

# MANHATTAN PROJECT SITES

NATIONAL PARK SERVICE  
U.S. DEPARTMENT OF THE INTERIOR



HANFORD, WASHINGTON • LOS ALAMOS, NEW MEXICO • DAYTON, OHIO • OAK RIDGE, TENNESSEE

## DRAFT SPECIAL RESOURCE STUDY/ENVIRONMENTAL ASSESSMENT

NOVEMBER 2009

This report has been prepared to provide Congress and the public with information about the resources in the study area and how they relate to criteria for inclusion within the national park system. Publication and transmittal of this report should not be considered an endorsement or a commitment by the National Park Service to seek or support either specific legislative authorization for the project or appropriation for its implementation.

# SUMMARY

## PURPOSE AND NEED

The purpose of this study is to comply with the Manhattan Project National Historical Park Study Act (Public Law 108-340), passed in 2004, which directed the secretary of the interior to “conduct a study on the preservation and interpretation of historic sites of the Manhattan Project for potential inclusion in the National Park System.”

## BACKGROUND

The Manhattan Project was an unprecedented government-directed top-secret program implemented in the United States during World War II to construct a nuclear weapon in advance of Nazi Germany, which had initiated atomic energy research in the 1930s.

The period of significance for the Manhattan Project is 1942 through the end of 1946. A series of events in 1942 denote the project’s initiation. Army Corps of Engineers Brigadier General Leslie Groves was selected to be military head of the project; then Groves selected Robert Oppenheimer as chief scientist for the project, and laboratory sites were selected to be located at Los Alamos, New Mexico, and Oak Ridge, Tennessee. Near the end of 1942, President Roosevelt gave the final authorization for the construction of the atomic bomb, and the first controlled nuclear chain reaction was achieved at the University of Chicago under the direction of Enrico Fermi. All of these events mark the beginning of the Manhattan Project in 1942. On January 1, 1947, the Manhattan Project was taken over by the Atomic Energy Commission, thus officially ending the Manhattan Project.

## STUDY AREA

Public Law 108-340 has a defined study area of Manhattan Project sites specifically including the (1) Los Alamos National Laboratory and townsite in New Mexico; (2) Hanford site in Washington; and (3) Oak Ridge Reservation in Tennessee. A fourth site at Dayton, Ohio, was added to the study by Congressional colloquy. While the four sites—Los Alamos, Hanford, Oak Ridge, and Dayton—are part of a larger story, Congress specifically directed the National Park Service to examine these four as potential units of the national park system using NPS criteria for inclusion.

## STUDY PROCESS

Several laws and policies outline criteria for units of the national park system. The National Park System New Area Studies Act (Title III of Public Law 105-391, 16 U.S.C. Sec. 1a-5) establishes the basic process for National Park Service studies of potential new national park areas. *NPS Management Policies 2006* states that “to receive a favorable recommendation from the National Park Service, a proposed addition to the national park system must (1) possess nationally significant natural or cultural resources, (2) be a suitable addition to the system, (3) be a feasible addition to the system, and (4) require direct NPS management instead of protection by other public agencies or the private sector. These criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation’s natural and cultural resources. These criteria also recognize that there are other management alternatives for preserving the nation’s outstanding resources.”

This study will determine whether these four dispersed sites—Los Alamos, Hanford, Oak Ridge, and Dayton—have national

## SUMMARY

significance and are suitable and feasible for inclusion in the national park system. For the purposes of this study, the determination of significance, suitability, and feasibility will be made for all four sites collectively.

### National Significance Findings

The Manhattan Project story, as well as a number of historic resources, meet the criteria to be considered nationally significant. As important contributors to the Manhattan Project, the four study sites, taken together, meet all four of the national park system criteria for national significance, and three of the six national historic landmark criteria.

### Suitability Findings

Cultural resources associated with the Manhattan Project are not currently represented in the national park system, and comparably managed areas are not protected for public enjoyment. The comprehensive story of the Manhattan Project is not interpreted by other federal agencies; tribal, state, or local governments; or the private sector. Various sites have some protection i.e. those managed by the Department of Energy, and some sites and museums tell parts of the story, but the comprehensive story of the nationally significant Manhattan Project is not told anywhere.

Therefore, the resources related to the Manhattan Project are suitable for inclusion in the national park system.

### Feasibility Findings

There are a number of factors that make the entire study area infeasible as a unit of the national park system. The establishment and operation of such an NPS unit would not be feasible due to the following issues:

- The size, boundary configurations, distance between sites, and landownership patterns would create a highly complex management scenario and would likely contribute to an unreasonably high cost of management by the National Park Service.

- Visitor access to DOE sites and privately owned sites in many different locations could be significantly limited; visitor enjoyment across all of these sites could not be assured.
- The Department of Energy has indicated it would continue to bear responsibility for safety, national security, historic preservation, and upkeep of its facilities; however, there are still concerns regarding the National Park Service assuming liability and unforeseen costs in addressing visitor and employee safety, national security, cleanup, historic preservation, and maintenance of the facilities in the future.
- The study area encompassing widely dispersed sites is not capable of efficient administration by the National Park Service at a reasonable cost. Within the context of the current commitments of the president, secretary of the interior, and the director of the National Park Service to address other national financial priorities, it is unlikely that sufficient funds would be available for the National Park Service to undertake new management responsibilities for such a park.

Although the study team initially considered an alternative that would designate the entire study area as a national historical park, the alternative was dismissed largely because the criteria for feasibility were not met. However, establishing an NPS unit within some smaller boundary configuration would eliminate or lessen many of the disqualifying issues, and may be feasible.

## MANAGEMENT ALTERNATIVES

### Alternative A: No Action, Continuation of Current Programs and Policies

This alternative provides a baseline for evaluating changes and impacts in the other alternatives. Under alternative A, the four Manhattan Project sites would continue to operate as they have in the past without any

national coordination regarding resource protection and interpretation of the Manhattan Project story—although the sites could communicate among themselves on an ad hoc basis. The management and sponsored activities occurring at each site would continue as they have, with local entities and personnel working separately or in concert with the Department of Energy to interpret and preserve each local Manhattan Project site. Each of the sites would continue to operate local programs in a manner they feel best suited to the local or national Manhattan Project story.

### **Alternative B: Nationwide Nonprofit Consortium**

In this alternative, local organizations interested in heritage tourism, preservation and interpretation of the Manhattan Project story would form a nationwide nonprofit consortium to work with the Department of Energy and other site owners to coordinate Manhattan Project-related preservation and interpretive efforts at the four sites. The work of a consortium would initially focus on Los Alamos, Oak Ridge, Hanford, and Dayton, but could expand to include other sites across the nation as well as around the world. The existing Atomic Heritage Foundation, the Energy Communities Alliance, or a newly formed entity would serve as the catalyst for this alternative and also could serve as the management entity for the nationwide consortium. The consortium would be a self-supporting, nonprofit entity, sustained through membership fees or other fundraising efforts. The viability of the consortium would be dependent on this private funding as well as the participation of local organizations. After it is formed, the consortium also could help raise funds for the local organizations.

Although the consortium members would provide a coordinated presentation of the work of the Manhattan Project, they would remain primarily accountable to their local communities for the preservation and interpretation of their associated sites.

Technical assistance would be potentially available to the consortium.

### **Alternative C: National Heritage Area**

In this alternative, the four Manhattan Project sites would be proposed for designation as a national heritage area (NHA). National heritage areas are places designated by Congress where natural, cultural, and historic resources combine to form cohesive, nationally important, and distinctive assemblages of resources or “landscapes” arising from patterns of human activity. They are generally managed through partnerships among public and private entities at the local or regional level.

The Manhattan Project National Heritage Area would be unlike any other national heritage area in that it would be located in noncontiguous areas and would be specifically thematic in a way that other areas are not.

Before the sites could be designated by Congress as a national heritage area, three critical requirements must be satisfied:

1. A national heritage area suitability/feasibility study, which would include public involvement, would need to be completed.
2. Widespread public support among residents of the potential heritage area for the proposed designation would need to be demonstrated.
3. Key constituents, which may include governments, industry, private organizations, and nonprofit organizations, in addition to area residents, would need to make a commitment to the proposal.

Once the national heritage area was designated, a nonprofit management entity would be need to be established to create a management plan and receive federal funds on the area's behalf. In this way, the national heritage area would provide comprehensive, consistent direction for management,

## SUMMARY

preservation, and interpretation of the Manhattan Project sites. The management entity could be a state or local agency, a federal commission, or a private nonprofit corporation. Two potential organizations that could become the management entity are the Atomic Heritage Foundation and the Energy Communities Alliance, both of which already provide a national link for Manhattan Project sites.

The Department of Energy and local stakeholders and property owners would be partners with the management entity. The managing entity and partners would have responsibility for the administration, viability, and direction of the national heritage area, and for prioritizing and coordinating fundraising for preservation efforts at all sites.

Depending on the legislation authorizing the national heritage area, numerous domestic sites related to the Manhattan Project could participate in the national heritage area, as could international members and sites that might have an important story to tell about atomic research during World War II.

Technical assistance for interpretation and historic preservation would be available from the National Park Service.

The national heritage area designation could result in initial federal funding of preservation and interpretation efforts at the four sites. However, eventually the heritage area would need to be self-sustaining, raising funds through grants, tour fees, membership fees, etc. In this regard, the management entity could develop a business plan to ensure the heritage area is sustainable.

### **Alternative D: Area Affiliated With the National Park System**

In this alternative, Congress would designate key Manhattan Project historic resources in Oak Ridge, Los Alamos, Hanford, and Dayton as the Manhattan Project National Historic Sites as an affiliated area of the national park

system. National Park Service management policies require that affiliated areas meet specific criteria. These criteria, and how Manhattan Project National Historic Sites would meet them, are described in Appendix J.

Historic sites within the affiliated area would include both publicly and privately owned sites. Public sites would include those owned and managed by the Department of Energy that are part of their inventory of Signature Facilities at the Manhattan Project sites. Also included in the affiliated area would be sites directly related to the Manhattan Project that are located in community settings and are owned and managed by local governments, nonprofit organizations, and private owners. Only those privately owned sites that have the permission of the owner would be included in the affiliated area.

The affiliated area could be managed by a commission, associated with the Department of Energy and established by Congress, that would coordinate preservation and public use of Manhattan Project sites identified in the legislation. Commission members would be appointed by the secretary of energy from nominations received from the museums and organizations in the four listed Manhattan Project communities, and from national organizations having expertise and interest in the commemoration of the Manhattan Project. The Department of Energy and the National Park Service would serve as ex officio nonvoting members of the commission, who would bring agency expertise in site management and visitor interpretation and education to the commission deliberations. The commission would be authorized by legislation to seek operations funding support from Congress that would enable the commission to hire staff to assist in the day-to-day operations of the sites. These funds would come from DOE appropriations. Other funds to support commission operations would also be

expected from both private and various nonfederal public sources.

In this alternative, the Department of Energy would manage its facilities in line with NPS policies, but would have financial responsibility for all ongoing operations, maintenance, and preservation of its facilities through its appropriations. The National Park Service's primary responsibility under this alternative would be to provide technical assistance in the areas of interpretation and historic preservation.

### **Alternative E: Manhattan Project National Historical Park**

In this alternative, Congress would designate a site in the Los Alamos, New Mexico area as the Manhattan Project National Historical Park managed by the National Park Service. Certain site resources within the existing Los Alamos Scientific Laboratory National Landmark District would be incorporated into the national historical park. Enabling legislation would allow for some limited federal public ownership of these sites, coupled with leasing opportunities elsewhere in the community. The enabling legislation would also allow for partnering with the Department of Energy to advance public educational and interpretive experiences and understanding at those DOE-managed sites in the Los Alamos area which are determined appropriate and safe for public access.

Other Manhattan Project sites—resources and historic districts located in Hanford, Oak Ridge, and Dayton—also contain important Manhattan Project historic resources. While the preservation of certain resources at these sites is fully recommended, these sites would be considered associated with, but not operationally part of, the Los Alamos-based National Historical Park. The National Park Service would be encouraged to have formal relationships with these associated sites through written agreements.

### **Alternatives Dismissed**

Initially, the planning team considered a national historical park comprising resources at all four sites. This was determined to be infeasible due to its large size involving four states, complex landownership patterns, and potential to be extremely difficult to manage in an efficient way. However, the DOE planning team members have advanced a modified version of this alternative throughout the planning process; they feel that a national park encompassing the resources at Oak Ridge, Hanford, and Los Alamos would best preserve the story and resources of the Manhattan Project.

The planning team also considered designation as a national monument under Department of Energy Administration. However, preservation and interpretation are not part of the DOE core mission, and the Department of Energy has not officially expressed an interest in administering such a monument without direct Park Service participation. Consequently, the study team dismissed this alternative from further consideration.

## **ENVIRONMENTAL ASSESSMENT**

Only alternative E calls for some outright NPS ownership of historic or cultural resources. Thus, in the other alternatives, there is the potential for inconsistent beneficial and adverse impacts to privately owned and managed properties and landscapes that would be long term and would range from minor to moderate in intensity.

Likewise, there is the potential for adverse impacts to privately owned collections, objects, and archives under alternatives A through D. Alternative E could bring some beneficial effect to museum collections, as the Manhattan Project National Historical Park would provide guidance and focus for collections.

## SUMMARY

Due to the inherent issues regarding visitor access and safety, none of the alternatives would result in more than negligible or minor beneficial impacts to visitor use and experience.

Each of the alternatives results in similar impacts to the socioeconomic environment. These impacts would be negligible, long term, and beneficial. The establishment of the

national historical park in alternative E would have the greatest economic benefit to the Los Alamos community through the increased visitation that would likely result from park designation. There also would be some economic benefits to sites in alternatives C and D due to national designation.



# CONTENTS

## **PART ONE: BACKGROUND**

*A GUIDE TO THIS DOCUMENT* 3

*INTRODUCTION* 5

Purpose and Need 5

Historical Overview of Manhattan Project 5

Legal and Policy Background 7

The Study 7

Related Plans and Studies 9

## **PART TWO: DESCRIPTION OF RESOURCES**

*INTRODUCTION* 15

*LOS ALAMOS RESOURCES* 17

Background 17

Structures and Sites 17

*HANFORD RESOURCES* 21

Background 21

Structures and Sites 21

*OAK RIDGE RESOURCES* 25

Background 25

Structures and Sites 25

*DAYTON RESOURCES* 29

Background 29

Structures and Sites 30

## **PART THREE: EVALUATION OF SIGNIFICANCE, SUITABILITY, AND FEASIBILITY**

*EVALUATION OF SIGNIFICANCE* 35

Introduction 35

Criteria for Inclusion in the National Park System 35

National Historic Landmark Criteria 38

Conclusion 38

*EVALUATION OF SUITABILITY* 41

Introduction 41

Resource Type – Thematic Framework 41

Existing Resources 45

Conclusion 46

*EVALUATION OF FEASIBILITY* 47

Introduction 47

Feasibility Analysis 47

Conclusion 50

## CONTENTS

### **PART FOUR: MANAGEMENT ALTERNATIVES**

#### *INTRODUCTION 53*

#### *ALTERNATIVE A: NO ACTION, CONTINUATION OF CURRENT PROGRAMS AND POLICIES 54*

- Resource Protection and Preservation 54
- Public Access 54
- Interpretation 54
- The Role of the National Park Service 55
- The Role of the Department Of Energy 55
- The Role of Other Entities 55

#### *ALTERNATIVE B: NATIONWIDE NONPROFIT CONSORTIUM 56*

- Concept 56
- Resource Protection and Preservation 56
- Public Access 56
- Interpretation 57
- The Role of the National Park Service 57
- The Role of the Department Of Energy 58
- The Role of Other Entities 58

#### *ALTERNATIVE C: NATIONAL HERITAGE AREA 59*

- Concept 59
- Resource Protection and Preservation 60
- Public Access 60
- Interpretation 60
- The Role of the National Park Service 61
- The Role of the Department Of Energy 61
- The Role of Other Entities 62

#### *ALTERNATIVE D: AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM 63*

- Concept 63
- Resource Protection and Preservation 63
- Public Access 64
- Interpretation 64
- The Role of the National Park Service 65
- The Role of the Department Of Energy 65
- The Role of Other Entities 66

#### *ALTERNATIVE E: MANHATTAN PROJECT NATIONAL HISTORICAL PARK 67*

- Concept 67
- Resource Protection and Preservation 67
- Public Access 68
- Interpretation 68
- The Role of the National Park Service 68
- The Role of the Department Of Energy 69
- The Role of Other Entities 69

#### *ESTIMATED COSTS OF THE ALTERNATIVES 71*

- Alternative A: No Action 71
- Alternative B: National Consortium 72
- Alternative C: National Heritage Area 72
- Alternative D: Area Affiliated with the National Park System 72
- Alternative E: Manhattan Project National Historical Park 73

<i>MANAGEMENT ALTERNATIVES NO LONGER UNDER CONSIDERATION</i>	75
Designation as a National Historical Park Encompassing Los Alamos, Oak Ridge, Hanford, and Dayton	75
Designation as a National Monument Under Department of Energy Administration	77
<i>THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE</i>	78
<i>MOST EFFECTIVE AND EFFICIENT MANAGEMENT OPTION ALTERNATIVE</i>	80
<i>SUMMARY TABLES OF ALTERNATIVES</i>	81

## **PART FIVE: THE AFFECTED ENVIRONMENT**

<i>ENVIRONMENTAL IMPACT TOPICS</i>	93
Impact Topics Dismissed from Further Analysis	93
Impact Topics Included in this Analysis	96
<i>LOS ALAMOS</i>	98
Historic Buildings and Structures and Cultural Landscapes	98
Museum Collections	99
Visitor Use and Experience	100
Socioeconomics	100
<i>HANFORD</i>	102
Historic Buildings and Structures and Cultural Landscapes	102
Museum Collections	103
Visitor Use and Experience	104
Socioeconomics	104
<i>OAK RIDGE</i>	105
Historic Buildings and Structures and Cultural Landscapes – Oak Ridge	105
Museum Collections	106
Visitor Use and Experience	106
Socioeconomics	106
<i>DAYTON</i>	108
Historic Buildings and Structures and Cultural Landscapes	108
Museum Collections	109
Visitor Use and Experience	109
Socioeconomics	109

## **PART SIX: ENVIRONMENTAL CONSEQUENCES**

<i>INTRODUCTION</i>	113
<i>ANALYSIS OF ENVIRONMENTAL CONSEQUENCES</i>	114
<i>METHODOLOGY FOR ASSESSING IMPACTS</i>	115
Introduction	115
Impacts to Historic Buildings, Structures, and Cultural Landscapes	116
Impacts to Museum Collections	116
Impacts to Visitor Use and Experience	117
Impacts to Socioeconomics	117
<i>ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE A: NO ACTION</i>	118
Historic Buildings and Structures and Cultural Landscapes	118
Museum Collections	119
Visitor Use and Experience	120

## CONTENTS

Socioeconomics	120
<i>ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE B: NATIONWIDE NONPROFIT CONSORTIUM</i>	122
Historic Buildings and Structures and Cultural Landscapes	122
Museum Collections	123
Visitor Use and Experience	124
Socioeconomics	125
<i>ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE C: NATIONAL HERITAGE AREA</i>	127
Historic Buildings and Structures and Cultural Landscapes	127
Museum Collections	128
Visitor Use and Experience	129
Socioeconomics	130
<i>ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE D: AN AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM</i>	132
Historic Buildings and Structures and Cultural Landscapes	132
Museum Collections	133
Visitor Use and Experience	134
Socioeconomics	135
<i>ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE E: MANHATTAN PROJECT NATIONAL HISTORICAL PARK</i>	137
Historic Buildings and Structures and Cultural Landscapes	137
Museum Collections	138
Visitor Use and Experience	139
Socioeconomics	140

## APPENDIXES, SELECTED REFERENCES, AND PREPARERS

<i>APPENDIX A: LEGISLATION</i>	145
<i>APPENDIX B: STAKEHOLDERS AND TRIBAL CONTACTS</i>	149
<i>APPENDIX C: RELATED STUDIES AND PLANS</i>	152
<i>APPENDIX D: OWNERSHIP AND CURRENT USES</i>	153
<i>APPENDIX E: NATIONAL REGISTER OF HISTORIC PLACES CRITERIA OF EVALUATION (36 CFR PART 60) AND NATIONAL NATIONAL HISTORIC LANDMARKS CRITERIA FOR EVALUATION (36 CFR PART 65)</i>	163
<i>APPENDIX F: RELEVANT CORRESPONDENCE AND NEWS RELEASES</i>	166
<i>APPENDIX G: NATIONAL PARK SERVICE INTERPRETIVE THEMES AND THEME SUB-TOPICS IN REVISION OF THE NATIONAL PARK SERVICE'S THEMATIC FRAMEWORK, 1996</i>	183
<i>APPENDIX H: UNITS IN THE NATIONAL PARK SYSTEM THAT ARE ASSOCIATED WITH WORLD WAR II THEMES</i>	185
<i>APPENDIX I: MANHATTAN PROJECT RELATED SITES</i>	186
<i>APPENDIX J: CRITERIA AND EVALUATION ASSOCIATED WITH ALTERNATIVE D: AN AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM</i>	189
<i>APPENDIX K: COST ESTIMATING DETAILS</i>	192
<i>SELECTED REFERENCES</i>	193
<i>PREPARERS</i>	199

## TABLES AND FIGURES

Table 1: Summary of Status of Manhattan Project Sites	39
Table 2: Annual Operating Budgets of the Manhattan Project Interpretation Partners	71
Table 3: Estimated Costs of the Alternatives	74
Table 4: Summary Comparison of the Alternatives	81
Table 5: Key Impacts of the Alternatives	87
Figure 1: Los Alamos Resources	16
Figure 2: Hanford Resources	20
Figure 3: Oak Ridge Resources	24
Figure 4: Dayton Resources	28



# BACKGROUND



DAYTON, UNIT III



OAK RIDGE, K-25 PLANT



LOS ALAMOS, 1940s





## A GUIDE TO THIS DOCUMENT

This *Draft Manhattan Project Special Resource Study / Environmental Assessment* is organized in accordance with the provisions of the National Park System New Area Studies Act, the National Park Service's *Management Policies 2006*, the Council on Environmental Quality's implementing regulations for the National Environmental Policy Act, and the National Park Service's Director's Order 12 and Handbook, "Conservation Planning, Environmental Analysis, and Decision Making."

**Part One: Background** sets the framework for the entire document. It describes why the study is being prepared and provides background information on the study, including a historical overview of the Manhattan Project, the legislative background of the study, and the National Park Service (NPS) policies and legislation that guide the development of special resource studies. The chapter also describes the study process, including public input that was considered in developing the study. The chapter concludes with a discussion of the Department of Energy (DOE) "Signature Facilities" and other related plans and studies that helped shape this study.

**Part Two: Description of Manhattan Project Sites** provides details on the sites and the resources that were considered in the special resource study. The information is organized by site: Los Alamos, Hanford, Oak Ridge, and Dayton. This information was used in the evaluation of the sites for inclusion as a unit in the national park system.

**Part Three: Evaluation of Significance, Suitability, and Feasibility** is one of the core parts of the special resource study. The chapter analyzes three of the criteria that must be satisfied by the Manhattan Project sites to be proposed by the National Park Service for inclusion in the national park system. The

results of this evaluation helped determine the range of alternatives that were considered by the study team.

**Part Four: Management Alternatives** describes the management alternatives that were considered as part of the *Manhattan Project Special Resource Study / Environmental Assessment*. This is another core part of the study. Five alternatives are described for the management and administration of the Manhattan Project sites, including a "no action" alternative. The environmentally preferred alternative is identified next, followed by a comparison of the estimated costs of the alternatives and a discussion of alternatives that were considered by the study team but dismissed from detailed evaluation. The chapter concludes with a summary table of the alternatives.

**Part Five: The Affected Environment** describes the cultural and natural resources, visitor uses and experiences, and the socioeconomic environment that would be affected by implementing the alternatives. The chapter begins with the identification of potential impact topics that are not analyzed in the environmental assessment, followed by a discussion of the impact topics that are analyzed. The chapter is organized by the four sites, with cultural resources, visitor use and experience, and the socioeconomic environment described for each site.

**Part Six: Environmental Consequences** analyzes the impacts of implementing the alternatives on the topics described in the "Affected Environment" chapter. Methods that were used for assessing the impacts in terms of the intensity, type, and duration of impacts are outlined at the beginning of the chapter. The chapter is organized by alternative and impact topic, with impacts to the four sites considered together under each

## PART ONE: BACKGROUND

impact topic. The analysis of each impact topic includes a brief discussion of potential cumulative impacts and conclusion. At the end of the chapter, there is a summary table of the impacts of the five alternatives.

**Appendixes, Selected References, and a list of Preparers** are found at the end of the document.

# INTRODUCTION

## PURPOSE AND NEED

The purpose of this study is to comply with the Manhattan Project National Historical Park Study Act (Public Law 108-340), which directed the secretary of the interior to “conduct a study on the preservation and interpretation of historic sites of the Manhattan Project for potential inclusion in the National Park System.”

## HISTORICAL OVERVIEW OF MANHATTAN PROJECT

The Manhattan Project was an unprecedented government-directed top-secret program implemented in the United States during World War II to construct a nuclear weapon in advance of Nazi Germany, which had initiated atomic energy research in the 1930s. Beginning in 1942, the Manhattan Project grew to a \$2.2 billion (1942 dollars) effort that employed some 130,000 workers at its peak. The Manhattan Project, together with similar weaponry development around the globe, resulted in scientific and technological advancements that transformed the world by ushering in the atomic age. Although huge in scope, it was largely kept out of public view and knowledge.

After the discovery of nuclear fission in Germany in late 1938, physicists recognized the possibility of utilizing the enormous energy released in this reaction. From 1939 on, experiments were performed to determine whether neutrons were released during fission and, if so, how to utilize them to achieve a sustained process, called a chain reaction, in which at least one neutron produced in fission of a uranium nucleus strikes another uranium atom, causing it to break apart. If the chain reaction could be controlled at a suitable rate, a power source, or reactor, was envisaged.

Alternatively, if the reaction proceeded unchecked, an instant release of energy—of a magnitude greater than that obtainable from any chemical explosive—was likely.

Frustrated by the leisurely pace of progress in America and fearful that Germany might produce a bomb first, Leo Szilard and other refugees from Nazi persecution convinced Albert Einstein to use his influence to urge government support from President Franklin D. Roosevelt. This tactic was successful, and in late 1939, funding was provided at a significantly higher level, allowing theoretical and experimental research to move faster. With entry of the United States in World War II following the Japanese attack on Pearl Harbor on December 7, 1941, the perceived urgency intensified and the pace of the federal government’s efforts to build a bomb quickened.

By mid-1942, it was obvious that pilot plants, and eventually full-sized factories, would have to be constructed, and that the scientists were ill prepared for this sort of activity. Because the work was now being done in secrecy and considerable construction was foreseen, Gen. Leslie R. Groves of the U.S. Army Corps of Engineers was given controlling authority. Scientific direction was retained by the National Defense Research Committee and subsequently by the Office of Scientific Research and Development, both under Vannevar Bush. To manage the project, the Corps set up the Manhattan Engineer District, so called because the headquarters was initially in New York City. From the Manhattan Engineering District came the name “Manhattan Project” for the nationwide effort.

Soon most research was consolidated at the Metallurgical Laboratory (Met Lab) at the University of Chicago under Arthur H.

Compton. Groves oversaw the purchase of an isolated site at Oak Ridge, Tennessee for the separation of the fissionable uranium-235 (U-235) isotope, which comprises only 0.7 percent of uranium ores; the most common isotope is uranium 238 (U-238). He began bringing industrial giants, such as the contracting company of Stone and Webster and the DuPont Chemical Company, into the project. Funds, totaling an enormous and unforeseen \$2.2 billion by the war's end, came from a special account that Congress voted the president for secret purposes. With such backing and under pressure to produce a weapon for use in the current war, Groves proceeded simultaneously on as many fronts as possible. No approach could be disregarded until proven unsatisfactory. Hence, liquid thermal diffusion, centrifuge, gaseous diffusion, and electromagnetic separation processes were all experimented with as ways to extract U-235 from U-238. The last two techniques—developed at Oak Ridge in huge uranium enrichment plants designated K-25 and Y-12, respectively—ultimately proved to be the most successful.

In December 1942, Enrico Fermi succeeded in producing and controlling a chain reaction in the pile, or reactor, he built at the Met Lab. This reactor not only provided necessary information for construction of a weapon but also furnished the means for a second path to the bomb. Uranium-238, while it does not fission in a reactor, can capture neutrons and ultimately be transformed into a new element, plutonium, not found in nature but highly fissionable. Plutonium, moreover, was seen to have the advantage of possessing different chemical properties, which would permit its extraction from uranium in processes simpler than the physical means required to separate the uranium isotopes. The X-10 Graphite Reactor at Oak Ridge—designed at the Met Lab and built over 10 months in 1943—produced the first significant amounts of plutonium. Fission studies of these samples heavily influenced bomb design. The X-10 chemical separation plant also proved the

bismuth phosphate separation process that was used at the T Plant, the first full-scale separation facility at Hanford, Washington. The X-10 Reactor also provided invaluable experience for the operation of the massive B Reactor, the first large scale reactor for producing plutonium, that was constructed in Hanford in 1944.

Appreciable quantities of U-235 from Oak Ridge and plutonium from Hanford were not produced until 1945, although means to employ these materials in a bomb were studied earlier. In late 1942, Groves placed J. Robert Oppenheimer in charge of a newly created weapons laboratory on an isolated mesa at Los Alamos, New Mexico. Oppenheimer's stature as a leading theoretical physicist encouraged many scientists to "drop out of sight" and work on the project for the duration of the war. Relatively little difficulty was encountered in designing a uranium weapon. Ballistics was a well-developed subject based in part on research and testing at the "Little Boy" Gun Site at Los Alamos; one piece of U-235 could be fired at another in a gun barrel, with the knowledge that together they would form a critical (explosive) mass. The atomic bomb dropped on Hiroshima, Japan, on August 6, 1945, was of this construction.

The technique would prove to be unsuitable for plutonium because if an isotope fissioned spontaneously, it could release sufficient neutrons to cause pre-detonation. Therefore, a new approach called implosion was conceived. A small sphere of plutonium is surrounded by a chemical high explosive; and when this outer covering is ignited the pressure wave compresses the plutonium core into a mass dense enough to reach criticality (enough neutrons strike plutonium nuclei to maintain the chain reaction). Because this process was entirely novel, preliminary testing was conducted in a variety of facilities at Los Alamos, where the first atomic bombs were designed and constructed, before the first detonation of a nuclear device was held at the

Trinity Site near Alamogordo, New Mexico, on July 16, 1945. After the Trinity Site test, the weapon was used against Nagasaki, Japan, on August 9, 1945.

In the early days of the Manhattan Project, The scientific and technical achievements took precedence over the ethical and moral ramifications of creating the first weapon of mass destruction. As the project moved closer to the detonation of the first atomic bomb, ethical questions arose in the minds of many working on the project; however, scientists and politicians were primarily concerned with ending the war as quickly as possible. After the Trinity Site test, the moral dilemma deepened.

After the war, J. Robert Oppenheimer explained it this way: “When you see something that is technically sweet, you go ahead and do it and you argue about what to do about it only after you have had your technical success. That is the way it was with the atomic bomb.”

The debate that began with the Manhattan Project continues today as we consider the ongoing consequences of nuclear proliferation around the world.

## LEGAL AND POLICY BACKGROUND

As noted at the beginning of this chapter, P.L. 108-340 directed the secretary of the interior to conduct this study. The text of this law is included as appendix A.

The National Park Service is responsible for conducting professional studies of potential additions to the national park system when specifically authorized by an act of Congress, and for making recommendations through the secretary of the interior, to the president and Congress.

In the National Park Service General Authorities Act of 1970, Congress declared that areas comprising the national park system are cumulative expressions of a single national

heritage. Potential additions to the national park system should therefore contribute in their own special way to a system that fully represents the broad spectrum of natural and cultural resources that characterize our nation.

Several laws and policies outline criteria for units of the national park system. The National Park System New Area Studies Act (Title III of Public Law 105-391, 16 U.S.C. Sec. 1a-5) establishes the basic process for National Park Service studies of potential new national park areas. *NPS Management Policies 2006* complies with this law, and provides further guidance. *NPS Management Policies 2006* (§1.3) states that “to receive a favorable recommendation from the National Park Service, a proposed addition to the national park system must (1) possess nationally significant natural or cultural resources, (2) be a suitable addition to the system, (3) be a feasible addition to the system, and (4) require direct NPS management instead of protection by other public agencies or the private sector. These criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation’s natural and cultural resources. These criteria also recognize that there are other management alternatives for preserving the nation’s outstanding resources.”

This study will determine whether the four dispersed sites that tell the story of the Manhattan Project—Los Alamos, Hanford, Oak Ridge, and Dayton—have national significance and are suitable and feasible for inclusion in the national park system. For the purposes of this study, the determination of significance, suitability and feasibility will be made for all four sites collectively.

## THE STUDY

### Study Area

This law (Public Law 108-340), passed in 2004, has a defined study area of Manhattan Project

sites specifically including the (1) Los Alamos National Laboratory and townsite in New Mexico; (2) Hanford site in Washington; and (3) Oak Ridge Reservation in Tennessee. A fourth site at Dayton, Ohio—where polonium, used as a trigger, was refined and produced—was added to the study by Congressional colloquy. While the four sites—Los Alamos, Hanford, Oak Ridge, and Dayton—are part of a larger story, Congress specifically directed the National Park Service to examine these four as potential units of the national park system using NPS criteria for inclusion.

### **Study Team and Process**

In response, to Public Law 108-340, “The Manhattan Project National Historical Park Study Act,” the National Park Service’s Denver Service Center (DSC) assembled an interdisciplinary study team. The team was assisted by personnel from the Department of Energy, the National Park Service’s Washington Office, and the NPS Intermountain, Pacific West, Southeast, and Midwest Regional Offices. Staff from Bandelier National Monument (near Los Alamos) and Dayton Aviation Heritage National Historical Park (in Dayton) also participated on the study team.

The study team was augmented at some locations, such as at Hanford, Washington, by local study teams. In addition to NPS personnel, these study teams consisted of members from state, local, and tribal governments; other federal agencies; and key organizations. These local study teams provided important input to the study process, including assisting in the development of some of the alternative concepts presented in the study.

The study began during the spring of 2006 with a series of meetings with key agencies and organizations and public scoping meetings at each of the four sites. The study team used information gathered from the scoping process, public databases, the Department of Energy, land and resource

management agencies, and other resource specialists to assess the significance of the resources and to develop management concept alternatives for the study area. The alternatives were then evaluated for their impacts. The draft special resource study / environmental assessment was subsequently assembled as a document and distributed to the public in the fall of 2009.

### **Period of Significance**

For the purposes of this special resource study, the period of significance for the Manhattan Project is 1942 through the end of 1946. It is a series of events in 1942 that denote the project’s initiation. Army Corps of Engineers Brigadier General Leslie Groves was selected to be military head of the project; then Groves selected Robert Oppenheimer as chief scientist for the project, and laboratory sites were selected to be located at Los Alamos, New Mexico, and Oak Ridge, Tennessee. Near the end of 1942, President Roosevelt gave the final authorization for the construction of the atomic bomb, and the first controlled nuclear chain reaction was achieved at the University of Chicago under the direction of Enrico Fermi. All of these events mark the beginning of the Manhattan Project in 1942. On January 1, 1947, the Manhattan Project was taken over by the civilian Atomic Energy Commission, thus officially ending the Manhattan Project. This new commission, composed of five civilians nominated by the president and confirmed by the Senate, was established to take full control from the War Department of all materials, facilities, production, research, and information relating to nuclear fission.

### **Public and Stakeholder Involvement**

The Manhattan Project Sites Special Resource Study has built upon the efforts of the Department of Energy, which identified the most significant sites associated with the Manhattan Project and designated them as Signature Facilities, and its preservation partner, the Advisory Council on Historic Preservation. The nonprofit Atomic Heritage

Foundation, with its record of advocacy for the preservation of the Manhattan Project sites, has also contributed. In addition, the team has consulted with other agencies or organizations and analyzed common interests and management potential for the Manhattan Project sites. These include state historic preservation offices (SHPOs); other appropriate local, state, tribal, and federal government agencies; and interested non-governmental organizations. A list of stakeholders can be found in appendix B.

The study team began seeking public comments on the project when it began scoping (gathering information) for the study. The scoping period officially began when a *Federal Register* notice was published in January 2006, informing people about the study and asking for interested citizens and groups to write their ideas, issues, and concerns for the study. In addition, a newsletter was mailed to over 4,000 individuals and groups about the study. The public scoping newsletter requested written comments to questions about a “20-year vision,” “concerns for the future,” and “opportunities/actions to be explored.” Approximately 362 written responses were received. Key stakeholders were contacted for input on the study. (A list of stakeholders may be found in appendix B.) Public scoping meetings were also conducted at Richland, Washington; Los Alamos, New Mexico; Santa Fe, New Mexico; Dayton, Ohio; and Oak Ridge, Tennessee, from March through June 2006. A total of 277 people attended these meetings. The public scoping comment period ran through June 30, 2006.

A second newsletter was mailed out in November 2006. This newsletter summarized some of the study team’s preliminary findings, identified initial management concepts, and presented an array of land and resource management techniques for the sites.

### **Summary of Written and Oral Public Comments**

As noted earlier, the study team received approximately 362 written comments on the public scoping newsletter.

Though the visions differed, there was little disagreement regarding the need and desire for further development of venues to present the story of the Manhattan Project.

Several themes emerged from the comments:

- concern that the Manhattan Project and its sites will be destroyed and forgotten by future generations
- insufficient funding would be allocated by Congress to develop and maintain the parks
- immediate action must be taken to capture the oral histories and memories of aging Manhattan Project participants
- potential health effects to visitors and employees from residual radiation
- concern about environmental effects from Manhattan Project (and cold war era) work and the need to clean-up the sites
- a great need to link the sites together in some manner, primarily through the internet

Commenters from each of the four individual sites tended to emphasize the importance of Manhattan Project resources or sites located nearest to them or the site with which they were most familiar. Finally, a few respondents felt that the study missed several important sites for potential inclusion in the study area—primarily the site of the first sustained reaction at the University of Chicago and the site of the first nuclear explosion at the Trinity test site in New Mexico.

## **RELATED PLANS AND STUDIES**

### **Department of Energy Signature Facilities**

The Department of Energy’s efforts to identify Signature Facilities played a major role in the

development of this study. During the 1990s, the Department of Energy began a process to preserve and interpret the remaining historically significant physical properties and artifacts associated with the Manhattan Project before they were lost. In December 1999, the department published a report entitled *The Signature Facilities of the Manhattan Project*. According to the report, eight historic properties were designated Signature Facilities, which “taken together, provide the essential core for successfully interpreting for the American public the Manhattan Project mission of developing an atomic bomb.” The department’s goal was to move forward in preserving and interpreting these properties by integrating departmental headquarters and field activities and joining with interested outside entities, organizations and individuals, including Congress, state and local governments, the department’s contractors, and various other stakeholders, in a working relationship toward meeting these goals. The eight Signature Facilities, which were “first-of-a-kind or one-of-a-kind facilities and devices that used some of the century’s most innovative and revolutionary technologies,” included the following:

- Metallurgical Laboratory, University of Chicago, Illinois
- X-10 Graphite Reactor, Oak Ridge, Tennessee
- K-25 Gaseous Diffusion Process Building, Oak Ridge, Tennessee
- Y-12 Beta-3 Racetracks, Oak Ridge, Tennessee
- B Reactor, Hanford, Washington
- T Plant, Chemical Separations Building, Hanford, Washington
- V-Site Assembly Building and Gun Site, Los Alamos, New Mexico
- Trinity Site, Alamogordo, New Mexico

All of these sites, with the exception of the Metallurgical Laboratory at the University of Chicago and the Trinity Site at Alamogordo,

New Mexico, are managed by the Department of Energy.

At the Department of Energy’s request, the President’s Advisory Council on Historic Preservation convened a panel of distinguished historic preservation experts who visited the Signature Facilities, evaluated their historical significance, and developed recommendations and preservation options for the department’s consideration. The Advisory Council delivered the panel’s final report to the secretary of energy in March 2001. The panel stated that development and use of the atomic bomb during World War II was “the single most significant event of the 20th century.” Moreover, the panel unanimously agreed with the department that the Signature Facilities are of extraordinary historical significance and “deserve commemoration as national treasures.”

