lead to commercialization of portions of the Hanford Site and continued economic development of the region. DOE and TRIDEC executed a memorandum of understanding that designates TRIDEC as the single voice of the local community for developing, reviewing, and prioritizing economic development activities related to Hanford. TRIDEC currently represents 42 economic development entities in the Benton/Franklin County area.

Idaho National Engineering Laboratory

Idaho Falls, Idaho

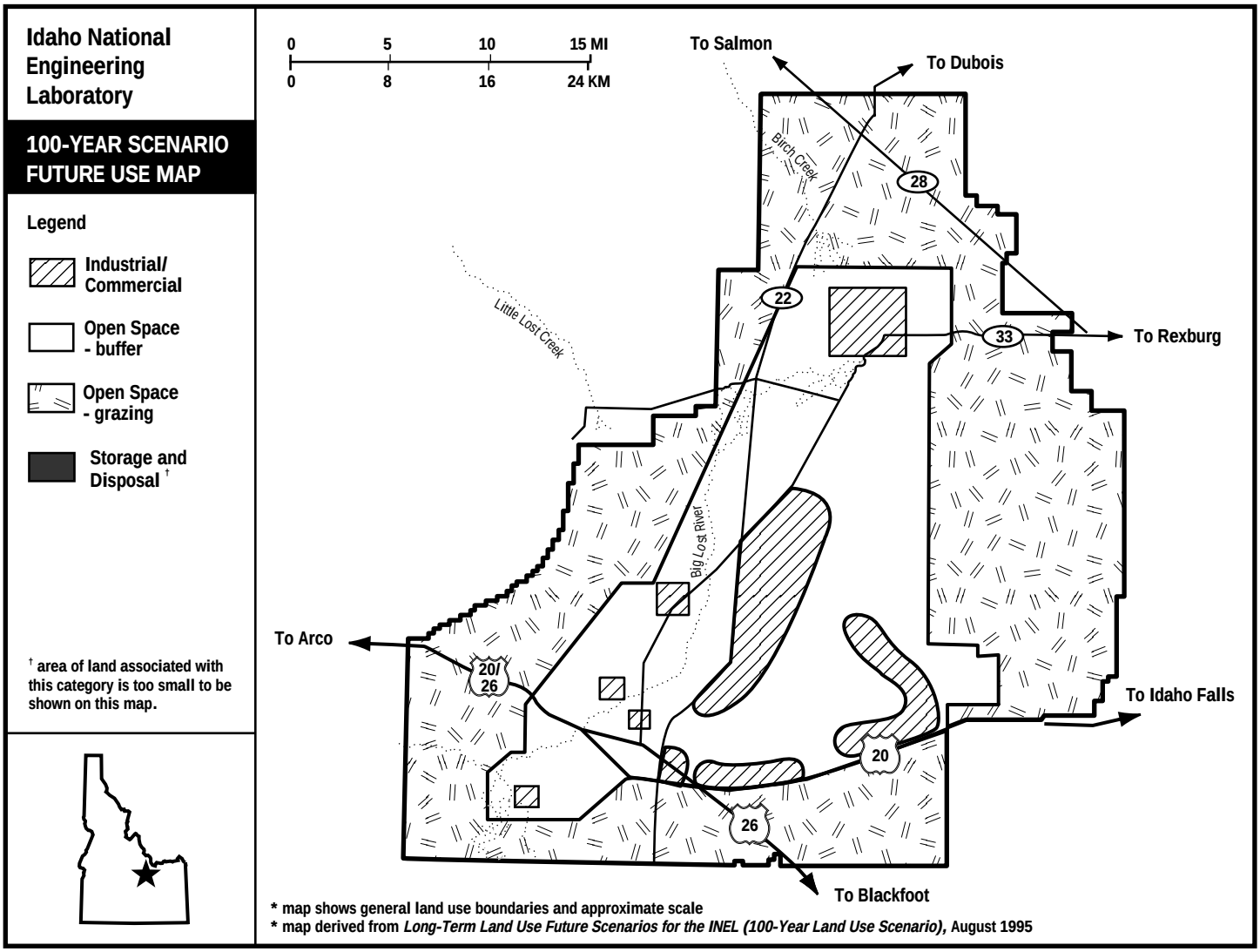

Figure 14. Idaho National Engineering Laboratory – Future Use Map, 100-Year Scenario

Idaho National Engineering Laboratory Future Use Facts

Idaho National Engineering Laboratory's future use recommendations, generated by an internal site team with local, regional, state, tribal, and public input, generally support ongoing site land uses with the central developed area being used as an industrial/commercial area and the surrounding area serving buffer and grazing purposes. The industrial area accounts for approximately 10 to 15 percent of the entire site.

The land use recommendations are being fully integrated in relevant documents and decisions, including INEL's comprehensive plan.

The one area of nonconsensus involves the interests of the Shoshone-Bannock tribes who favor restoration of the entire area and termination of industrial activities because of the area's cultural significance. Although DOE intends to continue to use the site to serve national needs, the Department recognizes its responsibility to work with the tribes to ensure that adverse impacts of DOE activities are avoided to the extent possible and mitigated where feasible. Furthermore, the site will continue to collaborate with the tribes to scout for additional cultural resources on the site and tailor activities accordingly.

Future Use Recommendations

Idaho National Engineering Laboratory (INEL) delineated probable future uses for the site in its report entitled "Long-Term Land Use–Future Scenarios." The document was developed with input from a broad array of stakeholders, including INEL's Site-Specific Advisory Board. As Figure 14 illustrates, the future use recommendations for INEL include large open spaces for grazing and buffer purposes, in addition to industrial/commercial and storage and disposal areas. While DOE contends that the future use scenarios projected in the document should not be construed as a future use plan, the recommendations should help facilitate cleanup decisions for contaminated waste sites.

According to the report, INEL projects that present site boundaries will not change over the next 100 years and that future industrial development will be concentrated within the central geographic portion of the site and existing major facilities areas. Current usage of 10 to 15 percent of the site to support ongoing missions is expected to remain unchanged in the near future. The remainder of the site will be maintained for use as a buffer and open space.

The industrial/commercial use category consists of worker-based facilities such as research and development facilities, support uses, and storage and disposal facilities. Such facilities could include development and/or reuse for both DOE and non-DOE purposes in accordance with DOE's strategic goals such as technology transfer initiatives. Waste management facilities will be located in specific areas.

The grazing areas will support grazing activities administered by the Bureau of Land Management (BLM) as specified in existing agreements. These grazing areas could also support limited resource-based recreational uses such as controlled hunting activities.

Existing Agreements.

Approximately 540,600 acres of INEL were acquired through a land withdrawal via Public Land Orders (PLOs) 318, 545, and 637, which state: "It is intended that the lands described in the Public Land Orders shall be returned to the administration of the Department of Interior (DOI) when they are no longer needed for the purpose for which they are reserved." According to federal land transfer guidelines, former public land attained via PLOs must be returned to the BLM to be managed for multiple uses (e.g., grazing, mineral extraction, recreational uses) and/or further disposition once DOE no longer needs the site or specific parcels; DOI must be consulted before final decisions are implemented. DOI/BLM also maintains control of surface and mineral rights at INEL.

The PLOs provide for certain responsibilities to remain with BLM, including:

- Administration of grazing permits on INEL;
- Granting of utility rights-of-way across INEL;
- Extraction of materials; and
- Wildfire, weed/insect, and predator control.

Special agreements between DOE and the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation allow tribal members free access to certain areas. These agreements also promote tribal involvement in the INEL cultural resource management program.

Furthermore, according to the 1868 Treaty of Fort Bridger, the tribes' rights to subsistence and traditional activities are protected on unoccupied federal lands; therefore, if the site eventually becomes excess to the federal government's needs, the tribes could exercise their full treaty rights on the site. Given their interest in preserving their rights to use the site for subsistence and traditional activities in the future, the Shoshone-Bannock did not support continued use of the site, but were particularly interested in minimizing adverse impacts of site activities on the environment and cultural resources.

Site Characteristics

INEL is located on 570,415 acres in southeastern Idaho, 29 miles west of the City of Idaho Falls. The site resides in five counties:

Cleanup Implications
Cleanup levels and schedules for the waste area groups will be determined in records of decision yet to be negotiated.

Bingham, Bonneville, Butte, Clark, and Jefferson. The entire site is about 39 miles long and over 36 miles wide.

The site lies over part of the Snake River Plain Aquifer, the largest aquifer in Idaho and one of the most productive in the nation. Because the aquifer is the source of all water used at INEL, protection of this resource is a central concern governing site operations. DOE holds a Federal Reserve Water Right which permits water pumping. While existing capacity appears to be satisfactory to support net water usage (based on withdrawals and returns), if DOE were to permit private use of lands or facilities, private water rights would need to be addressed. As is typical in many western states, the adjudication of water and its rights has a direct effect on development restrictions, opportunities, and future uses of land.

The majority of INEL land is used to support facility operations and to serve as safety buffer zones. Virtually all work is performed within the primary facilities areas—the Central Facilities Area, Test Reactor Area, and Idaho Chemical Processing Plant. Other land uses include environmental research, ecological preservation, socio-cultural preservation, grazing, recreation, and connecting infrastructure uses. The remaining land is essentially undisturbed.

Acreage allocated for grazing at INEL is mutually agreed on by DOE and DOI. DOI administers the area through BLM grazing permits that ensure that grazing is not allowed within two miles of any nuclear facility; dairy cattle are not permitted. The area used for grazing consists of roughly 300,000 to 350,000 acres. The U.S. Sheep Experiment Station uses a 900-acre portion of INEL for a winter feed lot for approximately 5,000 sheep.

INEL supports periodic uses associated with on-site resources. The Experimental Breeder Reactor I, a national historic landmark, houses a visitor center that is open for public tours. Controlled hunting is regulated by the Idaho Department of Fish and Game and DOE in order to maintain a healthy wildlife population.

In addition, the entirety of INEL is designated as a National Environmental Research Park. Because INEL is one of DOE's principal centers for nuclear energy research and development, much of the research at the Idaho park has focused on the movement of radionuclides through the environment. Studies have involved following pathways of radionuclides and various nonradioactive tracers to plants, animals, and humans.

Cultural and Historic Resources.

From a cultural preservation standpoint, INEL land is particularly significant to the Shoshone-Bannock Tribes of the Fort Hall Indian Reservation. The site is fully within the tribes' aboriginal homeland; Native Americans occupied the land for more than 10,000 years before federal takeover. The tribes consider many features on the INEL site, such as caves and buttes, to be sacred. The tribal members have a strong desire to leave these areas in an undisturbed state.

Cultural and historic resources from several periods of southern Idaho pre-history and history have been identified on the INEL site. These resources include fossils, Native American hunting and camping areas, trails made by early explorers, canals and diversions on the Big Lost River, signs of pre-INEL military activity, and early nuclear facilities.

As of June 1994, more than 100 cultural resource surveys had been conducted on the INEL site. The site is working with the Shoshone-Bannock Tribe, in particular, to identify and preserve cultural resources. All cultural resources in the inventories are considered nominees to the National Register of Historic Places and will require formal archeological testing and historic records searches.

Public Involvement

To initiate consideration of long-term land use issues at INEL, DOE-Idaho convened the Long-Term Land Use Team. The team was assisted by the Long-Term Land Use Steering Committee composed of DOE personnel and contractor managers, land planners, and support personnel. The team was directed to

develop reasonable future land use scenarios which incorporate current and future site missions and existing environmental and development constraints. Specifically, the planning team reviewed existing data sources and policies to meet the following goals:

- Identify general areas in which new facilities would likely be located within the existing infrastructure while considering probable design criteria and environmental constraints;
- Provide a resource for future decision-making associated with development;
- Provide input into the creation of a workable, comprehensive cleanup policy with achievable objectives; and
- Support the baseline risk assessment process.

The team first convened in November 1992 to discuss major issues affecting land development at INEL, to identify future trends, and to generate likely future land use scenarios for the site. Long-term land use scenarios were developed based on analysis of site and regional development characteristics and constraints.

Contamination Profile

There are over 90 operable units containing more than 400 potential release sites contaminated with hazardous, radioactive, and/or mixed waste at INEL. Contaminated sites are organized into 10 waste area groups (WAGs).

- **WAG 1**, associated with Test Area North, comprises 11 operable units (OUs) and 71 potential release sites, including underground storage tanks, waste pits, and evaporation ponds. Possible contaminants include asbestos, petroleum products, acids and bases, radioactive rubble and water, and laboratory wastes. Both groundwater and soil contamination are present.
- **WAG 2** is associated with the Test Reactor Area and is divided into 13 OUs composed of 51 potential release sites. Release sites include leaching ponds, underground storage tanks, rubble piles, cooling towers, and injection wells, French drains, and spill sites. Potential contaminants include petroleum products, PCBs, radioactive material, and heavy metals in soils and groundwater.
- **WAG 3**, the Chemical Processing Plant, comprises 14 OUs containing 83 potential release sites. Contaminants include organic compounds, radioactive materials, metals, corrosives, petroleum products, and mixed waste. Most contamination occurs in vadose zone, or subsurface soils.
- **WAG 4**, associated with the Central Facilities Area, consists of 13 OUs and 45 potential release sites. The latter include spills, underground storage tanks, a landfill, evaporation ponds, leach fields, and leach pits. Contaminants include solvents, PCBs, asbestos, radionuclides, unexploded ordnance, and heavy metals. Contamination occurs predominantly in soils.
- **WAG 5** is associated with the Power Burst Facility and Auxiliary Reactor Areas and is divided into 13 OUs consisting of 48 potential release sites. Release sites include evaporation ponds, sewers, waste sumps, a waste burial site, and storage tanks. Contaminants include petroleum products, radioactive waste, metals, and hazardous waste.
- **WAG 6** is divided in five OUs, consisting of 20 potential release sites associated with the operation of the Experimental Breeder Reactor-I and the Boiling Water Reactor Experiment Area. The latter facilities were decommissioned prior to 1992. Potential contaminants include organic compounds, metals, and radioactive material.
- **WAG 7**, the Radioactive Waste Management Complex, consists of five OUs, including the Transuranic Storage Area and the Subsurface Disposal Area. This area began receiving solid radioactive waste in 1952, including the majority of Rocky Flats Plant transuranic waste between 1953 and 1969. The transuranic and mixed transuranic waste was dumped into pits and trenches. Contaminants include volatile organic compounds, metals, and transuranic radioactive waste. Contamination has migrated more than 600 feet through the vadose zone to the Snake River Aquifer in trace amounts.
- **WAG 10** includes the Snake River Aquifer which as been contaminated by petroleum products, chlorinated solvents (e.g., trichloroethylene) and radionuclides, including cesium-137 and strontium-90.

The team sought stakeholder involvement through the establishment of the Participation Forum comprised of regional stakeholders, including professional planners; representatives of local, regional, state, and federal agencies; and members of the Shoshone-Bannock Tribes.

After developing initial drafts, the document was presented to both the Participation Forum and the INEL Environmental Management Site-Specific Advisory Board (SSAB) for review and concurrence. The SSAB also submitted a list of assumptions that should be considered in determining future use of the site. The U.S. Environmental Protection Agency and the Idaho Department of Heath and Welfare participated in an ex-officio capacity on the SSAB.

Long-Term Implementation

The future use scenarios identified in Long-Term Land Use Future Scenarios for the Idaho National Engineering Laboratory will be integrated into the Comprehensive Facility and Land Use Plan currently being developed. The planning assumptions and long-range scenarios form the basis for all comprehensive planning activities at INEL. The Comprehensive Facility and Land Use Plan will be completed in the first quarter of 1996.

The purpose of the plan is to delineate a coherent policy to guide facility and land use planning at INEL and to project site land and facility use under that policy. The comprehensive plan will serve as a reference for INEL personnel and the public. The plan includes facility and land use projections and identifies cleanup, development, and land preservation zones. The public participation was involved in developing this plan.

Reuse Issues.

INEL is currently investigating the feasibility of privatizing a wide variety of functions and facilities. Various mechanisms for the transfer or use of facilities, land, and equipment are being evaluated.

The Power Burst Reactor, once used as the severe-damage tester ground for commercial-reactor fuels, has been leased to the Idaho Brain Tumor Center to treat brain tumors with neutron radiation.

Kansas City Plant

Kansas City, Missouri

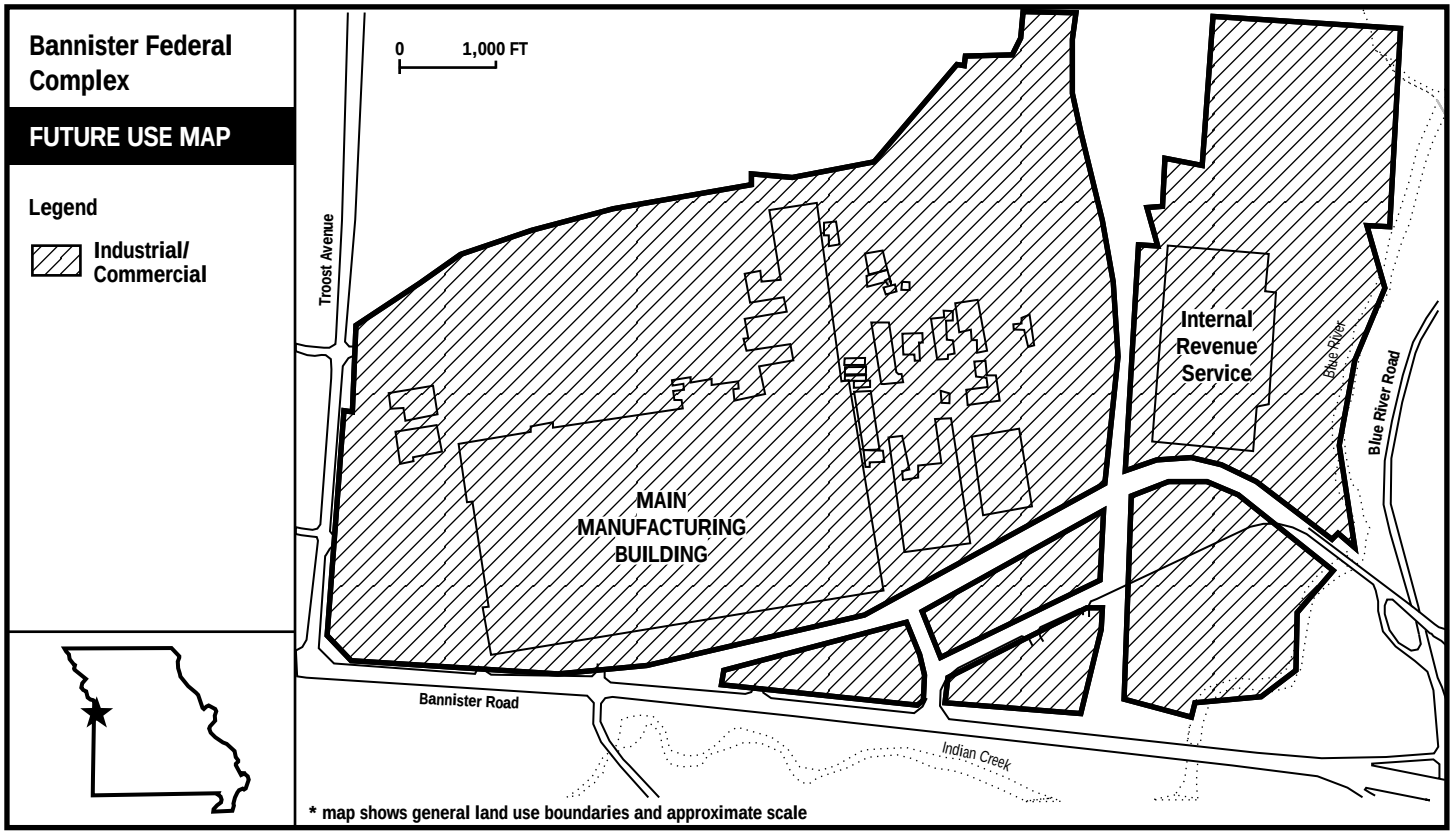

Figure 15. Kansas City Plant – Future Use Map

Kansas City Plant Future Use Facts

Future use of the Kansas City Plant at the Bannister Federal Complex is expected to continue industrial/commercial uses, specifically office space, warehousing, and light manufacturing. The plant's current mission is expected to continue as DOE's nonnuclear manufacturing center for nuclear weapons. Local governments have zoned the complex for heavy industry. The remainder of the complex will continue to be used by other federal occupants, including the General Services Administration, the Department of Defense, the Federal Aviation Administration, the National Oceanic and Atmospheric Administration, and the Internal Revenue Service.

The industrial designation for the plant was approved by the Community Involvement Group, comprised of representatives from local government, business, labor, regulatory agencies, and the public.

Future Use Recommendations

As Figure 15 illustrates, the future use recommendations for the Kansas City Plant at the Bannister Federal Complex suggest that the site will continue to be used exclusively for industrial purposes, including office space, warehousing, and light manufacturing. It is expected that the facility will be maintained in such a manner so as to support the continued operation of the facility. The following factors led to the industrial use recommendation:

- expected long-term mission for the federal government,
- extensive infrastructure,
- compatible with surrounding land use,
- positive economic impact on the community,
- past historical use of the site, and
- community expectations.

Existing Agreements.

DOE has custody and control of approximately 75 percent of the land and facilities currently used by the agency. DOE can construct new facilities/buildings as needed but cannot sell the property. An agreement reached between DOE and the General Services Administration (GSA) in 1977 transfers the property to GSA if DOE vacates. If GSA has no use for the property, then the site would be dispositioned through normal processes.

The Community Involvement Group, elected representatives of Kansas City, and other current federal occupants of the Bannister Federal Complex are in full accord with the future industrial designation for the site.

In addition, the City Council of Kansas City has adopted a master plan which includes the Bannister Federal Complex area and calls for industrial uses for the complex. Such uses would be compatible with the surrounding current and future land use projections for the area. The City has acknowledged the site's commitment to keeping the Bannister Federal Complex compatible with surrounding land uses and has expressed an interest in assisting the site on any future land use planning efforts. However, the City expressed concerns related to potential future sale of the land.

Site Characteristics

The Kansas City Plant is part of the Bannister Federal Complex, a highly-developed 300-acre site located 12 miles south of downtown Kansas City, Missouri within the City limits.

In addition to DOE, the other occupants of the federal complex are GSA, the Department of Defense, the Federal Aviation Administration, the National Oceanic and Atmospheric Administration, and the Internal Revenue Service. The complex is zoned for heavy industry. The surrounding area consists of single- and multiple-family dwellings, commercial establishments, industrial districts, and public use lands.

Contamination Profile

Contamination associated with the Kansas City Plant includes polychlorinated biphenyls (PCBs), chlorinated solvents, and petroleum hydrocarbons. Forty-one Resource Conservation and Recovery Act solid waste management units have been identified. Units include lagoons that received industrial wastewater contaminated by electroplating and degreasing operations, sumps, leaking storage tanks, and leaking process lines. Twenty-seven units have been remediated or require no further action because of the absence of contamination. PCB soil contamination occurs or is suspected to occur at the southeastern quadrant and northeast of the main building, at two electrical substations and at an underground ductbank. Soils and bedrock are contaminated with PCBs that leaked from a 10,000-gallon tank outside the main building. Soil removal for treatment and disposal has been and will continue to be the preferred remedy. Groundwater has been contaminated primarily with the chlorinated solvent trichloroethylene and its degradation products (e.g., 1,2-dichloroethene and chloroethene). A pump-and-treat program has been under way at the site since 1988, and secondary sources in the soil column will be removed and treated for disposal.

Long-Term Implementation
Future use planning for the Kansas City Plant will be conducted within the context of the current site development planning process. Major changes in mission, property usage, or environmental conditions will trigger additional community involvement in future use decisions.

Cleanup Implications

Forty-one solid-waste management units were originally identified at the Kansas City Plant. Twenty-seven of these units have been remediated or found to require no further action. Remedial actions at the remaining units will be completed by fiscal year 2001 as required by the consent order between DOE and EPA.

For most of the remediation projects within the environmental restoration program, the assumed remediation technology is soil excavation and off-site disposal. If the remediation technology agreed to by EPA cannot be funded in the targeted year, then the schedule in the consent order will be renegotiated.

Future use decisions will have little impact on cleanup requirements for the plant. Cleanup levels for the plant are generally defined by fixed regulatory limits as opposed to cleanup levels based on hazard- or risk-based models. For example, the site regulators have adopted the PCB cleanup level of 10 ppm established in the Toxic Substance and Control Act. Similarly, groundwater cleanup levels are determined by Safe Drinking Water Act maximum contaminant levels and petroleum hydrocarbon contamination is fixed by state cleanup levels for total petroleum hydrocarbon. There is no opportunity to incorporate future use decisions in the establishment of cleanup levels if pre-defined cleanup levels are used.

Institutional Controls.

Access to the Bannister Federal Complex/ Kansas City Plant is currently limited for safety and security purposes by means of security check points, fences, guards, etc. Site access will be limited for the foreseeable future.

Public Involvement

Public involvement for the Kansas City Plant centers on the Community Involvement Group (CIG), which is comprised of business and political leaders from the Kansas City metropolitan area, including the City manager and the mayor of Kansas City, Missouri; representatives from the Kansas City Chamber of Commerce, Kansas City Area Development Council, Labor Council of Greater Kansas City, Southern Community Coalition, Economic Development Corporation, Mid-America Regional Council, Project Refocus, and the Jackson County Office of Economic Development. The CIG provides DOE with input on a number of issues related to current operation of the Kansas City Plant. Representation within the group varies based on the topic under consideration.