Although the panel did not use national historic landmark criteria to evaluate the Signature Facilities, they recommended that the facilities do qualify as national historic landmarks. Accordingly, the report urged the Department of Energy to support efforts to convey to its employees, contractors, and the public the powerful story of the role the Signature Facilities played in one of the paramount events of the 20th century. Thus, the Advisory Council recommended that the sites associated with the Manhattan Project be formally established as a collective unit and be administered for preservation, commemoration, and public interpretation in cooperation with the National Park Service.

The Signature Facilities of the Manhattan Project as well as other extant historic properties throughout the United States from that effort represent a great human story, a story of a nation united in a common cause. It is the story of world-class scientists collaborating with industry, the military, and tens of thousands of ordinary Americans working at sites across the country to translate original scientific discoveries into an entirely new kind



of weapon. When President Harry S Truman revealed the existence of this nationwide, secret project to the American people, most were astounded to learn that such a far-flung, government run, top-secret operation with physical properties, payroll, and a labor force comparable to the automobile industry existed. The Manhattan Project, which President Franklin D. Roosevelt approved in 1942, had spent \$2.2 billion and employed some 130,000 workers at its peak by the end of the war in 1945. Despite extraordinary obstacles, the United States was able to combine the forces of the scientific community, the federal government, the

military, and industry into an organization that took nuclear science out of the laboratory and onto the battlefield, thus enabling the Manhattan Project to produce an atomic bomb in time to help end World War II. The Manhattan Project clearly demonstrated the importance of basic scientific research to our national security.

### **Other Studies**

This special resource study / environmental assessment builds on previous planning work and other reference materials. See appendix C for a listing of major related studies.

## PART ONE: BACKGROUND

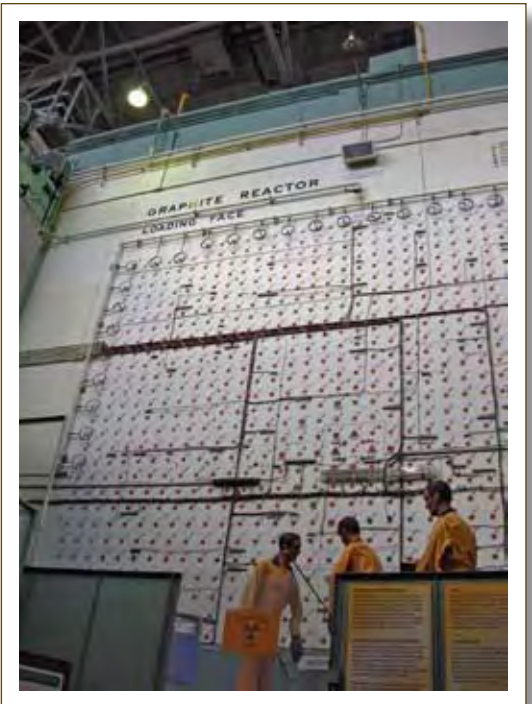
## DESCRIPTION OF RESOURCES



LOS ALAMOS, FAT MAN, BRADBURY MUSEUM



HANFORD B REACTOR



OAK RIDGE, GRAPHITE REACTOR

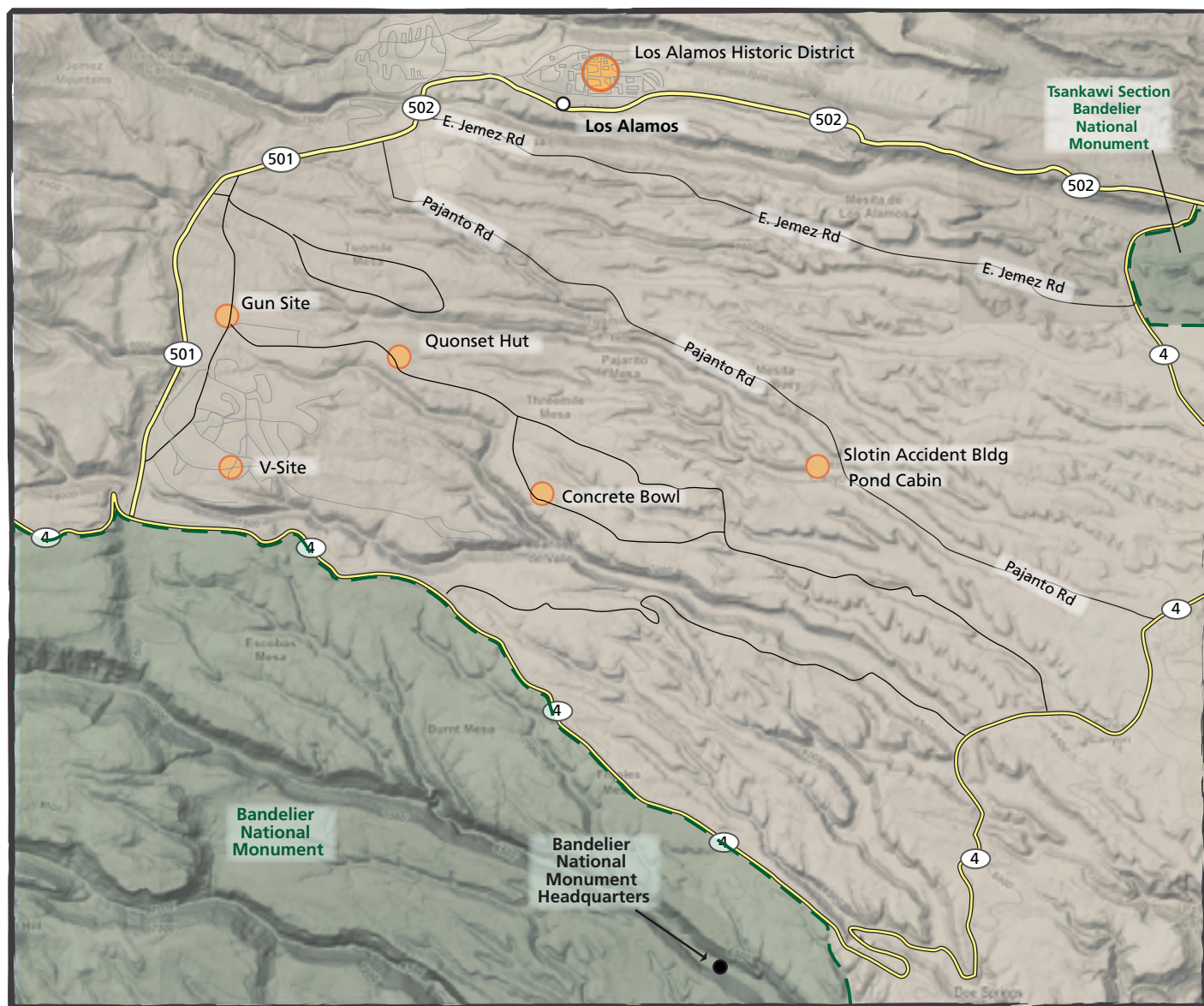


## INTRODUCTION

This chapter provides details on the sites and the resources that were considered in the special resource study. The information provides an overview of the key Manhattan Project resources at Los Alamos, Hanford, Oak Ridge, and Dayton, and was used by the study team in its evaluation of the significance,

suitability, and feasibility of including the sites as a unit in the national park system.

Additional information on the sites is included in “Part Five: The Affected Environment” and in “Appendix D: Ownership and Current Uses,” as well as in the related studies and plans listed in appendix C.



0 1 MILE

NORTH



# MANHATTAN PROJECT

## LOS ALAMOS NATIONAL LABORATORY

## NEW MEXICO

U.S. Department of the Interior • National Park Service  
DSC • 665/100653 • November 2009

# LOS ALAMOS RESOURCES

## BACKGROUND

On November 25, 1942, the War Department approved the appropriation of the 800-acre Los Alamos Ranch School—located on the Pajarito Plateau above the Rio Grande Valley in the Jemez Mountains of north central New Mexico—as the location for a research and design laboratory facility that was designated “Project Y” by the Manhattan Engineer District. Earlier in 1942, command of the Manhattan Engineer District was awarded to Brigadier General Leslie Groves of the Army Corps of Engineers. The remote and isolated site in New Mexico met his criteria for such a facility because it afforded natural physical barriers for security, and the 27 ranch school structures and associated outbuildings could easily support the small-scale facility originally envisioned for the laboratory. Additionally, the site also met other Groves’ selection criteria, including its inland location west of the Mississippi River, suitable climate, and access to a good water supply, an adequate transportation network, and an available labor force.

Additional lands were acquired from nearby federal government agencies, mostly U.S. Forest Service lands (45,000 acres), and homesteading and grazing lands from the area’s predominantly Hispanic homesteaders. Within several months of the formal establishment of the Los Alamos Scientific Laboratory on January 1, 1943, J. Robert Oppenheimer, one of the nation’s leading physicists, and his staff moved from the University of California, Berkeley, to Los Alamos where he became scientific director of the facility’s laboratory with responsibility for the scientific and technical details of “Project Y.” The primary goals of the laboratory, which began operations in April 1943, were to determine the chemical and metallurgical properties of uranium-235 and

plutonium and then design and build an atomic bomb.

The University of California agreed to operate the Los Alamos facility under contract with the federal government, and the top priorities of “Project Y” became recruitment of some of the country’s “best scientific talent” for the technical staff and the construction of technical buildings in the laboratory’s various technical areas. Construction was constant at Los Alamos during the war as the facility’s population surged from 200 in July 1943 to 5,600 in December 1944 and to 8,200 by the end of World War II.

## STRUCTURES AND SITES

### Los Alamos Scientific Laboratory National Historic Landmark Structures

*Fuller Lodge*

*Baker House*

*Ranch School Guest House*

*Stone Powerhouse*

*Private Residences on Bathtub Row (five structures)*

*Memorial Shelter at Ashley Pond*

The Los Alamos Scientific Laboratory National Historic Landmark (NHL), designated in 1965, is located in the Los Alamos town site, outside of the Los Alamos Laboratory fence. Resources that contribute to the significance of the designated NHL include nine extant structures associated with the pre-World War II Los Alamos Ranch School that were appropriated for use by the Manhattan Project. Each of these resources retains a high degree of integrity.

One of the factors in the selection of Los Alamos was the presence of housing for thirty scientists. The ranch school buildings were

erected generally in the 1920s in the ranch house and bungalow styles. The former faculty residences were inhabited by the head scientists and nicknamed “Bathtub Row” due to their superior facilities. Dr. Robert Oppenheimer’s home was noted for social gatherings of scientists and the theoretical conversations that took place there under informal circumstances.

### **(Potential) “Project Y” Manhattan Project National Historic Landmark**

A national historic landmark (NHL) is a building, district, site, structure, or object that is officially recognized by the federal government for its national significance. All national historic landmarks are listed in the National Register of Historic Places. Of all the historic places from across the nation that are in the national register, only a small number have meaning to all Americans. These we call our national historic landmarks. National historic landmarks are initially identified through theme studies or individual nominations and are designated by the secretary of the interior based on recommendations by the National Park System Advisory Board.

Currently, a study is underway via contract to the Cultural Resources Team of the Ecology Group, Environmental Stewardship Division at the Los Alamos National Laboratory for preparation of a nomination form for a potential “Project Y” Manhattan Project National Historic Landmark. The potential national historic landmark would consist of the following five separate historic properties in various technical areas of the Los Alamos National Laboratory that retain a high degree of integrity and together provide compelling insights into the most significant aspects of “Project Y.”

### ***“Trinity Test” V-Site (TA-16)***

The V-Site, which was then part of TA-25<sup>1</sup>, contained an assembly bay, laboratory buildings, an equipment building, and a warehouse used for experimental work with special assemblies. This technical area, now part of TA-16, was used to conduct tests. In addition to this mockup testing, the V-Site was used by laboratory personnel to assemble the high explosives lens components of the Trinity device in 1945.

In 1999, the V-Site location was selected for restoration and interpretation by the “Save America’s Treasures” program, but the area suffered substantive damage from the May 2000 Cerro Grande fire. Only the Process/Inspection Building (TA-16-516) and the Process/Inspection/Equipment Building (TA-16-517) survived the fire. Both buildings have been determined eligible for listing in the National Register of Historic Places under Criterion A by the New Mexico State Historic Preservation Officer (A list of the National Register of Historic Places Criteria of Evaluation may be seen in appendix E).

### ***“Little Boy” Gun Site (TA-8)***

The “Little Boy” Gun Site (TA-8) contains three extant buildings and their adjacent landscape features—Laboratory and Shop (TA-8-1), Shop and Storage Building (TA-8-2), and Laboratory (TA-8-3)—that are associated with development and testing in support of the “Little Boy” bomb that was dropped on Hiroshima. The three concrete “bombproof” buildings—which were constructed into the bank of a small ravine and designed to be partially underground—formed part of the Anchor Ranch Proving Ground (historically known as the Anchor West Site). The Anchor Ranch Proving Ground was completed and in active use by mid-September 1943.

---

<sup>1</sup> “TA” is an abbreviation for “Technical Area”



In 2002, the Gun Site was selected for restoration and interpretation by the “Save America’s Treasures” program after the May 2000 Cerro Grande fire damaged the V-Site. The three buildings (TA-8-1, TA-8-2, and TA-8-3) have been determined eligible for listing in the National Register of Historic Places under criteria A and C by the New Mexico State Historic Preservation Officer.

***“Fat Man” Quonset Hut (TA-22)***

Building TA 22-1, known as the Assembly and Loading Building, is a Quonset hut that is often referred to as a Pacific-style hutment facility. TA-22 was primarily used for detonator research and development. Some test assembly work was also conducted at this technical area, and the high explosives components associated with the “Fat Man” plutonium implosion bomb that was dropped on Nagasaki were assembled in the Quonset hut in 1945.

TA-22-1 has been determined eligible for listing in the National Register of Historic Places under criterion A by the New Mexico State Historic Preservation Officer.

***“Plutonium Recovery” Concrete Bowl (TA-6)***

TA-6, known as the Two Mile Mesa Site, was used to conduct research on detonators and for engineering tests of high explosives assemblies. The technical area was also used to develop methods for recovering active material (plutonium) in the event the field test of the implosion device failed.

One of the most visible legacies of the testing program at TA-6 is the large 200-foot-diameter Concrete Bowl/Experimental Area (TA-6-37) which consists of a sloping, ground-level concrete pad with a drain in the center. The concrete bowl consists of 16 pie-

shaped wedges. The center of the bowl has a raised dome with a metal cover on top. Near the north side of the bowl is a wood-framed, gravel-filled ramp.

TA-6-37 has been determined eligible for listing in the National Register of Historic Places under criteria A and C by the New Mexico State Historic Preservation Officer.

***“Criticality Accident” Laboratory/Staging Area (“Slotin Building”) (TA-18)***

Technical Area 18, known as the Pajarito Laboratory (PL), served as the location for several different operations during the Manhattan Project. The Radioactivity Group first used Pajarito Canyon in mid-1943. TA-18 also contained usable buildings associated with Ashley Pond’s failed dude ranch, and the Pajarito Club, which had been abandoned in 1916. The Radioactivity Group used ionization chambers and amplifiers to study samples of plutonium and to determine counting rates from spontaneous fission. The work at TA-18 by Segre and others led to the abandonment of the plutonium gun bomb design in July 1944.

Pajarito Laboratory became the main site for critical assembly work at Los Alamos in April 1946. The decision to transfer critical assembly work to TA-18 was directly related to Harry Daghlion’s death on August 21, 1945, from radiation exposure at TA-2 (Omega Site). TA-18’s control “Battleship Buildings”—TA-18-2 and TA-18-3—were earth-covered bunkers used to conduct the implosion tests.

TA-18-1 has been determined eligible for listing in the National Register of Historic Places under criterion A by the New Mexico State Historic Preservation Officer.



0 5 MILES

NORTH



# MANHATTAN PROJECT

## HANFORD REACTOR B

### WASHINGTON

U.S. Department of the Interior • National Park Service  
DSC • 665/100654 • November 2009

# HANFORD RESOURCES

## BACKGROUND

During meetings in June and October 1942, scientists informed Army and Manhattan Engineer District officials of their tests with various carrier solutions in the chemical separations phase of plutonium production. Because the intense radioactivity generated in these experiments had impressed the scientists it was determined in December to shift plutonium production from Oak Ridge, Tennessee, to another location. In November, the E. I. du Pont de Nemours & Co., Inc., signed on as prime contractor to construct and operate the new facility, and the firm added its weight to the contention that plutonium production should take place far from the populated East and Midwest.

On December 14, 1942, Groves met with du Pont officials and two of his top assistants, Cols. Kenneth Nichols and Franklin Matthias, to develop site criteria for the new plutonium production facilities. The facilities would need to be built on a large and remote tract of land, with a “hazardous manufacturing area” of at least 12 by 16 miles and the area would need space for laboratory facilities at least eight miles from the nearest pile or separations plant. There should be no towns of 1,000 or more people closer than 20 miles from the hazardous rectangle, and there should be no main highway, railway, or employee village within ten miles. An abundant, clean water supply would be needed, as would a large electric power supply and ground that could bear heavy loads.

Three days later, Matthias and two du Pont engineers left to scout the western United States for such a site. When they had seen and explored the isolated dusty desert tract lying between the towns of White Bluffs, Hanford, and Richland in Benton County, Washington, they reported to Groves that the site was “far

more favorable in virtually all respects than any other. After a January visit, Groves concurred, and land acquisition proceedings began.

Once the land had been procured for what became known as the 560-square-mile Hanford Engineer Works (today known as the Hanford site), construction proceeded at a nearly unbelievable pace. Between groundbreaking in March 1943 and the end of World War II, 554 buildings not dedicated to living requirements were constructed at the Hanford site. Among the most prominent of these were B, D, and F Reactors; T, B, and U Processing Canyons; 64 underground, high-level waste storage tanks; and numerous facilities dedicated to fuel fabrication. The need for labor to operate the facilities turned Hanford into an atomic boomtown, with the population reaching some 50,000 by summer 1944. Thus, the prewar hamlet of some 400 people became a small bustling secret city in little more than a year’s time.

## STRUCTURES AND SITES

### B Reactor

The B Reactor (105-B Building), the first of three (the others were designated D and F) built and operated by du Pont at the sprawling Hanford Engineer Works during World War II, was the world’s first production-scale nuclear reactor, becoming operational in September 1944.

Construction began in October 1943 and in spite of the unproven technology and wartime constraints, the reactor was constructed and taken to criticality with complete success in 11 months. The industrial-scale B Reactor sprang from Enrico Fermi’s historic laboratory in Chicago, where he oversaw the construction of the world’s first chain-reacting pile in

December 1942. Although built for the short-term, the B Reactor continued to produce plutonium until it was deactivated in February 1968; thus, the quality of its design and construction far exceeded immediate wartime needs.

The B Reactor was listed in the National Register of Historic Places in 1992. In addition, B Reactor has received broad recognition for its historical and engineering importance. In 1976, it was listed as a National Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers. In 1993, the American Nuclear Society designated the reactor a Nuclear Historic Landmark, and in 1994, the American Society of Civil Engineers named it a National Civil Engineering Landmark. Historic American Engineering Record documentation of the B Reactor was prepared in 2000. In August 2008, the B Reactor was designated a National Historic Landmark.

On Feb 28, 2008, Department of Energy Deputy Secretary Clay Sells directed that the departmental policy be...

- to maintain the B Reactor in a state preserving its historical significance,
- to facilitate a decision on the NHL designation by the Department of Interior,
- to determine contractual modifications necessary to maintain the B Reactor rather than proceed to cocooning or dismantling the B Reactor structure surrounding the reactor core.

On March 10, 2008, the Advisory Council on Historic Preservation issued a statement in support of the Department of Energy policy statement on the preservation and interpretation of the B Reactor. (See "Appendix F: Relevant Correspondence and News Releases.")

## **T Plant, Chemical Separation Building**

Located in the Hanford Site Manhattan Project and Cold War Historic District is the T Plant, Chemical Separation Building (221-T Building), which has been identified by the Department of Energy as a Signature Facility of the Manhattan Project. Completed in December 1944, the T Plant was the world's first large-scale plutonium separation facility. The separation process required construction of a massive structure 800 feet long, 65 feet wide, and 80 feet high. Inside, a row of 40 concrete cells ran the length of the building. A single gallery, 60 feet high, ran the length of the building above the cells.

## **Hanford Site Historic District**

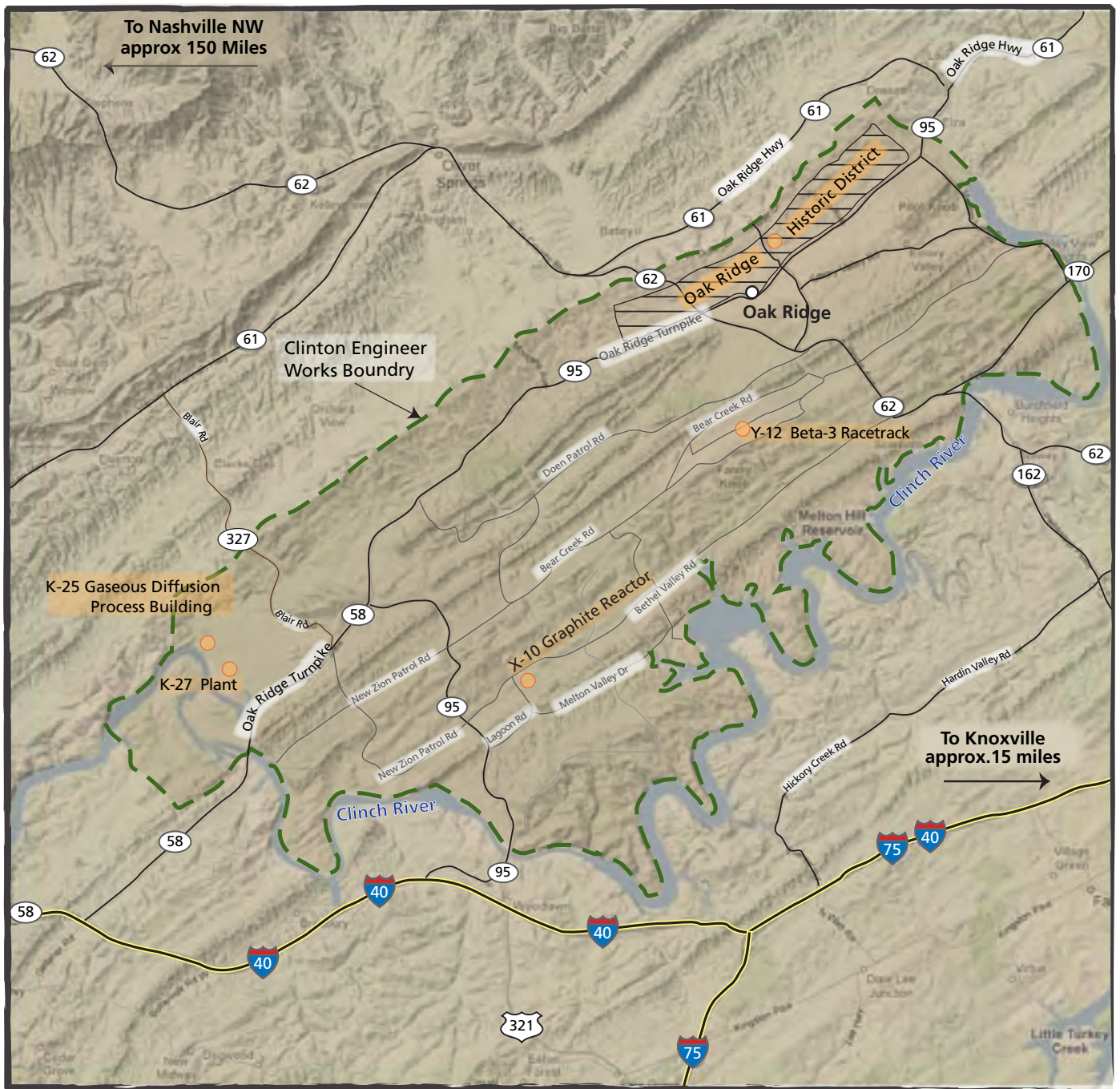
Establishment of the Hanford Site Manhattan Project and Cold War Era Historic District resulted in a determination that 528 Manhattan Project and Cold War-era buildings/structures and complexes were eligible for listing in the National Register of Historic Places. Of that number, 190 were recommended for individual documentation.

In July 1996, the Department of Energy identified a National Register of Historic Places-eligible Hanford Site Manhattan Project and Cold War Era Historic District that serves to organize and delineate the evaluation and mitigation of Hanford's plutonium production built environment. Standards for evaluating and mitigating the built environment were established in accordance with national register criteria. In August 1996 a programmatic agreement among the U.S. Department of Energy, Advisory Council on Historic Preservation, and Washington State Historic Preservation Office was approved by the signatory agencies to address management, maintenance, deactivation, alteration, and demolition of historic resources in the built environment at the Hanford site. In 1997 a National Register of Historic Places Multiple Property Documentation Form, "Historic, Archaeological, and Traditional Cultural Properties of the Hanford Site, Washington,"

was prepared to assist with the evaluation of national register eligibility of buildings and structures at the Hanford site. This document included historic contexts and themes that are associated with nuclear technology for national defense and non-military purposes,

energy production, and human health and environmental protection. The T Plant today is being modified as part of the cleanup process on the Hanford Nuclear Reservation.





0 3 MILES

NORTH



# MANHATTAN PROJECT

## OAK RIDGE NATIONAL LABORATORY

### TENNESSEE

U.S. Department of the Interior • National Park Service  
DSC • 665/100655 • November 2009

# OAK RIDGE RESOURCES

## BACKGROUND

The Oak Ridge Reservation on which Manhattan Project operations were located consisted of nearly 59,000 acres in Roane and Anderson Counties, Tennessee. The site was located 35 miles west of Knoxville in a remote rural area bordered by the Clinch River and a craggy mountain range known as Black Oak Ridge. The reservation was first known through the code name “Kingston Demolition Range” after Kingston, Tennessee, a town located south of the reservation. The reservation was soon renamed “Clinton Engineer Works” after Clinton, Tennessee, a town located to the north of the reservation. The site is now known as the Oak Ridge Reservation. The Oak Ridge National Laboratory does scientific research, and the Y-12 National Security Complex does primarily weapons-related work.

Oak Ridge, referred to as Site X, was the most complex of the three principal Manhattan Project sites because the government was searching for an area that could safely accommodate three major plant facilities as well as a townsite. The site met Groves’ selection criteria because its rural, isolated, and sparsely populated setting provided for security and minimized public awareness of the project. The site was located sufficiently inland from the nation’s coasts to be protected from enemy attack. Moreover, the ridge and valley system provided natural barriers between the three facilities as well as between the plants and the townsite. The reservation was located near the Tennessee Valley Authority’s hydroelectric plants at Norris and Watts Bar dams that provided an abundance of necessary electrical power, and the site was conveniently accessible by highway and railroad, thus amply providing for its transportation needs. Land for the site could be purchased at very low Depression-

era prices, and the Tennessee Valley region offered an abundant supply of “recruitable” non-farm labor. Approximately 3,000 people were displaced from the area because of development of the site for the Manhattan Project.

The Oak Ridge Reservation had four principal Manhattan Project components: the graphite pile (reactor), code named X-10; the electromagnetic plant, code named Y-12; the gaseous diffusion plant, code named K-25; and the town site or residential portion along Black Oak Ridge, named Oak Ridge. In April 1943, the X-10 site was officially named the Clinton Laboratories.

## STRUCTURES AND SITES

### X-10 Graphite Reactor National Historic Landmark

X-10, the first plutonium-producing graphite reactor in the world, was a precursor to the massive reactors that were later constructed at the Hanford site in Washington. When President Roosevelt authorized the Manhattan Project in 1942, the Oak Ridge site in eastern Tennessee had already been obtained and plans laid for an air-cooled experimental pile, a pilot chemical separation plant, and associated support facilities. The X-10 Graphite Reactor was built by E. I. du Pont de Nemours & Co., Inc., in ten months and went into operation at Oak Ridge on November 4, 1943. It used neutrons emitted in the fission of uranium-235 to convert uranium-238 into a new element, plutonium 239.

The reactor consists of a huge block of graphite, measuring 24 feet on each side, surrounded by several feet of high-density concrete as a radiation shield. The block is pierced by 1,248 horizontal diamond-shaped

channels. It was the first reactor and the first to produce significant amounts of heat energy and measurable amounts of plutonium, and it supplied the Los Alamos laboratory with the first significant amounts of plutonium.

The X-10 Reactor was listed in the National Register of Historic Places in 1965 and designated as a national historic landmark in 1966.

**K-25 Gaseous Diffusion Process  
Building/Site (Present-day East Tennessee  
Technology Park [ETTP])**

Begun in June 1943 and completed in early 1945, the K-25 plant was the largest, most costly building to be constructed for the Manhattan Project. The U-shaped facility measured 2,640 feet (one-half mile) by 1,000 feet. The K-25 Gaseous Diffusion Process Building/Site, located on the southwestern end of the Oak Ridge Reservation, used the gaseous diffusion method to separate uranium-235 from uranium-238.

In 1994, the Department of Energy contracted with the Jacobs Environmental Restoration Team to identify and evaluate national register eligibility for historic properties at the East Tennessee Technology Park in which the K-25 plant is currently located. The Jacobs Environmental Restoration Team, in consultation with the Tennessee State Historic Preservation Office, concluded that buildings comprising a nationally significant East Tennessee Technology Park Main Plant Historic District (K-25 Main Plant Historic District) as well as some associated buildings outside the district were eligible for listing in the national register.

**Y-12 Beta-3 Racetracks**

Built on the northeastern side of the Oak Ridge Reservation, the Y-12 Beta-3 Racetracks facility used the electromagnetic method to separate uranium-235 from natural uranium.

In 1995, the Department of Energy contracted with Thomason and Associates to identify and evaluate historic properties at the Y-12 Beta-3 Racetracks plant. Thomason and Associates after consultation with the Tennessee State Historic Preservation Office concluded that buildings associated with the Y-12 Plant Historic District, including the Y-12 Beta-3 Racetracks, were eligible for listing in the national register. This eligibility is based on the pioneering work with the production of enriched uranium and stable metallic isotopes that was conducted at Oak Ridge.

In August 2003, a programmatic agreement was ratified among the U.S. Department of Energy, Oak Ridge Operations Office, the National Nuclear Security Administration, the Tennessee State Historic Preservation Office, and the Advisory Council on Historic Preservation for the management, preservation, and interpretation of historic and cultural properties at the Y-12 National Security Complex.

In 1991, Thomason and Associates, a preservation consulting firm, prepared a Multiple Property National Register Documentation Form, "Historic and Architectural Resources of Oak Ridge, Tennessee," that covered the entire area of the original Oak Ridge Reservation. The keeper of the national register certified the form on September 5, 1991. This documentation explained historic contexts and concluded that historic districts and individual properties within the reservation that met national register criteria for significance and integrity and that those properties that were associated with the Manhattan Project and the Cold War were "nationally significant." Following this 1991 work, various historic properties within the original Oak Ridge Reservation associated with the Manhattan Project have been listed in the national register while others have been evaluated and determined eligible for national register listing.



## **Oak Ridge Historic District**

The Oak Ridge Historic District, which includes approximately six square miles of the original townsite, was listed in the national register for its association with the Manhattan Project and the Cold War. Skidmore, Owings, and Merrill (SOM), a Chicago architectural firm, developed an innovative plan for the townsite and used new materials and construction methods for the housing. Areas of significance for the historic district include (1) community planning and development; (2) architecture; and (3) military history. The national register listing includes the recommendation of the Tennessee State Historic Preservation Office that the district is “nationally significant.”

The district includes 3,716 contributing historic resources that have significant associations with the Manhattan Project and the Cold War. Contributing resources include various housing types (houses, temporary dwelling units, apartment buildings, and dormitories), schools, churches, and commercial buildings that retain varying degrees of integrity ranging from fair to good.

The Oak Ridge Historic District reflects the wartime efforts of the federal government, working with and directing private firms, to build and manage a secret community of some 81,000 residents with the sole purpose of successfully completing the goal of the Manhattan Project.

## **Individually Listed Historic Properties at Oak Ridge**

Historic properties individually listed in the National Register of Historic Places that are associated with the Manhattan Project include the following properties:

**Luther Brannon House** – Pre-World War II-era house used as residence and Manhattan Project headquarters by Gen. Leslie Groves throughout winter of 1942-43

**Freels Cabin** – Pre-World War II-era log house used as a picnic area for Manhattan Project employees

**J.B. Jones House** – Pre-World War II-era house probably used as residence for Manhattan Project employees

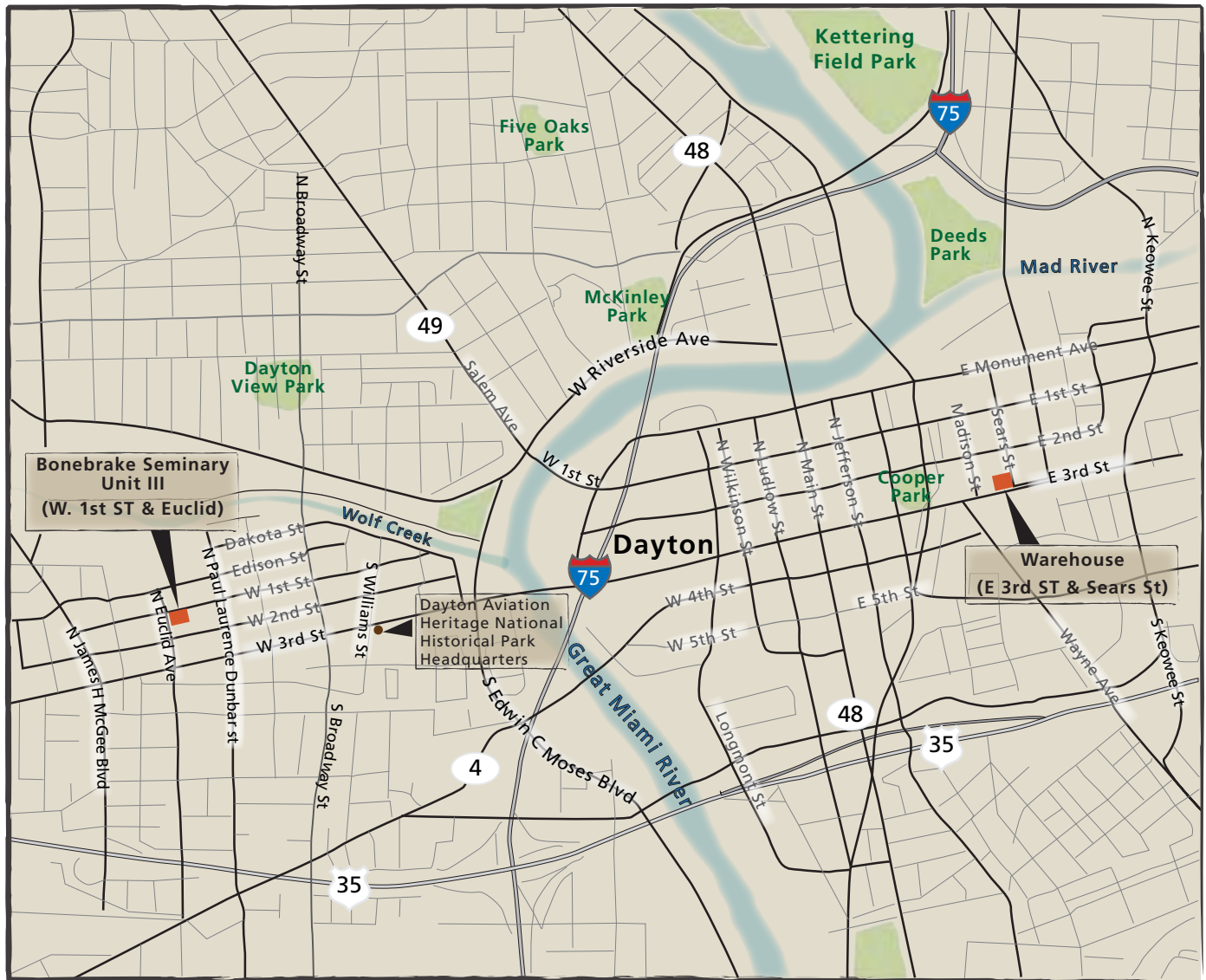
**New Bethel Baptist Church** – Pre-World War II-era church used as a wartime meeting room for Manhattan Project scientists

All four of these historic properties, which retain a high degree of integrity, were recommended for national register listing as “nationally significant” by the Tennessee State Historic Preservation Officer. Nevertheless, it should be noted that these structures had relatively minor associations with the Manhattan Project.

## **Oak Ridge National Laboratory Historic District**

In 1993, the Department of Energy contracted with DuVall & Associates, Inc., to identify and evaluate historic properties within the boundaries of the present-day Oak Ridge National Laboratory. Fieldwork and research were undertaken by Martha Carver and Margaret Slater, architectural historians/historic preservation specialists working with DuVall & Associates, Inc.

Carver and Slater, in conjunction with Department of Energy personnel and in consultation with the Tennessee State Historic Preservation Office, concluded that a number of historic structures within the laboratory boundaries having Manhattan Project and Cold War associations and varying degrees of integrity ranging from fair to good were “nationally significant” and eligible for listing in the national register. These properties included an Oak Ridge National Laboratory Historic District that incorporates the X-10 Graphite Reactor.



0 0.5 MILE

NORTH



# MANHATTAN PROJECT

## DAYTON WAREHOUSE AND SEMINARY

### OHIO

U.S. Department of the Interior • National Park Service  
DSC • 665/100656 • November 2009

## DAYTON RESOURCES

### BACKGROUND

During World War II critical Manhattan Project research occurred in and around Dayton, Ohio. General Groves contracted with the Monsanto Chemical Company, which had its central research facilities in Dayton, to refine and produce polonium for a polonium-beryllium initiator, a component essential for creation of a fission chain reaction and detonation of a plutonium-based atomic bomb.

Monsanto managed projects at four units around Dayton, three of which were associated with the “Dayton Project.” These included Unit I, Central Research Department headquarters (demolished); Unit III, the former site of the Bonebrake Theological Seminary; and Unit IV, the Runnymede Playhouse site (demolished). Monsanto also used the top three floors of the six-story 1912 J. K. McIntire Company Building (referred to as the “Warehouse” by Monsanto) from 1946 to 1948 to conduct research on the biological effects of polonium. None of the units or the McIntire Building is a designated national historic landmark, and no NHL evaluation of these sites is currently underway. The numbering system for “units” was developed by Monsanto to identify the company’s project sites. Work performed at Unit II did not relate to the Manhattan Project.

In 1948, an internal history of the Manhattan Project stated that the “research, development, and production work on polonium for the gun initiator program was of incalculable value in the later development of the initiator (or “urchin”) for the implosion bomb, and was perhaps essential to the success of the bomb.” Further testimony to the significance of the Dayton research was provided by Gen. Groves in an August 1945 letter to Monsanto chairman Edgar M.

Queeny. In the letter, which was printed in *Monsanto Magazine*, Groves observed that...

*... I want you to know that Dr. C.[harles] A. Thomas and his associates made a major contribution to our success. Dr. Thomas personally coordinated a very important phase of the chemical research pertaining to the project; he also completed vital research and solved production problems of extreme complexity without which the atomic bomb could not have been [developed].*

Thomas, director of central research for the Monsanto Company, was one of only fourteen scientists awarded a Medal for Merit by President Harry S Truman for contributing to the development of atomic weaponry. In early 1943, Groves offered Thomas the opportunity to be co-director of the Los Alamos Scientific Laboratory with J. Robert Oppenheimer and to have responsibility for all Manhattan Project chemistry and metallurgy, an offer Thomas declined since he did not want to take a leave of absence from Monsanto. Later Thomas accepted an assignment to coordinate the Manhattan Project’s chemistry and metallurgy research while remaining an active Monsanto employee.

By the summer of 1943, Manhattan Project scientists realized that a trigger combining the radioactive element polonium with beryllium provided the best source of subatomic neutrons necessary to trigger an atomic explosion in a plutonium bomb. However, before the commencement of the Manhattan Project, techniques for the mass-production of polonium did not exist. Oppenheimer turned to Thomas, assigning him and Monsanto responsibilities for developing procedures for polonium separation and production. Thus, beginning during the summer of 1943 Monsanto’s central research facilities at Dayton became the site for

concerted research and industrial development of polonium—the “Dayton Project.”

## **STRUCTURES AND SITES**

### **Unit I – Central Research Department Headquarters**

Logistical organization and personnel recruitment for the Dayton Project began during the summer of 1943 at Monsanto’s Central Research Department headquarters at 1515 Nicholas Road, a facility designated Unit I. This 10-acre site south of Dayton near the Great Miami River had been one of Monsanto’s agricultural products facilities. Monsanto provided space for a scientific library, supply rooms, and, initially, a small laboratory where x-ray and spectrographic work on polonium were conducted in the seven-building complex. Thomas and his assistants soon found that Unit I provided insufficient space for research into polonium refinement and production and began searching for a larger research and production facility. As a result of its search, Monsanto leased the building and grounds of the former Bonebrake Theological Seminary in west Dayton for what became Unit III.

During the early 1980s, Monsanto razed the Unit I buildings and further expanded its facility to the northeast. Today, a DuPont subsidiary, QCI/Chemfirst, operates the modern 20-acre chemical plant. The southwestern corner of the site where the World War II-era buildings were located consists of a fenced-in area planted in grass.

### **Unit III – Former Bonebrake Theological Seminary Site**

The Unit III site includes six buildings constructed by the Monsanto Company for polonium research, extraction, and refinement.

Six of the Manhattan Project-era concrete block buildings—facilities that housed the machine shop; boiler house; laundry/glass

blowing shop/decontamination facility; purchasing, safety/security, cafeteria; locker rooms/janitorial/laboratories; and laboratories—along with a guardhouse and the chain-link fence that encircled the property remain extant. These structures include most of the laboratory buildings where Monsanto employees conducted experiments in the refinement of polonium as well as support structures for machining equipment, blowing glass, and ensuring site security. In 1944, Unit III employees developed the first process that refined measurable, usable quantities of polonium, which was used in triggering devices.

In 1950, Monsanto returned Unit III to the Dayton Board of Education, which resumed using it as a maintenance facility for the city’s school system. The board razed the central Bonebrake Seminary building after 1955; however, most of the surrounding concrete block buildings constructed by Monsanto to support the Manhattan Project remain. The six structures, which were used for Dayton Project research and production during 1943-1948, retain their World War II quickly-built exterior architectural character. On June 7, 2006, Dayton Project Unit III was listed in the National Register of Historic Places with a state level of significance for its association with the Manhattan Project and the development of atomic weaponry in the United States. Staff at Dayton Aviation Heritage National Historical Park contacted staff with the national register program at the Ohio Historical Society to discuss changing Unit III’s level of significance to “national.” These discussions continue, and this possibility is currently under review.

### **Unit IV – Runnymede Playhouse Site**

Although Unit III provided adequate space for initial research and refinement, its facilities proved inadequate for extensive polonium production. Polonium has a short half-life (138.39 days), and the U.S. military required a constant supply of the element to ensure that initiators for its atomic bombs remained

active. Moreover, by February 1944, the Dayton Project employed nearly 200 individuals, and additional workspace was needed. Thomas turned to the family of his wife, Margaret Talbott, for this space. Her parents owned “Runnymede,” an estate in the affluent Dayton suburb of Oakwood. Prior to 1944, the Talbotts demolished the Runnymede mansion, but an outbuilding—the Playhouse—still stood on a 3.8-acre tract just south of the Talbott estate.

Because Thomas’ mother-in-law was unwilling to loan her family’s facilities to Monsanto, the federal government condemned the property. In March 1944, Secretary of War Henry Stimson used the Emergency Powers Act to acquire the Playhouse property. After significant repairs and alterations were made to the Playhouse it became the primary Dayton Project site for the production of polonium.

The test bomb detonated at the Trinity Site on July 16, 1945, in the world’s first nuclear explosion, used Dayton polonium in its Mark 3 trigger. Dayton-produced polonium also was used to trigger the “Fat Man” bomb that was dropped on Nagasaki. Today, the Runnymede Playhouse property is a landscaped residential site that features two modern homes and bears no evidence of its World War II-era uses.

### **J. K. McIntire Company Building**

In 2006, the J. K. McIntire Company Building, a six-story brick warehouse that had been constructed in 1912 at 601 East Third Street in Dayton, was listed in the National Register of Historic Places as a contributing resource to the Dayton Power and Light Building Group. This district was listed in the national register

with a local level of significance for its association with the industrial and commercial expansion of Dayton during the late 19th and early 20th centuries and for its architectural contribution to the building development of industrial and commercial architecture along East Third Street. The 2006 national register registration form, an addendum to the original nomination of the historic district, also states that the McIntire Building is significant for its association “with the investigation into the element polonium and its biological aspects associated with human contact.”

Research into polonium at Unit III and its production at Unit IV brought workers into contact with significant amounts of radioactive material that required attention to personnel health and safety. Monsanto opened a clinical laboratory at Unit III in February 1945, and Bernard Wolfe, an army physician, joined the Dayton Project that April to establish better monitoring and testing procedures. Monsanto implemented various policies, such as requiring workers to handle polonium through glove-ports, submit weekly urine samples, and shower and wash their hands in a diluted hydrochloric acid solution before leaving the site.

Two upper floors in the J. K. McIntire Company building were used for the monitoring and testing of Dayton workers from Unit III and Unit IV.

### **Charles A. and Margaret T. Thomas Home**

From 1933 to 1945, Charles and Margaret Talbott Thomas lived at 6088 Mad River Road in Washington Township south of the Dayton city limits. Dr. Thomas lived in this house while directing Manhattan Project work in Dayton. The house is still standing.



# EVALUATION OF SIGNIFICANCE, SUITABILITY, AND FEASIBILITY



OAK RIDGE, GRAPHITE REACTOR CONTROL PANEL



LOS ALAMOS, CONCRETE BOWL



HANFORD, B REACTOR PLANT





# EVALUATION OF SIGNIFICANCE

## INTRODUCTION

The Manhattan Project was a highly significant chapter in America's history that expanded scientific research, developed new technologies, and changed the role of the United States in the world community. This focused effort, combining military and scientific resources and involving hundreds of thousands of workers at multiple sites, was kept secret and out of public view for the duration of the project.

To be considered nationally significant, under §1.3.1 of NPS *Management Policies 2006* a proposed addition to the national park system must meet all four National Park Service criteria.

National Park Service management policies also mandate that national significance for cultural resources be evaluated by applying the national historic landmarks criteria for national significance contained in 36 CFR Part 65.

To be considered nationally significant, the Manhattan Project sites and their stories must meet at least one of the six national historic landmark criteria in addition to all four of the national park system criteria. It is important to keep in mind that significance is being evaluated in this section from a holistic or comprehensive point of view, not from an individual site or structure standpoint (although these sites have resources that can be considered significant in their own right).

## NATIONAL PARK SERVICE CRITERIA

### ***Criterion 1: An Outstanding Example of a Particular Type of Resource***

Taken together, Los Alamos, Oak Ridge, Hanford, and Dayton are integral elements that contribute to the outstanding resource

that is the Manhattan Project. These sites illustrate the expansion of science and technology through the application of untested scientific theory to the creation of a specific weapon that changed the role of the United States in the world community.

Many of the structures and sites at Los Alamos, Hanford, and Oak Ridge are listed or proposed for listing in the National Register of Historic Places and several are designated national historic landmarks or may have the potential for becoming national historic landmarks (see table 1). In addition, several of the sites are listed as Department of Energy Signature Facilities (see "Related Plans and Studies" section and table 1). These designations all support the finding that these sites contributed to the outstanding resource that is the Manhattan Project story.

The Dayton sites also contribute to the full story of the Manhattan Project and thus are part of the outstanding resource. Dayton is representative of many other areas around the nation that were part of the Manhattan Project. Dayton is illustrative of the dispersed, compartmentalized nature and secrecy of the project. While the work at Los Alamos, Hanford, and Oak Ridge was kept secret largely due to their geographic isolation, the secret work at Dayton was done in an urban environment and thus represents many of the other communities across the country that contributed to the project.

### ***Criterion 2: Possesses Exceptional Value or Quality in Illustrating or Interpreting the Natural or Cultural Themes of Our Nation's Heritage***

The Los Alamos, Oak Ridge, Hanford, and Dayton sites associated with the Manhattan Project possess exceptional value in illustrating and interpreting two of the most significant themes in the history of the United

States: “Expanding Science and Technology” and “Changing Role of the United States in the World Community.” The sites provide many opportunities to learn about how the Manhattan Project contributed to an understanding of nuclear physics and other sciences, the application of science, the war effort, the effects of radiation, the ethics of weapons of mass destruction, the ramifications of nuclear proliferation, and the importance of basic scientific research to national security. Enough structures, buildings, and other remnants remain at the four areas to interpret these themes. In addition, museum collections (photos, documents, and exhibits) describe the years of the Manhattan Project at all of the sites. The exceptional value of the sites for interpretation is supported by the Department of Energy’s designation of Signature Facilities (see pages 7-8) and the extensive writings about the Manhattan Project, including the Los Alamos, Oak Ridge, and Hanford sites.

***Criterion 3: Offers Superlative Opportunities for Public Enjoyment or for Scientific Study***

Structures and sites associated with the Manhattan Project continue to exist at Los Alamos, Oak Ridge, Hanford, and Dayton. While some of these properties have limited or no public access because of security and safety concerns, or are under private ownership in the case of Dayton, others are publicly accessible and provide opportunities for the public to see key sites that formed the core of the Manhattan Project. As described in “Part Five: The Affected Environment,” visitors can enjoy tours at Los Alamos, Oak Ridge, and Hanford, and visit museums at the three sites that showcase various elements of the Manhattan Project. Descriptions of the resources currently available at each site are detailed in “The Affected Environment” section of this document. Nowhere else can visitors get a grasp of and appreciate the magnitude and scope of the Manhattan Project. The areas’ project archives and collections also provide superlative

opportunities for researchers to study the history of the Manhattan Project.

***Criterion 4: Retains a High Degree of Integrity as a True, Accurate, and Relatively Unspoiled Example of the Resource***

The properties at Los Alamos, Oak Ridge, Hanford, and Dayton retain salient architectural, industrial, and technological characteristics and features associated with their period of significance. Sites at Los Alamos, Hanford, and Oak Ridge also retain a high degree of integrity as relatively unspoiled elements of the Manhattan Project story. The high degree of integrity of these sites is supported by designation or proposal to list many of the facilities in the National Register of Historic Places, designation or proposal for designation as national historic landmarks, and designation by the Department of Energy as Signature Facilities.

**Los Alamos Sites**

One district in the Los Alamos town site—the Los Alamos Scientific Laboratory—is a designated national historic landmark. Resources that contribute to the significance of the national historic landmark include nine existing structures associated with the pre-World War II Los Alamos Ranch School that were appropriated for use by the Manhattan Project. These resources, all of which retain a high degree of integrity, are (1) Fuller Lodge; (2) Baker House, directly north of the Lodge; (3) Stone Powerhouse; (4) five private residences which historically constituted “Bathtub Row”; and (5) Memorial Shelter at Ashley Pond.

Currently, a study is underway to prepare a nomination form for a potential “Project Y” Manhattan Project National Historic Landmark. The potential national historic landmark would consist of five separate historic properties in various technical areas of the Los Alamos National Laboratory that retain a high degree of integrity and together provide compelling insights into the most

significant aspects of “Project Y.” These properties include the following:

- “Trinity Test” V-Site in TA-16
- “Little Boy” Gun Site in TA-8
- “Fat Man” Quonset Hut in TA-22
- “Plutonium Recovery” Concrete Bowl in TA-6
- “Criticality Accident” (Slotin Building) in TA-18

### **Hanford Sites**

In 1996, the Hanford Site Manhattan Project and Cold War Era Historic District (the contributing resources of which retain varying degrees of integrity) was determined eligible for listing in the national register via a programmatic agreement among the Department of Energy, Advisory Council on Historic Preservation, and Washington State Historic Preservation Office. The T Plant, Chemical Separation Building, which is a contributing resource to the significance of the historic district, is believed to retain a high degree of integrity, however it has not yet been assessed by the National Historic Landmark program.

Hanford’s B Reactor, the world’s first industrial-scale nuclear reactor, was designated a national historic landmark in August 2008.

### **Oak Ridge Sites**

The X-10 Graphite Reactor retains a high degree of integrity and has been designated a national historic landmark. Although initially determined eligible by the Advisory Council on Historic Preservation and its panel of historic preservation experts, the K-25 Gaseous Diffusion Process Building has been further assessed for integrity and the National Historic Landmark program concluded that the K-25 plant does not retain a high enough degree of integrity for NHL designation. The Department of Energy has removed significant portions of the K-25 building as part of its cleanup efforts; thus, this structure has lost much of its integrity. The building

likely will be completely demolished over the next several years. The Y-12 Beta 3 Racetracks facility is also qualified (eligible) for NHL designation based on an initial evaluation; however, a preliminary assessment of integrity for the racetracks facility is still pending.

The Oak Ridge National Laboratory Historic District, which includes the X-10 Graphite Reactor and various other historic structures with significant Manhattan Project and Cold War associations, retains varying degrees of integrity ranging from fair to good. This historic district has been determined eligible for listing in the National Register of Historic Places and recommended by the Tennessee State Historic Preservation Office as having “national significance” related to national register listing.

In addition, the contributing resources in the Oak Ridge Historic District and four individually listed historic properties in Oak Ridge (Luther Brannon House, Freels Cabin, J.B. Jones House, and New Bethel Baptist Church) are listed in the National Register of Historic Places and recommended by the Tennessee State Historic Preservation Office as having “national significance” because they are associated with the Manhattan Project and the Cold War. While the individually listed properties retain a high degree of integrity, they had relatively minor associations with the Manhattan Project. The resources that contribute to the significance of the Oak Ridge Historic District retain varying degrees of integrity ranging from fair to good.

### **Dayton Sites**

Dayton Project Unit III and the McIntire Building have been listed in the National Register of Historic Places. Unit III retains a high degree of integrity; the McIntire Building retains integrity to an earlier time period, but may retain little integrity to the Manhattan Project period.

## **NATIONAL HISTORIC LANDMARK CRITERIA**

In order to be designated a national historic landmark, cultural resources like the Manhattan Project sites must retain a high degree of integrity and also meet at least one of the national historic landmark criteria for national significance. The Los Alamos, Oak Ridge, Hanford, and Dayton sites meet three national historic landmark criteria for national significance.

### ***Criterion 1: Associated with Events That Have Made a Significant Contribution to the Broad National Patterns of U.S. History***

The Manhattan Project transformed the world of science and technology and ultimately ushered in the atomic age and the modern information age as well as the threat of nuclear war and associated social and political uncertainties. A panel of experts convened by the Advisory Council on Historic Preservation concluded in 2001 that the development and use of the atomic bomb during World War II was “the single most significant event of the 20th century.” All of the sites being studied were integral elements and contributed to the story of the Manhattan Project, and thus made a significant contribution to U.S. history.

### ***Criterion 2: Associated Importantly with the Lives of Persons Nationally Significant in the History of the U.S.***

Some 130,000 people were associated with the Manhattan Project, all of whom to varying degrees were responsible for the story and

success of the project. Individuals who were nationally important and who visited or were associated with the four sites included General Leslie Groves, J. Robert Oppenheimer, Hans Bethe, Edward Teller, Ernest Lawrence, and Enrico Fermi.

### ***Criterion 3: Represent Some Great Idea or Ideal of the American People***

The Manhattan Project embodies several great American ideas or ideals, including the following:

- winning the race (in this case beating the Germans to build the first nuclear bomb)
- promoting innovative science
- believing in the American “can do” spirit
- uniting to achieve a common cause

As integral parts of the Manhattan Project, all four sites contributed to the above ideas or ideals.

## **CONCLUSION**

The Manhattan Project story and related resources meet the criteria to be considered nationally significant for the designation of a national park unit. As important contributors to the Manhattan Project, the four study sites, taken together, meet all four of the national park system criteria for national significance. In addition, a number of historic resources located at these sites also meet three of the six national historic landmark criteria.

Table 1: Summary of Status of Manhattan Project Sites

Site	Designated National Historic Landmark	Properties Having Potential for Being Designated a National Historic Landmark	Listed in the National Register (Non-NHL)	Determined Eligible (but not formally listed) in the National Register	Department of Energy Signature Facility
<b>Los Alamos</b>	Los Alamos Scientific Laboratory National Historic Landmark (includes Fuller Lodge, Baker House, Stone Powerhouse; 5 Private Residences on Bathtub Row, and Memorial Shelter)	“Project Y” Manhattan Project National Historic Landmark [draft nomination currently being prepared] (1) “Trinity Test” V-Site (2) “Little Boy” Gun Site (3) “Fat Man” Quonset Hut (4) “Plutonium Recovery” Concrete Bowl (5) “Criticality Accident” Laboratory/ Staging Area (“Slotin Building”) (6) Addition of Pond Cabin under consideration	None	(1) “Trinity Test” V-Site (2) “Little Boy” Gun Site (3) “Fat Man” Quonset Hut (4) “Plutonium Recovery” Concrete Bowl (5) “Criticality Accident” Laboratory/ Staging Area (“Slotin Building”)	(1) “Trinity Test” V-Site (2) “Little Boy” Gun Site
<b>Hanford</b>	B Reactor became an NHL in 2008		None	Hanford Site Manhattan Project and Cold War Era Historic District	(1) B Reactor (2) T Plant, Chemical Separation Building

PART THREE: EVALUATION OF SIGNIFICANCE, SUITABILITY, AND FEASIBILITY

Site	Designated National Historic Landmark	Properties Having Potential for Being Designated a National Historic Landmark	Listed in the National Register (Non-NHL)	Determined Eligible (but not formally listed) in the National Register	Department of Energy Signature Facility
<b>Oak Ridge</b>	X-10 Graphite Reactor National Historic Landmark	None	(1) Oak Ridge Historic District (includes - Luther Brannon House; Freels Cabin; J.B. Jones House; New Bethel Baptist Church (2) Woodland-Scarboro Historic District	(1) K-25 Gaseous Diffusion Process Building (2) Y-12 Beta-3 Racetracks (3) Oak Ridge National Laboratory Historic District	(1) X-10 Graphite Reactor (2) K-25 Gaseous Diffusion Process Building (3) Y-12 Beta-3 Racetracks
<b>Dayton</b>	None	None	(1) Dayton Project Unit III (2) McIntire Building	Undetermined	None

# EVALUATION OF SUITABILITY

## INTRODUCTION

An area is considered suitable for addition to the national park system if it represents a natural or cultural resource type that 1) is not already adequately represented in the national park system, or (2) is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

## RESOURCE TYPE – THEMATIC FRAMEWORK

Suitability is determined on a case-by-case basis by comparing and contrasting the study area with similar resources using the thematic categories defined in the *Revision of the National Park Service's Thematic Framework, 1996*.

Servicewide interpretive themes and theme sub-topics provide a framework that connects interpretation at all national park system units directly to the overarching mission of the National Park Service. In response to a congressional mandate to ensure that the full diversity of American history and prehistory is expressed in the National Park Service's identification and interpretation of historic properties, the bureau has developed a *Thematic Framework* (1996) of historical themes, which is included in appendix G. This classification is fundamental to the comparative analysis necessary in making judgments of the relative significance of resources.

Each of the themes identified below rest on a framework of topical sub-themes that are used to describe and explain the significance of the primary theme.

Manhattan Project sites are associated with two of the themes listed in the *Framework*:

- Expanding Science and Technology
- Changing Role of the United States in the World Community

### Expanding Science and Technology

This theme focuses on science, which is modern civilization's way of organizing and conceptualizing knowledge about the world and the universe beyond. Within this theme several sub-themes clarify and expand on the impacts of the science of nuclear energy and the atomic bomb. These sub-themes help to explain the Manhattan Project's importance through the physical sciences, the social sciences, and medicine.

Technology is the application of human ingenuity to modification of the environment in both modern and traditional cultures. In the case of the Manhattan Project, the basic science necessary to develop the bomb had not been fully developed at the beginning of the war. Experimentation and development were necessary to advance the science to a point where it was possible to design and deliver a functioning weapon to its target.

Relevant subthemes used to give explanation to the theme include the following:

### **Experimentation and Invention**

The sub-theme focuses on the new types of experimentation utilizing heretofore untested technology and methods for first identifying and then separating and assembling fissionable substances derived from naturally occurring parent materials into an atomic bomb.

Experimentation often required the invention of new technology to be developed such as nuclear reactors, particle accelerators,

triggering devices, and cyclotrons in order to determine the correctness of the scientist's theoretical formulations. Throughout the development of the atomic bomb, experimentation with known substances and properties, such as ballistics and the science of conventional explosives, was often necessary. Extending physicists' knowledge in these fields was critical in developing the mechanisms for both the implosion type and gun type nuclear weapon designs.

Nuclear fission was first experimentally achieved by Enrico Fermi in 1934, although he was not aware of it at the time. Not until late 1938 was the fission process described, and numerous scientists soon recognized that if fission reactions released additional neutrons, a self-sustaining nuclear chain reaction could result. This led to further uranium research, the discovery of plutonium, and the founding of the Manhattan Project.

Manhattan Project research and development efforts resulted in the creation of the first manmade reactor, known as Chicago Pile-1, which achieved criticality on December 2, 1942. The X-10 Graphite Reactor soon followed at Oak Ridge, producing the first significant amounts of plutonium. The B Reactor and two other full-scale production reactors at the Hanford site were built to produce plutonium for use in the Trinity device and the weapon dropped on Nagasaki. A parallel effort to separate uranium 235 from uranium 238 was pursued at Oak Ridge, resulting in the electromagnetic method used at the Y-12 site and the gaseous diffusion method used at the K-25 site. Research at Dayton focused on the production of polonium, which was used to detonate plutonium bombs.

Many of the theoretical propositions ultimately were demonstrated through experiments carried out in the buildings that made up the Los Alamos compound. One theoretical idea requiring extensive experimentation was in the development of a

plutonium bomb. This bomb required that high explosives be used to generate a spherical implosion creating a uniform wrap of high pressure and pushing sub-critical pieces of plutonium together to achieve a critical mass. The bomb designers at Los Alamos turned to this experimental implosion work, initiated by Seth Neddermeyer, when it was determined that the much simpler gun method could not be used for the plutonium bomb.

### ***Technological Applications***

This subtheme reflects the scientific applications ultimately arising from the development of the atomic bomb. What is certainly the most identifiable outgrowth of the Manhattan Project resulted from the need to determine whether a self-sustaining nuclear fission reaction could in fact occur. This was a necessary precursor to understanding whether a catastrophic release of energy in the form of a fission bomb was possible. A self-sustaining reaction was finally realized when Enrico Fermi demonstrated the first self-sustaining nuclear chain reaction with the development of a graphite-contained fission reactor at the University of Chicago.

Although originally developed in order to understand a nuclear chain reaction, a nuclear reactor first generated electricity on December 20, 1951. The original purpose for developing both the graphite reactor of the type first built at Chicago (which became more popular in the Soviet Union), and a water-cooled reactor such as the B Reactor, was the enrichment of uranium to plutonium and not for electrical power generation. In the post war world, the B Reactor would have implications for the future of commercial production of electricity. In the B Reactor, the heat generated by the enrichment of uranium to plutonium was an unneeded by-product. However, it was soon realized that in commercial reactors the water could be used to transfer the heat away from the nuclear reaction to create the steam necessary to spin the turbines used to generate electricity.



The unique characteristics of nuclear materials have found application in many areas unrelated to the traditional nuclear fields. In particular, radioisotopes—either naturally occurring or manufactured—have found broad application in tools, gauges, and imaging machines. Such equipment has been used by a diverse range of occupations including law enforcement, the oil industry, archeology, farming, and the manufacturing of common consumer products. Many of these radioisotopes and the kinds of radiation they generate were first created at the Hanford and Oak Ridge sites.

### ***Scientific Thought and Theory***

The road to Los Alamos began in 1895 with the discovery of X-rays by the German, Wilhelm Roentgen. From his work came the discovery of radiation by Antoine Becquerel in 1896, and the discoveries of radium and polonium by Marie and Pierre Curie in 1898. In 1905, Albert Einstein published the first of his seminal papers on relativity. In 1911, Ernest Rutherford conducted experiments at the University of Manchester describing atoms as "miniature universes." The Danish physicist Niels Bohr expanded Rutherford's findings and in 1913 published the first of three articles on the structure of the atom. Bohr's work created the discipline of quantum mechanics, the foundation of modern physics.

The birth of modern physics created a rich environment for the study of physical processes in nature. Werner Heisenberg discovered the uncertainty principal in 1927. Wolfgang Pauli formulated the exclusion principle in 1924 and deduced the presence of the neutrino in 1930. Harold Urey discovered deuterium in 1931. J. Robert Oppenheimer, the man who would lead Los Alamos during World War II, postulated the existence of black holes in the cosmos. Most importantly, James Chadwick discovered the neutron in 1932. The discovery of the neutron made possible the exhaustive investigation of the nucleus. Having a neutral electrical charge, the neutron could easily penetrate the negatively

charged electron shell and the positively charged nucleus of an atom and provide a wealth of data about the nuclear properties of elements.

The discovery of fission in late 1938 and the founding of the Manhattan Project were direct consequences of this pioneering work during the previous 45 years. Early Manhattan Project theoretical research took place largely in university laboratories. Later, the bulk of the theoretical work was concentrated in Los Alamos. Although the other three sites also needed a theoretical understanding of the work they were engaged in, locations like Oak Ridge and Hanford were where the theoretical became real. Even the need for polonium as a reaction initiator, a necessary component of the "Fat Man" bomb and refined and produced at the Dayton site, was conceived of at Los Alamos. Work at Los Alamos would go on to provide the foundation for new areas of scientific investigation and would have an impact on commercial interests in the post war years.

### ***Effects on Lifestyle and Health***

The Manhattan Project would ultimately have a profound effect on America. For years after the first atomic bomb was dropped on Japan, Americans struggled to come to terms with the knowledge that a new era in human history had begun. However, it would take years to understand the societal changes resulting from the development and use of the bomb. The post war era would result in great scientific advances such as nuclear medicine and social change, impacting numerous aspects of popular culture during the late 1940s and 1950s.

Fear of nuclear warfare and the adverse effects of atomic radiation pervaded popular film, literature, and other forms of mass culture. The word atomic began showing up in society in as different situations as food, movies, and even the names of motels.

America's post-World War II period is often portrayed as a time of affluence and contentment, but fear of atomic war also marked the era and affected the decisions Americans made about their lives and futures. Fear of atomic bomb attacks on the nation's cities helped motivate people to move to the relative safety of the suburbs. Some Americans built fallout shelters to protect their families while others, shocked by the prospect of nuclear annihilation at any moment, sought to live for the present.

In the months and years after the bombing of Japan, the "Atomic Age" provided writers with the inspiration for stories that conveyed political and moral messages and asked movie audiences to come to grips with the event's meaning and consequences. Some writers dramatized the horrors of atomic war in the hope that public awareness of nuclear annihilation would help prevent Armageddon. Others supported the growth of an American nuclear arsenal as a way to discourage foreign attack. They portrayed the Soviet Union, which had developed its own nuclear capacity after the war, as an aggressor nation that forced the United States into a position of nuclear retaliation against the evil Communist empire.

Positive portrayals of atomic bomb blasts existed as well, along with toys and games that made light of the destruction that could be wrought by an atomic bomb attack. In some cases these games may even have helped diffuse some of the fear the Americans felt about the bomb by desensitizing them to the devastation an atomic bomb could cause.

It was also during this period that the development of the field of nuclear medicine began. Nuclear medicine, a branch of diagnostic medicine and medical imaging, uses the nuclear properties of matter in identifying illness as well as in potential therapies. Certainly the best known example of this is radiation therapy wherein an attempt is made

to selectively destroy cancer cells in the human body.

The amalgam of scientists, civilian workers, and military personnel necessary to bring the Manhattan Project to a successful conclusion forged a new understanding of physics and impact on the popular culture in the United States. Nuclear power was too great to ignore and its use, in all of its expressions, proved to have a powerful effect on science and ultimately the lives of average Americans.

### **Changing Role of the United States in the World Community**

This theme explores diplomacy, trade, cultural exchange, security and defense, expansionism and, at times, imperialism. The interactions among indigenous peoples, between this nation and native peoples, and this nation and the world have all contributed to our changing role in the world community.

Additionally, this theme addresses regional variations. While the United States has left an imprint on the world community—especially during the 19th and 20th centuries—other nations and immigrants to the United States have had a profound influence on the course of American history. The emphasis in this category is on people and institutions—from the principals who define and formulate diplomatic policy to the private institutions that influence America's diplomatic, cultural, social, and economic affairs.

A relevant subtheme is as follows:

#### ***International Relations***

In the years between World War I and World War II, the United States had risen to pre-eminence in nuclear physics. This was in part due to the immigration of scientists from Europe, and in part to the ingenuity of native-born American physicists. It is distinctly possible that the United States would not have been the first nation to develop, test, and then use the atomic bomb had it not been for the work of immigrant European physicists like

Leo Szilard, Edward Teller, Hans Bethe, Enrico Fermi, and George Kistiakowsky who came to America (and to a lesser extent, to Great Britain) in the years immediately preceding World War II. It was their desire to escape Nazi oppression that led them to emigrate. As a result of this movement of physicists and their development of the atomic bomb, the United States became the world's first nuclear power and transformed the country from an industrial heavyweight into an international superpower. Most of these individuals were theoreticians who ended up relocating to Los Alamos where they worked together in seclusion to develop the basic physics of the bomb.

With other nations, such as Great Britain and France, but particularly the Soviet Union, racing to develop and possess the bomb as well as other foreign and domestic concerns, the Cold War came to define the era of post war international relations. Clearly, one of the defining characteristics of the Cold War was the use of nuclear weapons as the primary military deterrent force.

## **EXISTING RESOURCES**

As stated above, an area is considered suitable for addition to the national park system if it represents a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

### **Resources Within the National Park System**

While 14 park units contain cultural resources that are significantly associated with World War II-era themes—including one of the nation's newest parks, Rosie the Riveter/World War II Home Front National Historical Park, which deals with the American home front during the war—none

of these units has any specific or direct connection with the Manhattan Project, its research and production facilities, or its associated secret town sites. While many of these sites have interpretive programs on various aspects of World War II, no NPS unit has any substantive interpretation of the development of the Manhattan Project and the atomic bomb. None of these park units interprets the impact of the Manhattan Project on the end of World War II or the broad patterns of American history during the war and succeeding Cold War era. A list of units in the national park system that are associated with World War II themes may be seen in appendix H.

As a result, the resources of the four sites presented here—Hanford, Los Alamos, Oak Ridge, and Dayton—meet the National Park Service's established suitability criteria for consideration as a new unit of the national park system.

### **Resources Outside the National Park System**

Manhattan Project-related resources outside the national park system include hundreds of publicly and privately owned sites throughout the country. Several primary Manhattan Project sites are either publicly inaccessible or have limited access. With some exceptions, virtually all of the Manhattan Project-related sites have been abandoned or demolished, have lost much of their World War II-era integrity as a result of modern development, or have limited, restricted, or no public access. Many Manhattan Project-related resources primarily tell just the story of their individual contributions to the Manhattan Project. Various museums in the United States feature interpretive exhibits and programs that tell the story of the Manhattan Project. However, the principal focus of these museums is primarily on the activities and contributions of their individual communities to the Manhattan Project, and none provides a comprehensive national perspective. (See Appendix 1 for a list of Manhattan Project-related sites.)

## **CONCLUSION**

Cultural resources associated with the Manhattan Project are not currently represented in the national park system, and comparably managed areas are not protected for public enjoyment. The comprehensive story of the Manhattan Project is not interpreted by other federal agencies; tribal, state, or local governments; or the private sector. Various sites have some protection (such as those managed by the Department of Energy, and some sites and museums tell parts

of the story, but the comprehensive story of the nationally significant Manhattan Project is not told anywhere. Including Manhattan Project-related sites in the national park system would expand and enhance the protection and preservation of such resources and provide for comprehensive interpretation and public understanding of this nationally significant story in 20th century American history.

# EVALUATION OF FEASIBILITY

## INTRODUCTION

As stated in *NPS Management Policies 2006*, an area must meet two criteria to be feasible as a new unit of the national park system. An area must be of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment (taking into account current and potential impacts from sources beyond proposed park boundaries), and an area must be capable of efficient administration by the Park Service at a reasonable cost.

In evaluating these criteria, the National Park Service considers a variety of factors. These include size; boundary configurations; current and potential uses of the study area and surrounding lands; local planning and zoning; landownership patterns; access; public enjoyment potential; costs associated with acquisition, development, restoration, and operation; staffing requirements; current and potential threats to the resources; existing degradation of resources; the level of local and general public support (including landowners); and the economic and social impacts of designation as a unit of the national park system.

The analysis also considers the ability of the National Park Service to undertake new management responsibilities in light of current and projected availability of funding and personnel.

## FEASIBILITY ANALYSIS

The factors of feasibility are individually addressed here. The determination of feasibility is not based upon any single factor, but rather a collective assessment of all of the factors.

## Size and Boundary Configurations

Designating an NPS unit within three Department of Energy reservations and on private lands in four different states would be challenging. If all the resources at the four sites were included within the NPS unit, the unit would be extremely large. Within the sites, the resources may be separated by high-level security areas, such as the T-12 Beta-3 Racetracks and the K-25 facilities at Oak Ridge; this could make it difficult for visitors and NPS staff to travel between the resources. Although the Department of Energy has been discussing moving security fences at the sites, no agreements are in place identifying boundaries of the sites.

If a limited area were to be identified for designation as an NPS unit, and the boundaries were carefully drawn, it may be possible to designate an NPS unit that could tell the comprehensive Manhattan Project story.

## Current and Potential Uses of the Study Area and Surrounding Lands, Local Planning and Zoning

Detailed information on the current uses of resources in each of the Manhattan Project sites is included in appendix D. No local planning and zoning concerns have been identified. No changes to surrounding land uses are anticipated that would affect designation of the areas as an NPS unit.

## Landownership Patterns

Information on landownership at each of the study sites is included in appendix D. Much of the land in the Los Alamos, Hanford, and Oak Ridge Manhattan Project sites is under the jurisdiction of the Department of Energy.

Under an NPS unit scenario, DOE sites would remain under the ownership of that agency. An NPS unit encompassing all four areas would likely embrace additional resources, owned by a variety of private organizations, local governments, and individuals, such as the owners of private residences in the Oak Ridge Historic District. The agency would need to work with many owners, who have differing interests, desires, and concerns. This very complex landownership pattern would make efficient administration of an NPS unit spread out over four separate geographic areas extremely difficult.

If an NPS unit encompassed a limited area, then (depending on the unit's location) it is likely that a lesser number of landowners would be involved. In such a case, the landownership pattern would not detract from designation and administration of the unit.

### **Access and Public Enjoyment Potential**

There is a great deal of interest in public access to the sites and to the overall story of the Manhattan Project. The Department of Energy protects Signature Facilities of the Manhattan Project in Los Alamos, Hanford, and Oak Ridge, and provides for visitor use where possible. However, public access and use of many of the structures and buildings at Los Alamos, Hanford, and Oak Ridge have been, and likely will continue to be, limited or prohibited due to national security or public health concerns.

Although public use and enjoyment may be limited in some areas, this would not affect the feasibility of designating an NPS unit. As a focal point for telling the full story of the Manhattan Project, an NPS unit would have great potential for public use and enjoyment.

Although the Department of Energy would have overall responsibility for safety issues, there are still concerns that, as the manager of a park unit, the National Park Service could

find itself in a position where it would need to make a judgment regarding safety issues arising from the proximity of visitors and employees to radioactive materials—issues in which the National Park Service does not have expertise.

### **Costs and Staffing Requirements**

There are a number of elements to consider when evaluating the feasibility of costs of acquisition, development, restoration, and operation of an NPS unit. These costs would vary with the specific facilities and sites included, and the size and configuration of the boundaries.

A basic assumption of creating a new NPS unit for the Manhattan Project sites is that there would not have to be a major acquisition of land or facilities—the Department of Energy would retain full ownership of its sites, which constitute the majority of sites under study.

If a limited area was designated as an NPS unit, and that area was already in federal ownership, acquisition costs would be relatively low. A site owned by local governments or private entities could be acquired by the National Park Service, although this would be done through donation or on a willing seller basis. Hence, it is expected that there would be no significant costs associated with land acquisition.

However, there would be significant costs associated with establishing a new unit encompassing all four areas. Among those costs would be those associated with establishing the boundary of the NPS unit, holding regular meetings and preparing agreements with various landowners. Even if boundaries were established creating a unit of limited area, there would still be costs associated with developing management plan(s), establishing office space for staff, providing technical assistance with preservation, developing comprehensive

interpretation plan(s), and preparing needed environmental compliance documents.

The National Park Service understands that the Department of Energy would continue to be responsible for ownership, maintenance, historic preservation, and security of the DOE-owned resources if the areas were designation as an NPS unit, and would continue to be responsible for meeting the sites' current and future needs. It is anticipated that financial needs will increase as the sites are prepared for public use and the Department of Energy structures continue to age and deteriorate.

The operation of a new NPS unit that includes the entire study area would likely be very expensive relative to other national historical parks because of the complexity of partnerships, agreements, resource ownership, extraordinary distance between sites spanning four NPS regions, and other highly challenging issues.

Staffing requirements for the National Park Service would depend upon the configuration of the sites and the nature of agreements between partners for administering the four sites. A primary role of the National Park Service would be to provide technical assistance in site preservation and in the development of interpretive and educational opportunities. NPS staff would provide overall national coordination, and could be assigned to the individual sites as appropriate.

Although the Department of Energy has stated its commitment to long-term legal responsibility for safety, the National Park Service has concerns about potential risks to future NPS staff, partners, and volunteers. These concerns would be alleviated if the NPS unit did not include sites with radioactive materials.

## **Current or Potential Threats to the Resources**

A few specific resources in the Manhattan Project sites face potential threats. Major portions of the K-25 building at Oak Ridge are planned to be demolished, and the entire building likely will be demolished over the next few years. If the Dayton school board were to sell the Project Unit III facility, the structure could be demolished or modified. Until recently, the B Reactor at Hanford was proposed for cocooning; however, the Department of Energy has since determined that the facility will be maintained as is. None of these threats would eliminate all of the resources at the sites and thus prevent the establishment of an NPS unit.

## **Existing Degradation of Resources**

Taken as a whole, there are enough resources in reasonably good condition in the four areas to meet this factor of feasibility. Most of the Department of Energy resources on the three sites do not show obvious signs of degradation. However, several resources have already become degraded. A number of Manhattan Project structures at Los Alamos have been demolished or are scheduled for demolition. Portions of the K-25 building at Oak Ridge have been demolished, and the entire building likely will be demolished over the next few years. Some of the historic buildings in the Hanford Site Manhattan Project and Cold War Era Historic District may be deteriorating. Some privately owned structures in the Oak Ridge Historic District, such as the original Guest House, also are deteriorating. In addition, the Dayton Project Unit III facility has been vacant and may have experienced some deterioration.

## **Level of Local and General Public Support**

Based on input provided during the scoping period for this study, it appears there is local and general public support for the establishment of an area dedicated to telling the Manhattan Project story. The Department of Energy has indicated that if designation is determined to be feasible and Congress

determines it should be designated as a unit of the national park system, the Department of Energy would fully cooperate with that determination. There is no indication there would be opposition to establishing an NPS unit to tell the story.

## CONCLUSION

There are a number of factors that make the entire study area infeasible as a unit of the national park system. The establishment and operation of such an NPS unit would not be feasible due to the following issues:

- While size, boundary configurations, distance between sites, and landownership patterns would allow for feasibility, they are highly complex and would likely contribute to an unreasonably high cost of management by the National Park Service.
- Visitor access to DOE sites could be significantly limited due to safety and national security concerns; visitor enjoyment across all of these sites could not be assured.
- Although the Department of Energy has indicated it would continue to bear responsibility for safety, national security, historic preservation, and upkeep of its facilities, there are still concerns regarding

the National Park Service assuming liability and unforeseen costs in addressing visitor and employee safety, national security, cleanup, historic preservation, and maintenance of the facilities in the future.