A workshop to address future use was held in April 1995. Participants included planning economic development and environmental interests; EPA Region VII and the Missouri Department of Natural Resources; and tenants of the Bannister Federal Complex—DOE, GSA, and Allied Signal.

Lawrence Livermore National Laboratory

Livermore, California

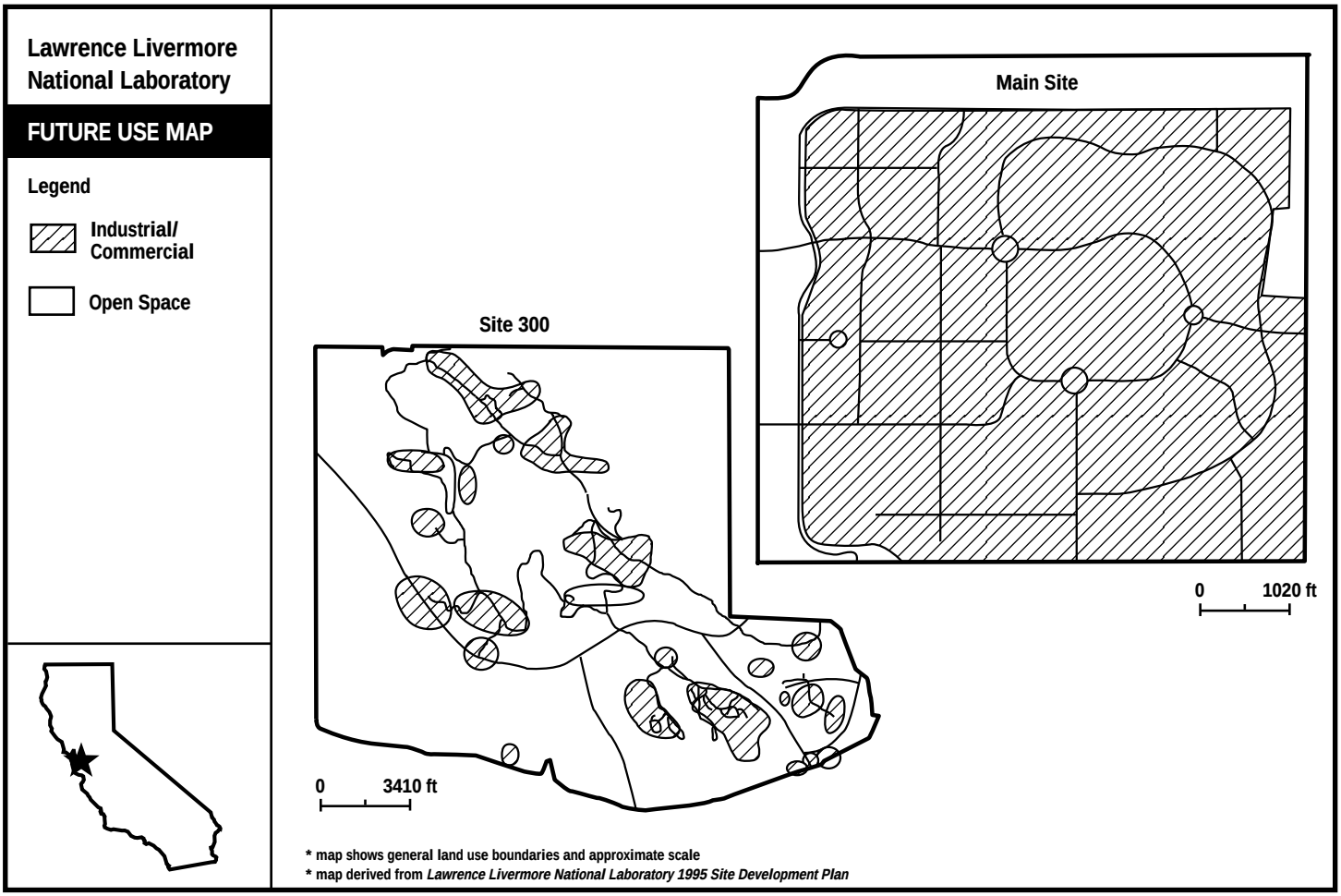

Figure 16. Lawrence Livermore National Laboratory – Future Use Map

Lawrence Livermore National Laboratory Future Use Facts

Future use projections for the Lawrence Livermore National Laboratory's (LLNL) Main Site and Site 300 are currently determined through the site development planning process with public involvement, mailing through the National Environmental Policy Act (NEPA) process. Both sites are projected to continue ongoing missions for the foreseeable future.

With the pending implementation of the Life Cycle Cost Management Order, LLNL's land use planning will be part of the laboratory's comprehensive planning efforts which will be more closely integrated with the NEPA process, looking beyond the site's boundaries and inviting stakeholders to participate.

Future use of the Main Site is classified primarily as industrial/commercial use with undeveloped open space parcels around the western, northern, and eastern boundaries serving as buffer zones. Current uses at Site 300—primarily mission-related and industrial/commercial uses with large open space areas serving as safety buffers—are anticipated to continue.

Future Use Recommendations

As Figure 16 illustrates, the future use recommendations for Lawrence Livermore National Laboratory's Main Site and Site 300 propose open space and industrial/commercial uses. Future use plans for the Main Site and Site 300 were developed as part of the site development planning process. Both sites are projected to continue ongoing missions for the foreseeable future.

Main Site.

The Main Site is expected to continue missions related to global security, global ecology, and bioscience for the foreseeable future. Under this scenario, future use of the Main Site can be classified primarily as industrial/commercial use with undeveloped open space parcels around the western, northern, and eastern boundaries serving as buffer zones. The industrial/commercial classification includes research and development, administration and technical support, institutional, and warehousing/storage/maintenance uses.

Site 300.

Site 300 is projected to continue conducting of experimental testing. Current site uses, including research and development, industrial, institutional, and administrative/technical functional uses, will be maintained. Additional areas for potential development to support site missions have been delineated. Large areas of open space will serve as safety buffer areas.

Site Characteristics

Main Site.

The Livermore Site is about 50 miles southeast of San Francisco. The valley surrounding the site has a mix of agricultural, residential, and light industrial uses. Current land use at the site is primarily industrial (i.e., research and development) while certain other areas remain undeveloped. Development has occurred on 630 of the 821 acres at the Livermore Site. A 500-foot wide security buffer zone lies along the northern and western borders of the site. The site comprises 173 permanent buildings and 331 temporary structures.

Low-level chemical and radioactive contamination is present in both the soil and groundwater at the Livermore Site. Nineteen different source areas have been identified in various parts of the site. The major contaminants are volatile organic compounds and hydrocarbons. Tritium has also been detected in an on-site monitoring well at concentrations above drinking water standards. The primary groundwater contamination at the Main Site is a 1.4 square-mile plume consisting mainly of trichloroethane which threatens private wells and water wells in the nearby City of Livermore.

Site 300.

Site 300 occupies 6,893 acres 17 miles east of the Main Site and provides capabilities to conduct nonnuclear experimental testing. Site 300 is principally used for research and development, but also includes industrial, institutional, and administration/technical support uses. The location, distribution pattern, and extent of these land uses are determined by the explosives safety arcs required by the DOE Explosives Safety Manual. Most of Site 300 is undeveloped and is available for compatible experimentation and testing.

The terrain of the site varies from plateaus to steep canyons with on-site elevations ranging from 525 to 1,750 feet. The area around Site 300 is sparsely populated. The majority of the land supports sheep and cattle ranching operations, wind energy farms, and an off-road vehicle recreation area.

Past operations involving the processing, testing, and deactivation of explosive materials resulted in soil and groundwater contamination at the site. The sources of contamination include leaking pipes and disposal sites; contaminants include high-explosive compounds, halogenated hydrocarbons, and tritium. The major area of concern is the General Services Area where solvents were discharged into dry wells or the ground. Trichloroethane plumes have reached both the shallow and regional aquifers in the areas.

Public Involvement
Future use recommendations were determined through the site development planning process with public involvement through the NEPA process.

Long-Term Implementation
LLNL will adhere to the Secretary's Land Use Policy in all future comprehensive planning activities for its sites. Upon implementation of the Life Cycle Asset Management Order, integrating of mission, economic, ecological, and cultural factors in LLNL's comprehensive plan will guide future decisions. The comprehensive plan is scheduled for completion in February 1997 and will consider the site's larger regional context and be developed with stakeholder participation.

Cleanup Implications

Main Site.

Decommissioning activities are planned for five buildings. The Department has negotiated agreements with the Environmental Protection Agency and the State of California for remediation on the basis that the site will continue to be used for research and development.

Currently, DOE is using pump-and-treat methods for groundwater at five treatment units; further migration is being prevented by on-site extraction wells. Groundwater treatment plans have been proposed to reduce the concentrations of solvents, gasoline, and other contaminants to levels below those specified in drinking water standards. Tritium in groundwater will be allowed to decay naturally in place.

Site 300.

The environmental restoration of Site 300 focuses on the assessment and remediation of releases of solvents, tritium, and high-explosive components from landfills, dry wells, spills, leaks, and other sources at the site. At the central General Services Area, groundwater from a shallow aquifer is being remediated for trichloroethane contamination with both pump-and-treat and soil/vapor/extraction systems.

Los Alamos National Laboratory

Los Alamos, New Mexico

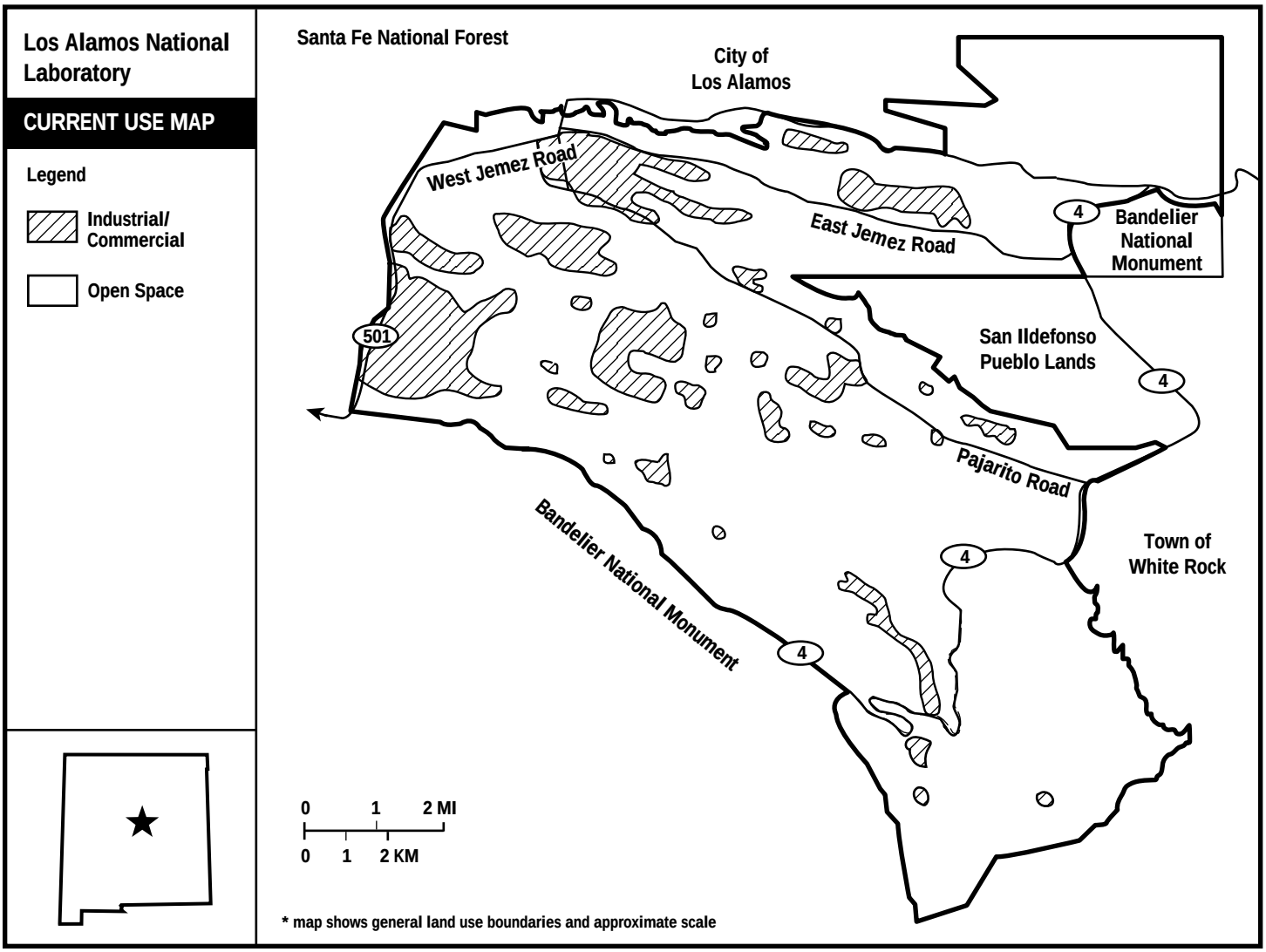

Figure 17. Los Alamos National Laboratory – Current General Land Use Map

Los Alamos National Laboratory Future Use Facts

The Future Site Use Integration Team at Los Alamos National Laboratory (LANL) is currently in the process of developing future use recommendations for the site. Interim recommendations call for the site to retain most of the 43 square miles (27, 520 acres) within its boundaries; however, DOE is considering a transfer of approximately 7,000 acres of land to Los Alamos County for industrial development.

The majority of the site is presently undeveloped, open space land comprised of high explosive areas and buffer zones. The industrial/commercial areas, referred to as "technical areas," include science buildings, laboratories, and office complexes. Because LANL is located on a plateau with a series of mesas and canyons, the technical areas are scattered across the site. Given these geographical constraints, future land use development may be limited.

Future use recommendations

It is expected that Los Alamos National Laboratory (LANL) will continue its special role in defense, particularly in nuclear weapons technology.

As Figure 17 illustrates, the majority of the site is currently undeveloped open land comprised of high explosive areas and buffer zones. The industrial/commercial areas, referred to as "technical areas," include science buildings, laboratories, and office complexes. Although the site appears to have large areas of unused land, very few areas are suitable for new development given that more than half of LANL's undeveloped acreage lies on slopes with grades exceeding 20 percent. Furthermore, security and safety buffers are required so that essential laboratory programs can continue without adversely affecting surrounding areas.

Future use recommendations for LANL are currently under review by the Future Site Use Integration Team. The current landlord is the Office of Defense Programs. Current projection of land requirements indicate that the Laboratory will need to retain most of the 43 square miles (27,520 acres) within the site's boundaries. The Department of Energy (DOE) is currently considering the transfer of as much as 7,000 acres of land, deemed excess to Departmental needs, to Los Alamos County for industrial development.

Site Characteristics

LANL covers an area of approximately 43 square miles of northern New Mexico, predominantly in Los Alamos County. The location is approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. The laboratory site is located on the Pajarito Plateau. The plateau has been carved by intermittent streams into a series of finger-like mesas and canyons. The elevation of the plateau ranges from 7,888 feet on the eastern flank of the Jemez Mountains to 6,200 feet at the western edge of the Rio Grande valley.

The site is bounded on the east by San Idefonso Pueblo Indian Reservation and to the south and west by public lands under the control of the U.S. Forest Service, the National Park Service, the Bureau of Land Management, and the General Services Administration. The town of Los Alamos is on the site's northern border and the town of White Rock on part of the site's southeastern border.

Contamination Profile

Since LANL was established in 1943, many of its operations required the use of hazardous chemicals and radioactive materials. The primary contaminants of concern include volatile and semi-volatile organic compounds, heavy metals, polychlorinated biphenyls, pesticides, herbicides, and radionuclides such as tritium, plutonium and uranium. In addition to these hazardous chemicals and radioactive materials, high explosives and asbestos are contaminants of concern. Asbestos, while no longer used, is generated as a waste during facility modifications and during decommissioning.

The use of these materials resulted in the contamination of facilities and, in some cases, the surrounding environment. Over 2,100 potential release sites have been identified. These sites are associated with releases from sumps, septic tanks, buried tanks, pipelines, firing sites, burial trenches and pits, surface impoundments and unintentional releases or spills. The most significant environmental restoration problems include the firing sites and the material disposal areas. The firing sites were used for aboveground tests involving detonation of explosive charges and resulted in widespread dispersion of depleted and natural uranium, beryllium, heavy metals including lead and high explosive compounds. The material disposal areas include both abandoned and active permitted waste disposal site that must undergo both corrective action and formal closure under the Resource Conservation and Recovery Act.

Ecological, Historical, and Cultural Resources.

There is a wide diversity of ecosystems in the Los Alamos area. This diversity has been created by the pronounced 4,920 foot elevation gradient that extends from the Rio Grande on the east to the Jemes Mountains 12 miles to the west. Many canyons, with abrupt changes in surface slope, parallel this gradient. The pronounced east-west canyon and mesa orientations, with concomitant differences in soils, moisture and soil radiation, produce an interlocking finger effect among ecological life zones, resulting in many transition overlaps of plant and animal communities within small areas. Six major vegetative community types are found in Los Alamos county. Most of LANL is surrounded by a pinon-juniper forest. The predominant community types within the boundaries of LANL include ponderosa pine woodland, pinon-jupiter, and juniper-grassland. Almost 350 plant species have been identified on LANL and adjacent lands.

One federally listed endangered animal species, the peregrine falcon, is known to inhabit Los Alamos County. The nesting peregrines from an area in Pueblo canyon, as well as other raptor, hunt on LANL lands. One Jemez Mountain salamander has been found on LANL property. This species is listed as endangered by the state and federal governments.

Wetlands within LANL boundaries fall primarily into two classifications: palustrine and riverine. Palustrine wetlands (ponds and marshes) have been identified in Sandia, Pajarito, and Pueblo canyons and small ones in other parts of LANL. Beds of ephemeral and intermittent streams that traverse LANL have been classified as temporarily flooded riverine wetlands.

LANL has seen extensive prehistoric use. Ruins and artifacts are widespread across the site, including some Solid Waste Management Unit (SWMU) areas.

Cleanup Implications

The environmental restoration program at LANL is being implemented following the Hazardous and Solid Waste Amendment (HSWA) requirements of the sites RCRA operating permit.

Because of the Laboratory's semi-arid climate and because the water table lies between 800 to 1,000 feet beneath the surface, contamination is dominantly confined to surface soils, stream and talus sediments, and the subsurface vadose zone. There are few cleanup standards established for these environmental media. It will therefore be necessary to base cleanup levels on risk and hazard based exposure models that incorporate present and future land use scenarios.

Derived from ephemeral or intermittent streams, isolated perched aquifers occur in many of the canyons. There has been some groundwater contamination by fission products identified in the perched aquifer beneath Los Alamos Canyon. Cleanup levels for the perched aquifers will be constrained by Safe Drinking Water Act Maximum Contaminant Levels and may be determined without future use input.

Institutional Controls.

There are 24 Material Disposal Areas on the Laboratory site. Although Final Corrective Measures Studies have not been completed for the Material Disposal Areas, it is generally assumed in baseline planning that many sites will be stabilized in place. Stabilization will largely comprise construction of an engineered cap and appropriate surface water drainage features. These sites will require long-term surveillance and maintenance to:

- prevent unauthorized entrance to the Material Disposal Areas,
- provide monitoring of environmental media surrounding the Material Disposal Areas, and
- to provide routine inspection and maintenance of the engineered cap and surface water control features.

Mound Plant

Miamisburg, Ohio

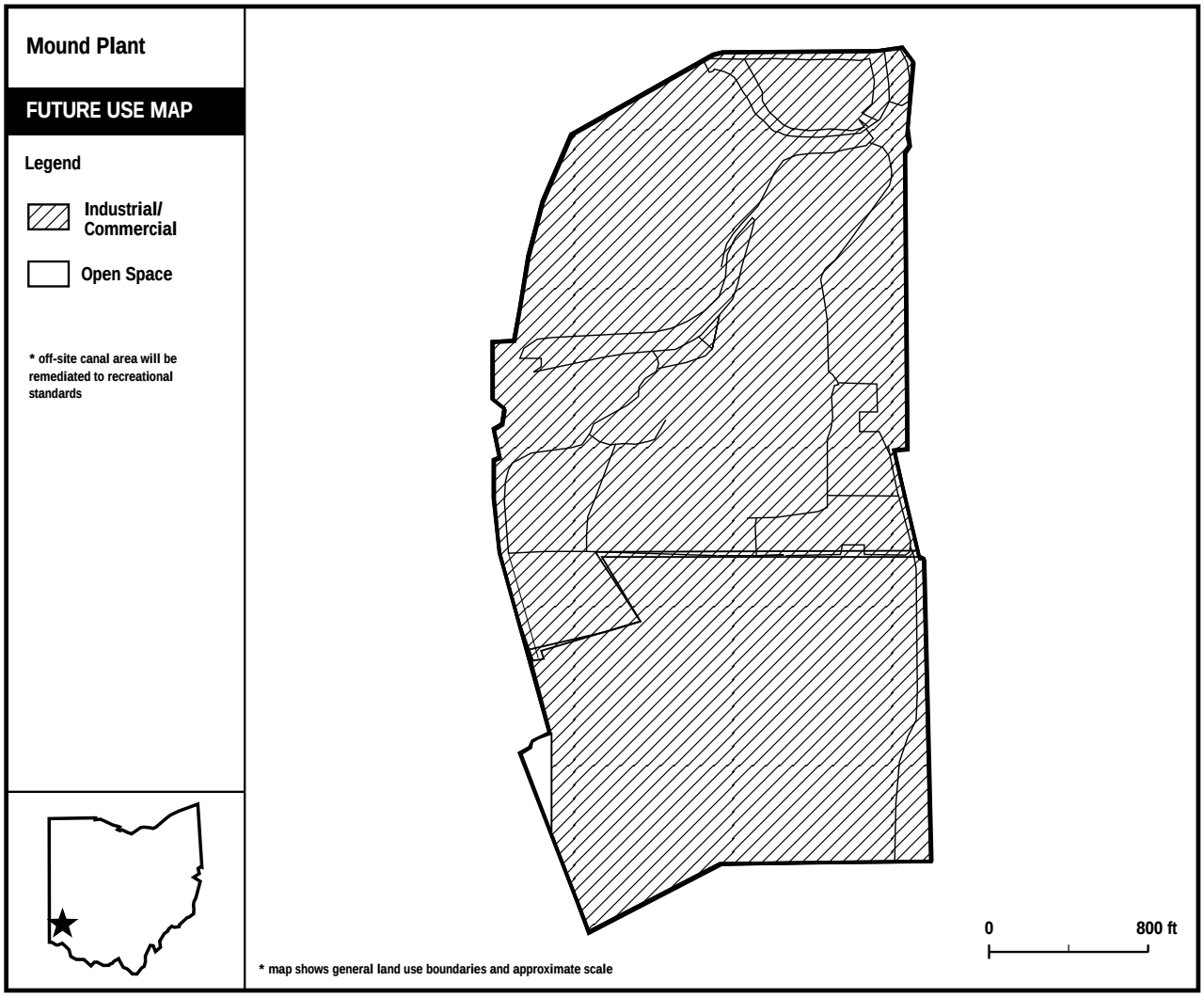

Figure 18. Mound Plant – General Future Use Map

Mound Plant Future Use Facts

The City of Miamisburg, through its right under the Constitution of the State of Ohio, has determined that future use of the Mound Plant site will remain industrial. However, a record of decision for Operable Unit (OU) 1, signed in June 1995, calls for a pump-and-treat operation to reduce concentrations of volatile organic compounds in on-site groundwater (the Buried Valley Aquifer). This measure will prevent contamination from migrating off-site and ensure compliance with drinking water standards consistent with a residential exposure scenario. Furthermore, off-site contamination in OU 4, located in a City park, will be remediated to a degree compatible with continued recreational use.

The City has played a pivotal role in the successful transition of the site for commercial reuse. In early 1994, DOE and the City signed the first eight business leases at Mound. Since that time, over 20 businesses have begun operations on the Mound Plant site, generating more than 120 full-time jobs. In early 1995, the City of Miamisburg created the Miamisburg Mound Community Improvement Corporation as an independent entity to nurture business development on the Mound site.

Future Use Recommendations

As Figure 18 illustrates, future use planning for the Mound Plant property led to a recommendation of industrial/commercial use for the entire site. A small wetlands area in the southwest region of the site was designated as open space. Off-site contamination in Operable Unit (OU) 4, located within a City park, will be remediated to a degree compatible with continued recreational use.

The City of Miamisburg has taken a lead role in determining future land use for the Mound property and in successfully transitioning the site to commercial reuse. A memorandum issued from the City to the Ohio Environmental Protection Agency in December 1993 recommended that future use of the site be industrial, consistent with and supported by the City of Miamisburg's long-range planning and zoning.

As part of DOE's economic development activities, the Ohio Field Office is working closely with the City of Miamisburg and the Ohio and U.S. Environmental Protection Agencies (EPA) to accomplish the eventual sale or transfer of the property. In early 1995, a 30-acre southern portion of the Mound property was approved by EPA for transfer to commercial use.

Widespread consensus exists for the future industrial use of the property. Through its land use planning process, the City of Miamisburg has consulted with local stakeholders who are specifically concerned about the environmental issues at Mound; these stakeholders concur with an industrial/commercial use scenario.

Site Characteristics

The 306-acre Mound Plant property is located within the City limits of Miamisburg in Montgomery County, Ohio, approximately 10 miles southwest of Dayton. Most of the Mound property, including the Main Hill and Special Metallurgical/Plutonium Processing Facility Hill, is currently industrial; the southern third of the property is an undeveloped open field.