- A number of factors indicate that the study area encompassing widely dispersed sites is not capable of efficient administration by the Park Service at a reasonable cost. Within the context of the current commitments of the president, secretary of the Department of Interior, and the director of the National Park Service to address other national financial priorities, it is unlikely that sufficient funds would be available for the National Park Service to undertake new management responsibilities for such a park.

Although the study team initially considered an alternative that would designate the entire study area as a national historical park, the alternative was dismissed largely because the criteria for feasibility were not met (see the section entitled “Management Alternatives No Longer Under Consideration”). However, establishing an NPS unit within some smaller, carefully planned boundary configuration may be feasible.



## MANAGEMENT ALTERNATIVES



LOS ALAMOS, FULLER LODGE



HANFORD, HISTORIC DISTRICT



DAYTON, J.K. MCINTIRE BUILDING



# INTRODUCTION

This chapter describes the alternatives that were considered as part of the *Manhattan Project Special Resource Study / Environmental Assessment*. The National Park New Area Studies Act, National Environmental Policy Act, and NPS *Management Policies 2006* all require special resource studies to examine alternatives in considering whether to propose direct NPS management for an area being considered for inclusion in the national park system.

The Manhattan Project study team, consisting of staff from the National Park Service's Pacific West, Midwest, Intermountain, and Southeast regional offices, Denver Service Center, Bandelier National Monument, Dayton Aviation Heritage National Historical Park, and the Department of Energy, developed the alternatives considered in this special resource study. The study team first brainstormed ideas for Los Alamos, Hanford, Oak Ridge, and Dayton collectively, focusing on broad management strategies and the entities that would manage the areas. The study team based these ideas on information gathered about the sites and public comments collected during the scoping period. These ideas were then winnowed down and combined into several preliminary alternatives. With input from the Department of Energy and the four NPS regional offices in which the four sites are geographically located, the alternatives were modified and

further winnowed down into the five alternatives presented in this chapter. For each of the alternatives there is a description of the overall concept underlying the alternative; a general description of key elements of the alternative, including overall approaches to protection of resources, public access, education, and interpretation; and the roles of agencies. The environmentally preferred alternative(s) and the estimated costs of the alternatives are discussed after the descriptions of the alternatives. At the end of the chapter, there are descriptions of alternatives that were considered but dismissed by the study team and a table that summarizes the alternatives.

It is important to stress that these alternatives are general in nature and do not go into details of management of the areas. It is also important to stress that the National Park Service does not have a preferred alternative. The director of the National Park Service is required under law and policy to identify which alternative or combination of alternatives would be most effective and efficient in protecting significant resources and providing for visitor enjoyment. The director will make this finding after the publication of the special resource study / environmental assessment, considering public and stakeholder comment. This finding will be included in the study package forwarded to the secretary of the interior.

## **ALTERNATIVE A: NO ACTION, CONTINUATION OF CURRENT PROGRAMS AND POLICIES**

This alternative provides a baseline for evaluating changes and impacts in the other alternatives. Under alternative A, the four Manhattan Project sites would continue to operate as they have in the past without any national coordination regarding resource protection and interpretation of the Manhattan Project story—although the sites could communicate among themselves on an ad hoc basis. The management and sponsored activities occurring at each site would continue as they have, with local entities and personnel working separately or in concert with the Department of Energy to interpret and preserve each local Manhattan Project site. Each of the sites would continue to operate local programs in a manner that the individual managers consider to be best suited to the local or national Manhattan Project story.

### **RESOURCE PROTECTION AND PRESERVATION**

Under alternative A, resource protection and preservation would not be a primary focus of the management of the four sites. The Department of Energy would continue to recognize the importance of the Signature Facilities at Los Alamos, Hanford, and Oak Ridge, and would continue to follow the requirements of section 106 of the National Historic Preservation Act and the National Environmental Policy Act. However, resource protection and preservation of the Manhattan Project story are not part of the department's core mission and thus likely would not be a high organizational priority. The protection and preservation of privately held resources—such as at the Dayton site—would continue to be subject to the discretion, interest, and financial ability of the owners. No Manhattan Project preservation efforts would likely be

undertaken at Dayton. Thus, the integrity of these resources could change in the future.

### **PUBLIC ACCESS**

Public access to the four sites would continue as it has in the past. Visitors would continue to be able to take tours at Los Alamos, Oak Ridge, and Hanford, and to visit museums at or near the sites. Public access would be limited at Department of Energy owned resources on the three sites due to health, safety, and national security issues. Public access to privately owned resources at Los Alamos, Hanford, and Oak Ridge would continue as it has, assuming the owners continue to permit access. At Dayton, public access would continue to be limited due to the local school board and private owners' lack of interest in making the resources available for public viewing.

### **INTERPRETATION**

No single organization would have responsibility for comprehensive interpretation of the Manhattan Project story—there would be no coordinated interpretation of Manhattan Project sites and activities, or national perspectives communicated at the four sites. Interpretive opportunities would continue to be provided by museums at or near the sites, including the American Museum of Science & Industry (Oak Ridge) and Bradbury Science Museum (Los Alamos), the Columbia River Exhibition of History, Science and Technology (Hanford), the Mound Museum (Dayton), and likely in the future at the Hanford Reach Interpretive Center at Hanford. However, the existing Oak Ridge and Los Alamos museums, funded by the Department of Energy, are not core

elements of the Department of Energy's mission and thus, like resource protection, probably would not be a high organizational priority. Local groups also would continue to provide differing types and quality of interpretation of specific resources, local historic districts, and museums at the four sites.

### **THE ROLE OF THE NATIONAL PARK SERVICE**

In this alternative, there would be no National Park Service presence or involvement beyond existing authorities for providing technical assistance for the preservation of nationally significant sites. There would be no direct NPS funding of interpretation or structure/site preservation efforts.

### **THE ROLE OF THE DEPARTMENT OF ENERGY**

The Department of Energy would continue to have full responsibilities for site ownership, maintenance, and security of Manhattan Project-related federal facilities at Los Alamos, Hanford, and Oak Ridge. The agency would also retain full responsibility for safety

and for addressing environmental compliance issues, including the National Environmental Policy Act and National Historic Preservation Act section 106 requirements, for all DOE-owned resources at the three sites. The Department of Energy would continue to play no role in the Dayton site.

### **THE ROLE OF OTHER ENTITIES**

Other private and public entities that own and manage Manhattan Project resources at the four sites would continue to have full responsibilities for site ownership, maintenance, and security of their respective properties. They would be responsible for all protection/preservation actions in historic areas not under federal government ownership, and would need to raise all operational, interpretation, and preservation funds on their own, such as through local initiatives and grants. However, the ability of local organizations to raise money and provide support would vary considerably by site. Individual organizations also would continue to be free to work with the Department of Energy to develop partnerships that would benefit both entities.

## **ALTERNATIVE B: NATIONWIDE NONPROFIT CONSORTIUM**

### **CONCEPT**

In this alternative, local organizations interested in heritage tourism, preservation and interpretation of the Manhattan Project story would form a nationwide nonprofit consortium to work with the Department of Energy and other site owners to coordinate Manhattan Project-related preservation and interpretive efforts at the four sites. The work of a consortium would initially focus on Los Alamos, Oak Ridge, Hanford, and Dayton, but could expand to include other sites across the nation as well as around the world. The organization of the consortium would be determined by its members. The initial catalyst for formation of the national consortium could be the Atomic Heritage Foundation or the Energy Communities Alliance, which are the two organizations that currently provide a national link for Manhattan Project sites, or another organization. The Atomic Heritage Foundation, the Energy Communities Alliance, or a newly formed entity also could serve as the management entity for the nationwide consortium. The consortium would be a self-supporting, nonprofit entity, sustained through membership fees or other fundraising efforts. The viability of the consortium would be dependent on these funds as well as the participation of local organizations. After it is formed, the consortium also could help raise funds for the local organizations.

Although the consortium members would provide a coordinated presentation of the work of the Manhattan Project, they would remain primarily accountable to their local communities for the preservation and interpretation of their associated sites.

### **RESOURCE PROTECTION AND PRESERVATION**

Under alternative B, resource protection and preservation would be a primary focus of the management of the four sites. As in all of the alternatives, the Department of Energy would recognize the importance of the Signature Facilities at Los Alamos, Hanford, and Oak Ridge, and would follow the requirements of section 106 of the National Historic Preservation Act and the National Environmental Policy Act. The protection and preservation of privately held resources—such as those at the Dayton site—would continue to be subject to the discretion, interest, and financial ability of the owners.

The national consortium would be responsible for and work to plan, prioritize, and obtain funding for resource preservation efforts at the four sites. The creation of a consortium could help funnel preservation and interpretation expertise to the Department of Energy and other site owners. Implementation of preservation efforts would depend on the ability of the national consortium and its local groups to raise funds and support.

### **PUBLIC ACCESS**

The national consortium might be able to improve public access opportunities at the four sites. As in all of the alternatives, visitors would be able to take tours at Los Alamos, Oak Ridge, and Hanford, and visit museums on the sites. Public access would be limited at DOE-owned resources at the three sites due to health, safety, and national security issues. However, the national consortium could work with the Department of Energy to increase public access opportunities to DOE-owned

sites where appropriate and feasible. Examples of sites where access might be enhanced include the B Reactor at Hanford, the “Trinity Test” V site and “Little Boy” Gun site at Los Alamos, and the Y-12 complex at Oak Ridge. The consortium could also work with other owners at Oak Ridge to improve access to the Oak Ridge Historic District. With increased public exposure and funding due to the efforts of the national consortium, it is possible that the local school board and private owners might have more interest in making the resources at Dayton available for public viewing.

## **INTERPRETATION**

Under alternative B, the interpretation of the comprehensive Manhattan Project story would become a major focus at each of the four sites. An important function of the consortium would be to coordinate the interpretive themes and stories of the individual sites, so that the associated sites would provide as complete a picture of the development and use of the atomic bomb as possible. A comprehensive and integrated Manhattan Project-related interpretation plan would be developed under this alternative, including a research-quality level and state-of-the-art education web-based network. Through this network, the consortium could make research related records more readily available. Thus, there would be coordinated interpretation of Manhattan Project sites and activities, and national perspectives would be communicated at the four sites. In addition, if the members decided, they could include other Manhattan Project sites and international members and sites, such as those in Germany that might have an important story to tell about atomic research during World War II.

The consortium would work with the Department of Energy to aid in fulfilling interpretation goals. If additional funding and expertise could be provided by the consortium, interpretive opportunities would be enhanced at the museums at or near the

sites, including the American Museum of Science & Industry (Oak Ridge) and Bradbury Science Museum (Los Alamos), and in the future at the Hanford Reach Interpretive Center at Hanford.

In this alternative, local groups at the sites also would be encouraged by the consortium under this alternative to provide coordinated, high quality interpretation of specific resources, local historic districts, and museums at the four sites. At Dayton, the consortium would work with existing groups or form a new group interested in interpretation of the Manhattan Project story at Dayton. The consortium and local group could then work with the local government and private owners to provide interpretive opportunities at Dayton.

As stated above, under this alternative a Manhattan Project site web-based network would be developed, which would aid interpretation. The web site would serve as a virtual museum, linking other related web sites, providing a complete story of the Manhattan Project, and telling how the four sites related to the project. Local entities could work with the web site to develop interpretive ideas. Visitors also could access the site to obtain information that would enhance their visits and appreciation of the sites.

## **THE ROLE OF THE NATIONAL PARK SERVICE**

Under alternative B, the National Park Service would not play a role in the management of the four sites, including preservation and interpretation efforts. No NPS funds would be used to directly operate or administer the sites. However, if directed by Congress, the National Park Service could serve as a catalyst for bringing groups together to form the nationwide consortium. The National Park Service also could provide the consortium with technical assistance in the preservation of nationally significant sites under existing authorities.

## **THE ROLE OF THE DEPARTMENT OF ENERGY**

As in all of the alternatives, the Department of Energy would continue to have full responsibilities for site ownership, maintenance, safety, and security of Manhattan Project-related federal facilities at Los Alamos, Hanford, and Oak Ridge. The department would also retain responsibility for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements, for all DOE-owned resources at the three sites. As the manager of active facilities that have varying degrees of relationship with the Manhattan Project, there would be opportunities for the Department of Energy to work with the nationwide consortium to interpret and preserve the cultural resources that survive from that period or are still in use. The

Department of Energy would continue to play no role in the Dayton site.

## **THE ROLE OF OTHER ENTITIES**

As in all of the alternatives, other private and public entities that own and manage Manhattan Project resources at the four sites would continue to have full responsibilities for site ownership, maintenance, and security of their respective properties. They would be responsible for all protection and preservation actions in historic areas not under federal government ownership. But unlike in alternative A, in alternative B the national consortium could assist and strengthen the private and public entities' efforts to raise operational, interpretation, and preservation funds. Local groups would also provide representatives to the national consortium to coordinate the interpretation of Manhattan Project stories and to develop other mutually beneficial linkages between the sites.



## ALTERNATIVE C: NATIONAL HERITAGE AREA

### CONCEPT

In this alternative, the four Manhattan Project sites would be proposed for designation as a national heritage area (NHA). National heritage areas are places designated by Congress where natural, cultural, and historic resources combine to form cohesive, nationally important, and distinctive assemblages of resources or “landscapes” arising from patterns of human activity. These patterns make areas representative of the national experience through the physical features that remain. They are generally managed through partnerships among public and private entities at the local or regional level.

The Manhattan Project National Heritage Area would be unlike any other national heritage area in that it would be located in noncontiguous areas and would be specifically thematic in a way that other areas are not.

Before the sites could be designated by Congress as a national heritage area, three critical requirements must be satisfied:

4. A national heritage area suitability/feasibility study, which would include public involvement, would need to be completed. (This special resource study does not meet the requirements for a national heritage area study.)
5. Widespread public support among heritage area residents for the proposed designation would need to be demonstrated.
6. Key constituents, which may include governments, industry, private organizations, and nonprofit organizations, in addition to area residents, would need to make a commitment to the proposal.

Once the national heritage area was designated, a nonprofit management entity would be established to create a management plan and receive federal funds on the area's behalf. Thus, the national heritage area would provide comprehensive, consistent direction for management, preservation, and interpretation of the Manhattan Project sites. The management entity could be a state or local agency, a federal commission, or a private nonprofit corporation. Two potential organizations that could become the management entity are the Atomic Heritage Foundation and the Energy Communities Alliance, both of which already provide a national link for Manhattan Project sites.

The Department of Energy and local stakeholders and property owners would be partners with the management entity in the Manhattan Project Sites National Heritage Area. The managing entity and partners would have responsibility for the administration, viability, and direction of the national heritage area, and for prioritizing and coordinating fundraising for preservation efforts at all sites.

Depending on the legislation authorizing the national heritage area, membership in the national heritage area would not have to be restricted to the four sites addressed in this study. Numerous domestic sites related to the Manhattan Project could participate in the national heritage area, as could international members and sites that might have an important story to tell about atomic research during World War II.

The national heritage area designation could result in initial federal funding of preservation and interpretation efforts at the four sites. But eventually the heritage area would need to be self-sustaining, raising funds through grants,

tour fees, membership fees, etc. In this regard, the management entity could develop a business plan to ensure the heritage area is sustainable.

## **RESOURCE PROTECTION AND PRESERVATION**

Under alternative C, resource protection and preservation would be a primary focus of the management of the four sites. As a national heritage area, efforts at each area would be sharply focused on the preservation of the associated sites, structures, landscapes, and resources. The creation of a national heritage area could help provide expertise to preserve structures and buildings at the four sites.

As in all of the alternatives, the Department of Energy would recognize the importance of the Signature Facilities at Los Alamos, Hanford, and Oak Ridge, and would follow the requirements of section 106 of the National Historic Preservation Act and the National Environmental Policy Act in protecting significant cultural resources. The protection and preservation of privately held resources—such as at the Dayton site—would continue to be subject to the discretion, interest, and financial ability of the owners.

The management entity would be responsible for planning for and obtaining funding for resource preservation efforts at the sites within the national heritage area. The management entity would work with all partners to establish preservation priorities among the sites. However, implementation of preservation efforts would depend on the ability of the management entity and partners to raise funds and support for the sites.

## **PUBLIC ACCESS**

Public access opportunities under alternative C would be the same as described for alternative B. The national heritage area designation might be able to improve public

access opportunities at the four sites. Collaborative efforts among the national heritage area partners, including the Department of Energy and the management entity at the site, would establish a national approach for public access to specific resources. As in all of the alternatives, visitors would be able to take tours at Los Alamos, Oak Ridge, and Hanford, and visit museums at or near the sites. Public access would be limited at DOE-owned resources on the three sites due to health, safety, and national security issues. However, the partners and management entity could work with the Department of Energy to increase public access opportunities at DOE-owned sites where appropriate and feasible. Examples of sites where access might be enhanced include the B Reactor at Hanford, the “Trinity Test” V site and “Little Boy” Gun site in Los Alamos, and the Y-12 complex at Oak Ridge. The partners and management entity could also work with other owners at Oak Ridge to improve access to the Oak Ridge Historic District. With increased public exposure and funding due to the national heritage area designation and efforts of the management entity, it is possible that the local school board and private owners might have more interest in making the resources at Dayton available for public visitation.

## **INTERPRETATION**

Under alternative C, the interpretation of the comprehensive Manhattan Project story would become a major focus at the four sites. As a national heritage area, efforts at the sites would be sharply focused on interpretation of the Manhattan Project and preservation of the associated sites, structures, landscapes, and resources. Designation of the Manhattan Project sites as a national heritage area would create an opportunity for interested individuals and local organizations to bring a range of visions and perspectives to the interpretation of the Manhattan Project story. The national heritage area partners would coordinate a comprehensive educational and

interpretive perspective for Manhattan Project interpretation, including the development of a research quality web-based network. An important function of the management entity would be to coordinate the interpretive themes and stories of the individual sites, so that the associated sites provide as complete a picture of the development and use of the atomic bomb as possible. The management entity could also centralize access to historic documentation on the Manhattan Project, which would aid interpretive efforts. Thus, there would be coordinated interpretation of Manhattan Project sites and activities, or national perspectives communicated at the four sites.

The management entity and partners would work with the Department of Energy to aid in achieving interpretive goals. With additional federal funding and expertise, interpretive opportunities could be enhanced at the museums at or near the sites, including the American Museum of Science & Industry (Oak Ridge) and Bradbury Science Museum (Los Alamos), and in the future at the Hanford Reach Interpretive Center.

In this alternative, local groups at the sites would be encouraged by the management entity and partners to provide coordinated, high quality interpretation of specific resources, local historic districts, and museums at or near the four sites. At Dayton, the management entity and partners would work with existing groups or form a new group interested in interpretation of the Manhattan Project story at Dayton. The management entity, partners, and local interest group(s) could then work with the local government and private owners to provide interpretive opportunities at Dayton.

As in alternative B, a Manhattan Project site web-based network would be developed, which would aid interpretation. The web site would serve as a virtual museum, linking other related web sites and providing a complete story of the Manhattan Project and explaining how the four sites related to the project. Local

entities could work with the web site to develop interpretive ideas. Visitors also could access the site to obtain information that would enhance their visits and appreciation of the sites.

## **THE ROLE OF THE NATIONAL PARK SERVICE**

Under alternative C, the National Park Service would not play a direct role in the management of the national heritage area. Limited NPS funds could be used on a temporary basis to develop a management plan or initially to help operate and administer sites in the national heritage. If directed to do so by Congress, the National Park Service could act as a catalyst to organize stakeholders interested in exploring the national heritage area concept. The National Park Service role in the heritage area would be defined in the enabling legislation. However, National Park Service involvement would be advisory in nature; the Park Service would neither make nor carry out management decisions. The National Park Service could provide technical assistance for preservation, interpretation, and education to the Department of Energy and private owners of Manhattan Project sites as directed by the national heritage area legislation.

## **THE ROLE OF THE DEPARTMENT OF ENERGY**

As with all of the management alternatives, there would be, by necessity, ongoing participation by the Department of Energy in the national heritage area. The agency would retain full responsibility for site ownership, maintenance, security, and safety for all Manhattan Project-related federal facilities at Los Alamos, Hanford, and Oak Ridge. The agency also would be responsible for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements. In addition, as the manager of active facilities that have varying

degrees of relationship with the Manhattan Project, the Department of Energy would have opportunities to work with the national heritage area management entity to interpret and preserve the cultural resources that survive from that period or are still being used. The Department of Energy would continue to play no role in the Dayton site.

### **THE ROLE OF OTHER ENTITIES**

As in all of the alternatives, other private and public entities that own and manage Manhattan Project resources at the four sites

would continue to have full responsibilities for site ownership, maintenance, and security of their respective properties. They would be responsible for all protection and preservation actions in historic areas not under federal ownership. However, unlike in alternative A, in alternative C the management entity could assist and strengthen the private and public organizations' efforts to raise operational, interpretation, and preservation funds. The management entity would also work with the partners to coordinate interpretation of Manhattan Project stories and develop other mutually beneficial links between the sites.

## **ALTERNATIVE D: AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM**

### **CONCEPT**

In this alternative, Congress would designate key Manhattan Project historic resources in Oak Ridge, Los Alamos, Hanford, and Dayton as the Manhattan Project National Historic Sites, an affiliated area of the national park system. National Park Service management policies require that affiliated areas meet specific criteria. These criteria, and how Manhattan Project National Historic Sites would meet them, are described in Appendix J.

Historic sites within the affiliated area would include both publicly and privately owned sites. Public sites would include those owned and managed by the Department of Energy that are part of their inventory of Signature Facilities at the Manhattan Project sites. Also included in the affiliated area would be sites directly related to the Manhattan Project that are located in community settings and are owned and managed by local governments, nonprofit organizations, and private owners. Only those privately owned sites that have the permission of the owner would be included in the affiliated area.

The affiliated area could be managed by a commission, associated with the Department of Energy and established by Congress, that would coordinate preservation and public use of Manhattan Project sites identified in the legislation. Commission members would be appointed by the secretary of energy from nominations received from the museums and organizations in the four listed Manhattan Project communities, and from national organizations having expertise and interest in the commemoration of the Manhattan Project. The Department of Energy and the National Park Service would serve as ex officio nonvoting members of the commission, who would bring agency

expertise in site management and visitor interpretation and education to the commission deliberations. The commission would be authorized by legislation to seek operations funding support from Congress that would enable the commission to hire staff to assist in the day-to-day operations of the sites. These funds would come from DOE appropriations. Other funds to support commission operations would also be expected from both private and various nonfederal public sources.

It is important to stress in this affiliated area alternative that the Department of Energy would manage its facilities in line with NPS policies, but would have financial responsibility for all ongoing operations, maintenance, and preservation of its facilities through its appropriations. The National Park Service's primary responsibility under this alternative would be to provide technical assistance as requested by the commission and/or the Department of Energy. As an example, technical assistance could be requested to address interpretive programming or museum collections management.

### **RESOURCE PROTECTION AND PRESERVATION**

Under alternative D, the Department of Energy would be authorized by legislation to request funding from Congress to assist in the preservation and ongoing maintenance of its Signature Facilities. The Department of Energy would continue to maintain, secure, and operate them. These include the X-10 Graphite Reactor National Historic Landmark, the K-25 Gaseous Diffusion Process Building, and the Y-12 Beta-3 Racetracks at Oakridge; the Trinity Test V-Site, "Little Boy" Gun Site, "Fat Man"

Quonset Hut, Plutonium Recovery Concrete Bowl, and the Slotin Building at Los Alamos; and the B Reactor National Historic Landmark at Hanford.

In addition, the preservation of other Manhattan Project historical resources would be encouraged and accomplished through both private and DOE funding sources. In some instances, a request would be made by the commission to Congress to appropriate federal funds to match private and nonfederal funds to assist in the preservation of certain non-DOE Manhattan Project structures and sites.

National Park Service staff at Dayton Aviation National Historical Park, in cooperation with the Ohio State Historic Preservation Office and the NPS Midwest Region Cultural Resources Office, could provide some additional technical assistance to the Dayton community to encourage historic preservation related to Dayton Project Unit III.

## **PUBLIC ACCESS**

Most, if not all, sites included in the affiliated area would be accessible to the public. These would include historical properties deemed safe and appropriate for public visitation within DOE managed areas; historic districts, structures, and features outside DOE-administered areas; museums; and other sites.

Department of Energy Signature Facilities would be open to the public on a case-by-case basis so long as both public safety and site security issues could be addressed. Tours of DOE sites could be offered regularly or intermittently, but all public access would be fully coordinated with the Department of Energy. Local partners and nonprofit organizations could conduct the tours. This would be accomplished through an operational agreement between the Department of Energy, the commission, and the local operator that would set out specific

requirements that address various public access, safety, security, and operational issues.

## **INTERPRETATION**

Once the affiliated area is established and the commission is seated and functioning, management and interpretation plans would be developed through a public process to help guide the future management, protection, and public use of the area's resources.

The commission would coordinate the overall interpretive and educational programming for the sites. This would include working collaboratively with local nonprofit museum associations and other organizations at each of the locations to ensure that a coordinated approach is taken related to site tours, educational programming, and the identification of optimal locations for interpretive exhibits or other media. Wherever possible, existing institutions such as the American Museum of Science and Energy (Oak Ridge), the Bradbury Science Museum (Los Alamos), the Mound Museum Association (Dayton), and the Hanford Reach Interpretive Center (Hanford) would assist with programming related to the interpretation of the Manhattan Project.

Given the affiliated status of the national historic sites under this alternative, the National Park Service would provide technical assistance to interpretive staff at the historic sites regarding the development and implementation of visitor education programs and related media. The Department of Energy and the National Park Service could develop an interagency agreement that would explain the Park Service's role in assisting the Department of Energy in the planning, design, and development of various interpretive media and exhibits that would be installed at DOE-managed historic sites and Signature Facilities. Given the federal ownership of the sites, specific funding requests for interpretive and educational purposes would be made to

Congress through the Department of Energy budget process.

As in alternatives B and C, a Manhattan Project site web-based network would be developed, which would aid interpretation. The web site would serve as a virtual museum, linking other related web sites, providing a complete story of the Manhattan Project, and explaining how the four sites related to the project. Also, interpretive and educational links could be established to other Manhattan Project sites throughout the United States that are owned and managed by other entities. The University of Chicago, the University of California at Berkeley, the Trinity test site at White Sands, New Mexico, and the Tinian Island airfield could be among the sites connected to the interpretive and educational programs of the affiliated area.

Since this would be an affiliated area of the national park system, a Manhattan Project National Historical Sites brochure would be developed using the NPS graphic identity system.

### **THE ROLE OF THE NATIONAL PARK SERVICE**

The National Park Service would not own or manage any specific sites at any of the Manhattan Project sites included in the affiliated area. In this alternative, the primary responsibility of the National Park Service would be to provide technical assistance for interpretive and educational programming. The NPS role would be to help ensure that a complete national story of the Manhattan Project is objectively told to the American people, and to help ensure continuity, accuracy, and professionalism in the development of any media and educational programs related to the various Manhattan Project sites.

Through existing historic preservation partnership programs, the National Park Service could provide technical assistance to the Department of Energy and community

groups and organizations related to preservation projects. The National Park Service also could help train staff at each of the sites in providing visitor services.

Under this alternative, the National Park Service would provide technical assistance to the commission for the development of the management and interpretation plans that would be mandated by Congress.

### **THE ROLE OF THE DEPARTMENT OF ENERGY**

As in all of the alternatives, the Department of Energy would retain full responsibility for site ownership, preservation, maintenance, security, and safety for all Manhattan Project-related federal facilities at Los Alamos, Hanford, and Oak Ridge. The agency also would be responsible for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements.

Specific Manhattan Project historic sites to be preserved along with those that are to be made available for public access and use would be articulated in legislation.

The Department of Energy and the National Park Service would collaborate with each other and with the commission on interpretation approaches at the various DOE-managed historic sites that are designated as part of the affiliated area.

The Department of Energy would collaborate with museum organizations and other nonprofit organizations at both the local and national level to provide public tours of those DOE-managed Manhattan Project sites deemed appropriate and available for public access.

## **THE ROLE OF OTHER ENTITIES**

As in all of the alternatives, other private and public entities that own and manage Manhattan Project resources at the four sites would continue to have full responsibilities for site ownership, maintenance, and security of their respective properties. In the affiliated area alternative, the commission and the Department of Energy would rely heavily on local partners to assist in the development and operation of museums, visitor facilities, and

historical sites open to the public. Use of both formal and informal agreements would shape important relationships between all the key partners. Funding from the partners would help support the salary of the support staff associated with the commission.

Local paid and volunteer staff from museums in Oak Ridge, Los Alamos, Dayton, and the Hanford area would provide important local expertise for interpretation efforts.



## **ALTERNATIVE E: MANHATTAN PROJECT NATIONAL HISTORICAL PARK**

### **CONCEPT**

In this alternative, Congress would designate a site in the Los Alamos, New Mexico area as the Manhattan Project National Historical Park managed by the National Park Service. Certain site resources within the existing Los Alamos Scientific Laboratory National Landmark District would be incorporated into the national historical park. Enabling legislation would allow for some limited federal ownership of these sites, coupled with leasing opportunities elsewhere in the community. The enabling legislation would also allow for partnering with the Department of Energy to advance public educational and interpretive experiences and understanding at those DOE-managed sites in the Los Alamos area which are determined appropriate and safe for public access.

Los Alamos was selected as the site for this national historical park for a number of reasons. The facilities and personnel here maintained the greatest concentration of theoretical and experimental work during the Manhattan Project era—it was this work that tied all of the sites together. In addition, the physical aspects of the surroundings have not changed as much over time as those of some of the other sites—when visitors approach Los Alamos by road today, they can still feel some of the isolation and remoteness that were key to the area’s original selection for the Manhattan Project. Finally, to a lesser degree, the proximity to Bandelier National Monument offers an opportunity to develop some efficiencies of operation that would not be available at other sites.

Other Manhattan Project sites—resources and historic districts located in Hanford, Oak Ridge, and Dayton—also contain important Manhattan Project historic resources. While the preservation of certain resources at these

sites is fully recommended, these sites would not be operationally part of the Los Alamos-based National Historical Park. However, through a formal agreement such as a memorandum of agreement, these sites could become associated with the park.

### **RESOURCE PROTECTION AND PRESERVATION**

Through legislation, the National Park Service would be authorized, subject to donation and willing seller provisions, to acquire one or more historic properties within the existing Los Alamos Scientific Laboratory National Historic Landmark District for purposes of preserving and interpreting historic structures related to the Manhattan Project activity at Los Alamos. These could include one or more of the “Bathtub Row” properties or other historic buildings of the era.

Separate, companion legislation would be recommended to provide congressional authorization and commensurate appropriations to the Department of Energy to preserve key Manhattan Project resources located in Los Alamos, Oak Ridge, and Hanford. This would provide for the preservation and maintenance of specifically identified historic Manhattan Project structures that are under the administration of the Department of Energy. Included would be the B Reactor National Historic Landmark at Hanford, the X-10 Graphite Reactor National Historic Landmark at Oak Ridge, and the five sites at the Los Alamos Scientific Laboratory: the Trinity Test V-Site, the “Little Boy” Gun Site, the “Fat Man” Quonset Hut, the “Plutonium Recovery” Concrete Bowl, and the Slotin Building.

## **PUBLIC ACCESS**

Sites in Los Alamos acquired by the National Park Service would be made available for public visitation and interpretation. DOE-managed sites in Los Alamos, Oak Ridge, and Hanford that meet security and safety considerations would also be made available by the Department of Energy for public tours. Public tours are already conducted at the Graphite Reactor National Historic Landmark in Oak Ridge and the B Reactor National Historic Landmark at Hanford in conjunction with partner organizations. As other sites are declared safe and available for public use, the Department of Energy, in conjunction with partner organizations, may open up these areas for visitation.

The National Park Service would not be expected to have any direct role in the conduct of tours of DOE historic facilities. Instead, formal written agreements between the Department of Energy and nonprofit community-based organizations would be the potential vehicles to provide tours of historic DOE Manhattan Project Facilities deemed appropriate for public tours.

## **INTERPRETATION**

The National Park Service would be authorized under this alternative to acquire or lease an appropriate location within the Los Alamos community for a park visitor center. This center would provide the visiting public with a contextual overview of the Manhattan Project for the national and international visitor. The National Park Service would coordinate with community officials concerning the development of a walking and driving tour and other appropriate interpretive activities that would be located outside the visitor center structure. The National Park Service would also encourage the public to visit other historical resources and related museums located within the Los Alamos community.

As part of the NPS interpretive mission, visitors accessing the Manhattan Project through web-based programming and other media, would be encouraged to visit Manhattan Project resources located outside of Los Alamos. Formal agreements between the National Park Service and partner organizations, including community-managed and DOE-managed resources at Hanford, Oak Ridge, Dayton, and other locations could be established to provide interpretive services.

As a part of this alternative, the National Park Service would establish a grant program for interpretation and education. Grants would be available to any of the other related Manhattan Project sites to be used in a variety of areas: the development of educational curriculum and associated materials, the development of interpretive media, and the establishment of web-based links to other Manhattan Project historical sites. This could be done within the Los Alamos community itself, and through outreach opportunities to other Manhattan Project communities and sites affiliated with the park such as the Hanford Reach Interpretive Center in Richland, Washington and the American Museum of Science and Energy in Oak Ridge.

## **THE ROLE OF THE NATIONAL PARK SERVICE**

The National Park Service would have operational responsibility for those structures that are acquired within the Los Alamos Scientific Laboratory National Landmark District. The National Park Service would not have any operational or management responsibility for any historic Manhattan Project facilities within the Department of Energy management area at Los Alamos, and would not have any operational or management responsibility for associated Manhattan Project historic structures at Oak Ridge, Hanford, or Dayton.

At the National Historical Park location in Los Alamos, the National Park Service would be

responsible for operating a visitor center within the community setting, providing technical assistance in the preservation of historic Manhattan Project resources, and coordinating with the Department of Energy and community officials and organizations regarding public use and educational opportunities within the Los Alamos community.

Operationally, the National Park Service could take advantage of the proximity of the Bandelier National Monument for various support services including administrative, personnel management, and other needs.

## **THE ROLE OF THE DEPARTMENT OF ENERGY**

As in all of the other alternatives, under the Manhattan Project National Historical Park alternative, the Department of Energy would retain full responsibility for site ownership, preservation, maintenance, security, and safety for all Manhattan Project-related federal facilities at Los Alamos, Hanford, and Oak Ridge that are now part of their management responsibility. The Department of Energy also would be responsible for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements.

Specific Manhattan Project historic sites to be preserved along with those that are to be made available for public access and use would be articulated in legislation. The legislation also would recommend the funding support necessary for the Department of Energy to preserve and maintain certain key Manhattan Project historic structures.

The Department of Energy and the National Park Service would collaborate with each other directly at the Los Alamos site for public access from the National Historical Park and visitor center to any DOE historic Manhattan Project facilities deemed appropriate and safe

by the Department of Energy for public access. Upon request, and through formal agreement, the NPS could also provide technical assistance to the Department of Energy for certain interpretive media developed for DOE sites. The Department of Energy would look to community organizations to assist with the conduct of tours of DOE historic facilities.

The Department of Energy would be expected to collaborate and enter into formal agreements with museum organizations and other nonprofit organizations at both the local and national level to provide public tours of those DOE-managed Manhattan Project sites deemed appropriate and available for public access. This would include sites such as the B Reactor National Historic Landmark at Hanford, and the X-10 Graphite Reactor National Historic Landmark at Oak Ridge.

## **THE ROLE OF OTHER ENTITIES**

As in all of the alternatives, other private and public entities that own and manage Manhattan Project resources at the four sites included in the study would continue to have full responsibility for site ownership, maintenance, and security of their respective properties. At the Manhattan Project National Historical Park in Los Alamos, the National Park Service would rely heavily on local partners and volunteers to assist in serving the public at visitor facilities through walking tours, and at historical sites that are open to the public. The Los Alamos Historical Museum and the Bradbury Museum would be viewed as important complementary educational resources for the visiting public and the National Park Service would seek a strong working relationship with both of these organizations. The National Park Service would also seek to build strong relationships with affiliated sites at the Hanford Reach Interpretive Center: in Richland, the American Museum of Science and Industry in Oak Ridge, and the Dayton School Board and the Mound Museum in Dayton. The

#### PART FOUR: MANAGEMENT ALTERNATIVES

Department of Energy also would be expected to enter into formal agreements with community organizations at Oak Ridge, Los Alamos, and the Hanford area to assist in the

conduct of public tours of any historic Manhattan Project facilities deemed by the Department of Energy to be appropriate and safe for public access.

## ESTIMATED COSTS OF THE ALTERNATIVES

This section compares the existing costs of administering the four Manhattan Project sites with the estimated initial costs of establishing the national consortium in alternative B, the national heritage area in alternative C, the affiliated area in alternative D, and the national historical park in alternative E. Table 3 summarizes the costs of the five alternatives. It must be stressed that the cost figures shown here are intended only to provide an estimate of the relative costs of alternatives. The publication of this special resource study / environmental assessment does not guarantee that funding and staffing needed to implement the alternatives will be forthcoming. Appendix K includes background information on how the cost estimates were derived.

### ALTERNATIVE A: NO ACTION

Under alternative A, the costs of administering the four sites would continue to be borne by the Department of Energy and partners who interpret the Manhattan Project story. Under this alternative, the National Park Service would not be involved with the sites and therefore would have no associated costs. Total annual operating costs of the museums, which interpret the Manhattan Project at the four locations, are currently about \$3.37 million (table 2). When the Hanford Reach Interpretive Center opens (planned in 2011-2012)—replacing the Columbia River Exhibition of History, Science, and Technology—annual operating costs of the museums are estimated to be \$4.67 million.

**Table 2: Annual Operating Budgets of the Manhattan Project Interpretation Partners**

Site	Agency or Partner	Annual Operating Budgets
Los Alamos	Bradbury Science Museum	\$1,200,000
Los Alamos	Los Alamos Historical Society	\$155,000
Hanford	Columbia River Exhibition of History, Science, and Technology	\$300,000
Oak Ridge	American Museum of Science and Energy	\$1,700,000
Dayton	The Mound Museum Association	\$15,000
	<b>TOTAL Operating Budgets</b>	<b>\$3,370,000</b>
Hanford	The Hanford Reach Interpretive Center: Will replace the Columbia River Exhibition of History, Science, and Technology when the center is open to the public, planned for 2011-2012	+ \$1,600,000
Hanford	Columbia River Exhibition of History, Science, and Technology	-( \$300,000)
	<b>TOTAL Operating Budgets (when the Hanford Reach Interpretive Center opens)</b>	<b>\$4,670,000</b>

### **ALTERNATIVE B: NATIONAL CONSORTIUM**

The members of the consortium would bear the costs of staffing the consortium, as well as implementing any actions planned by the consortium. The estimated cost of organizing and holding a start up meeting for the consortium is \$100,000. The consortium would develop staffing and action needs likely through a management plan, which could range in cost from \$300,000 to \$400,000. The National Park Service could provide technical assistance in the preservation and interpretation of the sites, but it is not possible to estimate what this assistance would entail and how much it would cost. This cost could be funded by the consortium or provided by the National Park Service, if directed by Congress. Implementation costs are not estimated, as the consortium must first identify the actions it would take. The consortium also could take advantage of appropriate public and private grant programs for additional funding.

### **ALTERNATIVE C: NATIONAL HERITAGE AREA**

If alternative C were implemented, the National Heritage Areas Partnership Act would require that a feasibility study be completed to determine whether the areas meet the criteria for designation as a national heritage area by Congress. This study could be conducted by the National Park Service or other interested parties, and is estimated to cost around \$100,000. If a national heritage area is designated, depending on its authorizing legislation, it may receive federal funding of up to \$1 million per year for 15 years, but typically no more than \$10 million total to support the establishment, development, and continuity of the national heritage area. Any federal funds received must usually be matched by other entities. Typically, within three years, the management entity must complete a management plan to continue receiving federal funding. It is estimated that this management plan would

cost \$300,000 to \$400,000. It is assumed here that the National Park Service would provide some or all of the funding for the management plan as part of the funding to establish the national heritage area. The additional costs to operate the national heritage area, and take actions to preserve and interpret resources are not estimated here.

### **ALTERNATIVE D: AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM**

Under alternative D, the Department of Energy would remain responsible for the maintenance, preservation, and operation of their Manhattan Project facilities. Private site owners would remain responsible for their site costs.

A commission to coordinate the preservation and public use of the Manhattan Project sites could seek funding from DOE appropriations, private donors, and nonprofit donors to fund salaries, support staff, operations, a website, and management actions.

Local organizations would be responsible for providing tours of sites as well as for hosting exhibits and films related to the Manhattan Project story.

The National Park Service would provide technical assistance to the commission and the Department of Energy in areas related to interpretation, which could include training of interpreters, assistance in creating an interpretive plan, assistance in creating a management plan, encouraging historic preservation at Unit III of the Dayton site, and assisting in media planning. Technical assistance would be expected to cost the National Park Service approximately \$190,000 per year.

## **ALTERNATIVE E: MANHATTAN PROJECT NATIONAL HISTORICAL PARK**

Under alternative E, the Department of Energy would remain responsible for the maintenance, preservation, and operation of their Manhattan Project facilities. Local organizations would primarily be responsible for providing tours of associated Manhattan Project sites, as well as for hosting exhibits and films related to the Manhattan Project story in their respective locations. The National Park Service could also have a role as a provider of tours, programs, and exhibits of DOE-managed sites.

As a unit of the national park system, the national historical park would have an annual operating budget for any facilities developed or purchased by the National Park Service at Los Alamos. In fiscal year 2006, comparable national park units in New Mexico maintained annual budgets of \$2, 703,000 (Bandelier National Monument), \$1,507,000 (Petroglyph National Monument), and \$1,451,000 (Pecos National Historical Park).

As discussed in the feasibility section of this document, it is possible that certain administrative costs for a Manhattan Project

National Historical Park located at Los Alamos, New Mexico, could be shared with Bandelier National Monument, which is in close proximity.

The Manhattan Project National Historical Park would have additional responsibilities related to partnering with other Manhattan Project sites not included in the national historical park. Acting as a coordinating entity with other sites could involve a suite of professional services, including interpretation, education, public outreach, historical architecture, archeology, and other disciplines. Therefore, operation costs of a Manhattan Project National Historical Park could be higher than costs at other local national park units. Operating costs and responsibilities would be determined through the general management planning process that would take place upon designation as a national historical park.

Alternative E calls for the establishment of a grant program. Existing NPS grant program awards range from \$150,000 to \$1.5 million annually. Preservation needs for Manhattan Project related sites are large, so grant awards towards the upper end of that range could be appropriate.

**Table 3: Estimated Costs of the Alternatives**

<b>National Park Service Costs</b>		<b>Department of Energy and Partners' Costs</b>
<b>Alternative A</b>	\$0	Current annual operating costs: \$3,370,000 <sup>1</sup>
<b>Alternative B</b>	Technical assistance if directed by Congress	Current annual operating costs: \$3,370,000 <sup>1</sup>  Initial consortium meeting planning: \$100,000  Management Plan: \$300,000 to \$400,000  Costs for operating the consortium and taking management actions to be estimated during initial consortium planning
<b>Alternative C</b>	Feasibility study: \$100,000  Additional federal funding to establish the national heritage area: up to \$1 million per year for 15 years, but not more than \$10 million total; this could fund the development of a management plan as well as technical assistance <sup>2</sup>	Current annual operating costs: \$3,370,000 <sup>1</sup>  Costs for operating the heritage area and taking management actions to be estimated in the management plan
<b>Alternative D</b>	Technical assistance in interpretation, media, interpretive training, management plan, and interpretation plan: \$190,000 per year	Current annual operating costs: \$3,370,000 <sup>1</sup> Costs for operating the affiliated area and taking management actions to be estimated during initial commission planning. Funding could be obtained from the Department of Energy, private entities, nonprofits, and other nonfederal agencies
<b>Alternative E</b>	Costs for operating the national historical park would be estimated through the general management planning process. Annual operating costs would be expected to range between \$1,450,000 and \$3,000,000  Grant program funds are estimated at \$1,000,000 per year	Current annual operating costs: \$3,370,000

(1) The existing annual operating costs for the four Manhattan Project sites are shown in Table 2.

(2) The National Heritage Areas Partnership Act establishes this maximum amount of federal funding for a heritage area and requires federal funding to be matched by partners.



## MANAGEMENT ALTERNATIVES NO LONGER UNDER CONSIDERATION

The special resource study team developed and considered two more alternatives for the Manhattan Project sites but decided not to include them in the range of alternatives because they were determined to be infeasible to implement. The two dismissed management alternatives are presented here to fully document the study process.

### **DESIGNATION AS A NATIONAL HISTORICAL PARK ENCOMPASSING LOS ALAMOS, OAK RIDGE, HANFORD, AND DAYTON**

Under this management alternative, Congress would establish a Manhattan Project National Historical Park, which would include resources and sites that are historically associated with the Manhattan Project at Los Alamos, Oak Ridge, Hanford, and Dayton. Other related sites, important to the story and having resource integrity, that are owned and managed by other private and public entities also could be incorporated into the national historical park through formal agreements. In this concept, the national historical park would encompass four noncontiguous areas, and would not be identified with just one location; however, it is likely that one site would serve as the primary orientation site.

#### **The Roles of the National Park Service and Department of Energy**

In this alternative, the National Park Service would be responsible for overall administration and coordination of the national historical park. The Park Service would coordinate with various site managers and those providing interpretation and preservation support to offer comprehensive and interrelated site interpretation with a national perspective. The National Park

Service would plan for preservation of historical sites at each unit through its general management planning and resource stewardship planning processes. The Park Service would provide technical assistance for site preservation and would assist in the development of interpretive and educational programming and associated exhibits and facilities that provide a national perspective complementing individual site stories. National Park Service staff support may be appropriate at one or more of the sites, but would not be expected to provide site management, maintenance, security, or operational support to structures owned and operated by the Department of Energy.

Additionally, the National Park Service and the Department of Energy would look to local partners to assist with providing interpretive programming, public access, and tours of historic facilities where public access is possible, and would partner with existing museums to assist in telling both the contextual and site-specific stories.

In this alternative, it is likely that one site would be designated by the National Park Service as the primary site for orientation to the comprehensive Manhattan Project story. This site would have corresponding National Park Service staff and interpretive presence; however, National Park Service personnel could be assigned to other important sites included in the national historical park as appropriate.

The Department of Energy would retain full responsibilities for site ownership, maintenance, and security of Manhattan Project-related industrial facilities at Los Alamos, Hanford, and Oak Ridge. The agency also would retain full responsibility for safety

and for environmental compliance issues, including the National Environmental Policy Act and section 106 of the National Historic Preservation Act requirements, for all agency-owned Manhattan Project resources at the three sites. The Department of Energy would continue to play no role in the Dayton site.

### **Reason for Dismissal**

The study team and NPS managers identified several concerns that resulted in the dismissal of this alternative. Although the Department of Energy would continue to be responsible for ownership, maintenance, and security of the resources under this alternative, there is still a concern regarding the potentially large financial liability the National Park Service might assume for the cleanup and maintenance of the sites—activities that are not part of the National Park Service mission but are part of the Department of Energy mission. These costs will likely increase as the Department of Energy structures continue to age and deteriorate. Even with a partnership with the Department of Energy, the National Park Service eventually could be asked to take more responsibility for the upkeep of the resources if the sites are contained within an NPS unit.

Similarly, although the Department of Energy would have overall responsibility for safety issues, there are still concerns regarding who would pay what costs and whether the National Park Service could find itself in a position where it would need to make a judgment over safety issues arising from the proximity of visitors and employees to radioactive materials—issues in which the National Park Service does not have expertise.

The operation of a new NPS unit for the Manhattan Project sites encompassing Los Alamos, Oak Ridge, Hanford, and Dayton would likely be very expensive relative to other national historical parks because of the complexity of partnerships, agreements, resource ownership, extraordinary distance

between sites spanning four NPS regions, and other highly challenging issues.

A few specific resources in the Manhattan Project sites face potential threats or have experienced degradation. Major portions of the K-25 building at Oak Ridge have been or are planned to be demolished; the entire building likely will be demolished over the next few years. Some of the historic buildings in the Hanford Site Manhattan Project and Cold War Era Historic District may be deteriorating. Some privately owned structures in the Oak Ridge Historic District, such as the original Guest House, also are deteriorating. In addition, the Dayton Project Unit III facility has been vacant and may have experienced some deterioration. If the Dayton school board were to sell the Project Unit III facility, the structure could be demolished or modified.

Public access and use of many of the structures and buildings at Los Alamos, Hanford, and Oak Ridge have been, and likely will continue to be, limited or prohibited due to national security or public health concerns. Although the Department of Energy continues to consider making the facilities more accessible, there still is a concern regarding how this can be achieved.

In addition, public access is limited or prohibited due to private ownership of structures and buildings at the Oak Ridge site, and private and school board ownership of the Dayton sites. Providing for public access is not part of the mission of these property owners. In addition, the ownership of the Dayton sites could change quickly and without notice.

Finally, implementation of this national historical park concept would be dependent upon congressional funding to the Department of Energy for both operational and historic preservation activities at all three sites where historic DOE facilities are involved, and congressional support to the National Park Service to help fund

interpretive and educational programming and materials, public access, site security, and site tours conducted by DOE/NPS partner organizations at all four sites. The lack of certainty in the provision of these needed funds was another factor in dismissing this alternative.

### **Department of Energy Position**

Throughout the planning process, a modified version of this alternative has been advanced by the DOE planning team members, who feel that a national park encompassing the resources at Oak Ridge, Hanford, and Los Alamos would best preserve the story and resources of the Manhattan Project. Draft DOE team member comments are in appendix F.

### **DESIGNATION AS A NATIONAL MONUMENT UNDER DEPARTMENT OF ENERGY ADMINISTRATION**

Under this management alternative, a Manhattan Project National Monument would be established via presidential executive order or congressional legislation and placed under Department of Energy administration. The monument would include resources and sites in federal ownership that are historically associated with the Manhattan Project, such as resources at Los Alamos, Oak Ridge, and Hanford. Other related sites, important to telling the Manhattan Project story and having resource integrity, that are owned and managed by other private and public entities, such as those at Dayton, could choose to be associated with the national monument, but would not be managed or operated by the Department of Energy.

### **The Roles of the National Park Service and the Department of Energy**

The Department of Energy would have responsibility for all aspects of the management and administration of the national monument under this alternative, including resource preservation and

interpretation. The agency would also continue to have full responsibilities for maintenance, safety, and security of Manhattan Project-related industrial facilities at Los Alamos, Hanford, and Oak Ridge. The department also would retain full responsibility for safety and for environmental compliance issues, including the National Environmental Policy Act and section 106 of the National Historic Preservation Act requirements, for all DOE-owned Manhattan Project resources at the three sites. The Department of Energy also could develop agreements and provide technical assistance to other entities that associate with the monument, such as the school board and private owners at Dayton. For example, the department could work with other entities to assist them in efforts to raise operational, interpretation, and preservation funds.

The National Park Service would not be directly involved with management of the national monument, including preservation and interpretation efforts—no NPS funds would be used to directly operate or administer the sites. The National Park Service also would have no responsibility for public safety or preservation related to the Manhattan Project resources at the sites. However, the National Park Service could provide technical assistance to the Department of Energy on an “as requested” basis.

### **Reason for Dismissal**

Protection and interpretation of Manhattan Project resources are not part of the Department of Energy’s core mission. The Department of Energy has not officially expressed an interest in administering such a monument without direct Park Service participation. The study team believed it was inappropriate for the National Park Service to propose that another federal department be made responsible for managing a national monument without its concurrence. Consequently, the study team dismissed this alternative from further consideration.

## THE ENVIRONMENTALLY PREFERABLE ALTERNATIVE

National Environmental Policy Act (NEPA) regulations and NPS policy require that environmental assessments identify the environmentally preferable alternative. The reader is reminded that the environmentally preferable alternative should not be viewed as the National Park Service's preferred alternative or as a positive or negative recommendation by the National Park Service or the Department of the Interior for any future management strategy or action directed at the Manhattan Project sites.

The environmentally preferable alternative is defined as "the alternative that will promote national environmental policy as expressed in Section 101 of the National Environmental Policy Act." Section 101 states that it is the continuing responsibility of the federal government to . . .

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. preserve important historic, cultural, and natural aspects of our national heritage; and maintain, wherever possible, an environment which supports diversity, and a variety of individual choices;
5. achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life's amenities; and
6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Based on these criteria, the environmentally preferable alternative is alternative E. This alternative best satisfies the national environmental goals—with the establishment of an NPS unit, this alternative provides the highest level of long-term protection of cultural resources while concurrently providing for a wide range of neutral and beneficial uses of the environment. This alternative would maintain an environment that supports a diversity and variety of individual choices, and it integrates resource protection with an appropriate range of visitor services and understanding.

With regard to the specific criteria, this special resource study evaluates management options rather than detailed development proposals; therefore, criterion 6 would be more appropriately evaluated when subsequent implementation planning occurs.

There would be no difference in how any of the alternatives would fulfill criterion 5 (achieving a balance between population and resource use).

The alternatives are not expected to substantially differ in their potential for degradation of the environment, risks to public health or safety, or undesirable or unintended consequences (criterion 3).

However, under alternative A, there would be a higher potential for the Department of Energy and the other owners to remove, sell, or ignore Manhattan Project resources, particularly at Dayton, than under alternatives B, C, D, and E. Thus, alternatives B, C, D, and E would better fulfill criterion 1 (fulfill responsibilities of future generations as trustee of the environment).

Alternative A also would not protect resources or provide for public enjoyment at Dayton. Compared to alternative A, alternatives B, C,

D, and E have the potential to increase awareness and interest, and thus increase opportunities for resource protection and for public enjoyment at Dayton and the other Manhattan Project sites. Consequently, alternatives B, C, D, and E would better achieve criteria 2, 3, and 4 than would alternative A.

In examining alternatives B, C, D, and E, there would be no noteworthy differences in how criteria 2 and 3 would be achieved. Any differences between the alternatives would largely depend on the nature and character of the consortium in alternative B, the national heritage area managing entity and its partners in alternative C, the commission and how it decides to manage the affiliated area in alternative D, and the formal relationships of the national historical park with other associated areas in alternative E. How each of the organizations in alternatives B, C, and D would implement the management concepts is another unknown variable. It is not possible to speculate about how differences in expertise and fund raising abilities among the three different management entities could affect the Manhattan Project sites.

Compared to alternatives B, C, and D, the establishment of a national historical park in alternative E would provide the highest level of assurance that succeeding generations would continue to appreciate and enjoy this area. A consortium, national heritage area, or

affiliated area would not necessarily be able to provide the same level of long-term assurance. Thus, alternative E would best achieve criterion 1.

With respect to criterion 4, alternatives B, C, D, and E would all generally ensure that important historic aspects of the sites would be preserved. Alternatives D and E contain specific recommendations for historic preservation funding through the Department of Energy to assist in preserving the DOE Signature Facilities at Hanford, Los Alamos, and Oak Ridge. Unlike the other alternatives, alternative E would establish a unit in the national park system. Compared to the other alternatives, an NPS unit would more likely have the funding and staff to best ensure the long-term protection of cultural resources within the Los Alamos Scientific Laboratory National Landmark District and ensure that the full story of the Manhattan Project continues to be told. The national historical park provides more protection for the Los Alamos resources than a national historical landmark designation by itself. An NPS unit also would likely be able to provide more incentive than the other alternatives for other related Manhattan Project site owners to enter into agreements with the National Park Service and thus provide more assurance that these resources would be protected.

## **MOST EFFECTIVE AND EFFICIENT MANAGEMENT OPTION ALTERNATIVE**

Public Law 105-391 directs that “...each study of the potential of an area for inclusion in the national park system...shall consider whether direct National Park Service management or alternative protection by other public agencies or the private sector is appropriate for the area [and] shall identify what alternative or combination of alternatives would in the professional judgment of the Director of the

National Park Service be the most effective and efficient in protecting significant resources and providing for public enjoyment...”

This section will be added in the final report following public and agency review of the draft report, and NPS policy determination.

## SUMMARY TABLES

Table 4: Summary Comparison of the Alternatives

Topic	Alternative A: No Action	Alternative B: National Consortium	Alternative C: National Heritage Area	Alternative D: Area Affiliated With the National Park System	Alternative E: Manhattan Project National Historical Park
<b>CONCEPT</b>	Continuation of current programs and policies; no national coordination regarding resource protection and interpretation of the Manhattan Project story	Congressional recommendation for the establishment of a nationwide consortium to work with the Department of Energy and other site owners to coordinate preservation and interpretation efforts	Congressional designation of a national heritage area, with a management entity that would work with the Department of Energy and other site owners to coordinate preservation and interpretation efforts	Congressional designation of key Manhattan Project historic resources in Oak Ridge, Los Alamos, Hanford, and Dayton as an affiliated area of the national park system  A commission, established by Congress, would oversee coordination, preservation, and public use of the sites.	Congressional designation of a site in the Los Alamos, New Mexico area as the Manhattan Project National Historical Park managed by the National Park Service, with certain site resources within the existing Los Alamos Scientific Laboratory National Landmark District incorporated into the National Historical Park.  Sites away from Los Alamos would be considered associated with, but not operationally part of, the Los Alamos-based National Historical Park.
<b>RESOURCE PROTECTION/ PRESERVATION</b>	Not a primary focus of management; protection on an ad hoc basis depending on discretion, interest, and financial ability of	A primary focus of management; the nationwide consortium could plan, prioritize, and obtain funds for resource preservation efforts, and help provide funds and	Same as alternative B except a national heritage area management entity would be responsible for planning, and obtaining funds; the management entity would work with its partners to establish	A primary focus of management; Department of Energy would be authorized by legislation to request funding from Congress to assist in the preservation and	The legislation would authorize the National Park Service to acquire one or more historic properties within the existing Los Alamos Scientific Laboratory National Historic Landmark District. subject to donation

PART FOUR: MANAGEMENT ALTERNATIVES

Topic	Alternative A: No Action	Alternative B: National Consortium	Alternative C: National Heritage Area	Alternative D: Area Affiliated With the National Park System	Alternative E: Manhattan Project National Historical Park
	the owners.	expertise to the site owners.	priorities among the sites.	ongoing maintenance of DOE Signature Facilities; preservation of other Manhattan Project historical resources would be encouraged and accomplished through both private and public funding sources.	and willing seller provisions. Separate, companion legislation would be recommended to authorize and provide commensurate appropriations to the Department of Energy to preserve key Manhattan Project resources located in Los Alamos, Oak Ridge, and Hanford.
<b>PUBLIC ACCESS</b>	Public access would continue as in the past, with limited access to Department of Energy resources; public access to other resources would depend on the discretion of the owners.	Public access opportunities could increase and/or improve at some or all of the four sites with increased public exposure, interest, and funding.	Same as alternative B.	Most, if not all, sites included in the affiliated area would be accessible to the public, including historical properties deemed safe and appropriate for public visitation within DOE managed areas.	Sites in Los Alamos acquired by the National Park Service would be made available for public visitation and interpretation. DOE-managed sites in Los Alamos, Oak Ridge, and Hanford that meet security and safety considerations would also be made available by the Department of Energy for public tours.  The National Park Service would not be expected to have any direct role in the conduct of tours of DOE historic facilities.



Topic	Alternative A: No Action	Alternative B: National Consortium	Alternative C: National Heritage Area	Alternative D: Area Affiliated With the National Park System	Alternative E: Manhattan Project National Historical Park
<b>INTERPRETATION</b>	Interpretive opportunities would continue to be provided at the museums on the sites; differing types and quality of interpretation would continue to be provided by local groups; no interpretation at Dayton	Interpretive opportunities could be enhanced at the museums; a web-based network would be developed to aid interpretation; local groups would be encouraged to provide coordinated, high quality interpretation; interpretive opportunities might be provided at Dayton	Same as alternative B	Same as alternative B	<p>The National Park Service would be authorized to acquire or lease an appropriate location within the Los Alamos community for a park visitor center. The Park Service would coordinate with community officials concerning the development of a walking and driving tour and other appropriate interpretive activities that would be located outside the visitor center structure.</p> <p>Formal agreements between the National Park Service and partner organizations, including community-managed and DOE-managed resources at Hanford, Oak Ridge, Dayton, and other locations could be established to provide interpretive services.</p>
<b>ROLE OF THE NATIONAL PARK SERVICE</b>	No National Park Service presence, involvement, or funding	No direct involvement in administration, preservation, or interpretation efforts; the agency could serve as a catalyst to form the nationwide consortium, and	No direct involvement in the administration of the national heritage area; the agency could act as a catalyst to explore the concept, can provide	No direct involvement in the administration of the affiliated area; a principle responsibility of the agency would be to provide technical	The National Park Service would have operational responsibility for acquired structures within the Los Alamos Scientific Laboratory National Landmark District.

PART FOUR: MANAGEMENT ALTERNATIVES

Topic	Alternative A: No Action	Alternative B: National Consortium	Alternative C: National Heritage Area	Alternative D: Area Affiliated With the National Park System	Alternative E: Manhattan Project National Historical Park
		could provide technical assistance on an “as requested” basis	limited funds on a temporary basis, and can provide technical assistance on an “as requested” basis	assistance for interpretive and educational programming.	At Los Alamos, the National Park Service would be responsible for operating a visitor center within the community setting, providing technical assistance in the preservation of historic Manhattan Project resources, and coordinating with the Department of Energy and community officials and organizations regarding public use and educational opportunities within the Los Alamos community.  The National Park Service could also pursue, subject to available funding, a grant program to assist in interpretive and educational programs and media development for other Manhattan Project historic sites at Hanford, Oak Ridge, Dayton, and other locations.
<b>ROLE OF THE DEPARTMENT OF ENERGY</b>	The agency would continue to have responsibility for site ownership, maintenance, security, safety, and	Same as alternative A, except the agency would work with the nationwide consortium to preserve and interpret resources related to the Manhattan Project; the	Same as alternative A, except the agency would work with the national heritage area management entity to preserve and interpret	Same as alternative A, except the agency would work with the National Park Service and the commission to preserve and interpret	Same as alternative A; in addition, the Department of Energy would be responsible for addressing environmental compliance issues, including National Environmental

Topic	Alternative A: No Action	Alternative B: National Consortium	Alternative C: National Heritage Area	Alternative D: Area Affiliated With the National Park System	Alternative E: Manhattan Project National Historical Park
	environmental compliance for federal facilities at Los Alamos, Hanford, and Oak Ridge; no agency role at Dayton.	Department of Energy would be responsible for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements.	resources related to the Manhattan Project; the Department of Energy would be responsible for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements.	resources related to the Manhattan Project; the Department of Energy would be responsible for addressing environmental compliance issues, including National Environmental Policy Act and National Historic Preservation Act section 106 requirements.	Policy Act and National Historic Preservation Act section 106 requirements.
<b>ROLE OF OTHER ENTITIES</b>	Other private and public entities would continue to have responsibility for site ownership, maintenance, and security of their properties, as well as for the preservation and interpretation of resources.	Same as alternative A, except local groups would provide representatives to the nationwide consortium, and with additional support, the entities could strengthen and enhance preservation and interpretation efforts.	Same as alternative A, except with additional support from the management entity, the local groups could strengthen and enhance their preservation and interpretation efforts.	Same as alternative A except the commission and the Department of Energy would rely heavily on local partners to assist in the development and operation of museums, visitor facilities, and historical sites open to the public.	Same as alternative A; in addition, at Los Alamos, the National Park Service would rely heavily on local partners and volunteers to assist in serving the public at visitor facilities through walking tours, and at historical sites that are open to the public.  The National Park Service would seek a strong working relationship with organizations in Los Alamos and with associated sites at Richland and Oak Ridge.  The Department of Energy would also be expected to

PART FOUR: MANAGEMENT ALTERNATIVES

Topic	Alternative A: No Action	Alternative B: National Consortium	Alternative C: National Heritage Area	Alternative D: Area Affiliated With the National Park System	Alternative E: Manhattan Project National Historical Park
					enter into formal agreements with community organizations at Oak Ridge, Los Alamos, and the Hanford area to assist in the conduct of public tours of DOE-managed sites that they are making accessible to the public.

Table 5: Key Impacts of the Alternatives

	Historic Buildings and Structures and Cultural Landscapes	Museum Collections	Visitor Use and Experience	Socioeconomics
Alternative A	<p>Historic preservation programs at the Department of Energy would continue, which would have beneficial impacts.</p> <p>There is a potential for long-term, minor to moderate, adverse impacts to privately owned and managed properties and landscapes.</p> <p>There would be no new impacts introduced with the implementation of alternative A.</p>	<p>The curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts.</p> <p>There is a potential for adverse impacts to privately owned collections, objects, and archives. There would be no new impacts introduced with the implementation of alternative A.</p>	<p>Alternative A would result in no impacts to visitor use and experience at Los Alamos, Hanford, and Oak Ridge, and a negligible long-term adverse impact at Dayton.</p>	<p>Alternative A would result in no impacts to socioeconomic environment of the Manhattan Project localities. The impacts of other actions range from negligible, long-term, and adverse to negligible, long-term, and beneficial.</p>
Alternative B	<p>Historic preservation programs at the Department of Energy would continue, which would have beneficial impacts.</p> <p>There is a potential for inconsistent impacts, both beneficial and adverse, at privately owned and managed properties and landscapes. These impacts would be long-term and range from minor to moderate in intensity.</p>	<p>The curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts.</p> <p>As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives. With the establishment of a national consortium, there would be no new impacts introduced.</p>	<p>Implementation of alternative B would result in negligible to minor, long-term, beneficial impacts.</p> <p>Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial.</p>	<p>Implementation of alternative B would result in a negligible long-term beneficial impact to socioeconomics of the Manhattan Project sites.</p> <p>Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial.</p>

PART FOUR: MANAGEMENT ALTERNATIVES

	<b>Historic Buildings and Structures and Cultural Landscapes</b>	<b>Museum Collections</b>	<b>Visitor Use and Experience</b>	<b>Socioeconomics</b>
Alternative C	<p>Under alternative C, historic preservation programs at the Department of Energy would continue, which would have beneficial impacts.</p> <p>There is a potential for inconsistent beneficial and adverse impacts at privately owned and managed properties and landscapes which would be long-term and range from minor to moderate in intensity.</p>	<p>Under alternative C, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts.</p> <p>As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative C. With the establishment of a national heritage area, there would be no new impacts introduced.</p>	<p>Implementation of alternative C would result in minor to moderate, long-term, beneficial impacts to visitor use and experience.</p> <p>Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial.</p>	<p>Implementation of alternative C would result in a negligible, long-term, beneficial impact to socioeconomics of the Manhattan Project sites.</p> <p>Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial.</p>
Alternative D	<p>Under alternative D, historic preservation programs at the Department of Energy would continue, which would have beneficial impacts.</p> <p>There is a potential for inconsistent beneficial and adverse impacts to privately owned and managed properties and landscapes that would be long-term and would range from minor to moderate in intensity.</p>	<p>Under alternative D, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts.</p> <p>As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative D. With the establishment of an area affiliated with the national park system, there would be no new impacts introduced.</p>	<p>Implementation of alternative D would result in minor to moderate, long-term, beneficial impacts to visitor use and experience.</p> <p>Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial.</p>	<p>Implementation of alternative D would result in a negligible, long-term, beneficial impact to socioeconomics of the Manhattan Project sites.</p> <p>Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial.</p> <p>Alternative D, in conjunction with other actions would result in long-term beneficial impacts that are negligible in intensity.</p>

	Historic Buildings and Structures and Cultural Landscapes	Museum Collections	Visitor Use and Experience	Socioeconomics
Alternative E	<p>Under alternative E, historic preservation programs at the Department of Energy would continue, which would have beneficial impacts.</p> <p>There is a potential for inconsistent beneficial and adverse impacts to privately owned and managed properties and landscapes that would be long-term and would range from minor to moderate in intensity.</p>	<p>Under alternative E, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts.</p> <p>As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative E.</p> <p>With the establishment of a national park unit, there could be some beneficial effect as the Manhattan Project National Historical Park would provide guidance and focus for collections.</p>	<p>Implementation of alternative E would result in minor to moderate, long-term, beneficial impacts to visitor use and experience. Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial.</p>	<p>Implementation of alternative E would result in a negligible, long-term, beneficial impact to socioeconomics of the Manhattan Project sites.</p> <p>Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial.</p>





OAK RIDGE



DAYTON, BUILDING 2



LOS ALAMOS, GUN SITE

## THE AFFECTED ENVIRONMENT



## ENVIRONMENTAL IMPACT TOPICS

Environmental impact topics were selected for analysis based on federal laws and regulations, concerns expressed by the public or other agencies during scoping, and the relevance to the study area and to the alternatives under consideration.

This study considers the best way to preserve and interpret the material cultures that represent the combined scientific and social efforts that resulted in breakthroughs in technology while achieving the goal of the Manhattan Project—the development of the first atomic bomb. The dispersed sites considered for inclusion reflect the dispersed nature of the national program that was the Manhattan Project.

The affected environment and an analysis of the environmental consequences of the alternatives are presented for each of the impact topics. A brief description of each impact topic is given below.

### IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

#### **Cultural Resources**

##### ***Indian Trust Resources***

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights; it represents a duty to carry out the mandates of federal law with respect to Native Americans and Alaska Native tribes.

There are no Indian trust resources associated with any of the Manhattan Project properties.

There are no lands within the DOE-owned or privately owned areas that are held in trust by the secretary of the interior for the benefit of Native Americans due to their status as Native Americans. Therefore, Indian trust resources is dismissed as an impact topic in this environmental assessment.

#### ***Archeological Resources***

The actions proposed are broad management alternatives that would not specifically impact prehistoric or historic archeological resources. The Department of Energy, which will remain the managing agency at three of the sites (Los Alamos, Hanford, and Oak Ridge), would continue to administer the sites in accordance with current laws and regulations governing the activities of federal agencies. Currently there is no federal ownership of Manhattan Project-related land at Dayton. Any lands managed or acquired by the federal government would be subject to federal law and regulation, and site specific planning would consider this impact topic in any future planning efforts. No ground-disturbing activities are included in any of the various alternatives proposed—the proposed actions are broad management alternatives that do not include specific actions. Therefore, this topic is dismissed from further analysis. Any future actions by the Department of Energy related to national register-eligible or national register-listed properties will involve compliance with 36 CFR 800 and the Advisory Council's regulations for compliance with Section 106 of the National Historic Preservation Act.

#### ***Ethnographic Resources***

An ethnographic resource is “a site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (DO-28: Appendix A).

Ethnographic research has been conducted to varying degrees at the three DOE sites included in this study. The sites at Dayton have not yet been considered as part of a larger ethnographic story related to the Manhattan Project. Although Dayton may not lend itself to an evaluation here, the sites at Los Alamos, Hanford, and Oak Ridge do have ethnographic data relevant to the Manhattan Project period (1942 to January 1, 1947). The Department of Energy has made use of ethnographic and oral history interviewing as a means of compliance with federal historic preservation requirements. However, the alternatives outlined in this study/environmental assessment are broad management actions that would not impact current efforts to conduct ethnographic work that has been used to assist in the protection of cultural resources at the sites under their management. Therefore, ethnographic resources is not evaluated here as an impact topic.

## **Natural Resources**

### ***Air Quality***

The four sites considered in this Manhattan Project special resource study are located in four distinct regions of the country, each with their own unique environmental characteristics. Site specific planning will consider this air quality in any future planning efforts. Current laws and regulations governing the activities of federal agencies including the Department of Energy will continue to apply. Due to the broad general management actions proposed and the fact that they will not impact air quality, it is dismissed as an impact topic.

### ***Water Quality***

Although water played an important role in the activities at some of the sites during the years of the Manhattan Project, it is not considered here due to the very general nature of the management actions proposed. These management actions will have no impact on water quality. Site specific planning will consider water quality in any future planning

efforts. Current laws and regulations governing the activities of federal agencies including the Department of Energy will continue to apply. Therefore, water quality is dismissed from further consideration.

### ***Prime and Unique Farmland***

Prime farmlands are lands that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and are also available for these uses.

Unique farmlands are other farmland other than prime farmland used for the production of specific high-value food and fiber crops. The 1981 Farmland Protection Policy Act (PL 97-98) was passed to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. Provisions of the act also ensure that federal programs are administered in a manner that (to the extent practicable) is compatible with the farmland protection programs and policies of state and local governments and private entities.

Three of the sites considered in this study are located in areas where towns have developed around the site, or where farming was phased out due to the unique requirements of the Manhattan Project. The Dayton sites are in an existing urban area. The use of these areas as farmlands was eliminated when the sites were developed for the Manhattan Project. Therefore, prime and unique farmland is dismissed as an impact topic.

### ***Lightscape Management and Soundscape Management***

The consideration of lightscapes and soundscapes as impact topics derives from NPS management policies. The Department of Energy, which will remain the managing agency at three of the sites, will continue to administer sites in accordance with current laws and regulations governing the activities of federal agencies. The fourth site at Dayton

is in an urban area. Most importantly, none of the actions proposed would affect lightscapes or soundscapes. Therefore, lightscapes and soundscapes are dismissed from further consideration.

### **Wilderness and Wild and Scenic Rivers**

At this time, there are no designated wilderness areas or Wild and Scenic River segments, and there are no areas proposed for study or designation at any of the locations considered in this study. In addition, none of the actions proposed would affect such a designation. Therefore, wilderness and wild and scenic rivers are dismissed from further consideration.

### **Other Natural Resource Topics**

Scenic Resources, Threatened and Endangered Species, Vegetation, Floodplains, Wetlands, and Wildlife are topics that have been dismissed. The proposed management actions in this special resource study / environmental assessment will have no impact on any of these topics. The Department of Energy, which will remain the managing agency at three of the sites, will continue to administer them in accordance with current laws and regulations governing the activities of federal agencies. There is no proposal for the creation of federal properties at Dayton. Therefore, these additional natural resource topics are dismissed from further consideration.

### **Other Topics**

#### **Environmental Justice**

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to

the Environmental Protection Agency, environmental justice is the

*...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.*

The goal of ‘fair treatment’ is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects and to identify mitigation measures for such impacts.

Each of the communities and their general vicinities considered in this study contain both minority and low-income populations; however, environmental justice is dismissed as an impact topic for the following reasons:

- The study team actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors.
- Implementation of any of the alternatives would not result in any identifiable adverse human health effects among minority or low-income populations.
- Implementation of any of the alternatives would not result in any identified effects that would be disproportionately specific to any minority or low-income community.

#### **Public Health and Safety**

Access to DOE properties is currently subject to restrictions. Both the Department of Homeland Security and the Department of Energy have regulations and policies in place

to secure nuclear research and development resources and programs and to protect visitors from exposure to high explosives and hazardous or toxic waste materials. Due to the seriousness of the potential for radioactive contamination at some of these sites, the Department of Energy maintains an active program for the protection of the public and works to mitigate impacts to public health and safety, which will continue under all of the alternatives. The Dayton sites have been cleaned and have been found safe by the United States Army Corps of Engineers for current uses. There would be no impacts or changes in visitor safety or public health related to any of the proposed alternatives. Therefore, public health and safety is dismissed as an impact topic.

### **Impairment to Park Resources**

The National Park Service's *Management Policies 2006* require analysis of potential effects to determine whether actions would impair park resources. The fundamental purpose of the National Park Service, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. Generally, environmental documents developed by the National Park Service assess the potential effects to the existing park's resources. However, there are no specific park resources and boundaries identified for this study; therefore, this topic of impairment to park resources is not applicable to the study.

## **IMPACT TOPICS INCLUDED IN THIS ANALYSIS**

### **Historic Buildings and Structures and Cultural Landscapes**

The structures and buildings considered in this study are identified both as contributing and noncontributing resources of the Manhattan Project. Various properties at the four sites have been listed in or have been determined as eligible for listing in the

National Register of Historic Places. Proposed alternatives for the use and treatment of these properties, including removal of noncontributing properties, could affect historic buildings, structures, and other character-defining features that contribute to the existing historic districts' significance.

According to the National Park Service's *Cultural Resource Management Guideline* (DO-28), a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

Three of the Manhattan Project sites are part of potential cultural landscapes that were created specifically for the endeavors of the scientists and workers in the creation of the first atomic bomb. At Los Alamos, Oak Ridge, and Hanford, actual "cities" were built to accommodate the various individuals involved. Many of the physical features and materials and their interrelationships, including patterns of spatial organization, land use, circulation patterns, and buildings and structures, continue to exist today. Unique structures were constructed to solve scientific problems. At Dayton, the activities of the Manhattan Project are part of the larger urban landscape that relates to the themes of scientific and aviation advances which are interpreted and preserved through the National Park Service's Dayton Aviation Heritage National Historical Park.

Some of the Manhattan Project-related sites and structures have been compromised by post-World War II developments, modifications, and operations as well as disuse, abandonment, fire, and facility cleanup. However, important structures, facilities, and features are still in place that

allow these sites to convey their historical associations with the Manhattan Project. Thus, the sites possess integrity of location, association, setting, design, materials, and workmanship relating to the Manhattan Project. It is possible that the alternatives could have the potential to impact cultural landscapes at these sites. Therefore, impacts on historic buildings, structures, and the cultural landscape that could result from actions proposed under the various alternatives are evaluated and analyzed in this environmental assessment.

### **Museum Collections**

Museum collections can include a diverse range of items such as prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens. Current museums at or near the three DOE-managed sites curate collections related to the Manhattan Project. At Los Alamos, the Bradbury Science Museum serves as a bridge between the Los Alamos National Laboratory and the larger community; the Los Alamos Historical Society includes historic photos, objects, and archives related to the Manhattan Project era.

The American Museum of Science and Energy at Oak Ridge focuses on energy as a central theme. At Hanford, there is the Hanford Reach Interpretive Center that preserves the natural and cultural history of the Hanford Reach of the Columbia River and greater Columbia Basin. Efforts at creating a museum out of the B Reactor at Hanford are underway through the auspices of the B Reactor Museum Association. At Dayton, a major Manhattan Project-related museum object is at the National Museum of the United States Air Force. It is "Bockscar" (or "Bock's Car"),

the B-29 bomber that dropped the "Fat Man" bomb on Nagasaki. The Mound Museum Association also has several, albeit much smaller, Dayton Project artifacts.

Department of Energy records are not maintained at a single location, but are found at numerous DOE sites across the country. Many permanent records are at the National Archives and Records Administration ([http://www.energy.gov/about/research\\_records.htm](http://www.energy.gov/about/research_records.htm)).

One or more of the alternatives could change how or where collections are stored; therefore this topic is retained for analysis.

### **Visitor Use and Experience**

Providing for visitor interpretation and quality visitor experiences are among the fundamental purposes of the National Park Service. Generally, visitor use and experience is not part of the mission of the Department of Energy. However, visitors are allowed at DOE sites where the public may gain access to some Manhattan Project-era facilities. It is possible that the alternatives being proposed for the Manhattan Project sites could affect visitation levels and visitor experiences. Therefore, this impact topic is analyzed in this document.

### **Socioeconomics**

Designation of the Manhattan Project sites as proposed in the alternatives may impact the surrounding communities. Under a new managing organization such as the consortium or heritage area, tourism levels could be affected, which in turn could affect local employment, traffic, local businesses, and government receipts. Therefore, socioeconomics is analyzed in this document.

# LOS ALAMOS

As originally planned, the sole purpose of this Manhattan Project Site was to develop the atomic bomb. The War Department planned to dismantle the site upon completion of the project. However, at the end of the war, distrust of the Soviet Union and the U.S. government's need for developing and maintaining a nuclear arsenal resulted in the establishment of a permanent nuclear weapons research and design entity at Los Alamos. The facility was soon designated as Los Alamos Scientific Laboratory, a name that lasted until the early 1980s. Then the facility was designated as one of several multipurpose national laboratories and the name was changed to Los Alamos National Laboratory (LANL).