The site has two high topographic areas divided by a sinuous valley. Most buildings are located on the northwest high area known as the Main Hill, with a smaller group of buildings located on the southeast high area known as the Special Metallurgical/Plutonium Processing Facility Hill. Several buildings, including the fire fighting training area, are located in the valley and on valley slopes.

One on-site perennial stream—the plant drainage ditch—flows east to west down the central valley of the plant property and discharges in to an abandoned section of the Miami-Erie Canal near the western site boundary (a National Pollutant Discharge Elimination Permit-permitted discharge). The Great Miami River lies less than one mile west of the site. Most of the Mound property lies well above the river floodplain.

The Mound high areas are underlaid by flat-lying Ordovician shales and limestone. The lower river valley areas are underlaid by glacial till and the Buried Valley Aquifer, a regionally important sole-source aquifer. A tongue of the Buried Valley Aquifer extends onto the western portion of the plant property. The 1989 placement of the Mound Plant on the Superfund National Priorities List was based largely on concerns of potential volatile organic contamination migrating off-site into this aquifer.

The site is directly bordered by a variety of land uses, including recreational (city park, golf course), residential, agricultural, and commercial/industrial uses. Many residences, five schools, the Miamisburg downtown area, and six parks/playgrounds lie within one mile of the plant.

No cultural or historic resources exist on the Mound property; however, the Miamisburg Mound, a 70-foot high Native American burial mound, is the focus of a City park adjacent to the eastern edge of the property and is a significant local cultural resource. The Miami-Erie Canal, just west of the plant boundary, has historical significance as part of the Ohio canal system that was built in the early to mid-1800s and used through the early 1900s.

Institutional Controls
The only long-term institutional controls that may be required are deed restrictions that limit site development to industrial purposes.

The Mound site has a large number of existing capital assets and land improvements (i.e., buildings, utilities, roads, infrastructure). Over 100 buildings exist on-site.

Cleanup Implications

Although industrial use is recommended on site, a record of decision for OU 1 signed in June 1995 calls for a pump-and-treat operation to reduce concentrations of VOCs in on-site groundwater (the Buried Valley Aquifer). In light of the surrounding area land uses, this measure will prevent contamination from flowing off-site and ensure compliance with drinking water standards consistent with a residential exposure scenario.

Furthermore, a removal action is planned to begin in 1996 in OU 4 which is located in a City park. Soil will be excavated, treated, and disposed of off-site to achieve a cleanup standard below 75 pCi/g for plutonium-238, which equals a recreational exposure scenario. This cleanup standard was set after extensive consultation with stakeholders through the Mound Action Committee process.

The working premise for other environmental restoration activities at Mound is that on-site surface and soil contamination will be remediated to industrial use standards.

- "Mound 2000" is an initiative proposed by the DOE Miamisburg Area Office and supported by the City and other stakeholders which accelerates site cleanup in order to release the land for economic development

Contamination Profile

Over 400 confirmed and potential release sites have been documented at the Mound Plant. The main radioactive contaminants of concern are plutonium, thorium, and tritium. Other contaminants include various volatile organic compounds (VOCs) in the form of solvents, paints, and industrial cleaning agents.

Two off-site releases of radioactive material have occurred. A liquid waste containing plutonium leaked into the soil after a pipeline ruptured in 1969. Heavy rain eventually moved this soil off-site and into the bed of the Miami-Erie canal where it adhered to subsurface clay. Another release occurred in 1989 when a small quantity of tritium escaped through a plant stack after an accident in a laboratory.

The Environmental Restoration Program has divided the site and affected areas into nine operable units (OUs). Three OUs require no further action. The six remaining OUs are summarized below.

OU 1 (Area B) includes the old landfill, the sanitary landfill, and an overflow pond that have been contaminated with VOCs. Part of the area was formerly used for open burning and waste disposal. The primary concern is that contaminants may be migrating into the Buried Valley Aquifer that underlies the southwest corner of the original Mound Plant.

OU 2 (Main Hill) addresses the source and pathways of possible contaminants at Mound's Main Hill, as well as off-site groundwater seeps at the north hillside area.

OU 4 (Miami-Erie Canal) addresses plutonium introduced into the old Miami-Erie Canal bed from past plant operations and nonroutine equipment malfunctions. This OU also includes the north and south pond within the park, the overflow creek from the canal to the Great Miami River, and the drainage ditch from Mound's west property line to the canal.

OU 5 (South Property) addresses on-site soil areas in the southern portions of the Mound Plant and specific areas containing small pockets of plutonium and thorium contamination.

OU 6 (Decommissioning Sites) verifies the results of decommissioning 86 buildings.

OU 9 (Site-wide and Off-site Activities) addresses the total environmental effects of any contamination attributable to Mound that may be found in the air, groundwater, soils, surface water, and sediments as well as plant and animal life. This OU covers the entire plant and the area within 20 miles of the plant.

Beginning in April 1996, this organization of OUs will be replaced by an on-site OU, an off-site OU, and the existing OU 1. This structure will enhance the site's ability to address the 406 release sites with flexibility consistent with the economic development mission.

earlier than currently planned. The concept would streamline the cleanup process and could shorten the total cleanup time by as much as 17 years. The "Mound 2000" concept includes the following streamlining components:

- reorganize operable units,
- transport low-level waste to a commercial facility,
- negotiate contract reform,
- implement removal action strategy,
- employ innovative technologies, and
- adopt a standardized approach to determine the degree of hazard.

Future use recommendations for the Mound property were determined by the City of Miamisburg under powers granted by the Constitution of the state of Ohio.

Public Involvement

The Mound site is currently zoned for industry in both the City's zoning ordinance and the City Land Use Plan, and no changes are foreseen to that designation. The City obtained support, in the form of "proxies," from surrounding local governments and interested stakeholders who concurred with the industrial future use designation.

The consensus of local stakeholders is that continued industrial use of the site is needed to support the Miamisburg job base. DOE and the regulators have used Mound Action Committees—focus groups comprised of interested stakeholders—to solicit public participation in decisions affecting environmental restoration, including setting remediation standards. Participation in the committees is open to the general public.

The Ohio EPA and U.S. EPA Region V have been actively involved in future use discussions. Both of agencies have also been supportive of the local governments' and stakeholders' recommendations.

Long-Term Implementation

The DOE Ohio Field Office and the City of Miamisburg Mound Transition Office have led the efforts to encourage new commercial businesses to locate at Mound. In early 1994, DOE and the City signed the first eight business leases at Mound. Since that time, over 20 businesses have begun operations on the Mound Plant site and have generated more than 120 full-time jobs. In early 1995, the City of Miamisburg created the Miamisburg Mound Community Improvement Corporation (MMCIC), an independent entity to nurture business development on the Mound site. Discussions continue between DOE, Ohio and U.S. EPAs, the City, and MMCIC about the possibility of transferring ownership of the Mound property and facilities to MMCIC.

These parties are discussing cleanup plans, site infrastructure needs, and projected dates when many of the 135 site buildings will be available for commercial reuse.

Nevada Test Site

Mercury, Nevada

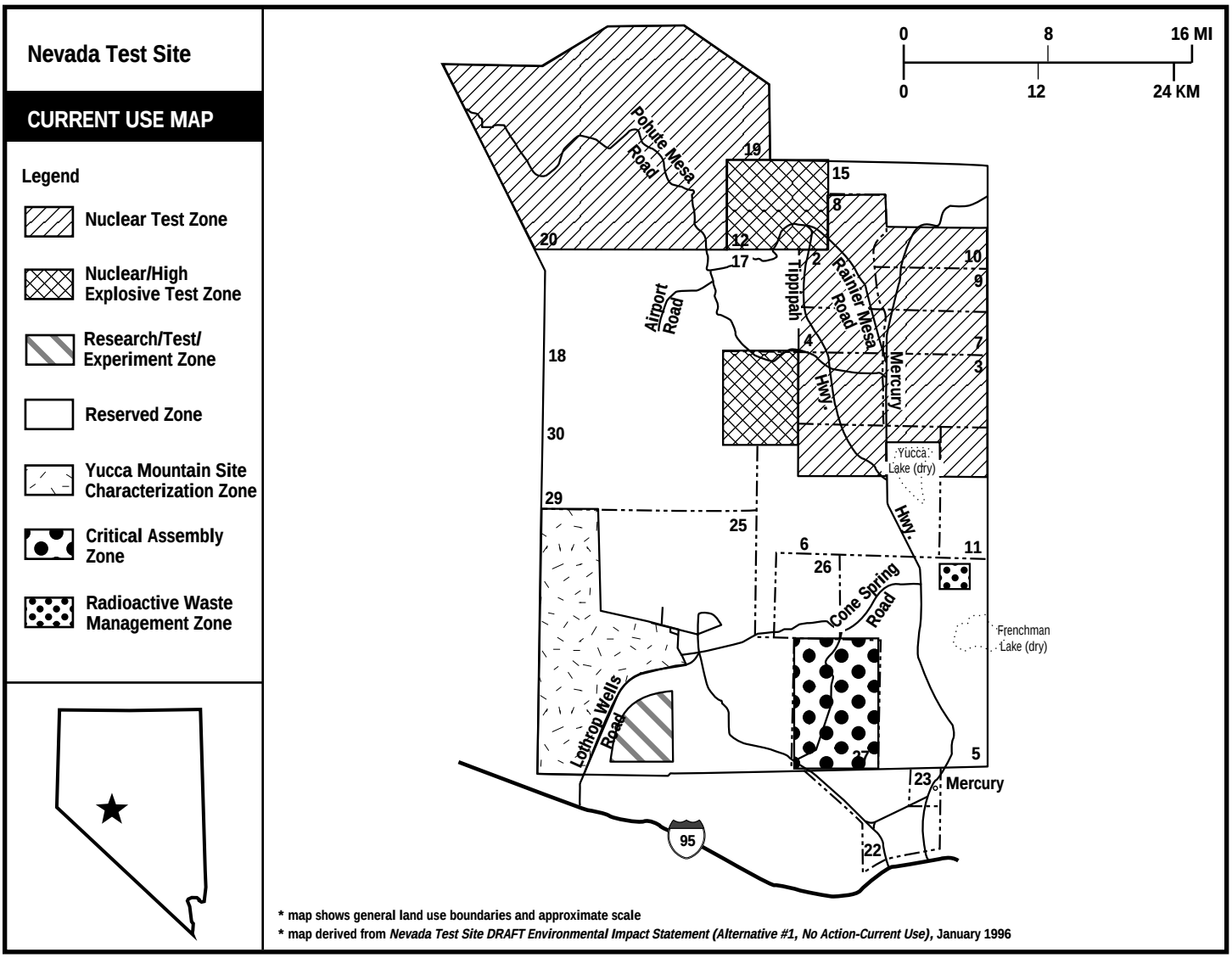

Figure 19. Nevada Test Site – Current General Land Use Map

Nevada Test Site Future Use Facts

The Nevada Operations Office is in the process of examining future use alternatives as part of its site-wide environmental impact statement (EIS) scheduled for release in June 1996. In considering future land use, the site has collaborated with its Citizens Advisory Board; economic development interests; and state, local, and tribal governments to evaluate four alternatives.

As part of this process, the site is developing a Resource Management Plan to ensure appropriate management of the natural, cultural, and historical assets on-site. Regardless of which alternative is preferred as part of the EIS, the Resource Management Plan, much like a comprehensive plan, will serve as a tool to guide the site toward its resource management goals.

Future Use Recommendations

Figure 19 displays the current land uses at Nevada Test Site (NTS), since future use recommendations for the site are still being developed. Future use alternatives for NTS are being examined through the development of a site-wide environmental impact statement (EIS). The NTS EIS evaluates the impact of various alternatives pertaining to DOE operations over the next five to 10 years. Published in January 1996, the draft EIS evaluates four use alternatives. The final EIS, due out in July 1996, will identify the preferred use alternative. Expected in August 1996, the record of decision will finalize the selected land use from the following four alternatives:

Alternative 1 – Continue current operations (no action). Ongoing DOE and interagency programs and activities at NTS and other associated areas in the state of Nevada would be continued under this alternative.

Alternative 2 – Discontinue operations. All current and planned programs, activities, and operations would be discontinued under this alterative. Only the environmental monitoring and site security functions necessary for human health, safety, and security would be maintained.

Alternative 3 – Expanded use. NTS and its resources would be made available for increased use to support defense and nondefense programs.

Alternative 4 – Alternative use of withdrawn lands. All defense-related activities and most "work for others" projects would be discontinued. Certain programs and activities that are not currently included in the NTS mission responsibilities are also evaluated. This alternative could include other activities, such as the relinquishment of portions of NTS, that would be dependent on future land use designations and withdrawal status.

Five categories of mission activities representing DOE's primary responsibilities are described under each alternative: defense programs, waste management, environmental restoration, DOE nondefense research and development, and "work for others" programs.

Existing Agreements.

Four separate Public Land Orders reserve NTS for weapons testing and supporting test facilities, roads, utilities, and safety buffers. A memorandum of understanding, specifically authorized by Public Law 99-606, dated November 6, 1986, also exists between DOE and the U.S. Air Force for joint use of over 106,000 acres of the Pahute Mesa to the northwest of NTS.

In 1988 the Bureau of Land Management granted a right-of-way to DOE authorizing the use of public lands for site characterization activities in the vicinity of Yucca Mountain. A management agreement between DOE-Nevada and the Yucca Mountain Project Office granted permission for the use of certain facilities in the Central Support Area in Area 25 and any of the western portion of Area 25 of NTS. These areas are reserved for the Yucca Mountain Project.

The Site Development Plan dated September 1994 states that the federal government will neither relinquish control of nor completely abandon NTS regardless of circumstances. If required, high-yield testing operations by the Lawrence Livermore and Los Alamos National Laboratories will be located in the more remote areas in the north because of geological, safety, and security considerations. Low-yield testing will be sited in the Yucca Flat area. The southern part of the site, which is not geologically suited for underground tests, will continue to be used for nonnuclear activities. Mercury Camp in the southern tip of the site will continue as the main base of operations for NTS. The forward area Control Point located in Area 6 will continue to serve as the main technical control center for all programmatic activities in the nuclear testing areas.

In addition to serving these national needs, NTS has been designated as a National Environmental Research Park for use as an outdoor laboratory for academic research on the effects of human activities on the desert ecosystem.

Influencing Factors.

Yucca Mountain is currently under consideration as the location of the nation's first high-level radioactive waste repository. Some portions of NTS have been set aside for use during site characterization studies. Although state political representatives and the public generally support current DOE operations at NTS, similar support has not been expressed regarding the possible selection of Yucca Mountain as the site for a high-level radioactive waste repository.

Site Characteristics

NTS is located approximately 65 miles north of Las Vegas, Nevada. The 1,350-square-mile facility is naturally buffered from public access on three sides by rugged, mountainous, undeveloped, federally-owned land. Nellis Air Force Range provides a buffer zone on NTS's east, north, and west borders. The Bureau of Land Management administers that land bordering the southern and southwest boundaries.

Existing NTS land use falls into four general categories: underground nuclear weapons test areas, reserved areas, industrial/research areas, and waste management areas. Approximately 25 percent of the 1,350-square-mile NTS facility is currently unused or provides buffer zones for ongoing programs and projects. NTS contains approximately 1,400 buildings with a total of approximately 2,800,000 square feet of space.

The historical mission of NTS is testing nuclear explosives for the nation's weapons research, development, and testing program. Currently, NTS is operating under the restrictions of a weapons testing moratorium. Total restriction of underground nuclear weapons testing is scheduled for implementation with the signing of a comprehensive test ban treaty. Besides nuclear weapons testing, a number of other programs fulfilling national research with environmental management needs are already in place. These programs include the aerial measurement system/aerial surveys, the Federal Radiological Monitoring and Assessment Center, the Liquid Gaseous Spill Test Facility, the Yucca Mountain Site Characterization Project, low-level/mixed waste storage and disposal, plutonium cleanup technology development, and the Nevada Environmental Restoration Project.

As of the September 1994 publication of the Site Development Plan, no official mission change for NTS had been announced; therefore, the current weapons testing readiness mission and the conduct of sub-critical, treaty-compliant, and permitted tests and experiments form the basis of future plans. Regardless of the level of testing activities, large segments of NTS could remain in reserve to support weapons testing in the required mode of readiness—a response time frame of three to five years.

Cleanup Implications

The site-wide EIS discusses environmental restoration activities required under each of the four proposed land use alternatives. Under Alternatives 1 and 3, environmental restoration activities would be essentially the same as those currently in progress. Under Alternative 2, restoration activities would not be performed; some sites would be decommissioned; some would be completely abandoned; and some would be monitored for protection of human health and safety. Under Alternative 4, which proposes alternative uses of withdrawn lands, restoration projects would continue at current or accelerated rates. The potential to return certain lands to the public domain under this alternative would depend on the ability to achieve established cleanup levels. Because site environ-

Contamination Profile

Approximately 2,000 areas at NTS may require some level of investigation and remediation. Of this total, approximately 1,030 were contaminated by the underground testing of nuclear weapons; more than 100 were affected by aboveground testing. The remaining areas include waste disposal facilities, leachfields, landfills, storage tanks, injection wells, inactive and abandoned buildings, associated equipment contaminated by previous operations, spill areas, and hundreds of small sites where unregulated disposal or storage of waste materials occurred during operations.

mental restoration projects are still in the early stages of characterization, remedial strategies have not been fully developed.

Because subsurface radiation at NTS will exist for centuries, the site is a posted, controlled-access facility surrounded by government-controlled buffer zones and protected by entrance guards, mobile patrols, and highly trained emergency response teams. Sensitive areas within NTS are equipped with chain link fencing, protective alarms, closed-circuit televisions, and secure communications systems. Such controls apply to all proposed land use alternatives evaluated in the EIS but would likely be conducted at reduced levels under Alternative 4, in which case various entities would manage portions of the site.

Public Involvement

In addition to using the public involvement procedures typically associated with the NEPA process, DOE has worked closely with its Citizens Advisory Board to analyze future land use. Created in June 1994, the board is made up of interested citizens and representatives of various constituent groups, including nearby residents and site workers; environmental or public interest group; labor and civic groups; and representatives of American Indian tribes, academia, and local governments. The board has taken a particular interest in land use because of its implications for environmental restoration and reuse. Issues being reviewed by the board include future land use, the site-wide EIS, and draft policy for the management of DOE lands and facilities.

Regulatory Involvement.

Representatives from the Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Air Force, and Nye County participate in the Technical Working Group for the NTS EIS. In addition, a representative of the State of Nevada Department of Environmental Protection participates as an ex-officio member of the board.

Governmental Involvement.

Nye County is represented on both the EIS Technical Working Group and the board. In addition to the state and local government involvement in the board, the state of Nevada Governor's office created the NTS Economic Adjustment Task Force to evaluate and recommend future site programs that could provide economic development opportunities. The task force is composed of state and local representatives, academicians, local business professionals, and management and operating contractor representatives. The DOE-Nevada Site Manager represents DOE on this task force.

The Task Force prepared a plan of action for the future of NTS in June 1994. The primary recommendation of the plan was to endorse the development of a diversified national test and demonstration facility that can continue to support the reduced nuclear weapons defense program while also attracting and supporting other high technology programs. Industry attracted by such programs can make significant, long-term contributions to local and national energy, environmental, defense, and economic needs.

Long-Term Implementation

In conjunction with the preparation of the NTS EIS, DOE is developing a framework for a Resource Management Plan for the site. The plan will establish a process for managing resources to ensure long-term diversity and productivity of affected ecosystems and sustainable use of land and facilities at NTS. DOE will use this process to assess the impact of existing facilities and activities as well as to evaluate the selection, design, location, and impact of proposed facilities and activities. Ultimately, the RMP will help ensure that site activities are consistent with preferred end uses and sensitive to the site's natural and cultural resources.

BEMR Comparison

The 1995 Baseline Environmental Management Report assumes that NTS's role as one of DOE's primary, low-level waste disposal sites will continue in support of the Environmental Management program. It further assumes that the site will remain under DOE ownership and institutional controls until new directions in missions and land use are determined.

Reuse Issues

The Governor's Task Force recommended that Nevada participate in DOE's Community Reuse Organization (CRO) program. Through the CRO program the state has formed the NTS Development Corporation to act as the single voice to DOE on economic development issues affecting NTS. DOE-Nevada has established an office that is coordinating strategic planning functions with the Corporation; the Nevada Alliance for Defense, Energy and Business; and the site operating contractor.

Oak Ridge Reservation

Oak Ridge, Tennessee

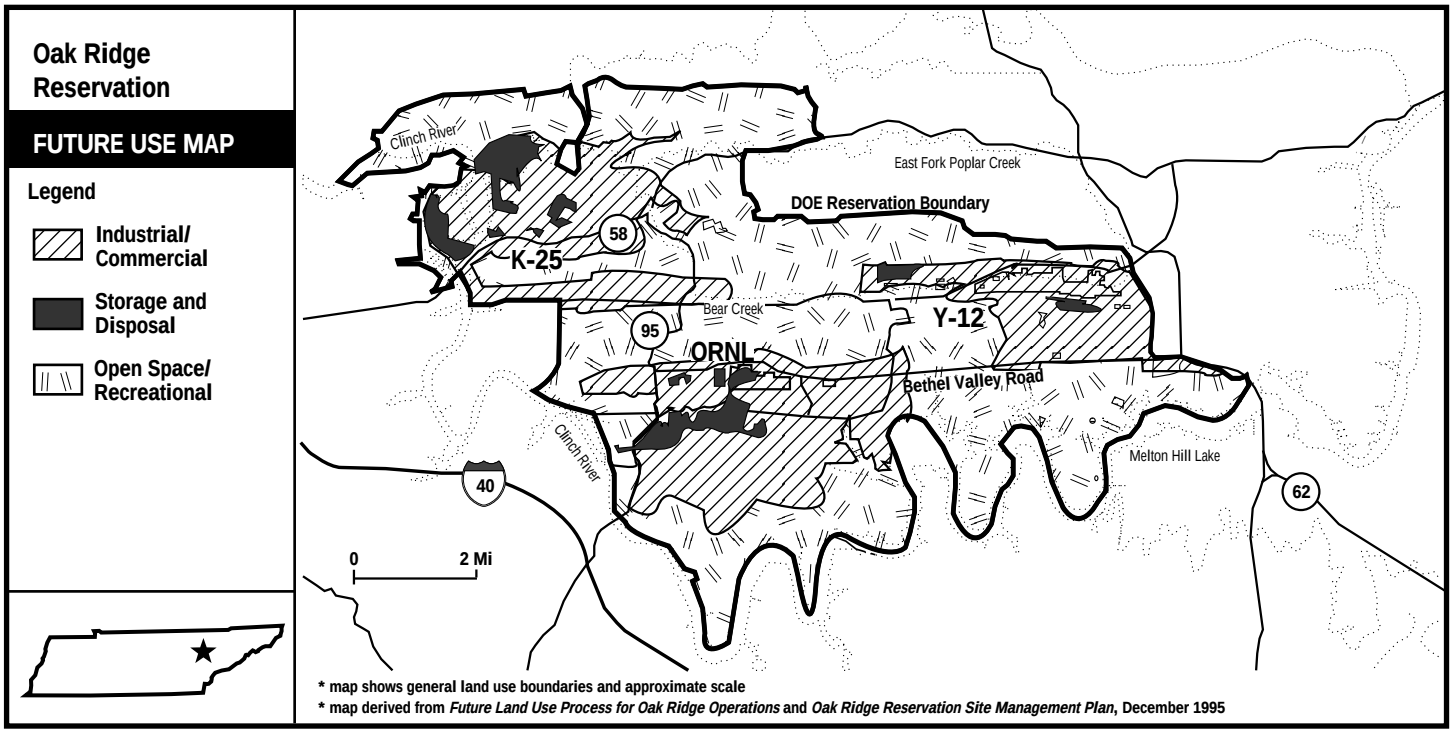

Figure 20. Oak Ridge Reservation – Future Use Map

Oak Ridge Reservation Future Use Facts

Recommendations developed through the Common Ground Process establish the basis for future use of the Oak Ridge Reservation. The overall vision specifies that the site should serve as an integrated science, education, and technology complex operated in partnership with the private sector. Under this scenario, the reservation would be managed by the federal government as a single parcel.

Based on Common Ground recommendations, the reservation would maintain existing industrial use sites as industrial or commercial parcels related to DOE missions, and retain the majority of existing conservation areas, particularly areas identified as "ecologically sensitive," as conservation zones with limited industrial, recreational, and research uses. The Site Management Plan translates the recommendations into three general land use categories—industrial/commercial, open space/recreational, and storage and disposal areas.

The recommendations also call for a comprehensive planning process, led by a group of federal, state, and local interests, to work through land use decisions. This process, along with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, would provide a vehicle to develop and implement plans for land and facility reuse and generate cleanup decisions.

Future Use Recommendations

Future use recommendations for the Oak Ridge Reservation were generated through the Common Ground Process, a broad public outreach effort that sought input from local citizens, local and regional elected and appointed officials, and other groups representing a variety of interests. As Figure 20 depicts, these recommendations include a mix of open space, recreational, industrial/commercial, and storage and disposal uses. Open space areas would allow conservation as well as limited recreational uses.