Los Alamos National Laboratory and the associated residential areas of Los Alamos and White Rock are located in Los Alamos County in north central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. The 43-square-mile Los Alamos National Laboratory site is situated on the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep east-to-west-oriented canyons cut by intermittent streams. Mesa tops range in elevation from approximately 7,800 feet on the flanks of the Jemez Mountains to about 6,200 feet at their eastern termination above White Rock Canyon and the Rio Grande. Plant communities on these mesas range from ponderosa pine forests on the flanks of the Jemez Mountains to piñon-juniper woodlands near the Rio Grande. The climate is moderate with relatively mild winters and summers. Most Los Alamos National Laboratory and community developments are confined to mesa tops. The surrounding land is largely undeveloped, and large tracts of land north, west, and south of Los Alamos National Laboratory are administered by the Santa Fe National Forest, Bureau of Land Management, Bandelier

National Monument, General Services Administration, and Los Alamos County. The Pueblo of San Ildefonso borders Los Alamos National Laboratory to the east. Los Alamos National Laboratory is divided into technical areas that are used for building sites, experimental areas, waste disposal locations, etc. However, these uses account for only a small part of the total land area. Over half of the total acreage has slopes with grades over 20%, making development difficult. In addition, much of the area that could be developed is needed for security and safety buffers because of the work being performed there. Therefore, of the 43 square miles, less than 25% is developed. The Department of Energy administers the area occupied by Los Alamos National Laboratory and has the option to restrict public access completely. However, the public is currently allowed limited access to certain areas of Los Alamos National Laboratory.

## HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

According to the 2002 *Integrated Natural and Cultural Resources Management Plan for Los Alamos National Laboratory*, cultural resources at Los Alamos National Laboratory are considered regionally and nationally significant.

For the purposes of this environmental assessment, cultural resources are reviewed here with a primary focus on the historic period related to the Manhattan Project (1942-1947). Cultural resources are protected under several state and federal laws, regulations, executive orders, and policies.

The historic resources present within Los Alamos National Laboratory boundaries and on the Pajarito Plateau can be attributed to



three phases: Spanish Colonial, Early U.S. Territorial and Statehood, and the Nuclear Energy Period. Because of the well-defined changes in the function of Los Alamos National Laboratory, the Nuclear Energy Period is further broken into three periods: World War II and Early Nuclear Weapon Development, Early Cold War, and Late Cold War. A systematic survey of the Historic Period resources present within Los Alamos National Laboratory boundaries is underway with an emphasis on two periods: The Manhattan Project Period (1943 to 1946) and the Early Cold War Period (1947 to 1964).

The Los Alamos Scientific Laboratory was designated as a national historic landmark on October 15, 1966. The Landmark District is comprised of nine structures of the Ranch School: the Fuller Lodge; a house directly to the north of the lodge, which is used as a museum; the small stone powerhouse, which is used by the Red Cross; and the five private residences, which constituted 'Bathtub Row.' In addition, on the southern shore of Ashley Pond is a memorial shelter, built out of ice house stones on the site of an icehouse.

Various factors have served to reduce the number of Manhattan Project buildings still existing at the Los Alamos National Laboratory. These include (1) expedient initial construction of the original buildings and structures; (2) infrastructure construction and development associated with the Cold War (particularly during the late 1950s and early 1960s) and with laboratory expansion during the late 1990s and early 2000s; (3) expansion and development of the Los Alamos townsite during the 1950s and 1960s; (4) structures lost during the Cerro Grande fire in May 2000; and (5) contamination of some buildings by asbestos and radioactive isotopes. As of 2005, only 36 Manhattan Project-related structures retained sufficient historical and physical integrity for meeting eligibility requirements for listing in the National Register of Historic Places, and only a handful are currently deemed suitable by the

Department of Energy for long-term preservation and interpretation.

In 2002, a study was undertaken via contract to the Cultural Resources Team of the Ecology Group, Environmental Stewardship Division at the Los Alamos National Laboratory for preparation of a nomination form for a potential "Project Y" Manhattan Project National Historic Landmark. The potential national historic landmark would consist of five separate historic properties in various technical areas of the Los Alamos National Laboratory that retain a high degree of integrity and together provide compelling insights into the most significant aspects of "Project Y." In between these historic properties are a wide range of buildings, structures, and sites that are associated with nuclear weapons research, testing, and development dating from the Cold War to the present. The five properties include "Trinity Test" V-Site (TA-16); "Little Boy" Gun Site (TA-8); "Fat Man" Quonset Hut (TA-22); "Plutonium Recovery" Concrete Bowl (TA-6); and "Criticality Accident" Slotin Building (TA-18). Each of these properties constitutes a small discrete area of 1 to 3 acres in size; the aggregate area of the potential national historic landmark is approximately 10 acres.

The cultural landscape around the Los Alamos site has been preserved to a great degree even with modernization of the facility as its use has continued as a national laboratory. Much of the character of the landscape from the days of the Manhattan Project has been preserved in the facilities and structures described above.

## MUSEUM COLLECTIONS

According to the history of the Bradbury Science Museum ([www.lanl.gov/museum](http://www.lanl.gov/museum)), the first Laboratory museum was established in an old ice house on the bank of Ashley Pond across from Fuller Lodge and officially opened in 1954. As the museum has expanded and grown over the years, the museum has

undergone various changes. The Bradbury Science Museum was founded in 1963 and is a part of Los Alamos National Laboratory. What started as an informal attempt to preserve the story of the Manhattan Project has grown into a professionally designed formal museum. Today the museum draws close to 100,000 visitors annually.

The Bradbury Science Museum is one of the principal museums in the United States that deals with the Manhattan Project story, however its focus is primarily on the local community and the broader story of the Los Alamos National Laboratory and its role in science and technology of today.

The Los Alamos Historical Society also deals with the Manhattan Project era, as well as other subjects related to the community. The historical society ([www.losalamoshistory.org](http://www.losalamoshistory.org)) maintains the Los Alamos Historic Museum and Shop and the Los Alamos Historical Archives. The society publishes books, provides lectures, and promotes the history of Los Alamos and the surrounding region. The society also owns and maintains the J. Robert Oppenheimer House. Existing collections include approximately 100,000 objects and archives with about 20% directly related to the Manhattan Project.

## VISITOR USE AND EXPERIENCE

Visitation statistics for Manhattan Project sites at Los Alamos are limited. However, the visitation data for the various sites at Los Alamos can give the reader an idea of the current visitation the area receives.

Public access to the actual laboratory is subject to strict guidelines. Visitors to the facility must be sponsored, signed in, and escorted by LANL personnel. Visits are not regularly scheduled and are closely monitored due to national security issues at the facility. Generally, most LANL-sponsored events take place at the Bradbury Science Museum in the

town of Los Alamos or off site at local universities and colleges.

The Bradbury Science Museum interprets the Los Alamos National Laboratory's history and current research and is located at the laboratory. In 2007, the museum received 73,658 visitors. The number of visitors has been steady for the past two years.

The Los Alamos Historical Society Museum received 28,456 visitors in 2007. This represents a drop in on-site visitation over the previous three years; however, website visitation has gone up.

## SOCIOECONOMICS

The County of Los Alamos, New Mexico is a small community of approximately 20,000 residents. The area has experienced slow growth in population in the last 25 years, and it is expected to continue to grow at a slow rate over the next 25 years—about 13% growth by 2030. Median home prices are significantly higher than in the rest of the state and the nation as are median household incomes. The county had a low unemployment rate of 2% in 2007 (US Census Bureau 2000; UNM 2004).

The Los Alamos National Laboratory, where over 57% of employed residents work, plays a large role in the county's economy. Nine percent of employed county residents work in tourism-related industries; including retail, arts, entertainment, recreation, accommodation, and food services (County of Los Alamos 2007).

Data on personal income by industry can give a window into the total economy of the area as well as provide a relative estimate of the role tourism plays in the economy. Total personal income in Los Alamos County was \$1,020 million in 2005. Personal income in the following industries was \$28 million: retail trade, arts, entertainment, recreation, accommodation, food services. While some of

this income undoubtedly came from serving residents, some likely came from serving visitors. This represents only 3% of the total personal income for the area (BEA 2005).

There is little data concerning the contribution of visitors to the economy. While visitors

coming to Los Alamos County affect the economy by spending on lodging, food, shopping, and sightseeing, tourism makes up a relatively small portion of the total county economy.

# HANFORD

At Hanford, the primary Manhattan Project activity was plutonium production by irradiating uranium fuel rods and then extracting the plutonium for use in the “Fat Man” bomb. Hanford’s B Reactor, which created the plutonium for the Trinity device, was the world’s first production reactor. Thus, its major themes relate to fuel manufacturing, reactor operations, chemical separations, and plutonium finishing.

## HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

Hanford’s cultural resources are diverse, ranging from early prehistoric times to the atomic age. The site contains a fragile and extensive record of human occupation documenting a series of overlapping cultural landscapes stretching thousands of years into the past. Each layer of history tells the story of how people have used the area. Archaeological remains combined with oral histories and traditional cultural places to document the changes in peoples’ lifeways throughout time on the Hanford site.

### Hanford Site Manhattan Project and Cold War Era Historic District

In July 1996, the Department of Energy identified a National Register of Historic Places-eligible Hanford Site Manhattan Project and Cold War Era Historic District that serves to organize and delineate the evaluation and mitigation of Hanford’s plutonium production built environment. Establishment of the historic district resulted in a determination that 528 Manhattan Project and Cold War-era buildings, structures, and complexes were eligible for listing in the National Register of Historic Places. Of that number, 190 were recommended for individual documentation.

Standards for evaluating and mitigating the built environment were established in accordance with national register criteria. In August 1996 a programmatic agreement among the Department of Energy, the Advisory Council on Historic Preservation, and the Washington State Historic Preservation Office was approved by the signatory agencies to address management, maintenance, deactivation, alteration, and demolition of historic buildings and structures in the built environment at the Hanford site (DOE 1996a).

In 1997 a *National Register of Historic Places Multiple Property Documentation Form, Historic, Archeological and Traditional Cultural Properties of the Hanford Site, Washington* was prepared to assist with the evaluation of buildings and structures at the Hanford site for their national register eligibility. This document included historic contexts and themes that are associated with nuclear technology for national defense and nonmilitary purposes, energy production, and human health and environmental protection. Certain property types, such as mobile trailers, modular buildings, storage tanks, towers, wells, and structures with minimal or no visible surface manifestations, were exempt from the identification and evaluation requirements.

Approximately 900 buildings and structures were identified as either contributing properties with no individual documentation requirement (not selected for mitigation) or as noncontributing exempt properties and are documented in a DOE-maintained database (Marceau 1998).

In 1999, the Department of Energy designated two properties at Hanford as Signature Facilities for the Manhattan Project. The Department of Energy made the designation to recognize that these properties are essential

to interpretation of the Manhattan Project mission of developing an atomic bomb. They are unique facilities and devices that used some of the 20th century's most innovative and revolutionary technologies. The sites at Hanford that fall into this designation are the B Reactor and the T Plant, Chemical Separation Building.

The role the Hanford site played in Manhattan Project and Cold War history has been chronicled in *The History of the Plutonium Production Failures at the Hanford Site Historic District 1943-1990*.

### **B Reactor**

All the Hanford production reactors and most associated facilities have been shut down, and each is in some stage of cleanup, decommissioning, or rehabilitation. An assessment of the contents of B Reactor was conducted to locate and identify Manhattan Project and Cold War era artifacts that may have interpretive or educational value in potential exhibits. Thirty-nine industrial artifacts were identified and tagged, located mainly in the fuel basin, exhaust fan room, and supply room. For the time being, these artifacts have been retained in place.

As clean up efforts continue at Hanford, the B Reactor has been deactivated; however, the Manhattan Project-era equipment and setting are still intact. Although the B Reactor was once scheduled for cocooning, the Department of Energy now plans to maintain the facility as is.

### **T Plant, Chemical Separation Building**

The T Plant is one of several buildings that have been determined eligible for the national register as contributing properties within the historic district. The building has been documented to Historic American Engineering Record standards.

Cultural landscapes identified by DOE cultural planning efforts include landscapes of Native Americans, early settlers, and the

Manhattan Project/Cold War. The Manhattan Project/Cold War cultural landscape has recent scientific significance. The U.S. government came to Hanford in 1943 to construct a secret wartime plutonium-production plant, the first of its kind. Existing communities, including Native American villages, were removed and the facility constructed. Much of the landscape related to the Manhattan Project still exists at the site even with the clean up and dismantling of certain structures.

## **MUSEUM COLLECTIONS**

At Hanford, the Department of Energy has developed a curation plan as part of the *Hanford Cultural Resources Management Plan* (2000). This plan is part of the Department of Energy, Richland Operations, Cultural Resources Program and seeks to manage and store collections and provide exhibits, educational programs, and collections access to researchers. The Hanford Cultural and Historic Resources Program manages historical collections related to the plutonium production complex and recovered from historic facilities. According to the Department of Energy, "the collection consists of archival items, such as publications, unpublished documents, photographs, drawings, models, museum/exhibit props, and panels. Three-dimensional artifacts, such as equipment, tools, vintage signs and posters, early office furniture, and workers safety items make up the balance of the collection. This collection offers numerous opportunities for creative, educational, and science-oriented exhibits."

The B Reactor Museum Association is an all-volunteer association of individuals and groups working to preserve the B Reactor on the Hanford Nuclear Site. The association was organized as a nonprofit in 1991 in Richland, Washington. Their goal is to preserve the world's first industrial-scale nuclear reactor as a public-access museum. The museum is slated to be located within the 105-B Reactor building and an associated interpretive center.

## VISITOR USE AND EXPERIENCE

Currently, a few organizations interpret Hanford's Manhattan Project role. A DOE contractor, Fluor Hanford offers a four-hour tour of the Hanford site, including a walking tour of the B Reactor. The tour was offered 24 times in 2007 in addition to some media tours; around 1,000 visitors toured the site. However, the demand for tours of the reactor is considerably greater. Registration for the tours fills within minutes of opening and many people who try to register have been unable to "win the lottery" as some describe the process. Fluor Hanford plans to increase the number of tours offered in 2008.

The Columbia River Exhibition of History, Science, and Technology Museum had 6,730 visitors in 2005. This museum interprets the scientific and cultural history of the mid-Columbia Basin. The museum will close once the Hanford Reach Interpretive Center opens.

The Hanford Reach Interpretive Center, named for the "reach," or stretch of the Columbia River, is scheduled to open in 2010 and will offer exhibits on science, history, art, and conservation. The organization anticipates 65,000 visitors a year for the first three years and then expects a slight drop in visitation. The Hanford Reach Interpretive Center also has proposed to provide additional tours at the Hanford site, thus providing the opportunity for an additional 4,000 people to tour Hanford.

## SOCIOECONOMICS

The Hanford site is located on three counties: Benton, Grant, and Franklin, and near the tri-cities metropolitan area of Kennewick, Pasco, and Richland. The three counties expect a growth in population of 53% by 2030, which is slightly slower growth than the counties experienced during the past 25 years. The 300,000 residents enjoy a lower cost of housing than the nation and the state, but also have a higher rate of unemployment—about 9%. Median income was higher than in both the state and the nation (US Census Bureau 2007; Washington Office of Financial Management 2007).

Visitor spending was \$296.5 million in 2005, reflecting an increase of approximately 5% annually over the past 15 years. The region employed 3,930 people in the tourism industry, or 3% of total employment in the region (Washington Department of Community, Trade, and Economic Development 2007; Tri-Cities Visitor and Convention Bureau, Vice President of Marketing and Public Affairs Tana Bader Inglima, email to Sarah Bodo, National Park Service, Denver, January 23, 2008).

The metropolitan area's gross domestic product (or the market value of all final goods and services produced in 2005) was \$7,349 million. Visitor spending on tourism services and goods makes up 4% of that total (BEA 2005).

While visitor spending due to Manhattan Project sites is unknown, it likely constitutes a small portion of total area visitor spending as the majority of visitation to the area focuses on the wineries and recreation.

## OAK RIDGE

At Oak Ridge, the principal Manhattan Project activity was isotope separation or production of enriched uranium. Naturally occurring uranium is over 99% uranium-238 (U-238) and less than 1% uranium-235 (U-235). The goal of the enrichment process was to achieve over 80% U-235 for use in an atomic bomb. Oak Ridge focused on three processes for uranium enrichment: electromagnetic separation, gaseous diffusion, and liquid thermal diffusion. While the thermal diffusion plant was torn down shortly after World War II, the Y-12 electromagnetic separation process plant and K-25 gaseous diffusion plant both operated for decades. Scientists and engineers designed the K-25 gaseous diffusion plant at Oak Ridge to use a totally untested and unproven technology. The Y-12 Beta-3 Racetracks is the only surviving World War II-era electromagnetic isotope separation equipment in the world, complete with operator panels and telephone switchboard almost exactly as they existed during the war.

Another significant theme at Oak Ridge is reactor operations. The X-10 Graphite Reactor at Oak Ridge was built in November 1943 as a prototype for the plutonium production reactors at Hanford. It produced the first significant amounts of plutonium that were instrumental in designing the “Fat Man” or plutonium-based implosion bomb. The X-10 chemical separation plant used to extract the plutonium proved the feasibility of the bismuth phosphate process used at Hanford.

### **HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES – OAK RIDGE**

In 1993, the Department of Energy contracted with DuVall & Associates, Inc., to identify and evaluate historic properties within the boundaries of the present-day Oak Ridge

National Laboratory. Fieldwork and research were undertaken by Martha Carver and Margaret Slater, architectural historians/historic preservation specialists working with DuVall & Associates, Inc.

Carver and Slater, in conjunction with DOE personnel and in consultation with the Tennessee State Historic Preservation Office, concluded that a number of Manhattan Project-related and Cold War-related structures had varying degrees of integrity ranging from fair to good; were “nationally significant”; and were eligible for listing in the national register. These structures included an Oak Ridge National Laboratory Historic District that incorporates the X-10 Graphite Reactor.

In 1999, the Department of Energy designated three properties at Oak Ridge as Manhattan Project Signature Facilities. The Department of Energy made the designation to recognize that these properties are essential to interpretation of the Manhattan Project mission of developing an atomic bomb. They are unique facilities and devices that used some of the 20th century’s most innovative and revolutionary technologies. The sites at Oak Ridge that fall into this designation are the X-10 Graphite Reactor, the K-25 Gaseous Diffusion Process Building, and the Y-12 Beta-3 Racetracks.

Specific historic properties include X-10 Graphite Reactor National Historical Landmark, the Oak Ridge Historic District, individually listed historic properties (Luther Brannon House, Freels Cabin, the J.B. Jones House, New Bethel Baptist Church), and the Oak Ridge National Laboratory Historic District.

The Department of Energy’s *Cultural Resource Management Plan, Department of Energy, Oak Ridge Reservation, Anderson and Roane Counties, Tennessee* (2001) provides the

Department of Energy with guidance on cultural resources management and compliance for all Oak Ridge operations. This planning document is the basis for the cultural resources management program at Oak Ridge. The cultural resource management plan was prepared in conjunction with the programmatic agreement among the Department of Energy Oak Ridge Operations Office, the Tennessee State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

*The Oak Ridge Reservation Annual Site Environmental Report* for 2006 provides an outline of compliance work completed for Oak Ridge as it relates to the National Historic Preservation Act. To date, there appears to be no consideration of the Oak Ridge Reservation as a cultural landscape, despite the nomination and listing of the area as the Oak Ridge Historic District. However, significant elements of a cultural landscape exist on the reservation.

## MUSEUM COLLECTIONS

Along with the Bradbury Science Museum at Los Alamos, New Mexico, the American Museum of Science and Energy at Oak Ridge, Tennessee, is the other principal museum in the United States that deals with the Manhattan Project story. Its focus is also primarily on the local community and the broader story of the Oak Ridge National Laboratory and its role in science and technology of today. The American Museum of Science and Energy is owned by the U.S. Department of Energy and is managed under the Oak Ridge National Laboratory. The museum opened in 1949 in an old wartime cafeteria. It was originally named the American Museum of Atomic Energy. Its guided tours took visitors through peaceful uses of atomic energy. The present facility, opened in 1975, continues to provide the general public with energy information. The name was changed to its current one in 1978 (<http://www.amse.org>).

The Department of Energy's *Cultural Resource Management Plan, Department of Energy, Oak Ridge Reservation, Anderson and Roane Counties, Tennessee* (2001) provides guidance on the curation and preservation of cultural resources, including objects from the historic period related to the Manhattan Project. The American Museum of Science and Energy is the repository and interpretive center for these objects/artifacts. Many of the current exhibits consist of photographs and narratives, although World War II-era mementos and equipment used in the uranium refining process are also included.

## VISITOR USE AND EXPERIENCE

The American Museum of Science and Energy currently interprets the Manhattan Project story, as does the historic Oak Ridge self-guiding driving tour. Oak Ridge and the Department of Energy have created a program that supports and promotes tourism to some of the historic sites at Oak Ridge. Visitation at the American Museum of Science and Energy was 107,980 in 2007. This number has decreased the last three years, perhaps due to the museum charging a higher fee, which makes visiting more difficult for school groups and some families.

A free local festival has evolved into what Oak Ridge promotes as an annual "Secret City Festival" which attracts almost 25,000 people during a single weekend each June. The City of Oak Ridge received approximately 300,000 visitors in 2006.

## SOCIOECONOMICS

Oak Ridge is located within two counties, Anderson and Roane. These counties currently have 127,000 residents. They are expected to continue to grow slowly by about 10% during the next 15 years. Median home value is somewhat below the state and nationwide averages, as is the median income. The region has a low unemployment rate (US



Census Bureau 2006; Tennessee Advisory Commission on Intergovernmental Relations 2003).

Approximately 35% of people employed in the city work for DOE contractors at the Oak Ridge facilities (City of Oak Ridge 2006).

Visitors spent about \$144 million in 2006 in the two counties, an increase of 6% over the previous year. Of this amount, \$25 million went to the 1,350 people employed in Oak Ridge's tourism industry (Oak Ridge Convention & Visitors Bureau, Director of Communications Nicky Reynolds, e-mail to Sarah Bodo, National Park Service, January 25, 2008).

Data on personal income by industry can give a window into the total economy of the area as well as provide a relative estimate of the role tourism plays in the economy. Total personal income in the two counties was \$3,558 million in 2005. Personal income in the following industries was \$235 million: retail trade, arts, entertainment, recreation, accommodation, food services. While some of this income was earned serving residents, some likely resulted from serving visitors. This represents 7% of the total personal income for the area (BEA 2005).

Visitors to the counties impact the economy by spending money on lodging, food, shopping, and sightseeing; however, tourism makes up a relatively small portion of the total county economy of the two counties.

## DAYTON

The sites at Dayton related to the Manhattan Project were associated with research and development efforts conducted by the central research facilities of the Monsanto Chemical Company. Industrial processes were developed to produce polonium for a polonium-beryllium initiator—a component essential for creation of a fission chain reaction and detonation of a plutonium-based atomic bomb. The work—known as the Dayton Project—was conducted under the supervision of Monsanto’s director of central research, Charles A. Thomas. One Manhattan Project history reports that Thomas was offered the position of co-director of the Los Alamos Scientific Laboratory with Oppenheimer in 1943. Later Thomas was one of only 14 scientists awarded a Medal for Merit by President Harry S Truman for contributing to the development of atomic weaponry.

Currently there are no organized efforts in place to interpret or preserve Manhattan Project era properties at Dayton. Most of the Dayton Project sites are currently in private ownership, with only the former Bonebrake Theological Seminary owned by a public entity, the Dayton School Board.

The National Park Service has a presence in the area at Dayton Aviation Heritage National Historical Park; however, that park is currently not mandated to interpret the Manhattan Project era. Dayton Aviation Heritage National Historical Park commemorates the legacies of three of the region's most notable residents: Wilbur and Orville Wright and Paul Laurence Dunbar. This nontraditional park contains four noncontiguous sites, each under different ownership and management. The core parcel—the Wright Cycle Company building and the Wright brothers' print shop building—are the only sites under National Park Service management. The three others

sites (Huffman Prairie Flying Field, Paul Laurence Dunbar State Memorial, and the Wright Flyer III) are separately owned, managed, and operated by the U.S. Air Force, Ohio Historical Society, and Carillon Historical Park, respectively. In addition to making the four sites part of a national park, the enabling legislation allows for all significant sites in the Miami Valley related to aviation heritage and Dunbar to be designated with signs.

### HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

In 1946, research on the biological effects of polonium radiation was conducted by Monsanto in leased space on the upper three floors of the J. K. McIntire Building, known as the “Warehouse,” where the company set up analytical and radioisotope counting laboratory equipment. Thus, the Dayton sites—including the hastily constructed bunker-like facilities of Unit III on the grounds of the former Bonebrake Theological Seminary and the Warehouse—represent the decentralized and compartmentalized nature of the Manhattan Project in which different aspects of the top secret project were conducted across the nation.

Monsanto’s Dayton units were the only commercially contracted facilities (facilities not operated by the government or a university) that produced industrial quantities of polonium. The laboratory established in the Warehouse, which was used to analyze thousands of urine samples from Dayton Project personnel and study the biological uptake and effects of polonium on mice and rats, was among the earliest of its genre. Thus, Dayton is representative of the wedding of powerful new economic forces, such as the chemical industry, to the World War II

military effort to produce an atomic weapon that established the United States as the leading economic and military power in the world.

During the course of the Manhattan Project, Monsanto managed projects at four units around Dayton, three of which were associated with the Dayton Project. These included Unit I, Central Research Department headquarters; Unit III, the former site of the Bonebrake Theological Seminary; and Unit IV, the Runnymede Playhouse site. Monsanto also used the top three floors of the six-story 1912 J. K. McIntire Company Building (the “Warehouse”) from 1946 to 1948 to conduct research on the biological effects of polonium.

Only Unit III, former Bonebrake Theological Seminary Site, and the J.K. McIntire Company Building—as well as the Charles A. and Margaret T. Thomas Home—are still in existence. Unit I and Unit IV have no integrity. Neither of the units nor the McIntire Building are designated national historic landmarks, and no NHL evaluation of these sites is currently underway.

The cultural landscape for the Dayton Project has not been evaluated and is distinctly different from DOE-managed sites at Los Alamos, Hanford, and Oak Ridge. Dayton’s facilities were purposely dispersed throughout the urban area, which is reflected in the current setting.

## MUSEUM COLLECTIONS

Currently there are no collections of any size that relate to the Manhattan Project at Dayton. The National Museum of the US Air Force at Dayton houses the Boeing Bockscar bomber. The museum also interprets the role of the Manhattan Project in the development of atomic testing and the role of the Army Air Forces in developing flight techniques for delivery and escape from the effects of aerial delivery of an atomic weapon.

The Mound Museum Association is part of the Mound Laboratory and Mound site, located between Dayton and Cincinnati. The Mound Museum is involved with the history of the Nuclear Age in the United States. The Association currently does not include the Dayton Project in its mission statement, however some members are former Mound/Dayton Project employees, spouses of former employees, or their descendants. The Association has expressed interest in expanding its mission to explicitly include the Manhattan Project (<http://moundmuseum.com/>).

## VISITOR USE AND EXPERIENCE

Manhattan Project sites in Dayton are privately owned and are not open for visitation.

The city’s tagline is “the birthplace of aviation,” and aviation-related activities are the main tourist attraction. The Manhattan Project plays a small part in the theme of the National Museum of the US Air Force with the Boeing Bockscar bomber, which dropped the “Fat Man” atomic bomb on Nagasaki. The museum attracts over 1 million visitors a year.

Currently most visitors to Dayton, and likely many residents of the area, are unaware of the role that Dayton played in the Manhattan Project. Dayton Aviation Heritage National Historical Park received 51,000 visitors in 2006. The Mound Museum, located at a post-war Atomic Energy Commission (later Department of Energy) site near Dayton, received 700 visitors in 2007.

## SOCIOECONOMICS

Dayton is located within Montgomery County. The county has roughly 540,000 residents, and the population has slowly decreased over the past twenty-five years. The population is projected to continue to decrease slowly over the next twenty-five

years. Housing prices are below the state and nationwide average prices, as are income levels. The unemployment rate in the county has risen in the past 7 years from 3% to 7% (US Census Bureau 2006; Ohio Department of Development 2007).

Of employed county residents, 51,700 or 12% work in tourism-related industries; including retail, arts, entertainment, recreation, accommodation, and food services. (BEA 2005).

Data on personal income by industry offers a window into the total economy of the area and provides a relative estimate of the role tourism plays in the economy. Total personal

income in Montgomery County was \$17.5 billion in 2005. Personal income in the following industries was \$1.2 billion: retail trade, arts, entertainment, recreation, accommodation, food services. While some of this income was earned serving residents, some likely resulted from serving visitors. This represents 7% of total personal income for the area (BEA 2005).

Visitors coming to Montgomery County affect the economy by spending money on lodging, food, shopping, and sightseeing; however, tourism makes up a relatively small portion of the total county economy.



LOS ALAMOS, QUONSET HUT



DAYTON, J.K. MCINTIRE BUILDING



HANFORD, REACTOR B CONTROL PANEL

## ENVIRONMENTAL CONSEQUENCES



# INTRODUCTION

This section of the special resource study/environmental assessment, describes the potential environmental and socioeconomic consequences (also called impacts or effects) of implementing the five alternatives considered in the study. The majority of NPS studies of potential new park units focus on detailed proposals for specific locations. This study is unique in that the focus is on broad management concepts for the four indicated sites, each of which is in a different state. The sites are related based on historic use rather than proximity.

The following factors should be considered in reviewing this study/environmental assessment:

- The alternatives in the study are broad management actions; therefore, the analysis of environmental consequences in this study/environmental assessment is necessarily quite general. The National Park Service can only make reasonable projections of likely impacts and in some cases, impact topics are dismissed as not appropriate for analysis at this time.
- Site-specific actions will be handled under separate site planning and environmental

documents that address specific impacts and effects at each location.

- The Department of Energy owns three of the sites proposed for actions under the various alternatives. The fourth site (Dayton) is owned by other private and local government entities. It is likely that the Dayton properties will stay in private hands, although Unit III (the former site of the Bonebrake Theological Seminary) may be available for purchase, as the current owner, the Dayton School Board, has expressed interest in divestiture of the property.
- The alternatives recognize the prerogative of the Department of Energy to choose whether and how to implement elements of the alternatives depending on changing national security needs.
- The nature of these sites as former and existing radioactive materials producing sites pose possible concerns regarding long-term management, continuing clean up, access, national security, and public safety.

## ANALYSIS OF ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act requires that environmental documents describe the potential environmental consequences of proposed federal actions and alternatives. In this case, the “proposed federal action” would be the adoption of one of the alternatives described in this special resource study. This section describes the potential impacts associated with the five alternatives. By assessing the environmental consequences of all the alternatives on an equivalent basis, the National Park Service and other decision makers can decide which alternative creates the most desirable combination of beneficial results with the fewest adverse effects on the environment.

The alternatives in this special resource study provide broad management directions. The environmental consequences associated with the proposed actions are analyzed on a

qualitative level because of the general nature of each proposed action. Thus, the environmental assessment should be considered a programmatic analysis. If any action is eventually implemented, the federal lead agency, in accordance with the National Environmental Policy Act, would conduct additional environmental analyses with appropriate documentation before implementing site specific actions.

The existing conditions for all the impact topics that are analyzed here were identified in the “Affected Environment” chapter. All the impact topics are assessed for each alternative. Impact analysis discussions are organized by alternative, and then by impact topic for each. For each impact topic, there is an analysis of the beneficial and adverse effects of implementing the alternative, and a description of cumulative impacts.



# METHODOLOGY FOR ASSESSING IMPACTS

## INTRODUCTION

Potential impacts (direct, indirect, and cumulative effects) are described in terms of type (are the effects beneficial or adverse), context (are the effects site specific, local, or even regional), duration (are the effects short-term, i.e. occurring during the period of a few months; long-term, i.e. lasting longer than ten years; or permanent), and intensity (is the degree or severity of effects negligible, minor, moderate, or major).

Direct effects are those that are caused by the action and occur at the same time and place. Indirect effects are those that are caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Because definitions of intensity (negligible, minor, moderate, or major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this environmental assessment.

Each alternative is compared to a baseline to determine the context, duration, and intensity of resource impacts. For purposes of impact analysis, the baseline is the continuation of current management projected over the next 10 years (alternative A). In the absence of quantitative data, best professional judgment was used to determine impacts. In general, the thresholds used come from existing literature, federal and state standards, and consultation with subject matter experts and appropriate agencies.

## Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which guide the implementation of the National Environmental Policy Act of 1969 (42 USC 4321 *et seq.*), require assessment of cumulative impacts in the decision-making process for federal projects. A cumulative impact is defined as "the impact on the environment which results from the

incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for all alternatives, including the no-action alternative. The cumulative impact scenario below, presents actions considered as part of the cumulative impact analysis.

## Cumulative Impact Scenario

Given the broad nature of the management alternatives, most of the cumulative impact scenario is focused on potential DOE actions or actions of private landowners (Dayton).

At Los Alamos, some historic buildings and structures constructed and used during the Manhattan Project years are still in use; several have already been removed or redesigned for other uses. This process is bound to continue, as the facility is an active research laboratory and space is limited. Of the remaining structures from that period, over half have been targeted for possible retention, while the others have already been demolished or are scheduled for decontamination and decommissioning.

Near Hanford, The Hanford Reach Interpretive Center is scheduled to open in 2010 and will offer exhibits on science, history, art, and conservation. The Hanford Reach Interpretive Center has also proposed to provide additional tours at the Hanford site.

At Oak Ridge, the K-25 complex (now known as the East Tennessee Technology Park) is scheduled for decontamination, decommissioning, and probable demolition. A number of other structures at Oak Ridge include World War II/Manhattan Project-era facilities in deteriorating condition also requiring

decommissioning or demolition. *The Oak Ridge Heritage Tourism Tactical Implementation Plan* (2006) outlines possible preservation of part of the K-25 site as a visitor attraction.

The Dayton School District, which owns the former Bonebrake Theological Seminary (the school district used the property as a maintenance facility for the district) may decide to sell their holdings to someone who will develop them for purposes other than preservation and interpretation. Because the area is surrounded by existing residential development, a likely scenario would be purchase by a residential developer who would offer the property for future sale and development.

### **Analysis of Impacts to Cultural Resources**

In this environmental assessment, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that guide the implementation of the National Environmental Policy Act (NEPA).

## **IMPACTS TO HISTORIC BUILDINGS, STRUCTURES, AND CULTURAL LANDSCAPES**

### **Definitions of Intensity Levels**

**Negligible:** Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be *no adverse effect*.

**Minor:** Impacts on the character-defining features, elements, or landscape pattern would be perceptible or measurable but would be slight and localized, resulting in little, if any, loss of integrity. The determination of effect for §106 would be *no adverse effect*.

**Moderate:** Impacts would alter character-defining features, elements, or landscape

patterns but would not diminish the integrity of the building, structure, or landscape to the extent that its national register-eligibility is jeopardized. The determination of effect for §106 would be *adverse effect*. When this occurs, a memorandum of agreement (MOA) is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b).

**Major:** Impacts would alter character-defining features, elements, or landscape patterns, diminishing the integrity of the building, structure, or landscape to the extent that it is no longer eligible to be listed in the national register. Alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for §106 would be *adverse effect*. When this occurs, measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

## **IMPACTS TO MUSEUM COLLECTIONS**

Museum collections (prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens) are generally ineligible for listing in the National Register. As such, §106 determinations of effect are not provided.

### **Definitions of Intensity Levels**

**Negligible:** Impact is at the lowest levels of detection—barely measurable, with no perceptible consequences, either adverse or beneficial, to museum collections.

**Minor: Adverse impact** —would affect the integrity of few items in the museum collection but would not degrade the

usefulness of the collection for future research and interpretation.

**Moderate: Adverse impact**—would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.

**Major:** Adverse impact—would affect the integrity of most items in the museum collections and destroy the usefulness of the collection for future research and interpretation.

## **IMPACTS TO VISITOR USE AND EXPERIENCE**

### **Definitions of Intensity Levels**

**Negligible:** Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.

**Minor:** Changes in visitor use or experience would be slight but detectable, but would not appreciably limit or enhance critical characteristics of the visitor experience. Visitor satisfaction would remain stable.

**Moderate:** Few critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be altered. The visitor would be aware of the effects associated with implementation of the alternative and would likely be able to express an opinion about the changes. Visitor satisfaction would begin to either decline or increase as a direct result of the effect.

**Major:** Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly decline or increase.

## **IMPACTS TO SOCIOECONOMICS**

### **Definitions of Intensity Levels**

**Negligible:** Effects would be below detectable levels or detectable only through indirect means and with no discernible effect on the character of the social and economic environment.

**Minor:** Effects would be detectable, but localized in geographic extent or size of population affected and would not be expected to alter the character of the established social and economic environment.

**Moderate:** Effects would be readily detectable across a broad geographic area or segment of the community and could have an appreciable effect on the social and economic environment.

**Major:** Effects would be readily apparent, affect a substantial segment of the population, extend across the entire community or region, and would likely have a noticeable effect on the social and economic environment.

## ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE A: NO ACTION

### HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

National register-listed or national register-eligible buildings and structures located on DOE property would continue to receive protection under existing federal historic preservation laws. All stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). Stabilization, preservation, or rehabilitation undertaken in accordance with these standards would have beneficial effects upon historic buildings and structures.

The responsibility for the preservation of privately owned buildings and structures would continue to remain in the hands of local citizens, organizations, local and state governments, and private owners. Historic buildings and structures not subject to federal historic preservation laws could be adversely impacted because preservation efforts would be uncoordinated and fragmented. Such resources could fall into disrepair, deteriorate, or be inappropriately developed. Any adverse impacts would be long term or permanent and of minor to moderate intensity.

The integrity of cultural landscapes could also be diminished as a result of uncoordinated and fragmented preservation efforts. The deterioration or inappropriate development of historic buildings and structures could adversely impact significant character-defining features of the cultural landscape, and could potentially affect the spatial organization, land use and circulation patterns, and historic viewsheds of the landscape. Any adverse impacts would be long term or permanent and of minor to moderate intensity.

There would be no dedicated federal funds available to preserve historic buildings and structures or cultural landscapes; however, specific programs or sites could seek support from existing federal programs or utilize state, local, and private funds. Surveys and research necessary to determine the eligibility of a building, structure, or landscape for listing in the National Register of Historic Places are a prerequisite for understanding the resource's significance, as well as the basis of informed decision making in the future regarding how the resource should be managed. Such surveys and research would be a beneficial impact.

### Cumulative Impacts

At Los Alamos, all Project Y sites are to be preserved, but other Manhattan Project-era structures within the Los Alamos National Laboratory have already been demolished or are scheduled for decontamination and decommissioning. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

At Oak Ridge, the K-25 is scheduled for partial demolition, but it is likely that the entire building will be demolished over the next few years. Impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity. A number of other structures at Oak Ridge, including World War II/Manhattan Project-era facilities, are in deteriorating condition, requiring decommissioning or demolition. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

The Dayton School District, which owns the former Bonebrake Theological Seminary, may decide to sell its holdings to someone who will

develop them for purposes other than preservation and interpretation. If the historic structures associated with the former Bonebrake Theological Seminary are razed, impacts to historic buildings and structures would be permanent, adverse and of moderate to major intensity.

As described above, implementation of alternative A would result in both long-term, minor to moderate, adverse effects and long-term, minor to moderate, beneficial effects to historic buildings and structures. The minor to moderate long-term adverse impacts of this alternative, in combination with the moderate to major, long-term or permanent adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term moderate to major cumulative effect. The adverse effects of alternative A, however, would be a small component of the adverse effect cumulative impact.

### **Conclusion**

Under alternative A, historic preservation programs at the Department of Energy would continue for the management of historic properties and cultural landscapes, which would have beneficial impacts. There would be no new impacts introduced with the implementation of alternative A. There is a potential for adverse impacts at privately owned and managed properties and landscapes which would be long term and range from minor to moderate in intensity.

Alternative A would result in cumulative impacts to historic buildings and structures that would be both long-term, minor to moderate, and adverse and long-term, minor to moderate, and beneficial. The minor to moderate, long-term, adverse impacts of this alternative, in combination with the moderate to major, long-term or permanent, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, moderate to major, cumulative effect. The adverse effects of alternative A,

however, would be a small component of the adverse cumulative impact.

### **MUSEUM COLLECTIONS**

Implementation of alternative A would result in no impacts to museum collections at any of the Manhattan Project sites at Los Alamos, Hanford, or Oak Ridge. These DOE-managed sites would continue to curate and manage collections according to existing cultural resource management planning and according to existing federal guidelines for collections. At Dayton, there would be a minor to moderate, long-term, adverse impact due to the lack of organization and care of collections. Collections would remain in private hands and there would be a higher potential for owners to discard or sell Manhattan Project objects and documents. The potential exists at Dayton for the loss of objects and the diminishing of a collection's usefulness for future research and interpretation.

### **Cumulative Impacts**

The cumulative impacts scenario for collections under alternative A relates to museum objects as well. Many of the buildings, such as the B Reactor at Hanford and the structural features of K-25 gaseous diffusion plant at Oak Ridge, include features, objects, and artifacts of the Manhattan Project era. Their loss to research and interpretation through demolition or removal would constitute a long-term, moderate to major, adverse impact.

The impacts of the other actions above, combined with the impacts of the alternative, would result in a major, long-term, adverse cumulative impact to museum collections.

### **Conclusion**

Under alternative A, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts. There is a potential

for adverse impacts to privately owned collections, objects, and archives. There would be no new impacts introduced with the implementation of alternative A.

## **VISITOR USE AND EXPERIENCE**

Implementation of alternative A would result in no impacts on the visitor use and experience at the Manhattan Project sites at Los Alamos, Hanford, and Oak Ridge. Management entities would remain the same and no actions are planned under this alternative. At Dayton, there would be negligible, long-term, adverse impact to visitor use and experience under the no-action alternative. Because there is very little interpretation of the Manhattan Project at this location, the continuation of current management would not contribute to increased long-term preservation through enhanced appreciation of the Manhattan Project story that would come from interpretation and education programs. Assets contributing to the story could be lost without a greater interpretation effort.

### **Cumulative Impacts**

Adaptive reuse and potential demolition of some buildings at Los Alamos would have a negligible, long-term, adverse impact. Currently, visitors can visit mostly the outside of buildings, and would not notice a change if buildings were adaptively reused. If a few buildings were demolished, some visitors would notice the alteration in the landscape; others would not. Demolition of some of the buildings could impact the experience as well as the long-term Manhattan Project visitation levels at the site, although these impacts would be negligible.

At Hanford, the completion of the Hanford Reach Interpretive Center would result in a moderate, long-term, beneficial impact to the visitor experience. The Hanford Reach Interpretive Center proposes to increase visitation to Hanford. The museum also plans

new exhibits interpreting the Manhattan Project. Both of these actions would have beneficial impacts to the visitor use and experience.

If a portion of the K-25 Complex at Oak Ridge were to be preserved for interpretive purposes, the new attraction would create a moderate, long-term, beneficial impact to the visitor experience.

No impact to the visitor experience at Dayton would occur if the school district sold the former Bonebrake Theological Seminary since there is no current visitation at the site.

The impacts of the other actions above, combined with the impacts of the alternative would result in a negligible, long-term, adverse cumulative impact to the visitor experience and use.

## **Conclusion**

Alternative A would result in no impacts to visitor use and experience at Los Alamos, Hanford, and Oak Ridge, and a negligible long-term adverse impact at Dayton. The impacts of other actions range from moderate, long-term, and adverse to moderate, long-term, and beneficial. This alternative would result in a negligible, long-term, adverse, cumulative impact.

## **SOCIOECONOMICS**

Implementation of alternative A would result in no impacts on the social and economic characteristics of the regions surrounding the Manhattan Project sites. Management entities would remain the same and no actions are planned under this alternative.

### **Cumulative Impacts**

Changes to the building use and some demolition of buildings in Los Alamos would likely result in a negligible, long-term, adverse impact to the region's economic environment

as slightly reduced visitation could affect total visitor spending.

Increases in visitation to the Hanford site proposed by the Hanford Reach Interpretive Center would have a negligible, long-term, beneficial impact on the regional economy. Plans are also underway to increase the number of visitors allowed to tour the B Reactor.

At Oak Ridge, the potential reuse of a portion of the K-25 building for interpretation would result in a negligible, long-term, beneficial impact to the regional economy, as additional visitation and therefore spending could come to the area.

At Dayton, the school district's potential sale of the former Bonebrake Theological Seminary could result in the land being developed as residential housing; this would result in a negligible, long-term, beneficial impact to the economy, as residents would bring new income to the area, resulting in trickle-down effects in the local economy.

Each of the other actions results in negligible impacts to the regional economies because

tourism plays only a minor role in each of the regions; it makes up an estimated 4% to 8% of each total economy. Additionally, the Manhattan Project facilities at Hanford and Dayton are not the primary draw for tourists in these areas, and therefore potential visitors to these facilities would likely make up a smaller portion of the economy than does the total amount of tourism. Dayton's tourism industry revolves around its aviation history. Hanford area's tourism is largely due to the local wineries and recreational activities.

Because alternative A has no impact to the socioeconomics of the Manhattan Project localities, this alternative would not result in any cumulative impact.

## **Conclusion**

Alternative A, continuation of current management, would result in no impacts to socioeconomic environment of the Manhattan Project localities. The impacts of other actions exhibit a range from negligible, long-term, and adverse to negligible, long-term, and beneficial. This alternative would result in no cumulative impact.

## ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE B: NATIONWIDE NONPROFIT CONSORTIUM

### HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

National register-listed or national register-eligible buildings and structures located on DOE property would continue to receive protection under existing federal historic preservation laws. All stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). Stabilization, preservation, or rehabilitation undertaken in accordance with these standards would have beneficial effects upon historic buildings and structures.

Although the responsibility for privately owned buildings and structures would continue to remain in the hands of local citizens, organizations, local and state governments, and private owners, the national consortium would strive to coordinate efforts to protect historic buildings and structures and preservation efforts would be less fragmented than under alternative A; this would be a beneficial impact. However, if such resources fell into disrepair, deteriorated, or were inappropriately developed, the adverse impacts would be long-term or permanent and of minor to moderate intensity.

Preservation efforts sponsored by the national consortium could also beneficially affect significant cultural landscapes. The more aware that nonfederal owners of historic buildings and structures are of appropriate stabilization, preservation, and rehabilitation guidelines and standards, the less likely that such resources would undergo inappropriate repair or development that would adversely affect either the buildings and structures

themselves or the historic viewsheds and visual relationship among landscape features. There would be no new dedicated federal funds available to preserve historic buildings and structures or cultural landscapes; however, specific programs or sites could seek support from existing federal programs or utilize state, local, and private funds. Surveys and research necessary to determine the eligibility of a building, structure, or landscape for listing in the National Register of Historic Places are a prerequisite for understanding the resource's significance, and form the basis of informed decision-making in the future regarding how the resource should be managed. Such surveys and research would be a beneficial impact.

In addition, the National Park Service could provide the national consortium with technical assistance on an "as requested basis." By collaborating with the consortium or individual property owners, the National Park Service could encourage the protection and preservation of significant buildings, structures, and landscapes and the adaptive use of such resources in accordance with the secretary of interior's standards. Such cooperative efforts, if successful, would have a beneficial impact upon both historic buildings and structures and cultural landscapes.

### Cumulative Impacts

At Los Alamos, all Project Y sites are to be preserved, but other Manhattan Project-era structures within the Los Alamos National Laboratory have already been demolished or are scheduled for decontamination and decommissioning. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.



At Oak Ridge, the K-25 is scheduled for partial demolition, with the likelihood that the entire building will be demolished over the next few years. Impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity. A number of other structures at Oak Ridge, including World War II/Manhattan Project-era facilities, are in deteriorating condition requiring decommissioning or demolition. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

The Dayton School District, which owns the former Bonebrake Theological Seminary, may decide to sell their holdings to someone who will develop them for purposes other than preservation and interpretation. If the historic structures associated with the former Bonebrake Theological Seminary are razed, impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity.

### **Conclusion**

Under alternative B, historic preservation programs at the Department of Energy would continue for the management of historic properties and cultural landscapes, which would have beneficial impacts. There is a potential for inconsistent impacts, both beneficial and adverse, at privately owned and managed properties and landscapes. These impacts would be long term and range from minor to moderate in intensity.

For cumulative impacts as described above, implementation of alternative B would result in predominantly beneficial impacts but also long-term, minor to moderate, adverse effects to historic buildings and structures. The predominantly beneficial impacts of this alternative, in combination with the moderate to major, long term or permanent, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, moderate to major cumulative effect. However, the adverse effects of

alternative B would be a very small component of the adverse cumulative impact.

**Section 106 Summary.** After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 8000.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of alternative B would generally result in no adverse effect on historic buildings and structures and cultural landscapes.

### **MUSEUM COLLECTIONS**

Implementation of alternative B would result in no impacts to museum collections at any of the Manhattan Project sites at Los Alamos, Hanford, or Oak Ridge. These DOE-managed sites would continue to curate and manage collections according to existing cultural resource management planning and according to existing federal guidelines for collections.

At Dayton there would be a minor to moderate, long-term, adverse impact due to the lack of organization and care of collections. Collections would remain in private hands and there would be a higher potential for owners to discard or sell Manhattan Project objects and documents. Both beneficial and adverse impacts would be potentially inconsistent related to privately held collections. The potential exists at Dayton for the loss of objects and the diminishing of a collection's usefulness for future research and interpretation.

### **Cumulative Impacts**

The cumulative impacts scenario for collections under alternative B relates to museum objects as well. Many of the buildings, such as the B Reactor at Hanford and the structural features of K-25 gaseous diffusion plant at Oak Ridge, include features, objects, and artifacts of the Manhattan Project era. Their loss to research and interpretation through demolition or removal would constitute a long-term, moderate to major, adverse impact.

The impacts of the other actions above, combined with the impacts of the alternative would result in a major, long-term, adverse, cumulative impact to museum collections.

### **Conclusion**

Under alternative B, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts. As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative B. With the establishment of a national consortium there would be no new impacts introduced.

### **VISITOR USE AND EXPERIENCE**

Alternative B would result in negligible to minor, long-term, beneficial impacts depending on the actions the consortium would take and the amount of money it would secure. A national consortium would be much more broad based than current management and would provide an entity to coordinate and disseminate information about visitor opportunities related to the Manhattan Project. A national consortium would bring greater recognition to the various Manhattan Project sites and could be an avenue for obtaining increased funding for visitor services. Consortium actions could appreciably change the interpretation on the Manhattan Project by interpreting the fuller story of the various sites at each location. The consortium would likely attract additional visitation that would not otherwise be attracted to the sites.

The visitor experience in Dayton, in particular, would be affected if the consortium took action to exhibit buildings where no visitation and very little interpretation exist currently. However, visitation would likely remain limited at Los Alamos, Hanford, and Oak Ridge due to safety concerns and because the Department of Energy will likely continue

to operate some of the buildings as places of work for DOE employees and contractors.

### **Cumulative Impacts**

Adaptive reuse and potential demolition of some buildings at Los Alamos would have a negligible long-term adverse impact. Visitors currently can visit mostly the outside of buildings, and would not notice a change if buildings were adaptively reused. The Bradbury Science Museum tells the story of the Manhattan Project in the town of Los Alamos, so changes to the buildings within the laboratory compound would be mostly unnoticed by the visiting public. If a few buildings were demolished, some visitors would notice the alteration in the landscape; others would not. Demolition of some of the buildings could affect the experience as well as the long-term Manhattan Project visitation levels at the site, although these impacts would be negligible.

At Hanford, the completion of the Hanford Reach Interpretive Center would result in a moderate, long-term beneficial impact to the visitor experience. The Hanford Reach Interpretive Center proposes to increase visitation to Hanford. The Museum also plans new exhibits interpreting the Manhattan Project. Both of these actions would be beneficial impacts to the visitor use and experience.

If a portion of the K-25 complex at Oak Ridge were to be preserved for interpretive purposes, it would create a moderate long-term beneficial impact to the visitor experience.

No impact to the visitor experience at Dayton would occur if the school district sold the former Bonebrake Theological Seminary properties since there is no current visitation at the site.

The impacts of other actions described above, in combination with the impacts of alternative

B, would result in negligible to minor long-term beneficial cumulative impacts.

### **Conclusion**

Implementation of alternative B would result in negligible to minor, long-term, beneficial impacts. Other impacts range from moderate, long term, and adverse to moderate, long term, and beneficial. Cumulative impacts are negligible to minor, long term, and beneficial.

## **SOCIOECONOMICS**

Implementation of alternative B would result in a negligible long-term beneficial impact to social and economic characteristics of the Manhattan Project sites and surrounding regions. Increased visitation due to actions implemented by the consortium would be expected, but would be limited by safety and operational concerns at Los Alamos, Hanford, and Oak Ridge. Hanford's visitation would continue to be restricted, so increased demand would not be met under this alternative. At Dayton, visitation would increase from the current zero visitation at the sites selected for this study. However, Dayton's tourism industry focuses on its aviation history, and the Manhattan Project theme is unlikely to become a primary draw for tourism there. Tourism makes up a minority role in each locality's economy, ranging from 4% to 8% of the total economy. Therefore, any changes in Manhattan Project tourism would likely make up a slight portion of each area's total economy.

### **Cumulative Impacts**

Changes to the building use and some demolition of buildings in Los Alamos would likely result in a negligible long-term adverse impact to the region's economic environment as slightly reduced visitation could affect total visitor spending. The continuing operation of the Bradbury Science Museum as the interpreter of the Manhattan Project story would serve to keep the effects minimal.

Increases in visitation to the Hanford site proposed by the Hanford Reach Interpretive Center would have a negligible long-term beneficial impact on the regional economy. Plans are also underway to increase the number of visitors allowed to tour the B Reactor.

At Oak Ridge, the potential reuse of a portion of the K-25 building as a visitor center and museum would result in a negligible long-term beneficial impact to the regional economy, as additional visitation and therefore spending could come to the area.

At Dayton, the school district's potential sale of the former Bonebrake Theological Seminary property could result in the land being developed as residential housing, which would result in a negligible long-term beneficial impact to the economy, as residents would bring new income to the area which has trickle-down effects in the local economy.

Each of the other actions result in negligible impacts to the regional economies because tourism plays a minority role in each of the regions, it makes up an estimated 4 to 8% of each total economy. Additionally, the Hanford and Dayton resources are not the primary draw for tourists, and therefore would likely make up a smaller portion of the economy than does tourism overall. Dayton's tourism industry revolves around its aviation history. The Hanford area's tourism is largely due to the local wineries and recreational activities.

The impacts of other actions described above, in combination with the impacts of alternative B, would result in negligible, long-term, beneficial cumulative impacts to the Manhattan Project sites and their local regions.

### **Conclusion**

Implementation of alternative B would result in a negligible long-term beneficial impact to socioeconomics of the Manhattan Project

PART SIX: ENVIRONMENTAL CONSEQUENCES

sites. Other actions would result in impacts ranging from negligible long-term adverse to negligible long-term beneficial. The

cumulative impacts of the alternative and other actions would result in long-term beneficial impacts, negligible in intensity.

## ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE C: NATIONAL HERITAGE AREA

### HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

National register-listed or national register-eligible buildings and structures located on DOE property would continue to receive protection under existing federal historic preservation laws. All stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). Stabilization, preservation, or rehabilitation undertaken in accordance with the Secretary's Standards would have beneficial effects upon historic buildings and structures.

Although the responsibility for privately owned buildings and structures would continue to remain in the hands of local citizens, organizations, local and state governments, and private owners, the national heritage area would strive to coordinate efforts to protect historic buildings and structures, and preservation efforts would be less fragmented than under alternative A; this would be a beneficial impact. There also would likely be a more organized and coordinated effort at preservation under alternative C as compared to alternative B. However, if resources fell into disrepair, deteriorated, or were inappropriately developed, the adverse impacts would be long-term or permanent and of minor to moderate intensity.

Preservation efforts sponsored by the national heritage area could also beneficially affect significant cultural landscapes. The more aware that nonfederal owners of historic buildings and structures are of appropriate stabilization, preservation, and rehabilitation

guidelines and standards, the less likely that such resources would undergo inappropriate repair or development that would adversely affect either the buildings and structures themselves or the historic viewsheds and visual relationship among landscape features.

There would be no new dedicated federal funds available to preserve historic buildings and structures or cultural landscapes; however, specific programs or sites could seek support from existing federal programs or utilize state, local, and private funds.

Surveys and research necessary to determine the eligibility of a building, structure, or landscape for listing in the National Register of Historic Places are a prerequisite for understanding the resource's significance, and form the basis of informed decision-making in the future regarding how the resource should be managed. Such surveys and research would be a beneficial impact.

In addition, the National Park Service could provide the national heritage area with technical assistance on an "as requested basis." Under alternative C, the resources of the national heritage area program would be available to participating partners. The National Park Service provides technical assistance as well as financial assistance for a limited number of years following designation, which provides a short-term beneficial impact. By collaborating with the consortium or individual property owners, the National Park Service could encourage the protection and preservation of significant buildings, structures, and landscapes and the adaptive use of such resources in accordance with the secretary of interior's standards. Such cooperative efforts, if successful, would have a beneficial impact upon both historic

buildings and structures and cultural landscapes.

### **Cumulative Impacts**

At Los Alamos, all Project Y sites are to be preserved, but other Manhattan Project-era structures within the Los Alamos National Laboratory have already been demolished or are scheduled for decontamination and decommissioning. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

At Oak Ridge, the K-25 Building is scheduled for partial demolition; it is likely that the entire building will be demolished over the next few years. Impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity. A number of other structures at Oak Ridge, including World War II/Manhattan Project era facilities, are in deteriorating condition requiring decommissioning or demolition. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

The Dayton School District, which owns the former Bonebrake Theological Seminary, may decide to sell their holdings to someone who will develop them for purposes other than preservation and interpretation. If the historic structures associated with the former Bonebrake Theological Seminary are razed, impacts to historic buildings and structures would be permanent, adverse and of moderate to major intensity.

### **Conclusion**

Under alternative C, historic preservation programs at the Department of Energy would continue for the management of historic properties and cultural landscapes, which would have beneficial impacts. There is a potential for inconsistent beneficial and adverse impacts at privately owned and managed properties and landscapes which

would be long term and range from minor to moderate in intensity.

Cumulative impacts of alternative C would result in predominantly beneficial impacts but also long-term, minor to moderate adverse effects to historic buildings and structures. The predominantly beneficial impacts of this alternative, in combination with the moderate to major, long-term or permanent, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term moderate to major cumulative effect. However, the adverse effects of alternative B would be a very small component of the adverse cumulative impact.

**Section 106 Summary.** After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 8000.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of alternative C would generally result in no adverse effect on historic buildings and structures and cultural landscapes.

### **MUSEUM COLLECTIONS**

Implementation of alternative C would result in no impacts to museum collections at any of the Manhattan Project sites at Los Alamos, Hanford, or Oak Ridge. These DOE-managed sites would continue to curate and manage collections according to existing cultural resource management planning and according to existing federal guidelines for collections.

At Dayton, there would be a minor to moderate, long-term, adverse impact due to the lack of organization and care of collections. Collections would remain in private hands and there would be a higher potential for owners to discard or sell Manhattan Project objects and documents. Both beneficial and adverse impacts would be potentially inconsistent related to privately held collections. The potential exists at Dayton for the loss of objects and the

diminishing of a collection's usefulness for future research and interpretation.

### **Cumulative Impacts**

The cumulative impacts scenario for collections under alternative C relates to museum objects as well. Many of the buildings, such as the B Reactor at Hanford and the structural features of K-25 gaseous diffusion plant at Oak Ridge, include features, objects, and artifacts of the Manhattan Project era. Their loss to research and interpretation through demolition or removal would constitute a long-term, moderate to major, adverse impact.

The impacts of the other actions above, combined with the impacts of the alternative would result in a major long-term, adverse, cumulative impact to museum collections.

### **Conclusion**

Under alternative C, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts. As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative C. With the establishment of a national heritage area, there would be no new impacts introduced.

## **VISITOR USE AND EXPERIENCE**

Under alternative C, the impacts on visitor use and experience would be similar to those described in alternative B. However, designation as a national heritage area would provide visitors with the most comprehensive interpretation of the Manhattan Project, as the heritage area would have a designated managing entity that would coordinate and disseminate information about visitor opportunities related to the Manhattan Project. A national heritage area would be able to make use of NPS expertise and there would be greater opportunities for securing federal funding to preserve and interpret sites for

visitors. There would be better opportunities for increased recognition of the various Manhattan Project sites. A benefit would come from providing a more comprehensive visitor experience than under alternative B.

Alternative C would result in minor to moderate, long-term, beneficial impacts depending on the actions the national heritage area management would take and the amount of money it would secure. The heritage area could appreciably change the interpretation on the Manhattan Project by interpreting the interconnected story of the various sites at each location, whereas currently each site interprets mainly its role in the project

The heritage area would likely attract additional visitation that would not otherwise be attracted to the sites. The visitor experience in Dayton would be particularly affected if the heritage area took action to exhibit buildings, where no visitation and very little interpretation exist currently. However, visitation would likely remain limited at Los Alamos, Hanford, and Oak Ridge due to safety concerns and because the Department of Energy will likely continue to operate some of the buildings as places of work for DOE employees and contractors.

Additionally, potential federal funding towards the heritage area that would not be available under the other alternatives would allow for additional investment in the sites, presumably lending to an improved visitor experience.

### **Cumulative Impacts**

Adaptive reuse and potential demolition of some buildings at Los Alamos would have a negligible, long-term, adverse impact. Currently, visitors can visit primarily the outside of buildings; they would not notice a change if buildings were adaptively reused. If a few buildings were demolished, some visitors would notice the alteration in the landscape, others would not. Demolition of some of the buildings could impact the experience as well

as the long-term Manhattan Project visitation levels at the site, although these impacts would be negligible.

At Hanford, the completion of the Hanford Reach Interpretive Center would result in a moderate, long-term, beneficial impact to the visitor experience. The Hanford Reach Interpretive Center proposes to increase visitation to Hanford. The Museum also plans new exhibits interpreting the Manhattan Project. Both of these actions would be beneficial impacts to the visitor use and experience.

If a portion of the K-25 complex at Oak Ridge were to be preserved for interpretive purposes, it would create a moderate, long-term, beneficial impact to the visitor experience.

No impact to the visitor experience at Dayton would occur if the school district sold the former Bonebrake Theological Seminary property since there is no current visitation at the site. The impacts of other actions described above, in combination with the impacts of alternative C, would result in minor to moderate, long-term, beneficial cumulative impacts.

### **Conclusion**

Implementation of alternative C would result in minor to moderate, long-term, beneficial impacts to visitor use and experience. Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial. Cumulative impacts would be minor to moderate, long-term, and beneficial.

## **SOCIOECONOMICS**

Implementation of alternative C would result in a negligible, long-term, beneficial impact to social and economic characteristics of the Manhattan Project sites and surrounding regions. Increased visitation due to actions implemented by the national heritage area management would be expected; this increase

likely would be greater than if the managing entity were the consortium, due to the availability of federal funding in this alternative. However, visitation would be limited by safety and operational concerns at Los Alamos, Hanford, and Oak Ridge. Since Hanford's visitation would continue to be restricted, increased demand for visits would not be met under this alternative. At Dayton, there is no visitation now, and it would not increase. However, since Dayton's tourism industry focuses on its aviation history, the Manhattan Project theme is unlikely to become a primary draw for tourism there. Tourism contributes only a minor role to each locality's economy. Therefore, any changes in Manhattan Project tourism would likely make up only a slight portion of each area's total economy.

### **Cumulative Impacts**

Changes to the building use and some demolition of buildings in Los Alamos would likely result in a negligible long-term adverse impact to the region's economic environment, as slightly reduced visitation could affect total visitor spending.

Increases in visitation to the Hanford site proposed by the Hanford Reach Interpretive Center would have a negligible long-term beneficial impact on the regional economy. Plans are also underway to increase the number of visitors allowed to tour the B Reactor.

At Oak Ridge, the potential reuse of a portion of the K-25 building as a visitor center and museum would result in a negligible, long-term, beneficial impact to the regional economy, as additional visitation and therefore spending could come to the area.

At Dayton, the school district's potential sale of the former Bonebrake Theological Seminary property could result in the land being developed as residential housing, which would result in a negligible, long-term, beneficial impact to the economy, as residents



would bring new income to the area, resulting in trickle-down effects in the local economy.

Each of the other actions results in negligible impacts to the regional economies because tourism plays a minor role in each of the regions; it makes up an estimated 4% to 8% of each total economy. Additionally, the Manhattan Project sites at Hanford and Dayton are not the primary draw for tourists, and therefore would likely make up a smaller portion of the economy than does tourism overall. Dayton's tourism industry revolves around its aviation history. Hanford area's tourism is largely due to the local wineries and recreational activities.

The impacts of other actions described above, in combination with the impacts of alternative C, would result in negligible, long-term, beneficial cumulative impacts to the Manhattan Project sites and their local regions.

### **Conclusion**

Implementation of alternative C would result in a negligible, long-term, beneficial impact to socioeconomics of the Manhattan Project sites. Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial. The cumulative impacts of the alternative and other actions would result in long-term beneficial impacts, negligible in intensity.

## ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE D: AN AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM

### HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

Under alternative D, national register-listed or national register-eligible buildings and structures located on DOE property would continue to receive protection under existing federal historic preservation laws. All stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). Stabilization, preservation, or rehabilitation undertaken in accordance with the Secretary's Standards would have beneficial effects upon historic buildings and structures.

Although the responsibility for privately owned buildings and structures would continue to remain in the hands of local citizens, organizations, local and state governments, and private owners, the commission would strive to coordinate efforts to protect historic buildings and structures; preservation efforts would be less fragmented than under alternative A, resulting in a beneficial impact. Similar to alternative C, there would likely be a more organized and coordinated effort at preservation under alternative D as compared to alternative B. However, if resources fell into disrepair, deteriorated, or were inappropriately developed, the adverse impacts would be long-term or permanent and of minor to moderate intensity.

Preservation efforts sponsored by the affiliated area could also beneficially affect significant cultural landscapes. The more aware that nonfederal owners of historic buildings and structures are of appropriate stabilization, preservation, and rehabilitation guidelines and standards, the less likely that

such resources would undergo inappropriate repair or development that would adversely affect either the buildings and structures themselves or the historic viewsheds and visual relationships among landscape features.

There would be no new dedicated federal funds available to preserve historic buildings and structures or cultural landscapes, unless otherwise authorized. Specific programs or sites could also seek support from existing federal programs or use state, local, and private funds.

Surveys and research necessary to determine the eligibility of a building, structure, or landscape for listing in the National Register of Historic Places are a prerequisite for understanding the resource's significance, and form the basis of informed decision making in the future regarding how the resource should be managed. Such surveys and research would be a beneficial impact.

Under alternative D, the resources of the affiliated area would be available to participating partners. The National Park Service provides technical assistance as well as financial assistance to affiliated areas as appropriate; this would provide a long-term beneficial impact. By collaborating with the affiliated area managers or individual property owners, the National Park Service could encourage the protection and preservation of significant buildings, structures, and landscapes and the adaptive use of such resources in accordance with the secretary of the interior's standards. Such cooperative efforts, if successful, would have a short- to long-term beneficial impact upon both historic buildings and structures and cultural landscapes.

## Cumulative Impacts

At Los Alamos, all Project Y sites are to be preserved, but other Manhattan Project-era structures within the Los Alamos National Laboratory have already been demolished or are scheduled for decontamination and decommissioning. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

At Oak Ridge, the K-25 Building is scheduled for partial demolition, with the likelihood that the entire building will be demolished over the next few years. Impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity. A number of other structures at Oak Ridge, including World War II/Manhattan Project era facilities, are in deteriorating condition requiring decommissioning or demolition. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

The Dayton School District, which owns the former Bonebrake Theological Seminary, may decide to sell their holdings to someone who will develop them for purposes other than preservation and interpretation. If the historic structures associated with the former Bonebrake Theological Seminary are razed, impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity.

Actions in alternative D would result in predominantly beneficial impacts but also long-term, minor to moderate adverse effects to historic buildings and structures.

## Conclusion

Under alternative D, historic preservation programs at the Department of Energy would continue for the management of historic properties and cultural landscapes, which would have beneficial impacts. There is a potential for inconsistent beneficial and adverse impacts to privately owned and

managed properties and landscapes that would be long term and would range from minor to moderate in intensity. The predominantly beneficial impacts of this alternative, in combination with the moderate to major, long-term or permanent, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term moderate to major cumulative effect. However, the adverse effects of alternative D would be a very small component of the adverse cumulative impact.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of alternative D would generally result in no adverse effect on historic buildings and structures and cultural landscapes.

## MUSEUM COLLECTIONS

Implementation of alternative D would result in a minor to moderate, long-term, beneficial impact to museum collections at the Manhattan Project sites at Los Alamos, Hanford, or Oak Ridge. These DOE-managed sites would continue to curate and manage collections according to existing cultural resource management planning and according to existing federal guidelines for collections. They would further benefit from NPS technical assistance.

At Dayton, there would be a minor to moderate, long-term, adverse impact due to the lack of organization and care of collections. Collections would remain in private hands and there would be a higher potential for owners to discard or sell Manhattan Project objects and documents. Both beneficial and adverse impacts would be potentially inconsistent related to privately held collections. The potential exists at Dayton for the loss of objects and the diminishing of a collection's usefulness for future research and interpretation.

### **Cumulative Impacts**

The cumulative impacts scenario for collections under alternative D relates to museum objects as well. Many of the buildings, such as the B Reactor at Hanford and the structural features of K-25 gaseous diffusion plant at Oak Ridge, include features, objects, and artifacts of the Manhattan Project era. Their loss to research and interpretation through demolition or removal would constitute a long-term, moderate to major, adverse impact.

The impacts of the other actions above, combined with the impacts of the alternative would result in a major, long-term, adverse, cumulative impact to museum collections.

### **Conclusion**

Under alternative D, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts. As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative D. With the establishment of an area affiliated with the national park system there would be no new impacts introduced.

### **VISITOR USE AND EXPERIENCE**

Under alternative D, the impacts on visitor use and experience would be similar to those described in alternatives B and C. Designation as an NPS affiliated area would provide visitors with comprehensive interpretation of the Manhattan Project equal to that provided under alternative C. Like a national heritage area, the affiliated area would have a designated managing entity that would coordinate and disseminate information about visitor opportunities related to the Manhattan Project. Like alternative C, an affiliated area would also be able to make use of NPS expertise and there would be greater opportunities for securing federal funding to preserve and interpret sites for visitors. There

would be better opportunities for increased recognition of the various Manhattan Project sites. A benefit would come from providing a more comprehensive visitor experience than that provided under alternative A. In addition, the National Park Service could provide the affiliated area with technical assistance in a manner similar to other affiliated areas where funds could be appropriated annually to support interpretive and educational programs.

Alternative D would result in minor to moderate, long-term, beneficial impacts depending on the actions the affiliated area management would take and the amount of money it would secure. As with alternative C, the NPS affiliated area could appreciably change the interpretation on the Manhattan Project by interpreting the interconnected story of the various sites at each location, whereas currently each site interprets mainly its role in the project.

As an area affiliated with the national park system, the sites would likely attract larger number of visitors than might come otherwise. The visitor experience in Dayton would be particularly affected if the affiliated area were established with NPS involvement. Currently there is no visitation and very little interpretation related to Manhattan Project era sites at Dayton. Visitation would likely remain limited at Los Alamos, Hanford, and Oak Ridge due to safety concerns and because the Department of Energy will likely continue to operate some of the buildings as places of work for DOE employees and contractors.

As with the heritage area concept under alternative C, potential federal funding for NPS technical assistance for the affiliated area, not available under the other alternatives, would allow for additional investment in the sites, presumably leading to an improved visitor experience.

### **Cumulative Impacts**

Adaptive reuse and potential demolition of some buildings at Los Alamos would have a negligible, long-term, adverse impact. Currently, visitors can visit primarily the outside of buildings; they would not notice a change if buildings were adaptively reused. If a few buildings were demolished, some visitors would notice the alteration in the landscape, others would not. Demolition of some of the buildings could affect the experience as well as the long-term Manhattan Project visitation levels at the site, although these impacts would be negligible.

At Hanford, the completion of the Hanford Reach Interpretive Center would result in a moderate, long-term, beneficial impact to the visitor experience. The center is expected to increase visitation to Hanford. The center also plans new exhibits interpreting the Manhattan Project. Both of these actions would be beneficial impacts to visitor use and experience.

If a portion of the K-25 complex at Oak Ridge were to be preserved for interpretive purposes, it would create a moderate, long-term, beneficial impact to the visitor experience.

No impact to the visitor experience at Dayton would occur if the school district sold the former Bonebrake Theological Seminary property, since there is no current visitation at the site.

The impacts of other actions described above, in combination with the impacts of alternative D, would result in minor to moderate, long-term, beneficial cumulative impacts.

### **Conclusion**

Implementation of alternative D would result in minor to moderate, long-term, beneficial impacts to visitor use and experience. Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial. The impacts of alternative D, in

combination with those of other past, present, and foreseeable future actions would result in minor to moderate, long-term, and beneficial cumulative impacts. The cumulative impacts of alternative D would comprise a relatively small portion of the overall cumulative effect.

### **SOCIOECONOMICS**

Implementation of alternative D would result in a negligible, long-term, beneficial impact to social and economic characteristics of the Manhattan Project sites and surrounding regions. Actions implemented by the commission would likely result in increased visitation, and this increase would likely be greater than if the managing entity were the consortium, due to the availability of federal funding. However, visitation would continue to be limited by safety and operational concerns at Los Alamos, Hanford, and Oak Ridge. Since Hanford's visitation would continue to be restricted, increased demand would not be met under this alternative. At Dayton, there is no visitation now and it would increase. However, Dayton's tourism industry focuses on its aviation history, and the Manhattan Project theme is unlikely to become a primary draw for tourism there. Tourism contributes only a minor role to each locality's economy. Therefore, any changes in Manhattan Project tourism would likely make up only a slight portion of each area's total economy.

### **Cumulative Impacts**

Changes to the building use and some demolition of buildings in Los Alamos would likely result in a negligible long-term adverse impact to the region's economic environment as slightly reduced visitation could affect total visitor spending.

Increases in visitation to the Hanford site proposed by the Hanford Reach Interpretive Center would have a negligible long-term beneficial impact on the regional economy. Plans are also underway to increase the

number of visitors allowed to tour the B Reactor.

At Oak Ridge, the potential reuse of a portion of the K-25 building as a visitor center and museum would result in a negligible, long-term, beneficial impact to the regional economy, as additional visitors and dollars could come to the area.

At Dayton, the school district's potential sale of the former Bonebrake Theological Seminary property could result in the land being developed as residential housing, which would result in a negligible, long-term, beneficial impact to the economy, as residents would bring new income to the area, resulting in trickle-down effects in the local economy.

Each of the other actions results in negligible impacts to the regional economies because tourism plays a minor role in each of the regions; it makes up an estimated 4% to 8% of each total economy. Additionally, the Manhattan Project sites at Hanford and Dayton are not the primary draw for tourists, and therefore would likely make up a smaller

portion of the economy than does tourism overall. Dayton's tourism industry revolves around its aviation history. Hanford area's tourism is largely due to the local wineries and recreational activities.

The impacts of other actions described above, in combination with the impacts of alternative D, would result in negligible, long-term, beneficial cumulative impacts to the Manhattan Project sites and their local regions. The cumulative impacts of alternative D would comprise a relatively small portion of the overall cumulative effect.

### **Conclusion**

Implementation of alternative D would result in a negligible, long-term, beneficial impact to socioeconomics of the Manhattan Project sites. Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial. Alternative D, in conjunction with other actions would result in long-term beneficial impacts that are negligible in intensity.

## ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE E: MANHATTAN PROJECT NATIONAL HISTORICAL PARK

### HISTORIC BUILDINGS AND STRUCTURES AND CULTURAL LANDSCAPES

Under alternative E, national register-listed or national register-eligible buildings and structures located on DOE property would continue to receive protection under existing federal historic preservation laws. Any acquired or leased National Park Service facilities at Los Alamos would also receive appropriate protection under these same laws. All stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). Stabilization, preservation, or rehabilitation undertaken in accordance with the Secretary's Standards would have beneficial effects upon historic buildings and structures.

Although the responsibility for privately owned buildings and structures would continue to remain in the hands of local citizens, organizations, local and state governments, and private owners, the National Park Service would strive to coordinate efforts to protect historic buildings and structures; preservation efforts would be less fragmented than under alternative A, resulting in a beneficial impact. Similar to alternatives C and D, there would likely be an even more organized and coordinated effort at preservation under alternative E as compared to alternatives A and B. However, if resources fell into disrepair, deteriorated, or were inappropriately developed, the adverse impacts would be long-term or permanent, and of minor to moderate intensity.

Preservation efforts sponsored by the national park unit could also beneficially affect significant cultural landscapes, especially at the designated site. The more aware that

nonfederal owners of historic buildings and structures are of appropriate stabilization, preservation, and rehabilitation guidelines and standards, the less likely that such resources would undergo inappropriate repair or development that would adversely affect either the buildings and structures themselves or the historic viewsheds and visual relationships among landscape features.

Funding made available for the site as a new unit of the national park system would help preserve historic structures at Los Alamos. The National Park Service could help coordinate grant writing efforts and other funding efforts to benefit the other associated Manhattan Project sites. Specific programs or sites could also seek support from existing federal programs or use state, local, and private funds.

Surveys and research necessary to determine the eligibility of a building, structure, or landscape for listing in the National Register of Historic Places are a prerequisite for understanding the resource's significance, and form the basis of informed decision making in the future regarding how the resource should be managed. Such surveys and research would have a beneficial impact.

Under alternative E, the resources of the national park unit could be made available to participating partners. As appropriate, other sites related to the Manhattan Project may be designated as associated areas through formal agreements. The National Park Service could provide technical assistance as well as financial assistance to associated areas as appropriate; this would provide a long-term beneficial impact. By collaborating with the associated area managers or individual property owners, the National Park Service could encourage the protection and

preservation of significant buildings, structures, and landscapes and the adaptive use of such resources in accordance with the secretary of the interior's standards. Such cooperative efforts, if successful, would have a short- to long-term, beneficial impact upon both historic buildings and structures and cultural landscapes.

### **Cumulative Impacts**

At Los Alamos, all Project Y sites are to be preserved, but other Manhattan Project-era structures within the Los Alamos National Laboratory have already been demolished or are scheduled for decontamination and decommissioning. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

At Oak Ridge, the K-25 Building is scheduled for partial demolition; it is likely that the entire building will be demolished in the next few years. Impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity. A number of other structures at Oak Ridge, including World War II/Manhattan Project era facilities, are in deteriorating condition requiring decommissioning or demolition. If the structures continue to deteriorate or are demolished, the impacts would be permanent, adverse, and of moderate to major intensity.

The Dayton School District, which owns the former Bonebrake Theological Seminary, may decide to sell their holdings to someone who will develop them for purposes other than preservation and interpretation. If the historic structures associated with the former Bonebrake Theological Seminary are razed, impacts to historic buildings and structures would be permanent, adverse, and of moderate to major intensity.

Actions in alternative E would result in predominantly beneficial impacts but also long-term, minor to moderate adverse effects to historic buildings and structures.

### **Conclusion**

Under alternative E, historic preservation programs at the Department of Energy would continue for the management of historic properties and cultural landscapes, which would have beneficial impacts. There is a potential for inconsistent beneficial and adverse impacts to privately owned and managed properties and landscapes that would be long term and would range from minor to moderate in intensity. The predominantly beneficial impacts of this alternative, in combination with the moderate to major, long-term or permanent, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, moderate to major, cumulative effect. However, the adverse effects of alternative E would be a very small component of the adverse cumulative impact.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5, *Assessment of Adverse Effects*) the National Park Service concludes that implementation of alternative E would generally result in no adverse effect on historic buildings and structures and cultural landscapes.

### **MUSEUM COLLECTIONS**

Implementation of alternative E would result in long-term, minor to moderate, beneficial impacts to museum collections at any of the Manhattan Project sites at Los Alamos, Hanford, or Oak Ridge. These DOE-managed sites would continue to curate and manage collections according to existing cultural resource management planning and according to existing federal guidelines for collections. They would further benefit from NPS involvement and technical assistance.

At Dayton, there would be a minor to moderate, long-term, adverse impact due to the lack of organization and care of collections. Collections would remain in



private hands and there would be a higher potential for owners to discard or sell Manhattan Project objects and documents.