Using the stakeholder preferences expressed through the Common Ground process, the Oak Ridge Operations Office adopted a concept or vision that, "…the Oak Ridge Reservation should be treated as a single parcel of land… as a center of high-wage, technology, and science-based industrial development." This vision is accompanied by general recommendations regarding future use of Oak Ridge Reservation which include the following:

- The reservation should be managed as a single property;
- Future uses should build on past and current technologies, skills, and facilities;
- Short-term uses (zero–25 years) should include research, compatible uses, and passive recreation;
- Long-term uses (26–100 years) should build on those activities taking place in the short-term; and
- A comprehensive strategy for use of reservation land and facilities should be developed and include plans for facility reuse.

According to Common Ground recommendations, future use of the reservation would include a mixture of uses that are compatible with and contribute to ongoing and anticipated DOE missions. These uses include research; specialized mixed industrial and conservation uses (including waste management and cleanup activities); office and business uses; institutional uses (primarily educational); recreational uses that are generally passive in nature (e.g., trails, wildlife observation, general open space uses); specialized forestry and agricultural research uses; and conservation areas that accommodate environmental research and habitat protection.

For cleanup purposes, the Common Ground Process recommended that all of the Reservation be designated as a "specialized mixed industrial and conservational use" area. The Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program translates this classification into three general land use categories— industrial/commercial, conservation, and storage and disposal areas.

Industrial areas include the existing plant and laboratory installations, adjacent areas for expansion, and other areas for future initiatives. They lie primarily within the developed area of the reservation but include some locations that are in a relatively undisturbed state and that were selected based on their suitability for future industrial use.

Conservation areas preserve existing natural features and habitats and accommodate uses that are related to and compatible with adjacent industrial uses. Such uses include industrial buffer zones, specialized agricultural and forestry research, environmental research, passive recreational uses, and environmental education. These areas are presently relatively undisturbed and are mostly forested, natural areas.

Storage and disposal areas have contaminated materials that the Department plans to contain and control. These areas may be used as sites for future waste management facilities to provide the capacity for planned environmental cleanup activities.

Consensus/Nonconsensus Issues.

In general, the Common Ground Process revealed strong support among its more than 350 stakeholder participants for the continuation of the Oak Ridge Reservation's current missions, especially research. Recommendations centered on the use of portions of the reservation to promote the development of private sector enterprise, protection of the site's special natural assets, and continuation of the site's environmental research including research on the effects of past contamination.

At the same time, some stakeholders supported a multi-purpose vision for the reservation. Public input included recommendations for varied recreational uses, such as hiking and biking trails that enable low-impact recreation and local transportation while providing green ways that serve as visual buffers, often called "viewscapes."

Less support was expressed for residential uses, especially in the near future. The City of Oak Ridge, however, indicated its interest in ultimately using three specific parcels for residential use, as depicted in Figure 21, the City's land use plan (see page 75). Although the Common Ground future use recommendations correlate with the City's proposed plan to a great extent, some City officials expressed concern about the remaining disparities. In addition, the City noted the need to resolve questions concerning potential reuse of specific parcels of the reservation. In particular, the City claims first rights to certain areas, designated as "self-sufficiency" parcels, once DOE no longer needs them for mission activities.

The state of Tennessee's Department of Environment and Conservation (TDEC) has indicated that recommendations resulting from the Common Ground Process provide only a starting point on which to base further review and final land use decisions through the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 process and by local governments and planning commissions. Concern was expressed that the Common Ground report appears to emphasize protection of the status quo and fails to develop a strategic land use plan. Support was expressed, however, for the recommendation that called for development of a top-level, integrated, and comprehensive strategy for use of the Oak Ridge Reservation land and facilities. Additionally, TDEC indicated that the seriousness of contamination at the reservation appears to have been downplayed and its effect on present and future land uses was not adequately addressed.

Site Characteristics

The Oak Ridge Reservation includes three major DOE installations: the K-25 Site, Oak Ridge National Laboratory (ORNL), and the Y-12 Plant. The reservation comprises approximately 35,000 acres located in the City of Oak Ridge and constitutes approximately 62 percent of the total land area within the city's corporate limits.

The reservation is bounded on the north and east by the City of Oak Ridge and on the south and west by the Clinch River. With the exception of Oak Ridge, the area surrounding the reservation is predominantly rural and is used largely for residences, small farms, and pasture land.

Responsibility for the reservation's 35,000 acres is divided among the three primary plant sites—the K-25 Site, Oak Ridge National Laboratory, and the Y-12 Plant.

K-25 Core and Buffer Areas: The K-25 Site's 4,845 acres contain 340 buildings, some of which are massive. Currently, K-25 has a multipurpose environmental management mission including environmental remediation; waste management; technology development, demonstration, and transfer; and education and training.

Oak Ridge National Laboratory Core and Buffer Areas: ORNL is responsible for 24,400 acres and 321 buildings. ORNL's missions are to conduct applied research and engineering development in the areas of nuclear fusion and fission, energy conservation, fossil fuels, and other energy technologies; and to perform basic scientific research in selected areas of physical, life, and environmental sciences.

Y-12 Core and Buffer Areas: The Y-12 site comprises about 4,370 acres adjacent to the City of Oak Ridge. The Y-12 mission focuses on weapons dismantlement and storage, enriched uranium material storage and management, weapons process technology and development support, decontamination and decommissioning, and technology transfer.

Of the 35,000 acres on the reservation, 10 to 20 percent has been developed for DOE and its facilities. In addition, it has been estimated that about five to 10 percent of the reservation's land has been earmarked for environmental cleanup. Other current uses of undeveloped

land include environmental research, health and safety buffer zones, and land set aside for future missions.

Ecological Resources.

Because the Oak Ridge Reservation has a large amount of undeveloped land, it serves as a nature preserve for the region's natural ecology. More than 40 plant and animal species found within the reservation are listed by TDEC as endangered, threatened, rare, or of special concern. In 1980, DOE designated 39 percent of the reservation's land as a National Environmental Research Park.

The Oak Ridge Reservation is located in the Clinch River watershed which supplies essentially all of the water to the reservation, Oak Ridge, and other cities along its course. Since the Clinch is the primary receiver of drainage from the reservation, discharges into the river must be monitored to ensure that water passing downstream satisfies all applicable state and federal water quality standards.

The environmental setting of the Oak Ridge Reservation is hydrologically and geologically complex. Because of an active hydrogeologic system, the primary means of contaminant transport and exposure is through an active groundwater and surface water system. The hydrogeology is characterized by highly fractured and solutioned strata that facilitate groundwater flow to receptors and make it difficult to predict flow pathways. Within this complex environmental setting, the reservation's contaminated areas vary considerably in terms of the nature and extent of contamination. Although contaminants may have originated from a specific area, migration in some instances has resulted in commingled plumes. Approximately 11 percent of all households within a five-county region surrounding the Oak Ridge Reservation use wells as a principal water supply for domestic or agricultural uses.

Six properties on the Oak Ridge Reservation are presently listed in the National Register of Historic Places (NRHP), including:

- the Graphite Reactor,
- the New Bethel Baptist Church and Cemetery,
- the Oak Ridge Turnpike Checking Station,
- the Bear Creek Road Checking Station,
- George Jones Memorial Baptist Church, and
- Freel's Bend Cabin.

Other properties may also be eligible for inclusion in the NRHP. Preservation of the resources is mandated by the National Historic Preservation Act of 1966 and the Tennessee Natural Areas Preservation Act of 1971.

Cleanup Implications

The future use recommendations resulting from the Common Ground Process equate to the commercial/industrial and recreational categories described in Environmental Protection Agency guidance. These recommended land uses will be used to develop the most likely exposure scenarios in the remedial investigation/feasibility study process. DOE will also evaluate areas of concern for all other land use scenarios, including recreational, industrial, residential, excavation, and agricultural uses, in determining relative risk during the baseline risk assessment. Although agricultural and residential land uses have not been identified as preferred land use options, they will be evaluated for comparative purposes as part of the remedial investigation process to clarify whether contaminants might pose a risk to human health and the environment under any conditions.

Acceptable risk and corresponding cleanup objectives for the Oak Ridge Reservation Environmental Restoration Program will be based on future land use recommendations; human health and environmental risks; and applicable, relevant, and appropriate requirements (ARARs). Final decisions on future land use, risks, ARARs, and cleanup goals will be made by DOE, EPA, TDEC, and the public through the Comprehensive Environmental Response, Compensation, and Liability Act process (i.e., feasibility study, proposed plan, engineering evaluation/cost analysis, action memoranda, and records of decision).

Institutional Controls
For the next 25 years, it is assumed that the Oak Ridge Reservation will be managed as a single property by the U.S. government, specifically DOE. Therefore, the existing forms of institutional and access controls will be maintained.

Public Involvement

The Common Ground Process was designed to be open, inclusive, and responsive to site and area issues; to consider DOE missions; to represent diverse stakeholder concerns; and to take into account economic and environmental considerations, societal and cultural issues, and technical information. The process involved DOE and stakeholder participation, a compilation of comprehensive baseline information and data to guide decision-making, and an inclusive evaluation and integration of resulting future use options by all participants.

Stakeholder participation in the Common Ground Process was conducted in two phases. In the first phase, stakeholders' views on future needs of the region and possible future uses of the Oak Ridge Reservation were gathered. In the second phase, the stakeholders' reactions to preliminary future use recommendations were considered.

During the first or "visioning phase," stakeholder values about regional needs and preferred future uses of Oak Ridge Reservation were elicited. During the fall of 1994, approximately 100 opinion leader representatives of community, government, and environmental groups were individually interviewed; and a series of workshops was conducted with volunteers solicited through newspaper ads and publicity. A total of 304 stakeholders participated in Phase I.

Contamination Profile

The Oak Ridge Reservation has a long and varied operational history; consequently, numerous radioactive and hazardous contaminants are found in a variety of environmental settings. Radioactive and hazardous contaminants occur in groundwater, soils, surface waters, and sediments, as well as specific biological receptors.

K-25: The K-25 site consists of several facilities, including the K-25 Building, that are no longer in use and will eventually require some level of decommissioning. The hazardous materials and wastes that will result from decommissioning include enriched uranium, PCBs, and asbestos. Decommissioning of the K-25 Processing Plant will require the removal and extraction of significant amounts of enriched uranium from miles of process pipes. Waste disposal practices at the site have resulted in groundwater contamination, including uranium, chlorinated solvents, and metals. The Pond Waste Project resulted in 70,000 drums of partially solidified and raw sludge containing metals, solvents, and low-level waste products stored on external pads. Currently, these drums are being repackaged and placed in compliant storage and/or shipped off-site for treatment and disposal.

Oak Ridge National Laboratory: Approximately 350 contaminated sites have been identified at ORNL and are grouped into 20 waste area groups (WAGs) that are further subdivided into operable units. Contaminants comprise a varied list of metals; radionuclides, including uranium, thorium, and fission products (strontium-90, cesium-137); chlorinated solvents; polyaromatic hydrocarbons; and PCBs. Several of these waste area groups have contaminated groundwater and surface water that transport contaminants off-site. For example, disposal units from WAG 1 and WAG 2 have contaminated underlying groundwater with strontium-90, cesium-137, and tritium. These radionuclides contaminate White Oak Creek and the Clinch River through a series of seeps and associated minor tributaries.

Y-12: The Y-12 Plant contains 217 waste management units that include landfills, incinerators, storage areas, aboveground and underground tanks, and surface impoundments. Contaminants include metals, radionuclides, PCBs, volatile organic compounds, and nitrates. The most significant releases include contamination of the Upper East Fork Poplar Creek and contamination of groundwater and surface water in the Bear Creek Valley region. The Upper East Fork Poplar Creek has been contaminated predominantly with mercury, lead, chromium, beryllium, uranium (depleted and enriched), PCBs, petroleum products, organic solvents derived from a number of point sources (outfalls, leaking pipes, etc.), and by contaminated groundwater. Progress made at the Y-12 site includes the closure of nine interim status Resource Conservation and Recovery Act units. Bear Creek is contaminated with PCBs, uranium, and cadmium. Groundwater is contaminated with nitrates, volatile organic compounds, radionuclides, and metals.

During the second or "preliminary recommendations" phase, recommendations were developed by a planning team in response to stakeholder input and technical, economic, environmental, and DOE mission considerations. Stakeholder reactions to the preliminary recommendations were then sought in a series of public meetings held in five regional communities and from almost 100 DOE and contractor managers. A total of 104 questionnaires were completed and returned. This phase took place during the spring and summer of 1995.

Officials of the seven counties surrounding the Oak Ridge Reservation were sent survey questionnaires; however, officials from only two counties responded. A meeting was held with seven planning officials from Oak Ridge and other nearby communities to review technical information concerning the reservation and the region and to obtain the officials' input.

Future use options were developed from external and internal stakeholders' preferences and weighed against the following data:

- DOE missions and strategic plans,
- environmental and economic impacts of land use changes on the reservation,
- local and regional plans and projections, and
- technical information about the reservation.

To obtain an objective appraisal on the ecological value of different uses, the Nature Conservancy was retained to study the Oak Ridge Reservation and propose a series of conservation and preservation areas. The future use recommendations include using these areas for passive recreation such as nature trails, wildlife observations, and general open spaces in areas that do not interfere with ongoing preservation and conservation efforts.

A draft final report was reviewed internally, at a public meeting, and during a 30-day public comment period that extended from September through October 1995. Stakeholders provided between 60 and 70 letters and oral comments at public meetings.

Long-Term Implementation

A primary recommendation of the Common Ground Process is to "…develop a top-level, integrated, and comprehensive strategy for use of Oak Ridge Reservation land and facilities and include implementation plans for facility reuse and future development. Strong consideration should be given to co-development of reservation property with the private sector through partnerships, financial incentives, and mutually acceptable property use agreements." Furthermore, the "…strategic and comprehensive planning effort should be conducted in consultation with the state of Tennessee, the City of Oak Ridge, and Anderson and Roane counties…" This recommendation stems from the Department's recognition that future use recommendations must be continually refined and that the site must continue to resolve outstanding issues with the City of Oak Ridge and others concerning reuse of specific parcels.

To facilitate Comprehensive Planning on the Reservation, the Oak Ridge Operations Office (ORO) has established the ORR management team consisting of representatives from each programmatic organization. This team will evaluate programmatic needs and opportunities and constraints to make land use recommendations to a board of senior DOE decisionmakers. The management team will seek to involve the public in comprehensive planning efforts.

Reuse Issues.

The East Tennessee Economic Council, a 20-year-old community organization, has served as a community reuse organization (CRO) since late 1993. The council has recently formed a new group of 36 members to serve as the primary interface with the Department on facility transfers for economic development. This reorganized CRO, known as the Community Reuse Organization of East Tennessee, is charged with providing broad-based representation of impacted communities, developing and submitting plans and proposals, operating in a public forum, and interacting with the appropriate boards that advise the Department. In its function as a key contact for leasing arrangements with the Department, the

New Citizens Advisory Board

A newly-formed site-specific advisory board will also contribute to ongoing land use planning issues related to site remediation.

organization anticipates playing an integral role in private-sector development on the reservation. The Oak Ridge Operations Office is working with the CRO to place two leases: one for a 1,000-acre parcel east of the K-25 site was completed in January 1996, and one for the K-25 Barge Facility is pending.

In addition to the CRO, DOE-Oak Ridge formed an internal organization in April 1994 called the ORO Economic Development Council (EDC). It is represented by members from Property Management, Finance, Procurement and Contracts, Legal Counsel, Intellectual Property Counsel, and Technology Transfer, Energy Research and Development, Defense Programs, Enrichment Facilities, and Environmental Management Offices. EDC's mission is to develop a process to transfer temporarily underutilized facilities. It set out to perform a pilot transfer to identify and resolve issues, select the appropriate transfer vehicle, and assist the community in setting up a CRO infrastructure. The initial pilot transfer project is the K-25 Barge Facility. Following completion of this lease, EDC members will review the process and consider how to make subsequent and more complex transfers operate more efficiently.

As the Department of Energy enters into reuse plans with the CRO and outside parties, the Department recognizes its commitment to the City of Oak Ridge regarding certain "self-sufficiency" parcels. Should these areas become excess to Department needs and ready for transfer, the City of Oak Ridge maintains first rights to purchase these lands at fair market value. Remaining tracts now designated as "self-sufficiency" are identified as Parcels 1 through 15, D and G.

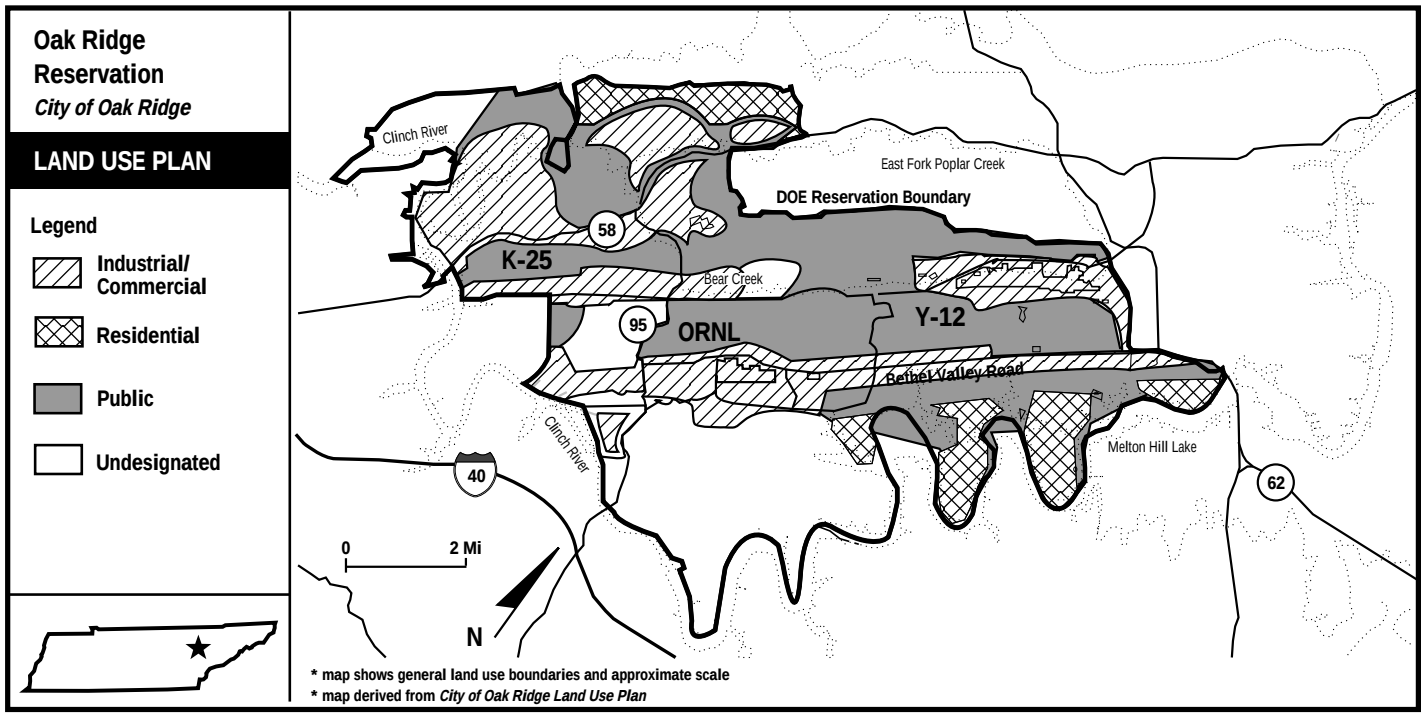

Figure 21. Oak Ridge Reservation – City of Oak Ridge Land Use Plan

Paducah Gaseous Diffusion Plant

Paducah, Kentucky

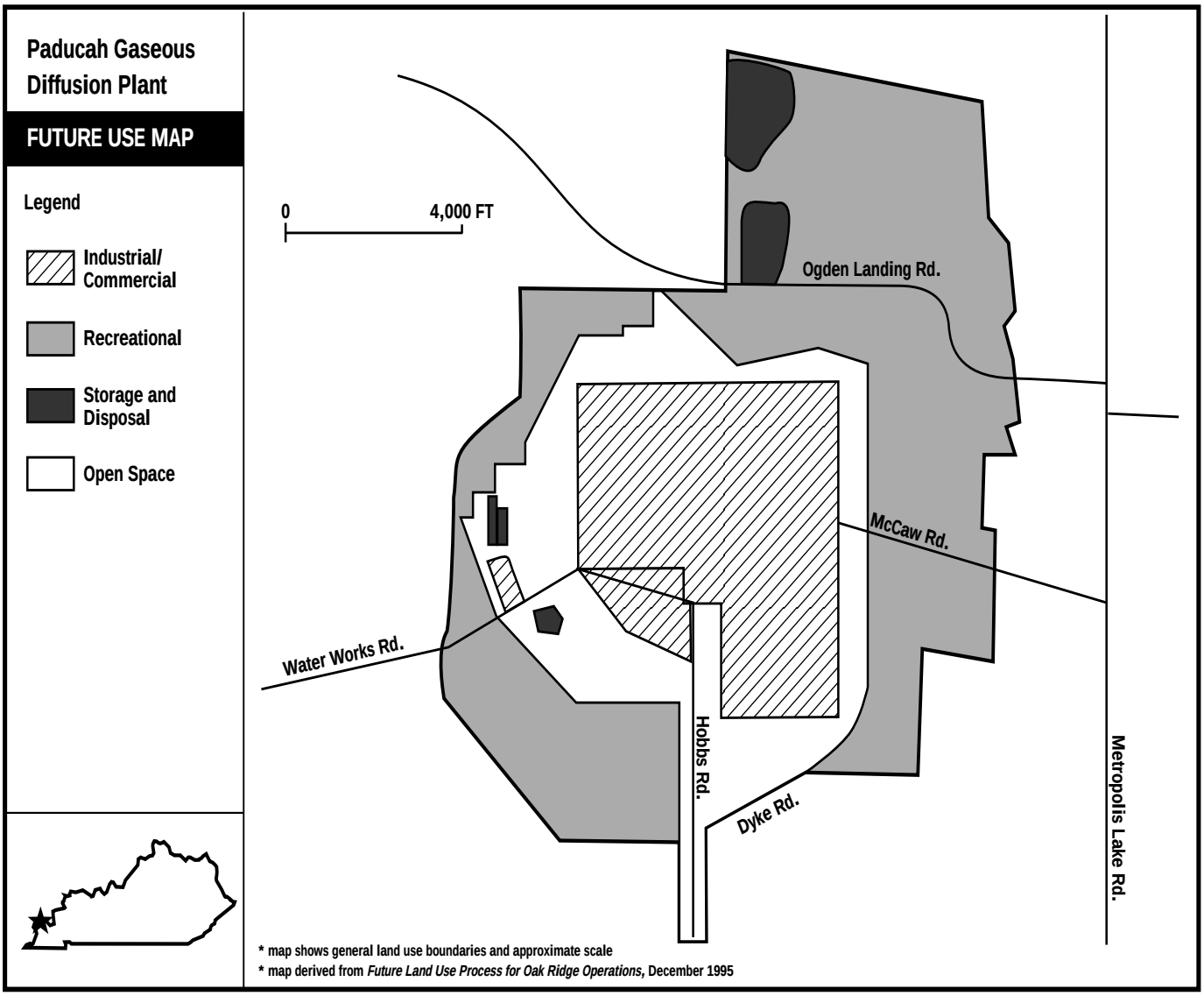

Figure 22. Paducah Gaseous Diffusion Plant – Future Use Map

Paducah Future Use Facts

The Paducah Gaseous Diffusion Plant (PGDP) is currently leased to the United States Enrichment Corporation (USEC) to provide uranium enrichment services under the Energy Policy Act of 1992. Because of this lease agreement, which is valid until 1999, future use planning at PGDP was conducted on a limited basis.

Based on the limited study, which included input from both internal and external stakeholders, DOE has recommended that future use of PGDP correspond with the current scenario of recreational, industrial, open space, and storage and disposal areas. This recommendation was influenced by the existing agreement between DOE and USEC; a lease agreement between DOE and the Kentucky Department of Fish and Wildlife to use a portion of PGDP as a wildlife management area; probable industry-related alternative missions identified through a contingency planning process; and a remedial strategy favoring presumptive remedies that would preclude unrestricted uses such as residential use.

Future Use Recommendations

As Figure 22 illustrates, the future use recommendations for the Paducah Gaseous Diffusion Plant (PGDP) call for continued mixed land uses including recreational, industrial/commercial, open space, and storage and disposal areas. The open space area serves as a buffer around the core industrial area; the storage and disposal areas include landfills and lagoons for waste management purposes.

Current and near-term land use at the PGDP is dictated by an agreement between DOE and the United States Enrichment Corporation (USEC). The agreement, authorized under the Energy Policy Act of 1992 (Public Law 102-486), enables USEC to lease production facilities at PGDP for uranium enrichment services. The current lease period is through 1999; however, USEC holds exclusive options to lease facilities and related properties for additional periods. Lease renewal notification must be provided by USEC in 1997.

Because of the existing agreement, the DOE Site Office at PGDP conducted only a limited study of future uses, but considered input from both internal and external stakeholders and other sources.

Existing Agreements and Influencing Factors.

Related factors that influenced the mixed industrial/recreational use recommendation included an existing agreement with the Kentucky Department of Fish and Wildlife (KDFW), recommended strategies from the Gaseous Diffusion Plant Turnover Contingency Alternative Missions Plan, and the lack of existing technology to remediate certain site contamination.

Lease agreements are also in place with KDFW to use most of the property outside of the fenced security area as part of a wildlife management area for the West Kentucky Wildlife Management Area. The leased property is adjacent to property already owned by KDFW. KDFW has indicated that it supports the current land use arrangement at the site, but would like to obtain the DOE property it leases if the Department ever decides it is no longer needed. The current lease agreement with USEC, however, gives the Corporation first right to obtain any real property associated with the plant that is not part of the existing agreement.

In the event that USEC does not renew its lease, the Gaseous Diffusion Plant Turnover Contingency Planning Alternative Missions Plan is in place to enhance DOE's readiness to terminate its lease by identifying possible alternative missions for PGDP. All categories of alternative missions point to a probable future industrial/commercial use scenario.

Site contamination was another important factor in recommending the chosen future use scenario. Based on the complex nature of wastes present at PGDP (e.g., radionuclides and dense, nonaqueous-phase liquids), the future use of the site may never be appropriate for unrestricted uses, such as residential use.

Consensus Issues

Based on a limited sampling of stakeholders, the majority favored maintaining the property in its current industrial/recreational capacity. No stakeholders recommended converting the property to residential or expanding industrial and recreational uses.

Site Characteristics

PGDP is located about three miles south of the Ohio River near the Kentucky-Illinois border and about 15 miles west of the city of Paducah (population approximately 27,000). PGDP is located on 3,423 acres of land owned by DOE. The primary operations associated with the enrichment process are located on the 748 acres within the plant security fence. Of the remaining acreage outside the fence, 2,080 acres are leased to KDFW as part of the West Kentucky Wildlife Management Area, and the remaining land is relegated to use as buffer zone.

PGDP is the largest employer in the region, currently employing more than 2,000 people including agency and contractor employees at the site.

Facilities include uranium processing facilities, a steam plant, electrical switchyards, cooling towers, cleaning and decontamination facilities, water and wastewater treatment plants, maintenance and laboratory facilities, and various other support operations.

The region is characterized as an area of fairly level topography with gently rolling hills and knobs. The area contains numerous streams, rivers, and lakes with elevations typically ranging from more than 700 feet to less

The PGDP is in the process of establishing a site-specific advisory board to review environmental issues and provide input to DOE's decision-making process. Land use will be a primary issue to be discussed by the board once it is established.

than 300 feet above sea level. The site is located within the drainage areas of Big Bayou and Little Bayou Creeks, which meet about three miles northeast of the site and discharge into the Ohio River. During the dry season, much of the flow in both creeks results from controlled effluent releases from PGDP.

The site is bordered by the West Kentucky Wildlife Management Area which is used by hunters and fishermen. North of the Paducah site, the Tennessee Valley Authority operates a power plant that provides electricity for commercial use. Land usage within the vicinity of PGDP is predominantly rural and lightly populated with sparsely located residences and farms.

During past PGDP operations, hazardous substances generated as byproducts from the enrichment process were released into the environment. These releases are typically associated with burial grounds, spill sites, landfills, surface impoundments, and underground storage tanks. The primary contaminants of concern include radionuclides, organic solvents, and PCBs.

Cleanup Implications

The extent to which DOE can remediate certain contaminated sites at PGDP directly influences future use of the property. Some burial grounds contain radionuclides that, because of their pyrophoric nature, can become unstable if disturbed. In such cases, leaving the material in place with a protective cap and monitoring system may be the only economically feasible and safe remedial option. In these situations, and with on-site landfills, it is unlikely that the future use of these areas will change because of the characteristics and volume of the buried wastes and EPA's presumptive remedy of containment rather than removal actions for landfills.

The presence of dense nonaqueous-phase liquids at PGDP, such as trichloroethylene, also directly affects future site use. In some cases, trichloroethylene has migrated into the groundwater and formed highly concentrated pools, thereby constituting long-term sources of groundwater contamination. Existing EPA guidance acknowledges that no remedial technologies currently exist that can clean up these liquids to drinking water standards. Numerous studies conducted over the past two decades have demonstrated the impracticability of attaining Maximum Contaminant Levels (MCLs) for chlorinated solvents such as trichloroethylene. It may be impossible to attain groundwater cleanup levels consistent with unrestricted use (a general goal or requirement) and regulatory levels (i.e., Safe Drinking Water Act MCLs). It is anticipated that several of the waste area groups not discussed here will require no further action due either to no measurable contamination or levels measured below regulatory concern.

Contamination Profile

The Paducah Plant has produced both on- and offsite contamination created by chlorinated solvents, metals, radionuclides, and PCBs. Radionuclides include uranium and technetium-99. The predominant chlorinated solvent or volatile organic compound is trichloroethylene. There are over 200 potential release sites or solid waste management units organized into 30 waste area groups (WAGs). Examples of release sites include, but are not limited to:

- A trichloroethylene spill at WAG 1;
- A toluene spill and several underground storage tanks requiring removal at WAG 7;
- A trichloroethylene release, and a suspected release of the PCB, trichloroethylene and technetium-99 at WAG 6;
- Thirty-seven potential radionuclide release sites at WAG 17;
- Sites contaminated with PCBs, uranium, pentachlorophenol, and petroleum hydrocarbons at WAG 16,
- A sludge lagoon contaminated with chromium, uranium, and PCBs;
- A PCB-contaminated transformer storage area, two 4,000-gallon underground storage tanks for diesel fuel, and an acid neutralization lagoon;
- Four wastewater lagoons potentially contaminated with PCBs and mercury; and
- Groundwater contaminated with technetium-99 and trichloroethylene that has migrated offsite.

Although cleanup levels have not been determined on a final basis, there are no anticipated problems in attaining cleanup levels for remedies requiring soil removal and treatment actions.

It is anticipated that the majority of remedial actions will require extraction, treatment, and disposal of contaminated media. Cleanup will achieve residual concentration levels consistent with applicable regulations and/or with risk levels appropriate to both current and future land uses. Risk-based cleanup goals for residual contamination in soil will be based on future use decisions agreed to in the Federal Facility Agreement Site Management Plan currently under negotiation. Cleanup levels for groundwater contamination are currently based on Safe Drinking Water Act MCLs. Because of technical problems associated with attaining the MCLs for trichloroethylene, a technical impracticability variance is currently under negotiation with the regulators. The variance will determine the final cleanup level.

Public Involvement

Stakeholder input on the future use of PGDP was sought from both external and internal stakeholders. Internal stakeholders included representatives from DOE and its contractors. External stakeholders included groups such as the PGDP Neighborhood Council, the PGDP Environmental Advisory Committee, city and county officials, and environmental activist groups.

Future use presentations and discussions were conducted with external stakeholders at various public workshops held in 1994 and 1995. In general, these individuals and organizations, including city and county officials, support a continued industrial/commercial presence at the site that would preserve existing jobs and contribute to the regional economy. As previously mentioned, KDFW also supports industrial and recreational uses of the site.

The majority of participating residents preferred continuation of current use practices in order to maintain jobs and economic benefits. However, they indicated that preventing migration of contaminants off-site was also a priority. Environmental activist groups agreed that remediation should be sufficient to prevent contaminant migration but suggested additional controls to the 748-acre fenced area to restrict access.

In addition, a facilitated workshop for DOE and contractor employees was conducted in April 1995 to identify the most likely alternative missions for the gaseous diffusion plants at Paducah and Portsmouth should the Department receive notification that USEC intends to terminate its lease agreement at one or both of the plants. The workshop was part of the process to develop the Gaseous Diffusion Plant Turnover Contingency Planning Alternative Missions Plan, and it identified six categories of likely alternative missions:

- training and education center;
- low-level radioactive material treatment/ storage/disposal facility;
- heavy industry complex;
- industrial park;
- resource recovery center; and
- facility to meet federal needs, including DOE's.

Long-Term Implementation

DOE initiated a contingency planning project by developing the Gaseous Diffusion Plant Turnover Contingency Planning Alternative Missions Plan to achieve a state of readiness should USEC provide notification of lease termination at PGDP. Once notification is received, DOE would involve external stakeholders and local communities in identifying alternative uses for the site facilities.

The Turnover Contingency Plan document also recommends establishment of a community reuse organization to work cooperatively with public and private sectors in developing a comprehensive plan for reuse of the Paducah site.

Pantex Plant

Amarillo, Texas

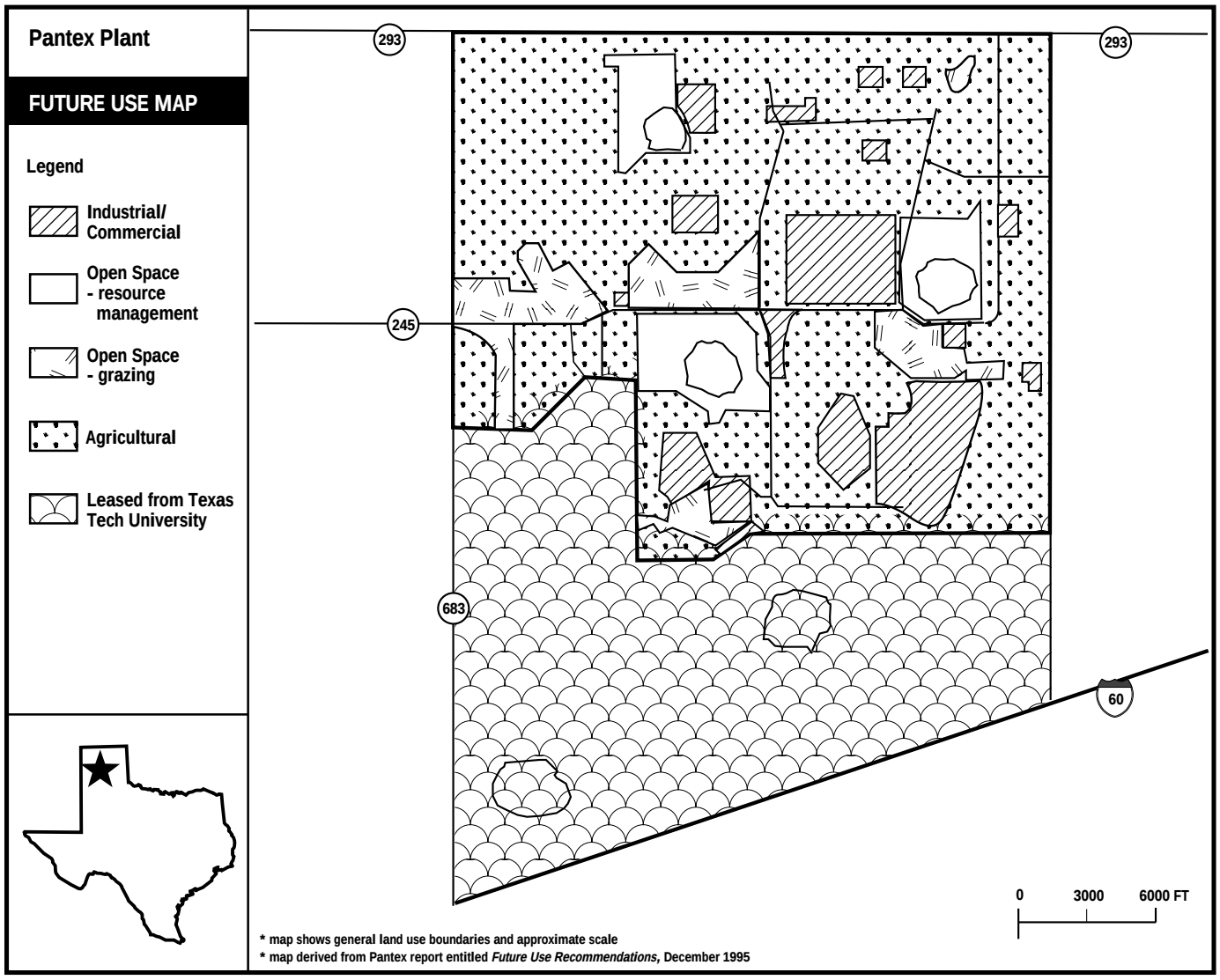

Figure 23. Pantex Plant – Future Use Map

Pantex Plant Future Use Facts

The current Pantex mission of assembly, disassembly, demilitarization, repair, retrofit, and storage of nuclear weapons and components from the nation's stockpile is expected to remain unchanged.

Future use for the site was determined primarily by Pantex personnel with minimal input from local stakeholders. Of 10,177 acres of DOE-owned land at Pantex, approximately 1,400 acres are being used for industrial/commercial purposes with approximately 2,277 acres relegated to open space use for playas (perennial wetlands) or playa protection buffer zones. The remainder of the land is used as a safety and security buffer zone; a service agreement with Texas Tech University permits use of this land for agriculture.

DOE leases an additional 5,800 acres of land from Texas Tech for use as a safety and security buffer zone. The buffer zone is used for agricultural purposes.

Approximately 7,100 acres of the DOE-owned land have been designated as available for reuse with limited safety and security restrictions.

Future Use Recommendations

The Pantex Plant mission is expected to remain unchanged. The mission at Pantex entails:

- Assemble nuclear weapons for the nation's nuclear stockpile;
- Disassemble nuclear weapons being retired from the stockpile;
- Demilitarize and sanitize components from dismantled nuclear weapons;
- Evaluate, repair, and retrofit nuclear weapons in the stockpile;
- Provide an interim storage site for plutonium pits parts from dismantled nuclear weapons; and
- Develop, fabricate, and test chemical explosives and explosive components for nuclear weapons and to support DOE initiatives.

As Figure 23 illustrates, the future use recommendations for the Pantex Plant advocate a combination of agricultural, industrial/commercial, and open space uses that include resource management and grazing. Of the 10,177 acres of DOE-owned land at Pantex, approximately 1,400 acres are being used for industrial/commercial purposes. Another 2,277 acres are being used for open space purposes for playas or playa protection buffer zones. The remainder of the land is an area that falls under a service agreement with Texas Tech University for agricultural use and as a safety and security buffer zone. Approximately 7,100 acres have been designated as available for reuse with limited safety and security restrictions.

Existing Agreements.

Since the 1980s, Pantex has leased 5,800 acres of land for a safety and security buffer zone from Texas Tech University which still uses the property for experimental cattle production. A separate service agreement allows Texas Tech University to use any DOE land for agricultural use if it is not being used for defense purposes. This contract is to be renegotiated in fiscal year 1996.

Site Characteristics

The Pantex Plant is located in the Texas panhandle in Carson County along U.S. Highway 60. The plant is about 17 miles northeast of downtown Amarillo. The Pantex Plant facility consists of approximately 10,177 acres owned by DOE, including 9,100 acres in the main plant area and 1,077 acres around Pantex Lake which is approximately 2.4 miles northeast of the main plant area.

Pantex lies on the Llano Estacado, or "staked plains," portion of the Southern Great Plains. The topography at Pantex Plant is relatively flat, characterized by rolling grassy plains and numerous natural playa basins. The term "playa" is used to describe the more than 17,000 ephemeral lakes in the Texas Panhandle, most of which are less than three-quarters of a mile in diameter, that receive runoff from the surrounding area. The region is a semi-arid farming and ranching area. Pantex Plant is sur-

Contamination Profile

The production of high-explosive components for nuclear weapons has resulted in soil contamination primarily from organic solvents and high explosives. In addition, tests of weapons components have contaminated some areas with high explosives and heavy metals. The contamination may migrate to subsurface soils and eventually to groundwater. (Groundwater contamination has been detected in the perched aquifer located 50 feet below ground and a few hundred feet above the Ogallala Aquifer, a major source of drinking and irrigation water for the region.)

Environmental restoration activities at Pantex are conducted in compliance with a Resource Conservation and Recovery Act (RCRA) permit issued by the Texas Natural Resources Conservation Commission in April 1991. Because the environmental program has been accelerated, activities began in 1992 and are expected to be completed by fiscal year 2000.

There are 144 on-site solid-waste management units grouped in 15 operable units (OUs). There are also 110 potential release sites identified at the plant. RCRA facility investigations have been completed for all OUs.

Long-Term Implementation
Comprehensive planning for the Pantex Plant has not been initiated under the Life-Cycle Management Order at this time. However, reports are developed for individual planning efforts throughout the plant. The Life-Cycle Management Order is anticipated for plant implementation in fiscal year 1997, and an integrated, comprehensive site planning report will be developed in that time frame.

rounded by agricultural land, but several significant industrial facilities are also located nearby.

Ecological and Cultural Resources.

Most of the ecological and prehistoric cultural resources at Pantex Plant are located in and around the six playas. Ecological buffer zones have been established around the four DOE-owned playas to protect prehistoric archeological sites potentially eligible for placement on the National Register of Historic Places; and to protect water quality, wetlands, floodplains, and the habitats of threatened and endangered species.

Pantex Plant provides habitats for several species protected by the federal and state Endangered Species Act. The nine endangered, threatened, or candidate species known to occur in the vicinity of Pantex Plant are the bald eagle, black tern, ferruginous hawk, loggerhead shrike, white-faced ibis, western burrowing owl, whooping crane, swift fox, and Texas horned lizard.

The Pantex Plant cultural resources relate to three periods of significance (i.e., prehistoric, World War II era, and Cold War era) and are managed through a set of interim management procedures developed in 1994. Pantex Plant has also initiated development of a Programmatic Agreement and Cultural Resource Management Plan to provide for more systematic and comprehensive management of the plant's cultural resources. Although no Native American mortuary remains or funerary artifacts have been found at Pantex Plant, plant staff have held separate meetings with representatives of eight Native American Tribes to identify any Native American concerns or interests.

Cleanup Implications

The assessment activities at 12 of 14 operable units (OUs) have revealed that 97 percent of the waste generated is nonhazardous. In-situ remediation will be the primary technology used to remediate hazardous waste. Consequently, this waste will not require waste management, treatment, or disposal.

Environmental restoration activities are scheduled for completion in fiscal year 2000; however, environmental restoration efforts do not include facilities located in the industrial portions of the plant that are available for reuse. The cost associated with decontaminating and demolishing a facility requires congressional approval for line item projects, an action typically requiring 10 to 12 years from the inception of a project.

Institutional Controls.

Any buildings or property inside the property protection fences and designated as available for reuse would continue under existing restrictive security precautions. Depending on how a building or property inside the property protection fence would be used, any clearances or access would have to coordinated with the security office.

Public Involvement

The Pantex Plant Citizens' Advisory Board has been active since August 1993. Following a fall 1995 meeting, the board ranked future use last among all topics for consideration. As a consequence, a focus group for future use may be formed to recommend future uses for the areas designated as available for reuse. Regulators will be asked to advise the focus group on future land use matters and environmental restoration.

Pinellas Plant

Pinellas County, Florida

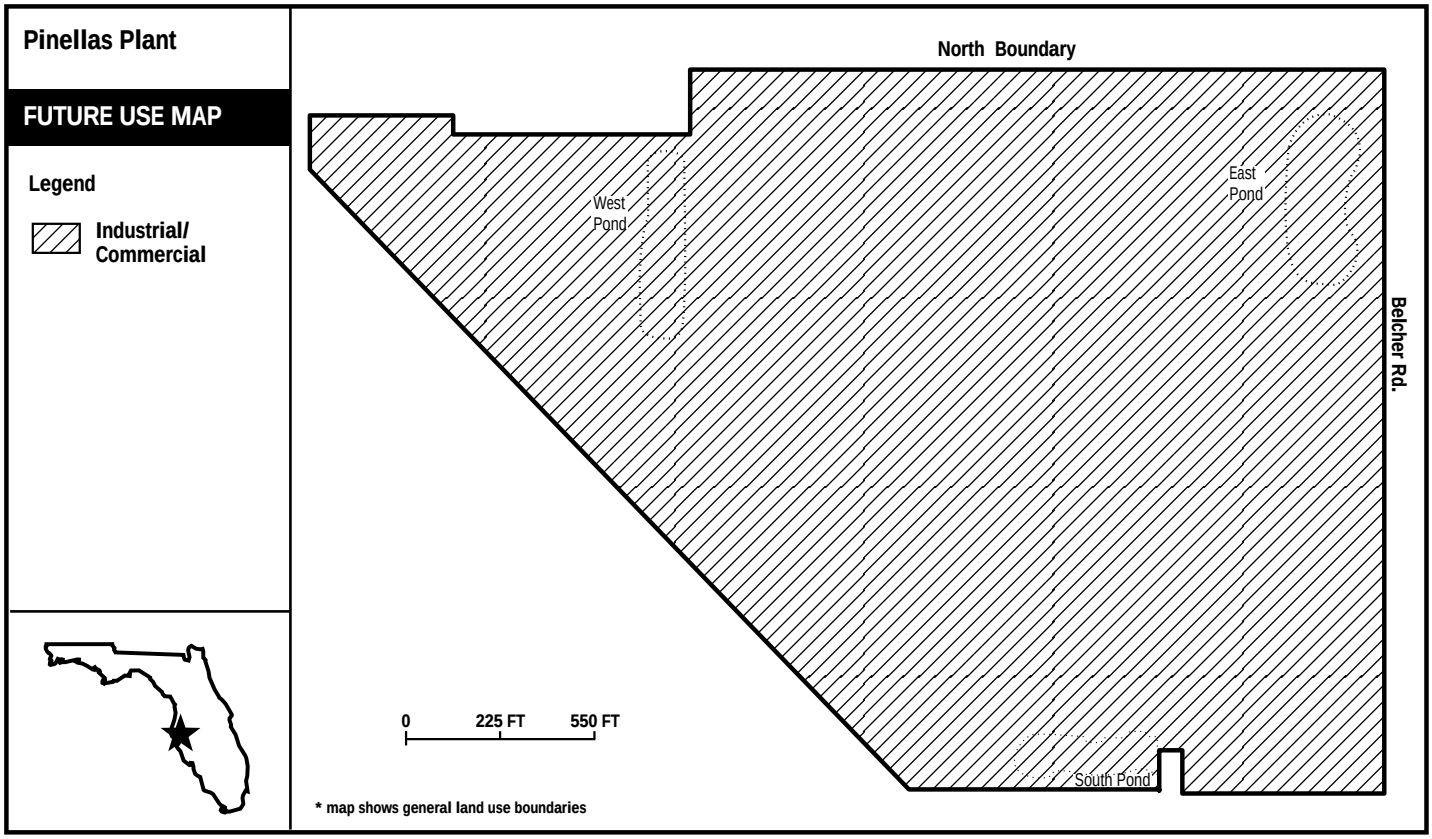

Figure 24. Pinellas Plant – Future Use Map

Pinellas Plant Future Use Facts

The Pinellas Plant Community Reuse Organization, made up of community stakeholders, undertook future use planning for the site. The recommendation for future industrial/commercial use of the Pinellas Plant was agreed upon by both the community reuse organization and the state of Florida.

DOE recently sold the plant to the Pinellas County Industry Council and under a lease agreement, is cleaning up the areas contaminated by prior government activities. Remediation systems will continue to generate waste through the year 2020.

Future Use Recommendations

The community reuse organization, an organization representing local community stakeholders, prepared the Pinellas Plant Future Use Plan. As Figure 24 depicts, the future use recommendations for the Pinellas Plant call for exclusively industrial/commercial uses.

In March 1995, DOE sold the Pinellas Plant to the Pinellas County Industry Council. DOE has leased back a large portion of the plant site to complete cleanup activities. Under the plant sale and purchase contract, DOE agreed to clean up all areas contaminated during past performance of government-funded work to levels consistent with regulations and planned industrial/commercial future uses.

Site Characteristics

The Pinellas Plant occupies a site of approximately 100 acres located six miles north of St. Petersburg in Pinellas County, Florida. Pinellas County is located on a peninsula bordered on the west by the Gulf of Mexico and on the east and south by Tampa Bay. The plant has been part of DOE's nuclear weapons complex since it opened in 1957. The plant's former mission was to fabricate components of products such as neutron generators, lightning arrestor connectors, capacitors, magnetics, and optoelectronic devices.

In September 1994, the plant stopped producing weapons-related components. The current mission is to achieve a safe transition of the facility from defense production and prepare the site for alternative uses as a community resource for economic development.

Cleanup Implications

Although DOE plans to conclude its operations at the Pinellas Plant by the end of fiscal year 1997, environmental restoration for remediation of contaminated groundwater and associated waste management activities will continue for many years. Funding for operation and maintenance and for all documentation of the completion of remedial actions should continue until the estimated completion date of 2020. Environmental restoration actions are not anticipated to adversely affect planned future use of the site.

Remediation decisions are expected to be complete and implementation of all remedial/corrective actions are expected to have begun by the end of fiscal year 1997. However, several remediation systems will continue to be operational and are projected to generate wastes through the year 2020.

Public Involvement

The community reuse organization that prepared the Future Use Plan is a stakeholder-based organization consisting of plant employees, regulators, local residents, environmental organizations, and interested members of the general public. The Tampa Bay Defense Transition Task Force, the Employee Facility Conver-

Contamination Profile

The following sources of contamination require cleanup:

- On- and off-site groundwater contamination from management and disposal of industrial solvents. Contamination is limited to the shallow groundwater aquifer and associated soils. (DOE is accelerating remedial actions, thus mitigating any risks to workers and area residents.)
- Waste management treatment and storage areas subject to closure requirements under the Resource Conservation and Recovery Act regulations and the plant hazardous waste operating permit. (Contamination from hazardous waste management at these locations is minimal because of strict adherence to the regulatory, permit, and site standard operating procedures requirements.)
- Areas within the Pinellas Plant buildings contaminated by defense mission components fabrication. Contamination of buildings may have occurred during production and materials management of radioactive (tritium) and nonradioactive chemicals.

sion Team, and Martin Marietta Specialty Components, Inc., were responsible for completing the Future Use Plan.

Community participation has been facilitated by an active public relations and public affairs program that solicits comments on site reports and holds public meetings to disseminate information. Outreach activities include conducting public meetings, facilitating the various Pinellas Plant Community Reuse Organization activities, and representing Pinellas Plant employees on the community reuse organization's Economic Development Advisory Group.

Regulatory Involvement.

Regulators were actively involved in the community reuse organization. The state of Florida concurs with the proposed industrial future use of the site and supports the Task Force's vision of establishing a commercial manufacturing technology center on the property in the future.

Local Government Involvement.

Local government and economic development councils have been active in the Pinellas transition to commercial/industrial future use. As indicated previously, the Pinellas County Industrial Council now owns plant property.

Portsmouth Gaseous Diffusion Plant

Portsmouth, Ohio

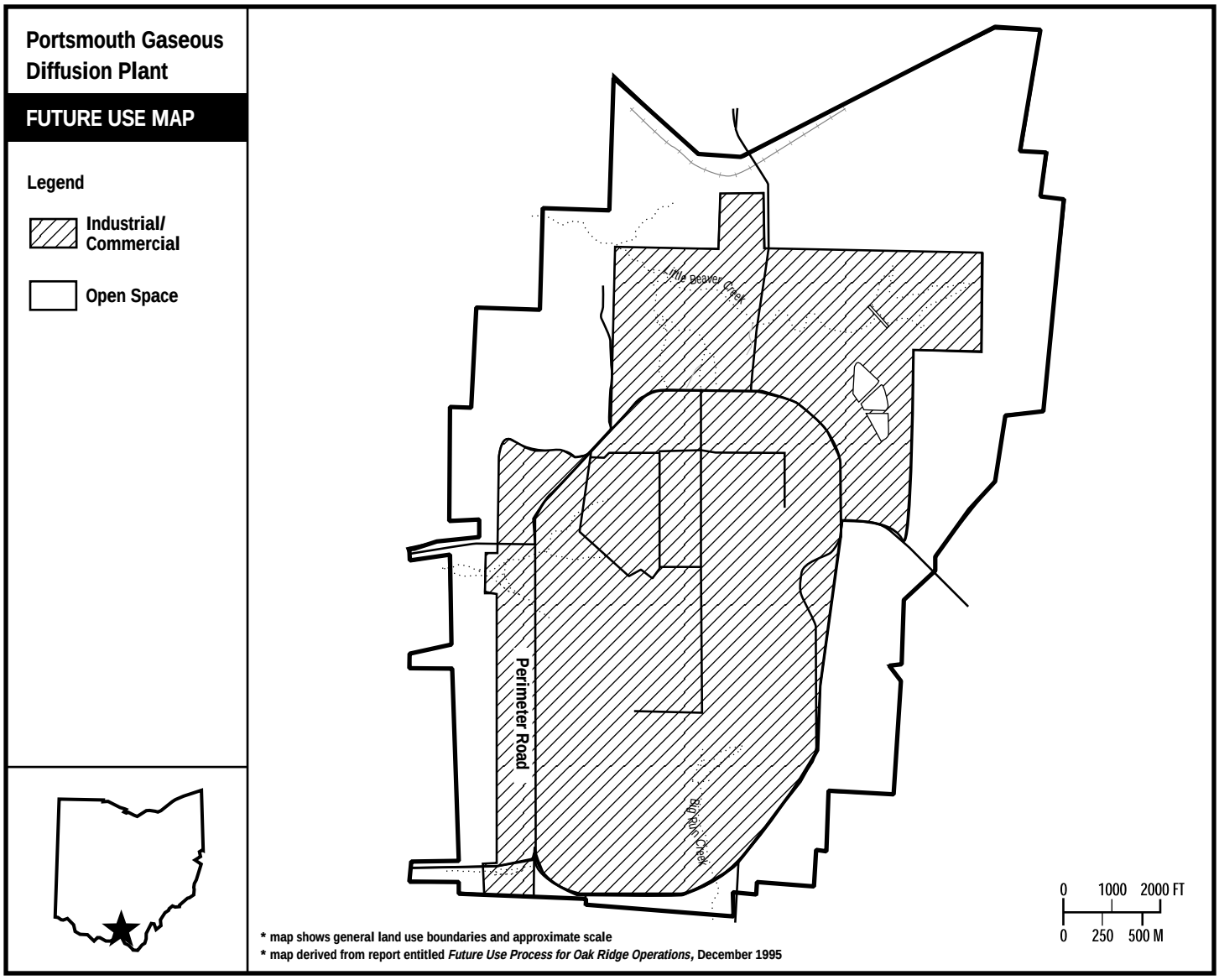

Figure 25. Portsmouth Gaseous Diffusion Plant – Future Use Map

Portsmouth Future Use Facts

The Portsmouth Gaseous Diffusion Plant is currently leased to the United States Enrichment Corporation to provide uranium enrichment services. Therefore, future use planning was conducted on a limited basis by soliciting external stakeholder input and developing a turnover contingency plan. Future use recommendations call for continued industrial use within the perimeter road and a combination of commercial, industrial, and open space uses outside the perimeter.

In addition to DOE's lease agreement with the corporation, other state and federal entities are using excess facilities on-site through leasing arrangements. Other facilities may become available for reuse in the future; a community reuse organization has been organized to pursue reuse and economic development.

Future Use Recommendations

As Figure 25 illustrates, the future use recommendations for the Portsmouth Gaseous Diffusion Plant (PORTS) propose industrial/commercial and open space land uses. Current and near-term land uses at PORTS are dictated by an agreement between the DOE and USEC. The agreement, authorized under the Energy Policy Act of 1992 (Public Law 102-486), enables USEC to lease production facilities at Portsmouth to provide uranium enrichment services. The current lease period is through 1999; however, USEC holds exclusive options to lease facilities and related properties for additional periods. Lease renewal notification must be provided by USEC in 1997.

Because of the existing agreement, the DOE Portsmouth Site Office has conducted only a limited study of future use to date. The primary objective of this limited study was to identify initial future land use recommendations that are reflective of the community's interests. The study indicated that stakeholders prefer that the Portsmouth facility continue to be used for industrial and/or commercial purposes. Specifically, a mixed use scenario with industrial/commercial uses within the perimeter road and commercial and open space use outside the perimeter road was recommended. Residential land use was not suggested by any stakeholder.

DOE will engage in an ongoing dialogue with the community reuse organization and interested stakeholders to update future use options. Through this partnership, DOE will determine appropriate land uses, evaluate alternative missions, and develop cleanup levels that are consistent with projected land uses.

Existing Agreements and Influencing Factors.

The initial future use recommendations were based on certain assumptions regarding the foreseeable future and other influencing factors. One of the primary assumptions was that USEC would continue production of enriched uranium through its lease with DOE and that other current lease agreements with outside agencies would continue. In addition to the agreement with USEC, DOE has also signed agreements to lease portions of the facility to both the Ohio Army National Guard and Defense Logistics Agency.

DOE undertook contingency planning to identify most likely mission alternatives in the event that USEC terminates its lease at the facility. Through this effort DOE has developed the Gaseous Diffusion Plan Turnover Contingency Planning Alternative Missions Plan. All categories of alternative missions identified point to a probable future industrial use scenario (see *Public Involvement* for an expanded discussion of the contingency planning effort).

Contamination is another factor that influences future use at Portsmouth. Based on the complex nature of the wastes present at the site, unrestricted uses, such as residential use, may not be possible or feasible; therefore, institutional controls may be required to restrict certain future uses.

Site Characteristics

PORTS is located in rural Pike County in south-central Ohio. In the four-county region surrounding the installation (including Ross, Jackson, and Scioto counties), about 54 percent of the land is forested and 41 percent is used for agriculture. Only about 1.5 percent of the land is residential, with the remaining 3.5 percent being commercial or industrial.

The Portsmouth facility comprises 3,714 acres. The remainder of the original 4,000 acres was conveyed back to the original owners in 1964 and 1965. A developed 1,200-acre central core area is surrounded by a perimeter road. The majority of the core area is leased by DOE to USEC through 1999; USEC retains the right of renewal or first refusal. The reservation land outside the perimeter road is used for a variety of purposes, including a water treatment plant, lagoons for the process wastewater treatment plant, sanitary and inert landfills, and open and forested buffer areas.

There are 320 facilities at the site. Most major production, maintenance, administrative and technical support, and warehousing facilities are operated and maintained by USEC

Cleanup Implications

There are no anticipated technological problems with attaining cleanup levels for soils. The suspected occurrence of dense non-aqueous phase liquids in one groundwater plume on-site and trichloroethylene and associated chlorinated solvents found in four other groundwater contaminant plumes could prohibit the attainment of regulatory cleanup levels (Safe Drinking Water Act maximum contaminant levels). The inability to attain maximum contaminant levels would likely result in long-term restricted use of groundwater.

under the lease agreement. DOE has a significant presence at the Portsmouth facility in conducting environmental restoration activities and initial decontamination and decommissioning of surplus facilities.

The Ohio Army National Guard occupies building X-751, 40 percent of building X-3346, an outside area south of GCEP process buildings X-3001 and X-3002, and an area south of the XT-801 south office building. The Defense Logistics Area uses a portion of the X-3002 GCEP process building for storage of equipment.

Public Involvement

As part of the limited future use study, DOE conducted informational sessions with both internal and external stakeholders to evaluate potential future uses for the site. Internal stakeholders include DOE and contractor employees involved in various programs at the Portsmouth Gaseous Diffusion Plant. External stakeholders include people who live and work in the surrounding region, those with oversight responsibilities for the plant, local and regional governmental representatives, and other interested individuals.

External Stakeholder Preferred Future Use Options.

On September 7, 1995, DOE held a workshop with the external stakeholder group to discuss future use planning for the Portsmouth site. A total of 38 stakeholders representing labor groups, natural resource organizations, environmental groups, state and federal regulators, community development organizations, elected officials, academia, local media, and the Ohio Governor's Office of Appalachia attended the meeting.

Workshop participants were asked to consider what they perceived to be the primary needs for the southern Ohio region and then list their ideas on how the Portsmouth facility could serve these needs. The consensus of the workshop participants was to continue using the Portsmouth plant for industrial use within the perimeter road and explore mixed uses outside the perimeter area, such as a combination of commercial/industrial and open space uses.

Internal Stakeholder Preferred Future Use Options.

DOE conducted a facilitated workshop in April 1995 to identify the most likely alternative missions for the gaseous diffusion plants at Portsmouth and Paducah should the Department receive notification that USEC intends to terminate its lease at one or both of the plants. The workshop was part of the process to develop the Gaseous Diffusion Plant Turnover Contingency Planning Alternative Missions Plan and resulted in the identification of six categories of likely alternative missions:

- training and education center;
- low-level radioactive material treatment/storage/disposal facility;
- heavy industry complex;
- industrial park;
- resource recovery center; and
- a facility to meet federal needs, including DOE's.

Long-Term Implementation

A community reuse organization (CRO) has been formed at the Portsmouth site as a standing committee of the Ohio Valley Regional Develop-

Contamination Profile

Environmental contamination associated with Portsmouth Gaseous Diffusion Plant is localized around or potentially associated with 82 identified solid waste management units. These units include on-site landfills, surface impoundments, sludge lagoons, aboveground tanks, buried tanks, an incinerator, and various other facilities that acted as release points. Dominant contaminants in both soils and groundwater include heavy metals, chlorinated solvents, petroleum hydrocarbons, radionuclides, and PCBs. The radionuclides are predominantly uranium and technetium. Five groundwater contaminant plumes of chlorinated solvents, primarily trichloroethylene, have been identified and their extent defined in the uppermost unconfined aquifer. The aquifer is considered to contain non-drinkable water.

ment Commission. The CRO's goal is to provide for an orderly transition of DOE's land, equipment, facilities, and personnel to alternative and useful purposes for the well being of the employees and the communities. The CRO works cooperatively with the public and private sectors to develop a comprehensive plan for identifying, negotiating for, and developing available DOE land and facilities, including on-site infrastructure, for economic development alternatives. The CRO intends to initiate a strategic planning process for the communities in the surrounding counties of Jackson, Ross, Pike, and Scioto, and coordinate with DOE's future use studies for the reservation.

The CRO plans to explore the feasibility of establishing three potential uses for the Portsmouth facility:

- a research and/or science park;
- a high tech incubator supporting the creation of new businesses; and
- a training facility to encourage entrepreneurs and small business development.

Rocky Flats Environmental Technology Site

Denver, Colorado

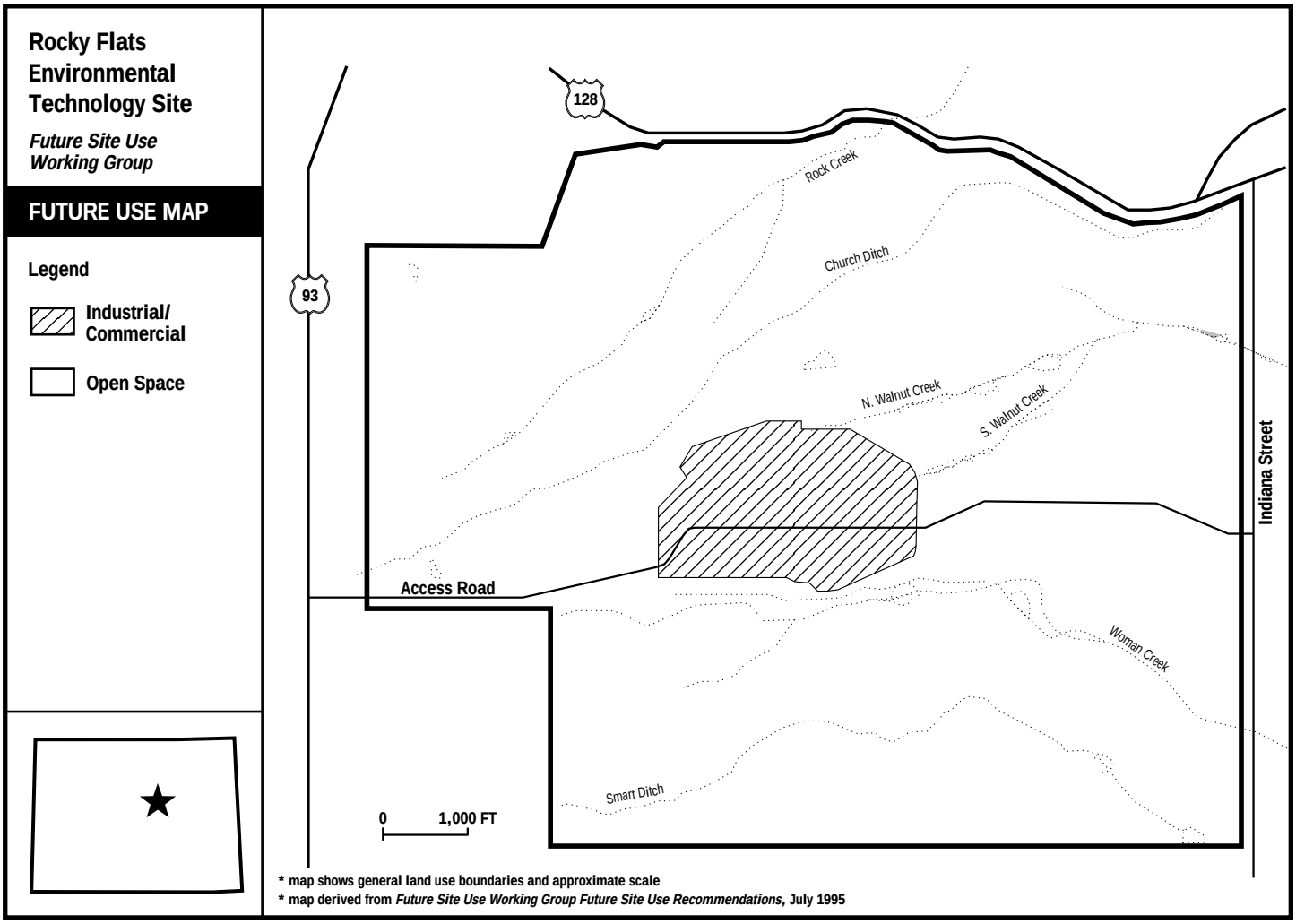

Figure 26. Rocky Flats Environmental Technology Site – Future Use Map

Rocky Flats Future Use Facts

The Future Site Use Working Group, representing a broad spectrum of interests and stakeholders, released its Future Site Use Recommendations report in June 1995 to guide DOE's cleanup efforts and land use planning. These recommendations advocate industrial/commercial land use for the core area and open space for the remainder of the site. Specific uses include industrial and environmental technology in the core industrial area and environmental research in the open space, buffer area.

Relative to site remediation, the Working Group calls for cleanup activities that cause the least damage to the site's natural, ecologically significant areas unless intrusive measures are necessary to mitigate imminent hazards. The Working Group's recommendations played a part in the decision by the Environmental Protection Agency, Region VIII (EPA-Region VIII) and the Colorado Department of Public Health and Environment (CDPHE) to forego consideration of a residential cleanup scenario except for Operable Unit 3.

Future Use Recommendations

Stakeholder future use recommendations for the Rocky Flats Environmental Technology Site have been developed by the Future Site Use Working Group (FSUWG). As Figure 26 depicts, the FSUWG advocated a mix of open space and industrial/commercial uses. FSUWG recommendations included a number of themes and principles representing major agreements of the group. The working group recommended retaining the current buffer area primarily as open space and retaining the core area of the site as an industrial area for cleanup and environmental technology. Overall, the FSUWG recommendations can be reflected by the following future use categories.

- **Industrial/Environmental Technology.** The core industrial area should continue to be used for industrial/commercial purposes, including environmental technology development and demonstration. During remediation of this area, structures and sites unaffected by contamination and cleanup activities may be considered for adjunct environmental technology activities related to DOE's mission. In addition, FSUWG also endorsed continued current wind technology and other renewable energy uses of the site currently being conducted at the National Renewable Energy Laboratory (NREL) wind site located within the site's northwestern boundary.
- **Open Space/Resource Preservation.** The current buffer area is recognized as a significant natural resource and should be preserved as open space for future environmental research and resource management. Natural areas should continue to be managed to minimize disturbance except as needed for cleanup activities.
- **Mining.** FSUWG recognized the privilege extended to owners of mineral rights in the northwest buffer zone for mining and included a mining land use category in their recommendations. However, the group also recommended that the federal government should appropriate any necessary funds for the purchase of these rights to preclude any future mining within the buffer zone. FSUWG recommended that areas currently used for mineral extraction should ultimately revert to open space if possible.

Consensus Issues.

Surrounding communities and counties have generally endorsed FSUWG's recommendations for future use of the Rocky Flats site. Several local governments passed official resolutions on their recommendations for the future use of the Rocky Flats site; these resolutions recommend uses compatible with FSUWG's recommendations. The Jefferson County Commissioners passed a resolution (via the site-wide environmental impact statement) stating:

> "Maintaining, in perpetuity, the undeveloped buffer zone of 'open space' around Rocky Flats is a critically important environmental, safety, and health constraint which must be required as part of any and all alternative actions proposed by the Department of Energy."

In recognition of FSUWG's recommendations, EPA-Region VIII indicated in a letter to RFFO that "…residential use can be considered outside the range of what is reasonable for the future of Rocky Flats," and "DOE may delete this scenario (residential) from the baseline risk assessments for all operable units except Operable Unit 3." In addition, CDPHE has indicated support for several FSUWG recommendations in public meetings and other forums.

Nonconsensus Issues.

FSUWG did not reach consensus on whether to endorse the following future uses for certain parcels within the buffer zone:

- Construction of a regional transportation parkway in the northwest corner of the buffer zone southeast of the NREL site.
- Office/commercial/light industrial uses in the northeast corner of the site at the intersection of Highway 128 and Indiana Street.
- Managed grazing in certain areas of the buffer zone during Phase I if done in a manner that would not negatively impact the natural environment or the health and safety of the workers and grazing stock.

Site Characteristics

The Rocky Flats site is located at an elevation of approximately 6,000 feet on a geological bench called Rocky Flats. This bench flanks the eastern edge of the foothills, slopes down gradually to the east, and overlooks the Denver metropolitan area.

The site comprises approximately 6,500 acres. The primary facilities (approximately 140 structures) are centrally located in the industrial or core area of the site on 384 acres. Approximately 15 percent of the buildings are used, in portion or in whole, for storage of radioactive, hazardous, and mixed wastes. As of December 1995, there were approximately 28,400 cubic meters of waste stored on-site.

Approximately 6,100 acres serve as a buffer zone to the core area and are preserved as open space with few facilities. Active mining for sand and gravel is ongoing in the north and west portions of the buffer zone. DOE owns approximately six percent of the mineral rights on the site with the balance held by private parties. The original northwest corner of the site was transferred to NREL in 1994.

Ecological and Historical Resources.

Recognition of the site's potential as a historically significant educational, interpretive, research, and environmental technology area significantly influences future use recommendations. By restricting public access to the site over the last 40 years, DOE has preserved rare or declining habitats that support declining animal species such as the Baird's sparrow, loggerhead shrike, and the Preble's Meadow jumping mouse — one of the rarest small mammals in North America and currently a candidate for listing as a threatened or endangered species.

The Rock Creek drainage was assessed by the Colorado Natural Heritage Program for its ecological value and found to have rare, valuable, and viable natural resources. This study concluded that the Rock Creek area contains significant features important for protecting Colorado's natural diversity and made specific recommendations for protection, preservation, and management of the area including the following:

- Establish a roundtable, inclusive of outside interests and agencies, for management of site resources;
- Develop a strategy for management of site natural resources; and
- Designate the Rock Creek area as part of the National Environmental Research Park program.

Other environmentally sensitive features of the Rocky Flats site include wetlands, seeps, riparian shrub land, terrestrial study areas, and an island of dry tall grass prairie much like the prairie that once covered thousands of square miles of the plains.

A cultural survey of the industrial area noted the historic importance of several facilities because of their role in the Cold War. Future discussions with the State Historic Preservation Office will define the steps for preserving historically significant site information.

Cleanup Implications

FSUWG recommended that future uses occur in three phases based on cleanup activities and the existence of radioactive and other waste materials still on-site. FSUWG recommended that during Phase 1 a primary emphasis be placed on cleanup in the industrial area and buffer zone. Radioactive and hazardous waste would be inventoried; plutonium would be consolidated and stabilized; production buildings would be deactivated; and initial cleanup of soil and water contamination in the buffer area would commence.

Phase II would focus on continued cleanup and environmental preservation and management. Stored plutonium and backlogged radioactive and hazardous waste would be removed from the site. In addition, decontamination and decommissioning of buildings would begin and cleanup of contamination in the buffer would continue.

It is expected in Phase III, that the entire site would be cleaned up to safe levels. Plutonium will have been completely removed and stored off-site. The site should be managed pri-

marily as a natural and cultural resource preserve for ecological and technological research and for public education and interpretation.

FSUWG emphasized that in all phases of cleanup, contaminant cleanup should not damage the site's natural resources. In fact, environmental management and resource preservation may take priority over cleanup of materials not considered imminently dangerous to human health and safety. The group recognized that it may be necessary to delay final cleanup of certain areas until technology is available to clean up the contamination without significantly affecting the natural environment.

EPA-Region VIII and CDPHE are using FSUWG recommendations as a basis for risk assessment and establishing cleanup goals for Rocky Flats.

Remedial action schedules and milestones have been established by the Interagency Agreement. However, DOE is currently working with the regulators to modify the agreement by developing a site conceptual vision to help guide future cleanup activities. One proposal for implementing the vision is the Accelerated Site Action Plan. The plan is intended to expedite cleanup of contamination and decontamination at an even faster pace than the timing of phases recommended by FSUWG. The plan would seek to safely consolidate radioactive materials and other hazardous wastes by the year 2003 with an interim cleanup plan. In addition, the buffer zone could be released as managed open space with all operable units closed and all buildings torn down unless they are needed for the storage of nuclear wastes or other viable uses.

Public Involvement

The Rocky Flats FSUWG was cosponsored by the Rocky Flats Local Impacts Initiative and the Citizens Advisory Board —the site's community reuse organization and site-specific advisory board, respectively. The group was chartered to make future use recommendations to DOE, CDPHE, and the EPA-Region VIII for use in environmental cleanup decisions. The resulting recommendations could also be used by local governments, economic development agencies, and surrounding landowners in planning and decision-making.

The diverse FSUWG membership included representatives from peace and health interest groups, environmental advocacy organizations, the Rocky Flats workers/steel workers union, the Rocky Flats neighboring homeowners/ homeowners associations, Arvada, Boulder City and County, Broomfield, Jefferson County, Superior, and Westminster as well as major

Contamination Profile

Environmental releases identified at the Rocky Flats Environmental Technology Site include plutonium, americium, uranium, hazardous metals, volatile organic compounds, polycyclic aromatic hydrocarbons, and PCBs. There are 177 contaminated or potentially contaminated individual sites organized in 16 operable units (OUs). Contaminants have been identified in surface and subsurface soils, groundwater and surface water. The most notable problems include:

- The OU 3 off-site plume of plutonium/americium-contaminated surface soils;
- The on-site OU 2 plume of plutonium/americium-contaminated surface soils;
- Groundwater in OUs 2, 5, and 6 that is contaminated with radionuclides and volatile organic compounds;
- Isolated zones of groundwater contaminated with volatile organic compounds and radionuclides in OU 1;
- Soils and groundwater from OU 4 that are contaminated with nitrates, metals, radionuclides, and organic compounds derived from solar evaporation ponds. The sludges from the pond and pondcrete derived from a pond sludge solidification project are a major waste management problem; and
- Radionuclides, metals, and organic compounds at the plant have migrated into surface water and sediments in the two major drainages of the plant site.

There are numerous other contaminated zones associated with the plant facilities as well as incidental isolated zones of surface soil contamination from PCBs and radionuclides (dominantly plutonium and uranium).

adjacent landowners. DOE, CDPHE, and EPA-Region VIII participated as ex-officio members to provide input and respond to the group's recommendations.

All FSUWG meetings were open to the public with time allocated for public input and questions. In addition, a public meeting attended by more than 75 stakeholders was held in the spring of 1995. FSUWG representatives were also responsible for conducting outreach to the coalitions they represented.

Long-Term Implementation

The Rocky Flats Field Office, EPA-Region VIII, and the Colorado Department of Public Health and Environment are currently developing a vision to help guide the future direction of the site. Although DOE is not in complete agreement with the FSUWG report, the group's recommendations will serve as a key factor in formulating the vision.

This vision will focus on all site activities including cleanup, plutonium consolidation, safety, physical plant conversion, and land use. Intended to streamline environmental management projects and ensure compliance with health and safety requirements, the vision will be an integral part of all future agreements and orders and will use reasonably anticipated land and water uses to establish specific cleanup standards for soil, groundwater, surface water, and buildings. The vision will define the intermediate site conditions for Rocky Flats at the completion of all major environmental remediation and decontamination and decommissioning activities and the final site conditions after all stored special nuclear materials and containerized wastes have been removed.

A comprehensive planning process will be conducted as a vehicle for implementing the site vision. FSUWG recommended that DOE develop and implement a Resource Management Plan to ensure restoration, preservation, and maintenance of the natural environment.

Since the Rocky Flats site has traditionally been exempt from local and state planning and zoning actions, the site is depicted as a void on all local planning and/or zoning maps. In an effort to plan for the site in its regional context, Jefferson County, the host county of Rocky Flats, is currently undertaking an integrated comprehensive planning process that includes the site and calls for participation by all the communities within the county as well as representation from Rocky Flats.

Reuse Issues.

Issues surrounding reuse of the site are currently being addressed through the designated community reuse organization — the Rocky Flats Local Impacts Initiative. In particular, the group is working with the site to facilitate transfer and reuse of machinery and equipment for community development purposes.

As cleanup activities are concluded, RFFO will consider the commercialization of facilities and utilities that are out of health and safety protection areas and are no longer needed by RFFO. As one option, the utilities could be privatized with DOE leasing from a private enterprise.

Sandia National Laboratories/Albuquerque

Albuquerque, New Mexico

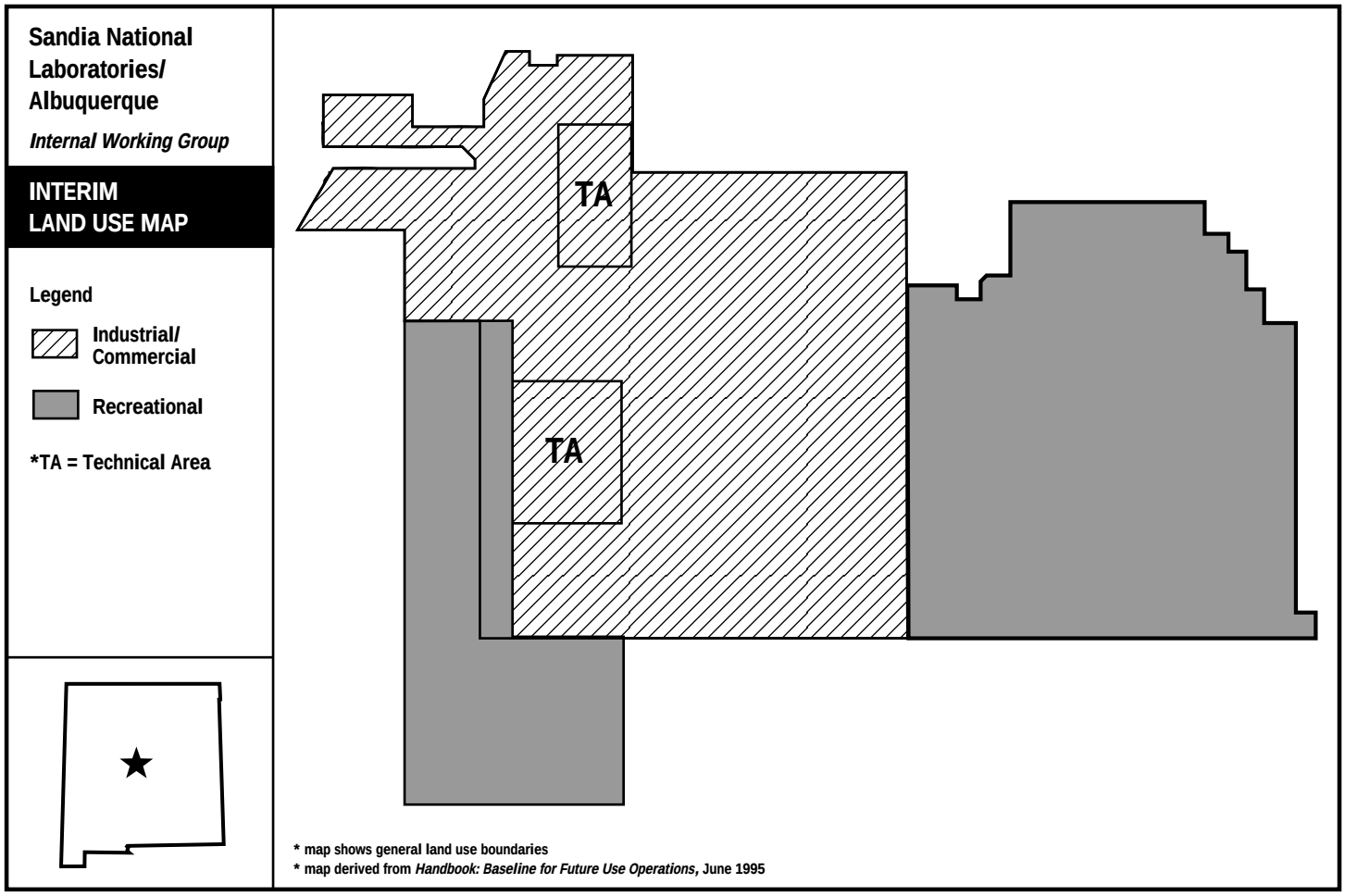

Figure 27. Sandia National Laboratory/Albuquerque – Interim Land Use Map

Sandia National Laboratory/ Albuquerque Future Use Facts

Interim future use recommendations for DOE property at the Kirtland Federal Complex specify industrial/commercial and recreational use scenarios. These recommendations will provide the basis for ongoing environmental restoration projects on the site.

The interim recommendations were developed by the Future Use Logistics and Support Working Group. The process considered the likelihood that federal government missions will continue for the foreseeable future and that institutional controls will remain in place.

DOE expects that the recently formed Sandia National Laboratories Citizens Advisory Board will play a significant role in finalizing the recommendations. Completion of the Future Use Project is scheduled for May 1996.

Future Use Recommendations

The Future Use Logistics and Support Working Group (Working Group), developed preliminary recommendations for the Kirtland Federal Complex with cooperation from EPA and the New Mexico Environment Department (NMED). These interim recommendations recognize the high probability of continued federal use of the complex for the foreseeable future. As illustrated by Figure 27, the Working Group's interim future use recommendations propose industrial/commercial and recreational uses. Under this continued use scenario, the federal government would maintain institutional control of the site and restrict access. However, for environmental remediation purposes, significant portions of the complex would be designated as either industrial or recreational; these land use categories will provide the basis for establishment of risk-based cleanup criteria for DOE environmental restoration sites within the complex.

The current target for completion of the Kirtland Federal Complex DOE-Sandia National Laboratories (SNL) Future Use Project and submittal of final recommendations is May 1996. The SNL Citizens Advisory Board is expected to play a key role in providing public input into final recommendations for future use of DOE land and facilities on the complex.

Site Characteristics

DOE operations in Albuquerque, including SNL, the Inhalation Toxicology Research Institute (ITRI), Allied Signal Federal Manufacturing and Technologies/New Mexico, Ross Aviation Inc., Transportation Safeguards Division, and Safeguards and Securities Training Academy, are situated on the Kirtland Federal Complex within the boundaries of Kirtland Air Force Base. Land parcels within the complex are owned by DOE, the U.S. Air Force, the State of New Mexico, the Pueblo of Isleta, and the U.S. Forest Service. DOE itself owns approximately 2,820 acres. Many DOE facilities operate under a complicated series of land use agreements between the DOE Albuquerque Operations Office, U.S. Air Force, and the U.S. Forest Service. Approximately 14,920 acres used in support of DOE have been acquired through land use permits or leases from Kirtland Air Force Base, the State of New Mexico, the Pueblo of Isleta, and through land withdrawn from the Cibola National Forest.

The Office of Defense Programs is the landlord for DOE laboratory operations and is expected to continue the use of the property in support of its missions. SNL's primary responsibility is national security programs in defense and energy with emphasis on nuclear weapons research and development. The laboratories also conduct work for the Department of Defense and other federal agencies on a noninterference basis.

The DOE facilities and environmental restoration sites within the boundaries of the Kirtland Federal Complex are distributed over a large area and have originated from various projects and missions.

Public Involvement

DOE's Future Use Project at the Albuquerque site has been active since June 1994. The Working Group, composed of representatives from DOE, EPA, NMED, SNL, ITRI, Allied Signal Federal Manufacturing and Technologies/New Mexico, Ross Aviation Inc., Transportation Safeguards Division, Safeguards and Securities Training Academy, the U.S. Air Force, and the U.S. Forest Service, has been instrumental in developing recommendations. The group was formed early on in the process to identify stakeholders and provide them with information.

The DOE-SNL Citizens Advisory Board (CAB) was identified as the most appropriate vehicle for stakeholder participation. The Working Group has tried to facilitate CAB involvement by ensuring the availability of adequate information relevant to future use issues. The CAB held its first meeting in June 1995 and is currently in the process of reviewing site baseline information and preliminary future use information.

Because land use on the Kirtland Federal Complex is influenced by a variety of land owners, lease agreements, and withdrawal sta-

Reuse Issues

Community economic development organizations have not been involved in future use planning because the Kirtland Federal Complex is an active site and is not in the process of closure. Reuse agreements exist in the form of land use permits granted to DOE by the U.S. Air Force. Permit agreements stipulate the condition of lands to be returned to the U.S. Air Force.

tus, future land use is a very complex issue. The Working Group has compiled the *Handbook: Baseline for Future Use Options* to explain the history of the complex and establish a baseline of information relevant to the environmental restoration process and future use. The Working Group has divided the complex into seven geographic management areas based on current land use and ownership. A series of workbooks is being developed for each management area that describes operational history, including past and current missions and land ownership. The workbooks also provide physical descriptions of environmental restoration sites and their current status in terms of characterization and the regulatory process. Finally, the workbooks will include the proposed future use recommendations of the Working Group based on current use and expected future conditions. The recommendations are not considered to be final since they have not gone through the public participation process.

Workbooks for all seven management areas will be completed in early 1996. It is intended that members of the CAB and other interested stakeholders will use the workbooks to make informed decisions regarding future use.

The activities of the Working Group have been summarized at the SNL environmental restoration quarterly meetings. The baseline handbook, workbooks, and other related material are also available through DOE reading rooms.

EPA and NMED have been involved in the Working Group through participating in meetings, developing biweekly meeting minutes and agendas, and reviewing all draft documents for the workbooks and the handbook. Representatives of EPA and NMED have participated as ex-officio members of the group, have offered input to the recommendations, and have reviewed the recommendations of the Working Group through the workbooks. While they have not formally concurred, the agencies commented on the future use documents.

The Pueblo of Isleta and the Bernalillo County Commission have been kept apprised of the future use planning activities at SNL and have been sent copies of all related communications and publications. To date, there has not been strong, ongoing involvement in the planning process by either entity. There appears to be no disagreement between the future use process and local land use plans.

While no formal connection exists between the U.S. Air Force and DOE environmental restoration activities, the U.S. Air Force has worked cooperatively with the Future Use Logistics and Support Working Group throughout the process.

Cleanup Implications

According to site analyses, the future use recommendations are technologically, environmentally, and economically feasible. The majority of remedial action sites are relatively small and are amenable to selective or full excavation, hand pick-up, or capping in place with monitoring, if needed. Waste will be stored and treated as appropriate in a permitted temporary unit or corrective action management unit; any waste concentrates will be disposed in commercial facilities off-site in accordance with waste acceptance criteria requirements.

The current baseline estimate is to complete the Environmental Restoration Project in fiscal year 2000. However, it is assumed that access to the Kirtland Federal Complex lands will continue to be restricted as long as DOE or the U.S. Air Force operations continue.

Long-Term Implementation

SNL is currently working on zoning and master plans that will be integrated into a new comprehensive plan. The comprehensive plan is intended to provide a planning model for future facilities, infrastructure, and traffic/pedestrian movement associated with the laboratory. It will consider the needs and objectives of the planning analysis, including management goals, opportunities and constraints, environmental factors, visual objectives, security, circulation, and existing facilities. A study of the desired physical relationships between functional organizations and facilities will be included.

Sandia National Laboratories/California

Livermore, California

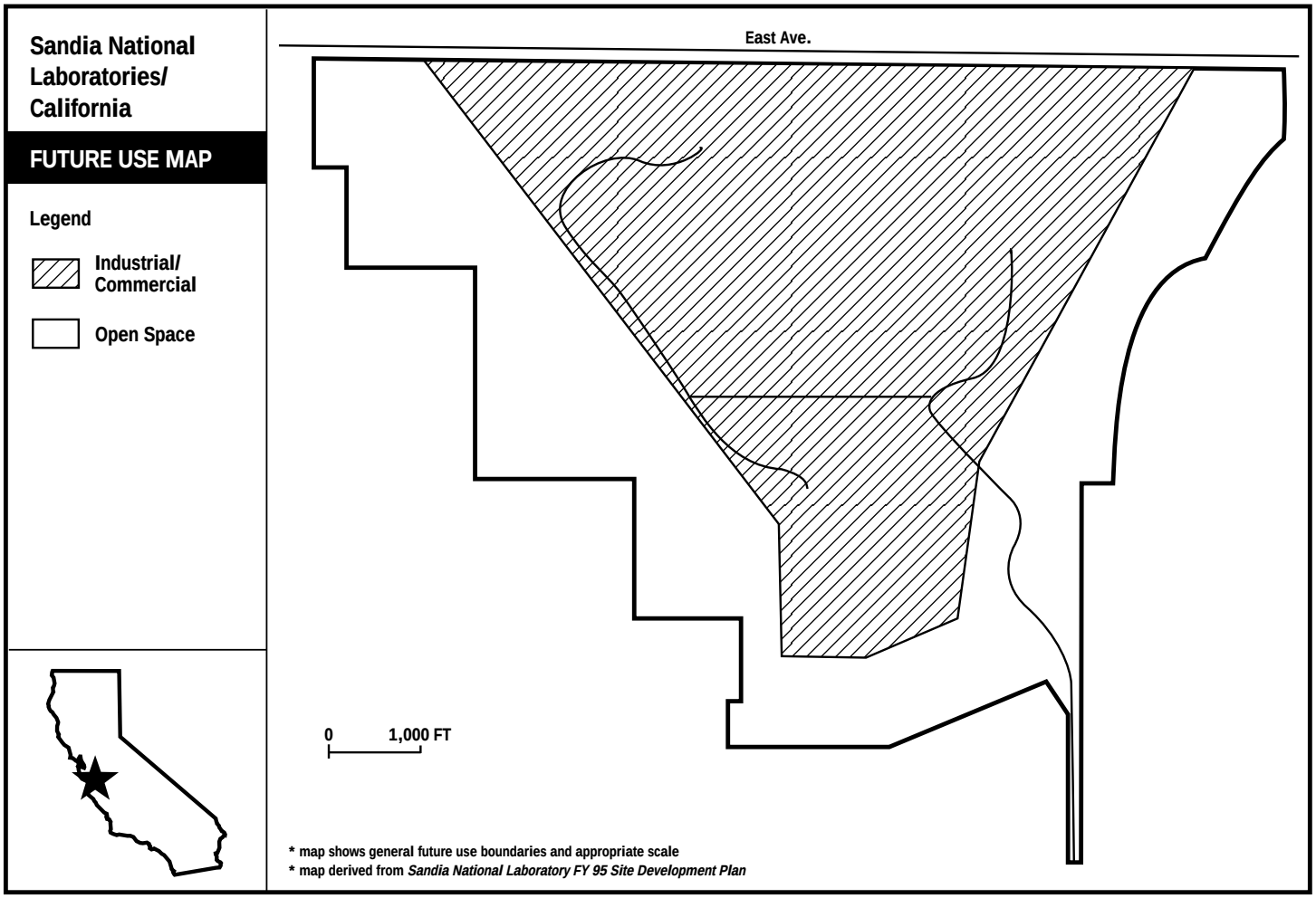

Figure 28. Sandia National Laboratory/California – Future Use Map

Sandia National Laboratories/ California Future Use Facts

Future use projections for the Sandia National Laboratories/California site are determined through the site development planning process. The site is projected to continue ongoing missions for the foreseeable future. Future use is classified primarily as industrial; the current buffer zone will be maintained as open space.

Future Use Recommendations

As Figure 28 illustrates, the future use recommendations for Sandia National Laboratories/California call for open space and industrial/commercial uses. Future use projections for the Sandia National Laboratories/California site are determined through the site development planning process. The site is projected to continue ongoing missions for the foreseeable future. Future use is classified primarily as industrial; the current buffer zone will be maintained as open space.

The size of the site will remain at its current 413 acres. New facilities will be required in the future to meet programmatic needs resulting from new and ongoing missions. However, no development will occur in the buffer zone or areas with major constraints to development.

Site Characteristics

Sandia National Laboratories/California is located 40 miles southeast of San Francisco and three miles east of downtown Livermore. The 413-acre site lies in the Livermore-Amador Valley and is surrounded by hills ranging in elevation from 1,000 to 2,000 feet. Land use surrounding the site was once primarily agricultural, but now includes residential areas to the west and industrial parks to the north.

Savannah River Site

Aiken, South Carolina

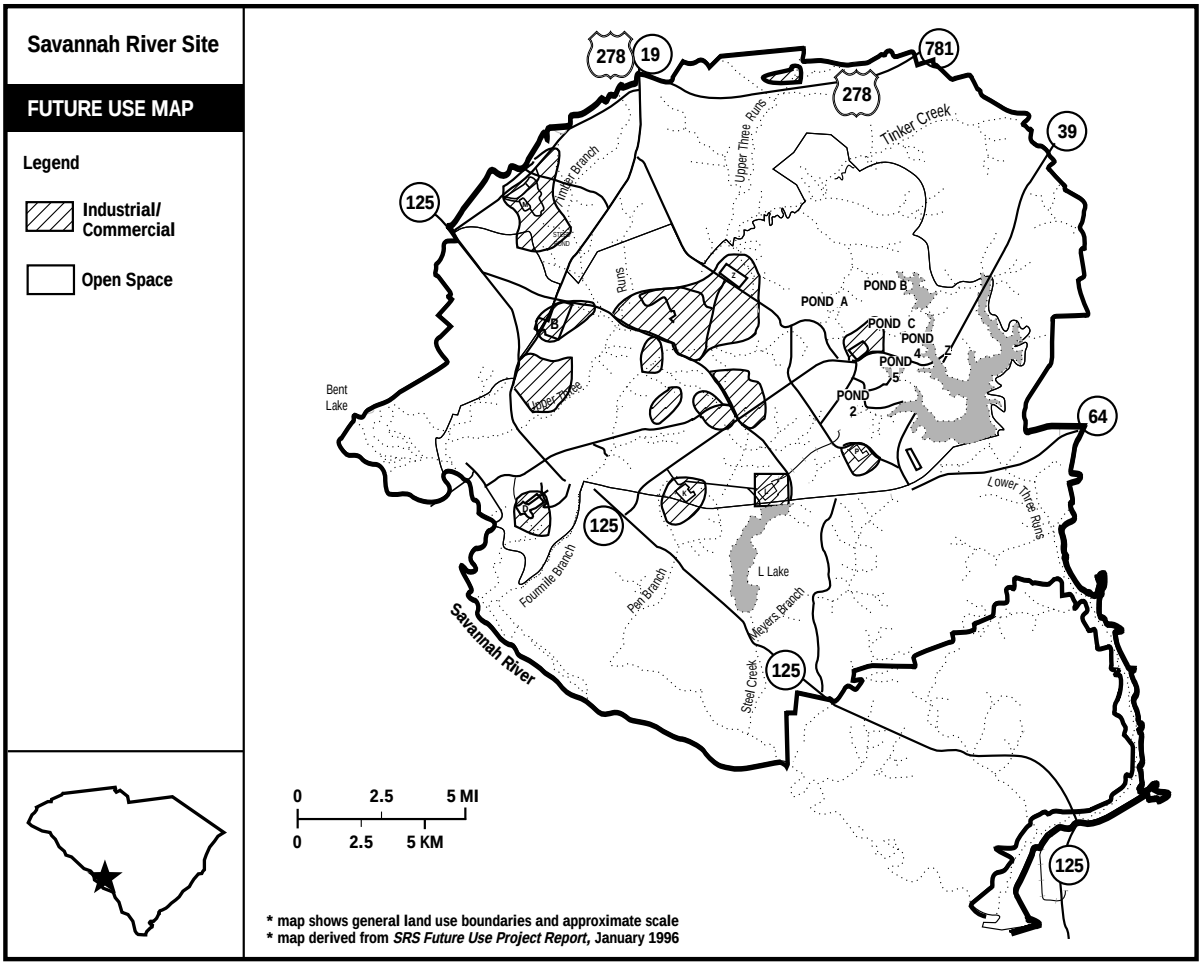

Figure 29. Savannah River Site – Future Use Map

Savannah River Site Future Use Facts

Stakeholders and the Savannah River Operations Office (DOE-SR) generally agree that the Savannah River Site (SRS) should continue to be owned by the federal government for the foreseeable future and that the site should be used for DOE's activities; under this scenario, existing site boundaries would be maintained. DOE-SR's future use recommendations call for continued industrial/commercial use of the currently developed areas of the site with all other areas reserved for open space purposes, including ecological research, conservation, specific types of recreation, public education, forest management, and cultural and archeological programs. Residential use will be prohibited.

Some stakeholders, including the SRS Citizen Advisory Board, advocate potential development of a larger portion of the site to serve economic development interests. The SRS Citizens Advisory Board recommended that approximately one-third of the site be used for nuclear and non-nuclear activities; however, the DOE-SR recommendation suggests that only about ten percent of the site be used for industrial activities and that the existing industrial areas be used for additional industrial development. DOE-SR and many interested stakeholders emphasize the need to preserve the ecological diversity of the site's environment.

The DOE-SR is supporting congressional legislation to formally designate this site as a National Environmental Research Park (NERP). The NERP status allows multiple uses, including DOE activities, commercial ventures, conservation, environmental activities, and recreation.

Future Use Recommendations

The future use vision for the Savannah River Site (SRS) was determined through a broad outreach effort that sought stakeholder input from the general public, SRS Citizens Advisory Board, SRS Land Use Technical Committee, and other groups. The Future Use Project has culminated in the development of the draft *Savannah River Site Future Use Project Report, Stakeholder Recommendations for SRS Land and Facilities*, a document describing the process used to obtain stakeholder preferences and recommendations. At the public's requests, individual and group recommendations all influenced the final recommendations. The recommendations reflect the majority of the public's comments and concerns and are based on the SRS Citizens Advisory Board recommendation on future use.

Using the majority of recommendations and themes that emerged from the Future Use Project, DOE and stakeholders propose that SRS continue to be owned by the federal government for the foreseeable future, maintain existing boundaries, and be used for continuing defense activities. As Figure 29 illustrates, future use recommendations for SRS call for a mix of open space and industrial/commercial uses. The current industrial areas will continue to be used for the conduct of defense and environmental management activities, such as the treatment and storage of waste, as well as disposal and monitoring of waste materials that remain onsite. Using the multiple use planning concept, other areas of the site will be used to support ecological research, forest management, and historical and archeological programs with limited recreational use.

The recommendations described below are taken from the SRS Future Use Project Report and are based on many diverse comments received by DOE from the general public. The recommendations in the report were based on the SRS Citizens Advisory Board future use recommendation to DOE, the Environmental Protection Agency, and the South Carolina Department of Health and Environmental Control.

- SRS boundaries should remain unchanged, and the land should remain under the ownership of the federal government, consistent with the site's designation as the first National Environmental Research Park.
- Residential uses of SRS land should be prohibited.
- Should DOE or the federal government ever decide to sell any of the SRS land, then DOE shall seek legislation to give former landowners (as of 1950-52) and/or their descendants the first option to buy back the land they once owned.
- All SRS land should be available for multiple use, except for residential use (e.g., industry, ecological research, natural resource management, research and technology demonstration, recreation, and public education), wherever appropriate and nonconflicting.
- Some of the land should continue to be available for nuclear and non-nuclear industrial uses; commercial industrialization should be pursued.
- Industrial and environmental research and technology development and transfer should be expanded.
- Natural resource management should be pursued wherever possible, with biodiversity as the primary goal.
- Recreation opportunities should be increased as appropriate.
- Future use planning should consider the full range of worker, public, and environmental risks, benefits, and costs associated with remediation.

Influencing Factors.

A primary consideration in developing future use recommendations was recognition of SRS's status as a unique resource that provides multiple use opportunities, including ecological research, natural resource management, research and technology demonstration, and recreation. SRS's status as a NERP and proposed legislation to formally declare the site a NERP are major factors in future use planning. Most stakeholders recognized the importance of designating SRS as a NERP. While maintaining site borders and appropriate institutional controls, researchers can store their equipment without fear of interference from the general

public. The status encourages research on human's effect on the environment as well as demonstrations of environmental remediation techniques, natural resource management, and ecology. Even industrial areas can be valuable for research.

Consensus/Nonconsensus Recommendations.

While DOE-SR did not attempt a consensus process, the recommendations reflect the majority of input from internal and external stakeholders. The site's recommendations closely reflect CAB's recommendations, although the site manager included three minor exceptions. First, while CAB's recommended future use map (see Figure 30 on page 109) reserved one-third of the site for nuclear and non-nuclear industrialization, DOE-SR's intent is to limit industrial development to those areas currently being used for industrial purposes—roughly 10 percent of the site (see Figure 29 on page 105). Secondly, DOE-SR will continue to review recreational proposals on a case-by-case basis. The site manager advocates taking a conservative approach for the foreseeable future, rather than actively promoting increased recreational activities. And lastly, current laws and regulations do not permit giving former landowners first refusal of excess SRS land. However, the recommendation from the SRS report reflects the same sentiment in that it states,

> "If DOE or the federal government should ever decide to sell any of the SRS land, then DOE shall seek legislation to permit former landowners (as of 1950-52) and/or their descendants to have the first option to buy back the land they once owned."

The SRS Land Use Technical Committee formulated similar recommendations. The Land Use Technical Committee is comprised of 23 site senior technical experts from all major site organizations who supply in depth technical land use analysis to site management regarding project siting, land use conflict resolution and planning, and environmental compliance. The recommendations from the Citizens for Environmental Justice were a synthesis of all the comments they received and do not reflect any order of priority. The recommendations from DOE-SR follow the 1995 Savannah River Operations Office Strategic Plan.

Site Characteristics

SRS is located in south central South Carolina and occupies an area of approximately 310 square miles. The Savannah River forms the site's southwestern boundary for 27 miles along the South Carolina-Georgia border; the center of SRS is approximately 22.5 miles southeast of Augusta and 19.5 miles south of Aiken, the nearest major population centers. The site includes portions of Aiken, Allendale, and Barnwell counties. Except for site facilities, land cover comprises a wide variety of natural vegetation types with more than 90 percent of the area in forested land.

SRS contains approximately 2,862 buildings, 234 of which are considered surplus. Twenty major industrial areas have been in use at SRS for 40 years. An additional 20 potential industrial sites have been identified and given preliminary evaluations.

Open fields and pine and hardwood forests cover 73 percent of the site; approximately 22 percent is wetlands, streams, and two lakes; production and support areas, roads, and utility corridors account for five percent of the total land area. In addition, the site's NERP designation enables various researchers to continue using the site to study the impacts of human activities on the environment. If the site is declared a NERP by congressional legislation, this research will continue indefinitely.

The United States Forest Service has also conducted a program of natural resource management at SRS since 1952 through an interagency agreement. Natural resource management enhances environmental diversity, protects threatened and endangered species and their habitats, conserves other species, provides quality habitats for native wildlife, protects soil and watershed values, and provides a healthy forest for environmental research.

Adjacent sites are used mainly for forest, agricultural, and industrial purposes; industrial uses include a commercial two-unit nuclear reactor power plant, a regional low-level waste repository, and a wide variety of traditional industries.

Historical and Ecological Resources.

Surveys conducted since 1974 by a consortium of interested parties identified 1,000 archaeological sites to-date. A zone categorization system was developed in 1989 to assist land use planners. Sensitive areas are divided into zones to help protect known archaeological sites, ecologically sensitive areas, and remnant cemeteries located on SRS. The site use permitting process ensures consideration of cultural resources in all land use planning.

In terms of ecological resources, the SRS site contains tremendous environmental assets, including Carolina bays and an enormous variety of rare fauna and flora. Recognition of this rich environment played a significant role in developing recommendations that maintain the site as a NERP and preserve the majority of the site for conservation.

Public Involvement

DOE-SR initiated the SRS Future Use Project in the spring of 1994 through the establishment of the Future Use Project Team. The team sought broad-based stakeholder input through a variety of public participation activities designed to share information and develop stakeholder future use preferences. These activities included holding public meetings, making presentations to civic and community organizations, briefing elected officials, and working with interested citizens groups. The stakeholders involved in this process included interested citizens, former landowners, hunters, employees, civic organizations, local government officials, representatives from minority and disadvantaged communities such as Citizens for Environmental Justice, SRS Citizens Advisory Board, Citizens for Nuclear Technology Awareness, and the Savannah River Regional Diversification Initiative. A database of more than 300 stakeholders was developed to enable DOE to keep interested parties informed about future use issues.

At the first public meeting held by DOE-SR on the SRS Future Use Project, citizens were asked how they wanted to participate in the process. Some proposed using the SRS Citizens Advisory Board to gauge public preferences; others said they would prefer to provide input directly to DOE-SR. To satisfy both groups, a dual approach to public participation was used. DOE-SR held six public meetings to solicit ideas and suggestions from interested citizens in various locations surrounding the site. These meetings were co-sponsored by the Risk Management and Future Use Subcommittee of the SRS Citizens Advisory Board. One meeting was also co-sponsored by the Savannah River Regional Diversification Initiative, the community reuse organization. Several other organizations and the regulators were also invited to co-sponsor the meetings. During the same period, CAB's Risk Management and Future Use Subcommittee worked with the public to develop their recommendations. In addition, the Citizens for Environmental Justice held a one-day workshop on future use at the Savannah River Site where they developed their land use recommendation.

Two internal stakeholder groups provided recommendations. The SRS Land Use Technical Committee is comprised of 23 senior technical

Cleanup Implications

Remediation goals have been established to enable restoration of all soil and groundwater near the site perimeter to permit unrestricted use. In some cases, technology may not yet be available to attain that goal for groundwater or surface water with contaminated sediments. In those special cases, hydraulic controls will be used to prevent the spread of contaminants until effective remediation technology is developed. Furthermore, remediation of some of the industrial areas (e.g., canyons and burial grounds) is infeasible; these areas will likely be entombed or used as waste management areas.

Contamination Profile

More than 1,000 facilities at SRS have been potentially contaminated with hazardous and radioactive materials. More than 90 areas of concern are currently being analyzed or remediated, while approximately 400 potential release sites are undergoing preliminary evaluation. About 100 of these areas are expected to require further investigation and remedial action. The waste sites that have already been cleaned will require long-term monitoring.

The migration of hazardous and radioactive contaminants through the soil has resulted in groundwater contamination which may have reached offsite areas. Groundwater beneath an estimated five to 10 percent of SRS has been contaminated by industrial solvents, tritium, metals, and other constituents used or generated by production operations.

representatives from major site organizations representing major program areas (Savannah River Ecology Laboratory, Savannah River Forest Service, Westinghouse Savannah River Company, Wackenhut Services, Inc., University of South Carolina Institute of Archaeology and Anthropology, etc.). The second group, consisting of DOE-SR employees, provided input through the strategic planning process and also provided comments on the initial draft of the SRS Future Use Project Report.

Long-Term Implementation

Westinghouse Savannah River Company appointed a land use coordinator to develop and implement a comprehensive land use planning program. Many stakeholders, both internal and external, agree that the site should institute a comprehensive planning process with public involvement to ensure appropriate implementation of the future use recommendations and wise management of the site as a NERP. DOE recognizes that the future use planning process is only the first step in working through ongoing land use decisions at the site.

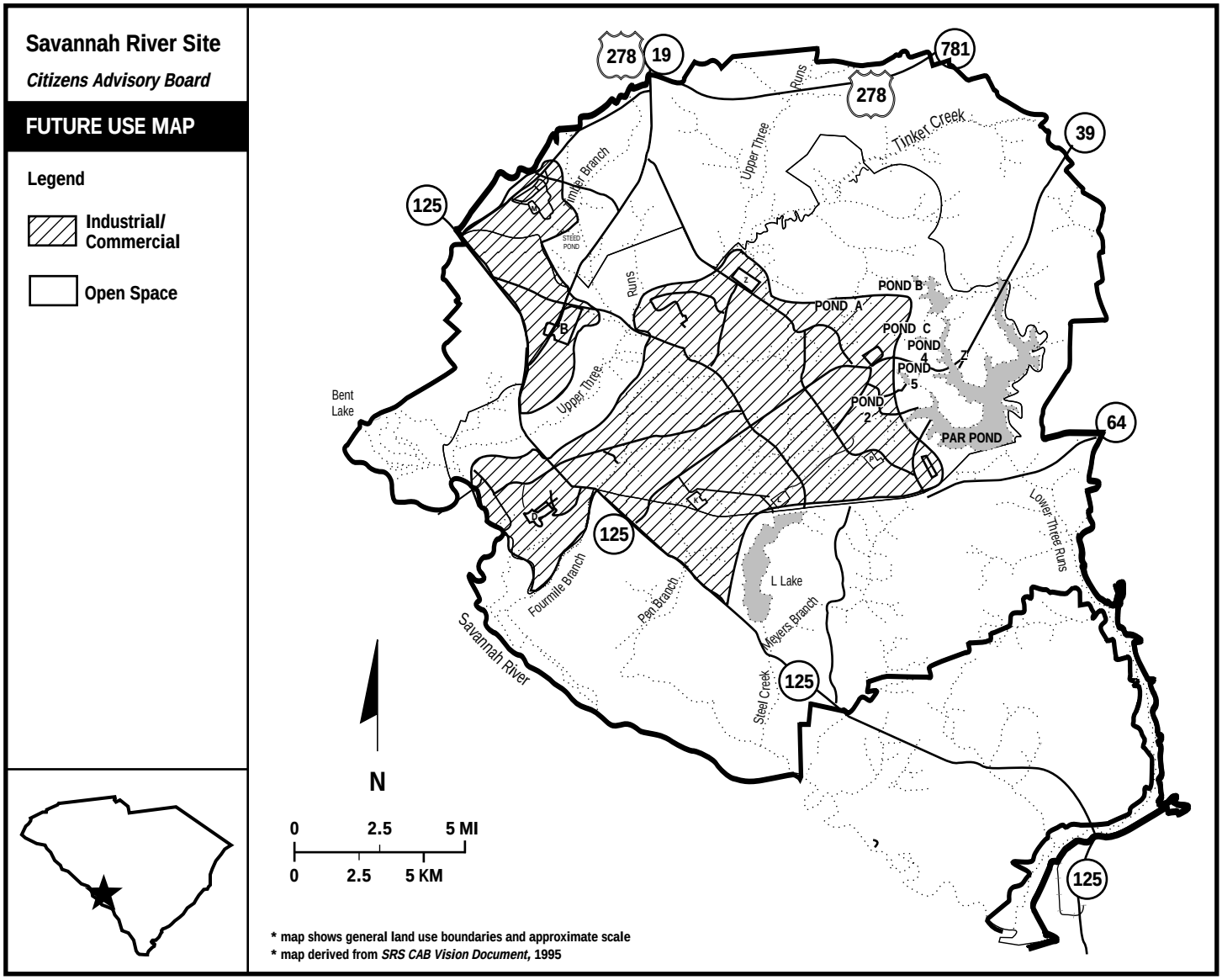

Figure 30. Savannah River Site – Citizens Advisory Board Future Use Recommendations

Institutional Controls.

DOE will continue to control access to the site for security and safety reasons. Current controls, as well as additional controls if necessary, will be maintained. In accordance with the site's NERP designation, the site will continue under federal control.

Reuse Issues.

The Savannah River Regional Diversification Initiative (SRRDI), the site's community reuse organization, works to ensure economic diversification in the two-state region and supports an expanded mission for the Savannah River Site. The organization is focusing its efforts on the Central Savannah River Area to offset the adverse economic impact caused by downsizing of defense facilities, including SRS. Using DOE funds, SRRDI is overseeing development of a comprehensive regional economic development plan that will guide future technology-related diversification efforts. The members are interested in the Future Use Project from an economic perspective. This group holds monthly public meetings.

Appendix A: Resource Guide and Points of Contact

Argonne National Laboratory - East

Tim Crawford (708) 252-2436

Argonne National Laboratory - East, Laboratory Integrated Facilities Plan, FY94. Document No. JOSTD-106-G-T006.

FY1993 - Site Development Plan.

Brookhaven National Laboratory

Joseph Eng (516) 344-7982

Brookhaven National Laboratory, Future Land Use Plan. August 31, 1995.

The Impact of Brookhaven National Laboratory on the Long Island Economy. June 1995.

1992 Site Development Plan, Brookhaven National Laboratory.

Fermi National Accelerator Laboratory

John Kasprowicz (708) 252-2691

FY1993 Site Development Plan, Fermi National Accelerator Laboratory.

Fernald Environmental Management Project

Sue Peterman (513) 648-3179

Gary Stegner (513) 648-3153

Fernald Citizens Task Force, Recommendations on Remediation Levels, Waste Disposition, Priorities and Future Use. July 1995.

Fernald Citizens Task Force Tool Box. October 1994.

Hanford Site

Paul Krupin (509) 372-1112

The Future for Hanford: Uses and Cleanup, the Final Report of the Hanford Future Site Uses Working Group. December 1992.

Comprehensive Land Use Plan For the Hanford Site, DRAFT. (to be released June 1996.)

Hanford Remedial Action Environmental Impact Statement, DRAFT. (to be released June 1996.)

Hanford Site Development Plan. May 1993. DOE/RL-93-19.

The Hanford Strategic Plan, DRAFT, 1996.

Idaho National Engineering Laboratory

Dan Shirley (208) 526-9905

Long-Term Land Use Future Scenarios for the Idaho National Engineering Laboratory. August 1995.

Idaho National Engineering Laboratory, Site Development Plan, 1994. DOE/ID-10390.

DRAFT, 1995, Idaho National Engineering Laboratory Comprehensive Facility and Land Use Plan.

Kansas City Plant

Phil Keary (816) 997-7288

FY1994, Kansas City Plant, Site Development Plan.

Kansas City Area Operations Plan. January 1996.

Lawrence Livermore National Laboratory

Rick D'Arienzo (510) 422-9247

Shaun Kesterson (510) 637-1702

FY95 Site Development Plan. UCRL-LR-110253-95.

FY95 Technical Site Information. AR-118365-94.

Los Alamos National Laboratory

Pete Crowley (505) 665-8764
Juan Griego (505) 665-6439
Bill Pelzer (505) 667-7756

Site Development Plan, Annual Update 1993, Los Alamos National Laboratory. LALP-93-27.

Mound Plant

Tim Sullivan (513) 865-3220

Mound Plant, Site Development Plan, FY1996.

Nevada Test Site

Tim Killen (702) 295-1288

Nevada Site Development Plan. September 21, 1994.

Nevada Test Site, DRAFT, Environmental Impact Statement. January 1996.

Oak Ridge Reservation

Gary Bodenstein (423) 576-9429
Dave Kendall (423) 576-9359

Future Land Use Process for Oak Ridge Operations, A Report to the U.S. Department of Energy on the Recommended Future Uses of the Oak Ridge Reservation, Paducah Gaseous Diffusion Plan, and the Portsmouth Gaseous Diffusion Plant. December 1995.

Oak Ridge Reservation, Site Development Plan. June 1994. ES/EN/SFP-22.

Paducah Gaseous Diffusion Plant

Carlos Alvarado (502) 441-6804
John Morgan (502) 441-5069

Future Land Use Process for Oak Ridge Operations, A Report to the U.S. Department of Energy on the Recommended Future Uses of the Oak Ridge Reservation, Paducah Gaseous Diffusion Plant, and the Portsmouth Gaseous Diffusion Plant. December 1995.

DRAFT, Site Management Plan (to be released mid-1996).

Pantex Plant

Gordon Gabert (806) 477-3163
Sharon Buell (806) 477-4041

Pantex Plant, FY 1994, Site Development Plan. PLN14.

Pantex Plant Future Use Recommendations. December 1995.

FY 1997 Pantex Plant Capital Asset Management Process (CAMP) Report.

Pinellas Plant

David Ingle (813) 541-8943

FY1996 Community Transition Plan, Pinellas Plant Community Reuse Organization. October 1995.

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Portsmouth Gaseous Diffusion Plant

Bob Barnett (616) 897-2700
Sandy Childers (614) 897-2336
John Sheppard (614) 897-5510

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Rocky Flats Plant

Laura Johnston (303) 966-4755
Frazer Lockhart (303) 966-7846

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Sandia National Laboratories/ Albuquerque

Deborah Garcia (505) 845-5460
Karen Talbot-Rohde (505) 881-7180

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Sandia National Laboratories/ California

Deborah Garcia (505) 845-5460

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Savannah River Site

Virginia Gardner (803) 725-5752
Gail Jernigan (803) 725-4535
Cris Van Horn (803) 725-5313

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Appendix B: Submissions Memorandum

United States Government **Department of Energy**

memorandum

DATE: May 1995

REPLY TO ATTN OF: Joan Glickman (EM-5)

SUBJECT: Submitting Future Use Recommendations/ Next Steps for the Future Use Project

TO: Distribution

In January 1994, the Associate Deputy Secretary for Field Management (FM), Donald W. Pearman, and I directed site managers to collaborate with stakeholders in identifying future use options for Department installations by December 1995 (see Appendix C on page 117). In order to assist the sites in fulfilling this requirement, the Future Use Project Office was established within the Office of Public Accountability (EM-5).

During the next few months, the Future Use Project Office will work with appropriate site staff to develop summary information on each site's efforts to identify future use options. These site summaries will provide background information for the submittal of site recommendations in December 1995. While the sites will write and submit their recommendations for the December Report, the Future Use Project Office will draft cross-cutting sections of the Report concerning issues such as how recommendations will be used, what types of further analysis will be needed, and how future use planning might evolve. The following types of information are needed for the site summaries and the December Report:

- site physical and natural characteristics,
- contamination profiles,
- current and projected site missions,
- site-specific approaches to identifying future use options,
- key stakeholder interactions and stakeholder future use recommendations,
- issues and lessons learned related to future site uses, and
- key accomplishments related to future use, reuse, etc.

The Future Use Project Office and sites will rely on existing information to prepare most of this summary information. In general, additional efforts to collect data will not be required.

In addition to laying the groundwork for the December 1995 Future Use Report, the summary information will be used to do the following:

- satisfy information requests within the Department and from Congressional leaders;
- facilitate communication among sites on future use issues and lessons learned;
- enhance coordination among program offices responsible for comprehensive site planning, facility transition, economic development, and environmental cleanup; and
- apprise stakeholders of the status of future use-related activities within the Department.

Background

An understanding of long-term future site uses is essential to effective planning and decision making for a myriad of Department of Energy activities. The purpose of the Future Use initiative, under the leadership of the Future Use Project Office, is to provide a basis for (1) environmental remediation decision making, (2) site development and comprehensive planning, and (3) reuse of surplus land and facilities.

In addition, Secretary Hazel O'Leary has issued the Department Land and Facility Use Policy (see Appendix D on page 119) that augments the original Future Use initiative by requiring sites, with significant public participation, to develop comprehensive plans that integrate mission, economic, ecologic, social, and cultural factors. Many sites are currently well underway with efforts aimed at satisfying this directive.

The Future Use Project: Next Steps

In addition to working with the sites to generate and submit stakeholder-preferred future use options by December 1995, the Future Use Project Office is beginning to work with sites to identify facilities and land parcels that are viable for reuse and/or disposition. In accordance with the Secretary's Land and Facility Use Policy and corporate management principles, the Future Use Project Office will assist sites in maximizing the beneficial use of their resources by helping them assess the following:

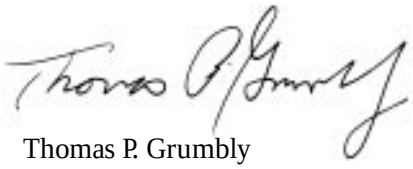
- which facilities and land are needed for current and future missions;
- which facilities have significant associated landlord expenses; and
- which facilities should be targeted and marketed for reuse.

Once again, the Future Use Project Office and sites can rely on existing information to help identify facilities that may be available for alternative uses. In particular, the Surplus Facility Inventory Assessment and other databases available through the Office of Field Management and the Office of Policy can provide useful information.

As part of this second phase, the Future Use Project Office will distribute briefs on topics such as leasing and marketing facilities and selling personal property. In addition, the Office will compile and distribute case studies of reuse, leasing, and other related successes. These efforts will be coordinated with EM-60 and other relevant offices to ensure maximum use of existing resources.

Follow-up Between Sites and the Future Use Project Office

The Future Use Project Office will be contacting you or your staff for help in gathering information for the site summaries, the December Future Use Report, and topic papers. Your support in this critical endeavor is appreciated. Please contact Joan Glickman (phone 202-586-5607, fax 202-586-4622, e-mail joan.glickman@em.doe.gov) with any questions.



Thomas P. Grumbly
Assistant Secretary for
Environmental Management

Appendix C: Final Draft Memorandum

United States Government **Department of Energy**

memorandum

DATE: January 12, 1994

REPLY TO ATTN OF: EM-40 (R. Harris, 3-8199)

SUBJECT: Transmittal of Final Draft *Forging the Missing Link: A Resource Document for Identifying Future Use Options*

TO: Distribution

Following our direction, a Final Draft of a resource document, *Forging the Missing Link: A Resource Document for Identifying Future Use Options*, has been prepared to provide immediate guidance to the Heads of Field Elements on future use issues.

This document will help agency officials implement a site-specific process to identify future use options based on the unique characteristics of site and stakeholder needs. The document does not address or answer every issue related to future use options, land use planning, and decisionmaking; instead, it provides a means for us to immediately initiate the process for identifying—in a participatory format—stakeholder-preferred future use options. The document identifies steps to be taken by Headquarters and field elements to resolve those issues affected by or affecting future uses in a coordinated, well-planned fashion.

Even with the extensive input to this draft by various organizations, stakeholders, and others, every issue may not have been identified or resolved. As a result, the document is submitted in draft form for interim use. In its present form, the document will allow timely identification of options with provisions for periodic updates to reflect additional guidance based on emerging issues, supplemental information, and lessons learned. If we wait until all questions and answers are known, then we will never begin to resolve these crucial issues aggressively, and we will never achieve results.

A draft of the supporting appendices (approximately 12) will not be available until February. In the meantime, we expect the Heads of Field Elements to initiate future use processes in accordance with the framework established in this guidance document. To this end, they should:

1. Identify and provide the name of a single point-of-contact to the Future Use Project Office established in our Office of Public Accountability (EM-5);

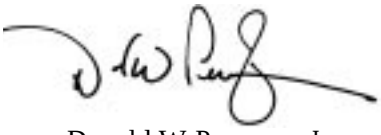
2. Establish a Project Team for each site and appoint a Team Leader;

3. Review available resources, inventory relevant site information, and public participation history; and

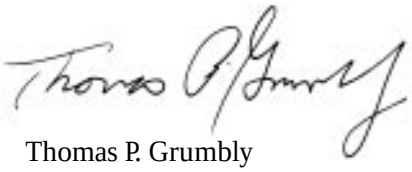
4. Arrange a meeting with representatives from the Future Use Project Office to discuss process implementation plans and resource needs.

This future use site activity requires your immediate attention and aggressive action. As site-specific efforts evolve, this resource document will be updated to reflect further guidance. The approach we are pursuing on future uses of DOE sites is a "bottom-up" approach, with the active participation of stakeholder groups and the public. We are committed to consider and integrate stakeholder-preferred future use options into our planning and decisionmaking.

To meet our goal by the end of 1995 at all facilities and sites conducting environmental restoration, it is critical this effort begin no later than mid-January 1994.



Donald W. Pearman, Jr.
Associate Deputy Secretary for
Field Management



Thomas P. Grumbly
Assistant Secretary for
Environmental Management

Appendix D: Hazel O'Leary Memorandum

Department of Energy
Washington, DC 20585

December 21, 1994

MEMORANDUM FOR: SECRETARIAL OFFICERS
AND OPERATIONS OFFICE MANAGERS

FROM: HAZEL R. O'LEARY

SUBJECT: Land and Facility Use Policy

Today, I issued an innovative Departmental policy that strengthens the stewardship of our vast lands and facilities and encourages the return of some of these national resources to their rightful owners—the American public. The policy will stimulate local economies, cut costs and red tape, and ensure public participation in the planning processes. The new policy states:

> It is Department of Energy policy to manage all of its land and facilities as valuable national resources. Our stewardship will be based on the principles of ecosystem management and sustainable development. We will integrate mission, economic, ecological, social and cultural factors in a comprehensive plan for each site that will guide land and facility use decisions. Each comprehensive plan will consider the site's larger regional context and be developed with stakeholder participation. This policy will result in land and facility uses which support the Department's critical missions, stimulate the economy, and protect the environment.

The new policy is highlighted in the attached book, *Department of Energy – Stewards of a National Resource*. The book describes how we are changing the way we manage our lands and facilities. It also describes some of our recent successes in finding new uses for our surplus land and facilities. These successes range from new leases at the former Mound facility and the use of an idle reactor for brain cancer treatment at the Idaho National Engineering Laboratory to the creation of an urban park adjacent to our headquarters and the development of the National Wind Technology Center at the Rocky Flats plant. The book provides information about our major sites and contact numbers for each public affairs office. It encourages businesspeople, public officials, citizen organizations, and our site neighbors to provide their ideas for new site and facility uses.

This new policy has already undergone the initial directives review process and will be incorporated in the Department's broader Corporate Facilities Management Directive initiative that I have commissioned to respond to the National Performance Review.

I know you share my excitement about the opportunities we have in finding new uses for our lands and facilities. I look forward to working with you to fulfill the responsibility entrusted to us by the citizens of the United States for managing these valuable national resources.