Both beneficial and adverse impacts would be potentially inconsistent related to privately held collections. The potential exists at Dayton for the loss of objects and the diminishing of a collection's usefulness for future research and interpretation.

### **Cumulative Impacts**

The cumulative impacts scenario for collections under alternative E relates to museum objects as well. Many of the buildings, such as the B Reactor at Hanford and the structural features of K-25 gaseous diffusion plant at Oak Ridge, include features, artifacts, and objects of the Manhattan Project era. Their loss to research and interpretation through demolition or removal would constitute a long-term, moderate to major, adverse impact. However, the National Park Service, in its role as the coordinating entity, could encourage the consolidation and organization of collections at Los Alamos for the Manhattan Project National Historical Park, providing a beneficial impact related to research and interpretation.

The impacts of the other actions above, combined with the impacts of the alternative would result in a major, long-term, adverse, cumulative impact to museum collections.

### **Conclusion**

Under alternative E, the curation of museum objects and archives at the Department of Energy sites would continue, which would have beneficial impacts. As with alternative A, there is a potential for adverse impacts to privately owned collections, objects, and archives under alternative E. With the establishment of a national park unit, there could be some beneficial effect as the Manhattan Project National Historical Park would provide guidance and focus for collections.

### **VISITOR USE AND EXPERIENCE**

Under alternative E, the impacts on visitor use and experience would be similar to those described in alternatives B, C, and D. Designation as an NPS unit would provide visitors with more comprehensive interpretation of the Manhattan Project than that provided under alternatives A, C, and D. There would be more opportunities for increased recognition of the various Manhattan Project sites through the efforts of the Park Service as a coordinating entity. In addition, the National Park Service could provide the Manhattan Project associated areas with technical assistance to support interpretive and educational programs.

Alternative E would result in minor to moderate, long-term, beneficial impacts. As with alternatives C and D, as a coordinating entity with an established presence at the Los Alamos site, the Park Service could appreciably enhance the interpretation of the Manhattan Project by interpreting the interconnected story of the various sites, whereas currently, each site interprets mainly its own role in the project.

As a unit of the national park system, the Los Alamos site, as well as other associated sites, would likely attract larger numbers of visitors than might come otherwise. The visitor experience in Dayton would be particularly affected if those sites became formally associated with the park through a memorandum of agreement. With NPS involvement, additional attention could be focused on some of the lesser-known sites related to the Manhattan Project. Currently there is no visitation and very little interpretation related to Manhattan Project era sites at Dayton.

Visitation would likely increase at Los Alamos, as there would be a focal point for learning about the Manhattan Project as the NPS acquired or leased properties for that purpose. Visitation at Hanford and Oak Ridge may also increase as the Park Service draws

attention to the story of the Manhattan Project at these sites. The Department of Energy already operates some visitor programs at their sites and they may be encouraged to increase their involvement in interpreting their sites with the designation of the Los Alamos site as the Manhattan Project National Historical Park.

As with the heritage area concept under alternative C and the affiliated area concept under D, potential federal funding for NPS technical assistance for Manhattan Project associated areas may be available and would allow for additional investment in the sites, presumably leading to an improved visitor experience and an additional long-term, beneficial impact.

### **Cumulative Impacts**

Adaptive reuse and potential demolition of some buildings at Los Alamos would have a negligible, long-term, adverse impact. Currently, visitors can visit primarily the outside of buildings; they would not notice a change if buildings were adaptively reused. If a few buildings were demolished, some visitors would notice the alteration in the landscape, others would not. Demolition of some of the buildings could affect visitor experience as well as the long-term Manhattan Project visitation levels at the site, although these impacts would be negligible.

At Hanford, the completion of the Hanford Reach Interpretive Center would result in a moderate, long-term, beneficial impact to the visitor experience. The center is expected to increase visitation to Hanford. The center also plans new exhibits interpreting the Manhattan Project. Both of these actions would have beneficial impacts to visitor use and experience.

If a portion of the K-25 complex at Oak Ridge were to be preserved for interpretive purposes, it would create a moderate, long-term, beneficial impact to the visitor experience.

No impact to the visitor experience at Dayton would occur if the school district sold the former Bonebrake Theological Seminary property, since there is no current visitation at the site.

The impacts of other actions described above, in combination with the impacts of alternative E, would result in minor to moderate, long-term, beneficial cumulative impacts.

### **Conclusion**

Implementation of alternative E would result in minor to moderate, long-term, beneficial impacts to visitor use and experience. Other impacts range from moderate, long-term, and adverse to moderate, long-term, and beneficial. The impacts of alternative E, in combination with those of other past, present, and foreseeable future actions would result in minor to moderate, long-term, and beneficial cumulative impacts. The cumulative impacts of alternative E would comprise a relatively small portion of the overall cumulative effect.

### **SOCIOECONOMICS**

Implementation of alternative E would result in a negligible, long-term, beneficial impact to social and economic characteristics of the Manhattan Project sites and surrounding regions with the exception of Los Alamos, which would experience a minor, long-term, beneficial impact. Actions implemented by the National Park Service would likely result in increased visitation, and this increase would likely be greater than if the managing entity were the consortium or the commission, due to the availability of federal funding.

However, visitation would continue to be limited by safety and operational concerns at Los Alamos, Hanford, and Oak Ridge. Since Hanford's visitation would continue to be restricted, increased demand would not be met under this alternative. At Dayton, visitation would likely increase, as now there is no visitation at the Dayton sites. However,

Dayton's tourism industry focuses on its aviation history, and the Manhattan Project theme is unlikely to become a primary draw for tourism there. Tourism contributes only a minor role to each locality's economy. Therefore, any changes in Manhattan Project tourism would likely make up only a slight portion of each area's total economy.

### **Cumulative Impacts**

Changes to the building use and some demolition of buildings in Los Alamos would likely result in a negligible, long-term, adverse impact to the region's economic environment as slightly reduced visitation could affect total visitor spending.

Increases in visitation to the Hanford site proposed by the Hanford Reach Interpretive Center would have a negligible long-term beneficial impact on the regional economy. Plans are also underway to increase the number of visitors allowed to tour the B Reactor.

At Oak Ridge, the potential reuse of a portion of the K-25 building as a visitor center and museum would result in a negligible, long-term, beneficial impact to the regional economy, as additional visitors and dollars could come to the area.

At Dayton, the school district's potential sale of the former Bonebrake Theological Seminary property could result in the land being developed as residential housing, which would result in a negligible, long-term, beneficial impact to the economy, as residents

would bring new income to the area, resulting in trickle-down effects in the local economy.

Each of the other actions results in negligible impacts to the regional economies because tourism plays a minor role in each of the regions; it makes up an estimated 4% to 8% of each total economy. Additionally, the Manhattan Project sites at Hanford and Dayton are not the primary draw for tourists, and therefore would likely make up a smaller portion of the economy than does tourism overall. Dayton's tourism industry revolves around its aviation history. Hanford area's tourism is largely due to the local wineries and recreational activities.

The impacts of other actions described above, in combination with the impacts of alternative E, would result in negligible, long-term, beneficial cumulative impacts to the Los Alamos site and any associated Manhattan Project sites and their local regions. The cumulative impacts of alternative E would comprise a relatively small portion of the overall cumulative effect.

### **Conclusion**

Implementation of alternative E would result in a negligible, long-term, beneficial impact to socioeconomics of the Manhattan Project sites. Other actions would result in impacts ranging from negligible, long-term, and adverse to negligible, long-term, and beneficial. Alternative E, in conjunction with other actions would result in long-term beneficial impacts that are negligible in intensity.





OAK RIDGE, RACETRACKS



HANFORD, WORKER'S BUS



LOS ALAMOS, STONE POWER HOUSE

## APPENDIXES, REFERENCES, AND LIST OF PREPARERS



## APPENDIX A: LEGISLATION

Public Law 108-340  
108th Congress

An Act

To direct the Secretary of the Interior to conduct a study on the preservation and interpretation of the historic sites of the Manhattan Project for potential inclusion in the National Park System.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

### SECTION 1. SHORT TITLE.

This Act may be cited as the ``Manhattan Project National Historical Park Study Act''.

### SEC. 2. DEFINITIONS.

In this Act:

- (1) Secretary.--The term ``Secretary'' means the Secretary of the Interior.
- (2) Study.--The term ``study'' means the study authorized by section 3(a).
- (3) Study area.--
  - (A) In general.--The term ``study area'' means the historically significant sites associated with the Manhattan Project.
  - (B) Inclusions.--The term ``study area'' includes--
    - (i) Los Alamos National Laboratory and townsite in the State of New Mexico;
    - (ii) the Hanford Site in the State of Washington; and
    - (iii) Oak Ridge Reservation in the State of Tennessee.

### SEC. 3. SPECIAL RESOURCE STUDY.

- (a) Study.--
  - (1) In general.--The Secretary, in consultation with the Secretary of Energy, shall conduct a special resource study of the study area to assess the national significance, suitability, and feasibility of designating 1 or more sites within the study area as a unit of the National Park System in accordance with section 8(c) of Public Law 91-383 (16 U.S.C. 1a-5(c)).
  - (2) Administration.--In conducting the study, the Secretary shall--
    - (A) consult with interested Federal, State, tribal, and local officials, representatives of organizations, and members of the public;
    - (B) evaluate, in coordination with the Secretary of Energy, the compatibility of designating 1 or more sites within the study area as a unit of the National Park

System with maintaining the security, productivity, and management goals of the Department of Energy and public health and safety; and  
(C) consider research in existence on the date of enactment of this Act by the Department of Energy on the historical significance and feasibility of preserving and interpreting the various sites and structures in the study area.

(b) Report.--Not later than 2 years after the date on which funds are made available to carry out the study, the Secretary shall submit to Congress a report that describes the findings of the study and the conclusions and recommendations of the Secretary.

#### SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated such sums as are necessary to carry out this Act.

Approved October 18, 2004.

#### LEGISLATIVE HISTORY--S. 1687:

-----

SENATE REPORTS: No. 108-270 (Comm. on Energy and Natural Resources).

CONGRESSIONAL RECORD, Vol. 150 (2004):

Sept. 15, considered and passed Senate.

Sept. 28, considered and passed House.





## United States Department of the Interior

### NATIONAL PARK SERVICE

1849 C Street, N.W.  
Washington, D.C. 20240

IN REPLY REFER TO:

L58 (0120)

NOV - 1 2004

#### Memorandum

To: Associate Director, Park Planning, Facilities, and Lands  
Regional Directors for Pacific West Region, Intermountain Region, and  
Southeast Region

From: *Adrian* Director

Subject: Activation: P.L. 108-340, Manhattan Project National Historical Park Study Act

On October 18, 2004, President Bush approved S. 1687, to direct the Secretary of the Interior to conduct a study on the preservation and interpretation of the historic sites of the Manhattan Project for potential inclusion in the National Park System, as Public Law 108-340. Under this Act, the National Park Service is required to conduct a special resource study of three sites associated with the development of the atomic bomb during World War II: Los Alamos, New Mexico; Hanford, Washington; and Oak Ridge, Tennessee. The Act requires the study to be conducted in consultation with the Department of Energy and completed within 2 years of the date funds are made available for the study.

Senator Jeff Bingaman of New Mexico introduced S. 1687 on September 30, 2003. The Subcommittee on National Parks of the Senate Energy and Natural Resources Committee held a hearing on the bill on March 9, 2004, and the committee approved the bill, with amendments, on April 28. The Senate passed S. 1687 on September 15, 2004.

Similar legislation (H.R. 3207) was introduced by Representative Doc Hastings of Washington on September 30, 2003. No hearing was held on this legislation in the House. On September 15, 2004, the House Committee on Resources approved H.R. 3207 with amendments similar to amendments to S. 1687 adopted by the Senate. The House passed S. 1687 on September 28, 2004.

#### Summary of P.L. 108-340:

Section 1 provides a short title, the "Manhattan Project National Historical Park Act."

Section 2 contains definitions for terms used in the Act.

Section 3(a) requires the Secretary of the Interior, in consultation with the Secretary of Energy, to conduct a special resource study to assess the national significance, suitability, and feasibility

of designating one or more of the three sites named in the study as a unit of the National Park System. The three sites are the Los Alamos National Laboratory and townsite in New Mexico; the Hanford Site in Washington; and the Oak Ridge Reservation in Tennessee. This section further requires the Secretary, in conducting the study, to consult with various interested entities, evaluate the compatibility of designating one or more of these sites as a unit of the National Park System with maintaining certain goals of the Department of Energy, and consider previous research done by the Department of Energy on these sites.

Section 3(b) requires the Secretary of the Interior to submit to Congress a report on the findings, conclusions and recommendations of the study within 2 years of funds being made available for the study.

Section 4 authorizes the appropriation of such sums as are necessary to carry out the Act.

Responsibility: Associate Director, Planning, Facilities, and Lands;  
Regional Directors for Pacific West Region, Intermountain Region, and  
Southeast Region

Attachments:

Public Law 108-340

*Congressional Record* September 30, 2003 (Introductory remarks by Senators Bingaman  
and Cantwell)

Senate Report 108-270

*Congressional Record* September 15, 2004 (Senate passage of S. 1687)

House Report 108-744

*Congressional Record* September 28, 2004 (House passage of S. 1687)

## APPENDIX B: STAKEHOLDERS AND TRIBAL CONTACTS

### **LOS ALAMOS**

#### ***Bradbury Museum (DOE)***

Mail Stop C330  
Los Alamos National Laboratory  
Los Alamos, NM 87545  
505-667-4444  
<http://www.lanl.gov/museum/>

#### ***Los Alamos Arts Council***

PO Box 284  
Los Alamos NM 87544  
505-663-0477  
<http://www.laartscouncil.org/>

#### ***Los Alamos County***

PO Box 30  
Los Alamos, NM 87544  
505-662-8333  
<http://www.lac-nm.us/>

#### ***Los Alamos Historical Society***

113 Monte Ray Drive North  
Los Alamos, NM 87544  
505-672-9792  
<http://www.losalamoshistory.org/>

#### ***Los Alamos National Laboratory***

PO Box 1663  
Los Alamos, NM 87545  
<http://www.lanl.gov/>

#### ***Bandelier National Monument***

15 Entrance Road  
Los Alamos, NM 87544  
505-672-3861 ext. 517  
<http://www.nps.gov/band/>

#### ***New Mexico Preservation Officer***

Bataan Memorial Building  
407 Galisteo Street  
Suite 236  
Santa Fe, NM 87501  
505-827-6320  
<http://www.nmhistoricpreservation.org/>

### **HANFORD**

#### ***B Reactor Museum Association***

PO Box 1531  
Richland, WA 99352  
<http://www.b-reactor.org>

#### ***Columbia River Exhibition of History, Science, and Technology***

95 Lee Blvd  
Richland, WA 99352  
509-943-9000  
<http://www.crehst.org/>

#### ***REACH Board of Directors (Hanford Reach Interpretive Center)***

PO Box 3032  
Richland, WA 99354  
509-943-4100  
<http://visithereach.org/>

#### ***Tri-Cities Visitor and Convention Bureau***

PO Box 2241  
Tri-Cities, WA 99302  
509-735-8486  
<http://www.visittri-cities.com/>

#### ***Office of Archeology & Historic Preservation***

PO Box 48343  
Olympia, WA 98504-8343  
360-586-3065  
<http://www.dahp.wa.gov/>

#### ***Tri-Cities Economic Development Council (TRIDEC)***

901 North Colorado  
Kennewick, WA 99336  
509-735-1000  
<http://www.tridec.org/>

***Confederated Tribes and Bands of the Umatilla Indian Reservation***

PO Box 638  
Pendleton, OR 97801  
541-276-3165  
<http://www.umatilla.nsn.us/>

***Nez Perce Tribe of Idaho***

PO Box 305  
Lapwai, ID 83540  
208-843-2253  
<http://www.nezperce.org/>

***Confederated Tribes and Bands of the Yakama Nation***

PO Box 151  
Toppenish, WA 98948  
509-865-5121

***Colville Business Council***

Confederated Tribes of the Colville Reservation  
<http://www.colvilletribes.com>

***Wanapum Tribe***

15655 Wanapum Village Lane SW  
Beverly, WA 99321  
509-932-3571

**OAK RIDGE**

***Oak Ridge Convention and Visitors Bureau***

302 South Tulane Avenue  
Oak Ridge, TN 37830  
1-800-887-3429  
[www.oakridgevisitor.com](http://www.oakridgevisitor.com)

***City of Oak Ridge***

200 S. Tulane Ave.  
Oak Ridge, TN 37830  
865-425-3550  
<http://www.ci.oak-ridge.tn.us/>

***American Museum of Science and Energy***

300 S. Tulane Avenue  
Oak Ridge, TN 37830 USA  
865-576-3200  
<http://www.amse.org/>

***Oak Ridge National Laboratory***

1 Bethel Valley Rd  
Oak Ridge, TN 37830  
865-576-2900  
[www.ornl.gov](http://www.ornl.gov)

***Tennessee Historical Commission***

2941 Lebanon Road  
Nashville, TN 37243-0442  
615-532-1550  
<http://www.tennessee.gov/environment/hist/>

**DAYTON**

***Dayton Aviation Heritage National Historical Park***

22 S Williams St  
Dayton, OH 45402  
937-225-7705  
<http://www.nps.gov/daav/>

***Dayton Board of Education***

115 S. Ludlow Street  
Dayton, Ohio 45402  
937-542-3000  
<http://www.dps.k12.oh.us/cms/dpsadmin/board.html>

***The Mound Museum Association***

500 Capstone Circle  
Miamisburg, OH 45342  
937-847-2610  
<http://moundmuseum.org/>

***Ohio Historic Preservation Office***

Ohio Historical Society  
567 East Hudson Street  
Columbus, OH 43211-1030  
614-298-2000  
<http://www.ohiohistory.org/>

**NATIONAL**

***Advisory Council on Historic Preservation***

1100 Pennsylvania Avenue NW  
Suite 803  
Old Post Office Building  
Washington, DC 20004  
202-606-8503  
[www.achp.gov](http://www.achp.gov)

***The Atomic Heritage Foundation***

910 17th Street, NW  
Suite 408  
Washington, DC 20006  
202-293-0045  
<http://www.atomicheritage.org/>

***Energy Communities Alliance***

1101 Connecticut Ave, NW  
Suite 1000  
Washington, DC 20036-4374  
202-828-2317  
<http://www.energyca.org/>

***Department of Energy***

1000 Independence Ave., SW  
Washington, DC 20585  
202-586-4403  
<http://www.doe.gov/>

## APPENDIX C: RELATED STUDIES AND PLANS

This special resource study provides an opportunity to build on previous studies. The following planning work has influenced the preparation of this *Manhattan Project Special Resource Study and Environmental Assessment*.

- *The Signature Facilities of the Manhattan Project* (1999) report describes the sites of the Manhattan Project and their importance in history. This document was used extensively for background on the facilities integral to the Manhattan Project.
- Department of Energy tourism study
- The *Cultural Heritage Resources Management Plan for Los Alamos National Laboratory* (2005) describes the area's heritage resources as well as the management methods in use. The special resource study/environmental assessment took into account these resources.
- The *Integrated Natural and Cultural Resources Management Plan for Los Alamos National Laboratory* (2002) outlines the DOE approach for implementing resource management plans and strategies at Los Alamos. This plan provided information on the natural environment at Los Alamos for assessment and impact analysis.
- The *Hanford Cultural Resources Management Plan* (2003) documents cultural resources at the Hanford Site and the management practices associated with the resources. The planning team gained valuable information from the document about the Hanford Site's cultural resources; this information was used in analyzing the impacts of the alternatives in this special resource study/environmental assessment.
- The *Resource Management Plan for the Oak Ridge Reservation* (1993) identifies natural resources on the Oak Ridge property. This information was used in assessing the environment and potential impacts of the alternatives in this special resource study/environmental assessment.
- The *Cultural Resource Management Plan for the DOE Oak Ridge Reservation Anderson and Roane Counties, Tennessee* (2001) provided the special resource study/environmental assessment with information on cultural resources in the area.
- The *Oak Ridge Heritage Tourism Tactical Implementation Plan* (2006) provided important understanding of tourism and economics related to Oak Ridge for the impact analysis.
- The *Creating the Living Story of "The Secret City" A Heritage Tourism Plan to Significantly Expand Oak Ridge Annual Visitations* (2007) evaluated Oak Ridge community assets and the attractiveness of those assets for heritage tourism. A series of "Big Ideas" is proposed for developing a heritage tourism program, "Consider national Heritage Area designation" is included as idea #6. Study identifies local stakeholders and potential partners and proposes a timeline for implementation.
- The United States Army Corps of Engineers *Preliminary Assessment of the Bonebrake Theological Seminary Site, Dayton Unit III* (2000) includes information on the current state of the area related to environmental and human health.
- The United States Army Corps of Engineers *Combined Preliminary Assessment/Site Inspection Report, Dayton Warehouse, City of Dayton, Montgomery County, Ohio* (2005)

## **APPENDIX D: OWNERSHIP AND CURRENT USES**

### **Los Alamos**

#### ***Los Alamos Scientific Laboratory National Historic Landmark Structures***

##### ***Fuller Lodge***

Since 1966 the Lodge, which is owned by Los Alamos County, has been used for social gatherings and meetings and houses various offices, including the Art Center at Fuller Lodge, the Archives and Research Library of the Los Alamos Historical Museum, and the Los Alamos Arts Council. The building also houses a small visitor/information center.

##### ***Ranch School Guest House***

The Los Alamos Historical Society owns the former Guest House and administers/operates the Los Alamos Historical Museum and Book Shop in the historic building, which is open to the public on a daily year-round basis except for major holidays (free admission). The museum interprets the social history of the Los Alamos area, and museum staff provide museum/historic district tours for a nominal fee. The Baker House, adjacent to the historical museum, is a privately owned residence and is not accessible to the public.

##### ***Stone Powerhouse***

The building is owned by Los Alamos County and has been used for offices. The structure does not meet earthquake standards, and its possible demolition is under consideration.

##### ***Private Residences on Bathtub Row***

These residences are privately owned with the exception of the J. Robert Oppenheimer House, which was purchased by the Los Alamos Historical Society in 2003. The owner of the aforementioned Baker House also owns one of these residences. The residences are currently closed to the public. The current residents of the Oppenheimer House, who moved into the structure in 1956, have a life trust agreement with the historical society and may live in the house as long as they wish.

##### ***Memorial / Memorial Shelter / Ashley Pond / Rose Garden***

The Memorial (commemorating the Manhattan Project), Memorial Shelter, Ashley Pond, and Rose Garden are owned by Los Alamos County and publicly accessible. The setting of Ashley Pond is enhanced by a number of county-owned sculptures from the “Art in Public Places” program. The Los Alamos Garden Club actively maintains the Rose Garden in the vicinity of the shelter.

##### ***Individually Listed National Register Properties***

- Potential “Project Y” Manhattan Project National Historic Landmark
- “Trinity Test” V-Site (2 buildings)
- “Little Boy” Gun Site (3 buildings)
- “Fat Man” Quonset Hut
- “Plutonium Recovery” Concrete Bowl
- “Criticality Accident” Laboratory/Staging Area

These historic structures are located within the boundaries of the Los Alamos National Laboratory, a reservation under Department of Energy ownership and administration and managed for the department's National Nuclear Security Administration by the Los Alamos National Security LLC. All of these buildings/structures are in secure areas of the reservation and are not accessible to the public, although small group special tours are periodically conducted at the "Trinity Test" V-Site.

In 1999, the V-Site Assembly Building and Gun Site were listed in the Department of Energy's "Signature Properties of the Manhattan Project." The Department of Energy was awarded a grant through the federal Save America's Treasures Program by the National Park Service to stabilize and restore the V-Site and Gun Site. The May 2000 Cerro Grande fire severely damaged all of the V-Site structures except for the High Bay building, where scientists assembled the "Gadget" for the Trinity Test. Currently, landscaping at the V-Site is being completed, and the planning phase for restoration of the Gun Site landscape will soon commence.

The Risk Reduction and Environmental Stewardship Division's Cultural Resources Management Team is currently preparing a national historic landmark nomination for the potential "Project Y" Manhattan Project National Historic Landmark, although current funding is not sufficient to complete the nomination work in Fiscal Year 2007. The Pond Cabin, located near the "Criticality Accident" Laboratory/Staging Area is under consideration as an addition to the nomination.

The potential for relocating the security fence in the vicinity of the Gun Site to make it publicly accessible is under consideration, but will likely take several years to resolve. Activities have been moved out of the "Criticality Accident" Laboratory/Staging Area, thus reducing its security level. Future long-term planning for the area may enable the site to be more accessible to the public. Currently, the Quonset Hut, Concrete Bowl, and Laboratory/Staging Area facilities are vacant.

During FY 06 Congress provided \$500,000 to the Office of Environmental Management for Manhattan Project facility "preservation" efforts at Los Alamos.

### ***Bradbury Science Museum***

The Bradbury Science Museum in downtown Los Alamos is operated by Los Alamos National Security, LLC for Department of Energy's National Nuclear Security Administration. The museum consists of history, defense, and research galleries and contains exhibits that interpret the history and current research of Los Alamos National Laboratory. The museum, which is open to the public (on a free admission basis) year-round except for Thanksgiving, Christmas, and New Year's Day, serves as a bridge between the laboratory and the community.



Table A: Summary of Ownership of Los Alamos Sites

Property	Ownership
Potential "Project Y" Manhattan Project National Historic Landmark 1. "Trinity Test" V-Site (2 buildings) 2. "Little Boy" Gun Site (3 buildings) 3. "Fat Man" Quonset Hut 4. "Plutonium Recovery" Concrete Bowl 5. "Criticality Accident" Laboratory/Staging Area	Department of Energy
Bradbury Science Museum	Department of Energy
Fuller Lodge	Los Alamos County
Stone Powerhouse	Los Alamos County
Memorial/Memorial Shelter/ Ashley Pond/Rose Garden	Los Alamos County
Ranch School Guest House	Los Alamos Historical Society
Oppenheimer Residence on Bathtub Row	Los Alamos Historical Society
Baker House	Private
Four Private Residences on Bathtub Row	Private

## Hanford

### **B Reactor**

The B Reactor is a historic structure at the Hanford Site, a reservation under the ownership and administration of the Department of Energy (DOE) and managed by the department's Richland Operations Office (DOE-RL). Since 1991, the B Reactor Museum Association has been dedicated to the preservation and display of the B Reactor as a museum or interpreted historic site open to the public. In 1999, the B Reactor was included in DOE's list of "Signature Properties of the Manhattan Project." In September 1999, a final Hanford land use plan was approved allowing visits to the B Reactor for the next 50 years. In August 2000, the B Reactor Project was formed by the DOE-RL Operations Office and managed by Bechtel Hanford Inc., the environmental restoration contractor. In August 2001, an Engineering Evaluation/Cost Analysis Action Memorandum was signed by DOE and the U.S. Environmental Protection Agency providing for up to ten years of hazard mitigation and public access.

A draft national historic landmark nomination for the B Reactor (which retains a high degree of integrity) was presented in December 2007 to the National Park System Advisory Board's Landmarks Committee. The committee recommended the NHL nomination to the Advisory Board for consideration and approval. In August 2008 the B Reactor was designated a National Historic Landmark.

The interior of the B Reactor building and the face of the reactor are currently accessible to the public on a limited basis. The Department of Energy originally planned to turn the reactor over to Washington Closure Hanford for "cocooning" (dismantling the reactor to the radioactive core

and sealing it with concrete) in 2009. Such action would have prohibited the reactor's use as an interpretive component and would likely have adversely alter the cultural landscape of the Hanford reservation in the vicinity of the reactor. However, on February 29, 2008, the Deputy Secretary of the Department of Energy issued a policy directive that no actions be taken which would preclude the preservation of the B Reactor and options for public access. (See memo in "Appendix D: Relevant Correspondence.")

In another action, Congress provided during FY06 \$1,000,000 to the B Reactor to keep a preservation option viable. DOE-RL then authorized spending a portion of these B Reactor funds on repair of the B Reactor roof, estimated to cost approximately \$580,000, to preserve the integrity of the building.

### ***T Plant, Chemical Separation Building***

The T Plant, Chemical Separation Building, is a historic structure at the Hanford site, a reservation under DOE-ownership and administration and managed by DOE-RL. In 1999, the T Plant was included in the Department of Energy's list of "Signature Properties of the Manhattan Project." The T Plant ceased chemical separation in 1956, but it continues to be used for treating and storing wastes. The building is located in a secure area of the reservation and not accessible to the public.

### ***Hanford Site Manhattan Project and Cold War Era Historic District***

The Hanford Site Manhattan Project and Cold War Era Historic District consists of more than 1,000 historic buildings and structures at the Hanford site, a reservation under DOE ownership and administration and managed by DOE-RL. All of the buildings and structures in the district are located in secure areas of the reservation, and none are accessible to the public, although a few may be leased to outside agencies and entities for non-DOE operations and activities.

Table B: Summary of Ownership of Hanford Sites

Property	Ownership
"B" Reactor	Department of Energy
"T" Plant, Chemical Separation Building	Department of Energy
Hanford Site Manhattan Project and Cold War Era Historic District	Department of Energy

## **Oak Ridge**

### ***Oak Ridge National Laboratory Historic District***

The National Register-eligible Oak Ridge National Laboratory (ORNL) Historic District contains 54 contributing historic properties, including the X-10 Graphite Reactor, a designated national historic landmark. The structures are located at the Oak Ridge National Laboratory, a research and development complex which is one of three primary industrial complexes on the Oak Ridge Reservation. The Department of Energy Oak Ridge Office is responsible for major Department of Energy programs performed at ORNL. Department of Energy's Office of Science is the landlord

agency having responsibility for ORNL, and UT-Battelle, LLC manages ORNL for the Department of Energy. Three Department of Energy offices; Science, Environmental Management, and Nuclear Energy, have ongoing missions on the ORNL campus. ORNL's main site encompasses approximately 1,100 acres in Bethel and Melton Valleys, with additional facilities located on the adjacent Copper Ridge. In addition to the historic district a 1993 Architectural and Historic Assessment identified 11 buildings and structures—located near, but outside the main Oak Ridge National Laboratory campus in the East Support Area of the reservation—as individually eligible for listing in the National Register of Historic Places.

In February 2005, a Programmatic Agreement was ratified among the U.S. Department of Energy, Oak Ridge Operations Office; the Tennessee State Historic Preservation Office; and the Advisory Council on Historic Preservation for the management, preservation, and interpretation of the historic properties at the Oak Ridge National Laboratory and nearby East Support Area. Some of the structures have been or are slated for demolition. All of the structures/buildings in the historic district are in secure areas of the reservation.

The Oak Ridge National Laboratory has a visitor center, but Bethel Valley Road, which is the main access route to the laboratory from both directions, is closed to the public. Thus, arrangements for visiting the national laboratory must be made ahead of time. Currently, a seasonal "Department of Energy Oak Ridge Facilities Public Tour" is offered primarily for visitors who have a non-technical interest in Department of Energy facilities. Special guided tours, general orientation tours, and other "customized" tours also are offered, primarily for educational groups, although advance registration is required and participation is limited to U.S. citizens.

During FY 06 Congress provided \$ 500,000 to the Office of Environmental Management for Manhattan Project facility "preservation" efforts at Oak Ridge.

### ***X-10 Graphite Reactor National Historic Landmark***

The X-10 Graphite Reactor is a national historic landmark located in the Oak Ridge National Laboratory's historic district, on the Oak Ridge Reservation. The X-10 Graphite Reactor is located in a secure area of the reservation. In 1999, the X-10 Graphite Reactor was included in the Department of Energy's list of "Signature Properties of the Manhattan Project."

The reactor was opened to the public in 1968. Currently, public tours of the X-10 Graphite Reactor are provided by the Department of Energy's Oak Ridge Office. Tours occur on Tuesdays and Fridays from April through September. Visitors purchase tickets at the American Museum of Science and Energy in Oak Ridge, departing by bus to the X-10 facility. The tour program highlights Department of Energy facilities—Oak Ridge National Laboratory, Y-12 National Security Complex, and East Tennessee Technology Park—and includes a stop at the X-1-Graphite Reactor. Interpretive material, including cross-section models and audio-visual displays, has been installed at and adjacent to the reactor face.

### ***K-25 Gaseous Diffusion Process Building***

The K-25 Building is an industrial structure located at the East Tennessee Technology Park (ETTP), formerly known as the K-25 Site, on the Oak Ridge Reservation. The Department of Energy's Office of Environmental Management is the landlord for ETTP, which is managed by the Bechtel Jacobs Company LLC. In 1999, the K-25 Building was included in the Department of Energy's list of "Signature Properties of the Manhattan Project." The building is currently being decontaminated and demolished and is not accessible to members of the public.

In March 2005, a Memorandum of Agreement was ratified among the U.S Department of Energy, Oak Ridge Operations Office, the Tennessee State Historic Preservation Office, and the Advisory Council on Historic Preservation regarding site interpretation of the East Tennessee Technology Park. Short-term stipulations in the agreement provided for retention of the north end of the U-shaped K-25 Building (footprint of approximately 135,000 square feet) along with specified original equipment and approximately the upper ten feet of the interior walls of the legs of the “U.” The lower portion of the walls would be planted with grass, and a handrail with lighting would be provided for safety. Visual indicators would be provided at each corner of the structure’s footprint to represent the structure’s original height. The Department of Energy also committed to selecting and preserving for possible future display and interpretation those portions of the “Roosevelt Cell” and associated equipment necessary to illustrate and convey the gaseous diffusion process at K-25.

Several consultation meetings were held in 2007 with various consulting parties, including the City of Oak Ridge, to discuss action items in a Memorandum of Agreement between the two entities regarding ongoing clean up and construction efforts at K-25. The Oak Ridge Heritage and Preservation Association, in partnership with the American Museum of Science and Energy in Oak Ridge, hired consultants to study the north end of K-25 (consisting of approximately 110,000 square feet) and its feasibility of functioning as a museum. While some members of the association believe the entire north end must be preserved or restored, others feel that the building represents only one piece of the Oak Ridge story and that its restoration challenges may be insurmountable.

At a May 2009 K-25 consultation meeting, the DOE Oak Ridge Operations Office stated that while numerous stipulations contained in the March 2005 Memorandum of Agreement were or had been implemented, three significant stipulations had proven impractical. The DOE Oak Ridge Operations Office proposed to eliminate the stipulations related to preserving the north end of the U, retaining approximately the upper 10 feet of the interior walls of the legs, and salvaging the Roosevelt Cell. The DOE Oak Ridge Operations Office proposed to replace these stipulations with new ones defining the Department of Energy’s commitment for K-25 site interpretation and commitment to saving and interpreting a cell facility identical to the Roosevelt Cell but in better condition.

In June 2009, the DOE Oak Ridge Operations Office, by letter, requested comments from signatories and other consulting parties regarding revisions to an amended (or new) Memorandum of Agreement that would codify the elimination of the three stipulations discussed in May 2009. If approved in fall 2009, this would mean that the K-25 building would be demolished in its entirety (down to the slab) over the next several years (demolition of the west leg of the U is already underway).

With the probable demolition of the entire K-25 building, the focus has shifted to mitigation. Ideas put forth range from a freestanding, staffed history center at the K-25 site to a more American Museum of Science and Energy-based strategy to a combination of the two. Other alternatives could emerge as consultation continues.

The Southern Appalachian Railway Museum (SARM) is currently constructing a train museum in the ETTP on lands transferred from Department of Energy to SARM. SARM operates the “Secret City Scenic Excursion Train” that begins at a boarding station –a retired Department of Energy Guard House named “Wheat” in honor of the community that existed at the site prior to World

War II—at ETTP near State Route 58. The train makes a 14-mile round trip extending five miles to the north before returning to the boarding station. No security clearance is required for U.S. citizens to ride the train, but passport and visa information are required for non-U.S. citizens, and persons from countries such as China are prohibited. The train does not stop, and tour participants do not get off the train during trips. The train tour runs seasonally on the first and third weekends of each month from April through October.

A public overlook south of the Oak Ridge Turnpike (SR-58) provides a distant view of the extensive site and displays a photographic montage and timeline of the operations and events associated with the history of K-25.

### ***Y-12 Beta-3 Racetracks***

The Y-12 Beta-3 Racetracks is a historic structure in the currently designated Y-12 National Security Complex, one of three primary industrial complexes on the Oak Ridge Reservation. The National Nuclear Security Administration, a quasi-independent agency within Department of Energy, is the landlord for Y-12, which is managed by B & W Technical Services Y-12, L.L.C. In 1999, the Y-12 Racetracks was included in Department of Energy's list of "Signature Properties of the Manhattan Project." In August 2003, a Programmatic Agreement was ratified among the U.S. Department of Energy, Oak Ridge Operations Office, the National Nuclear Security Administration, the Tennessee State Historic Preservation Office, and the Advisory Council on Historic Preservation for the management, preservation, and interpretation of historic and cultural properties at the Y-12 National Security Complex.

The complex is located in a secure area of the reservation, and public tours are not routinely conducted due to high security and extensive construction activity at the site. However, limited public tours of the Y-12 complex have occurred as part of Oak Ridge's "Secret City" celebration. The Y-12 Complex coordinates tours for displaced residents and their family members to visit cemeteries where their relatives are buried as well as the locations of their former homesteads. Tours are available for specific authorized visitors based on their "need to know."

Department of Energy has constructed a new welcome center for the Y-12 Complex outside of its secured area just off Scarboro Road. The "New Hope Building"—named for a pre-World War II community that existed at the site—provides visitor orientation services.

Some consideration has been given to moving the secured portion of the Y-12 Complex to the west. If such a move took place, public access might be provided to the historic Y-12 Beta-3 Racetracks structure. However, questions remain as to who would operate the building.

### ***Oak Ridge Historic District***

The National Register-listed Oak Ridge Historic District, covering approximately 3,500 acres in the City of Oak Ridge, includes 3,716 contributing historic resources and 1,363 non-contributing resources that are not associated with the Manhattan Project and the Cold War. The historic district includes the area north of the Oak Ridge Turnpike that was designed by Skidmore, Owings, Merrill to house Manhattan Project personnel during World War II. The district's boundary is generally defined on the north by properties along Outer Drive, on the east by properties along East Drive, on the west by properties along Jefferson and Louisiana Avenues, and on the south by properties along or to the north of the Oak Ridge Turnpike. This area best represents the wartime townsite and contains a relatively low number of non-contributing resources, although it also contains the postwar development that occurred while the city was

under Atomic Energy Commission jurisdiction. Contributing resources include various housing types (cemento “alphabet” houses, duplexes, flattops, temporary dwelling units, apartment buildings, and dormitories), schools, churches, and social, public, and commercial buildings. The Oak Ridge townsite’s main commercial area was originally located in Jackson Square, an area consisting of four related buildings of frame construction connected by a covered walkway. Jackson Square continues to serve the city as a major commercial district, and two of its four buildings retain sufficient historic fabric and design to be considered contributing resources. The original Guest House, located adjacent to Jackson Square, is also considered to be a contributing resource, although the structure has been vacant for a lengthy period and is deteriorating. Properties in the district constitute a mix of privately and publicly (local government entities) owned buildings and structures. The resources in the district are accessible via public state, county, and city roads.

### ***Woodland-Scarboro Historic District***

The National Register-listed Woodland-Scarboro Historic District, covering some 700 acres in the City of Oak Ridge, includes 622 contributing buildings and 294 non-contributing buildings that have significant associations with the Cold War. The historic district, located south of the Oak Ridge Turnpike, includes the area that was designed by Skidmore, Owings, and Merrill to house Atomic Energy Commission personnel during the Cold War. The district is generally bounded by Rutgers, Lafayette, Benedict, Wilberforce, and Illinois and includes areas that served as trailer camps and hutments (Woodland for whites; Scarboro for African Americans) for Manhattan Project personnel during World War II. Contributing resources include houses, schools, churches, and public and commercial buildings. Properties in the district constitute a mix of privately and publicly (local government entities) owned buildings and structures. The resources in the district are accessible via public state, county, and city roads.

### ***Individually Listed National Register Properties***

New Bethel Baptist Church  
Luther Brannon House  
J.B. Jones House  
Freels Bend Cabin

These national register-listed Oak Ridge structures, which have historical associations with the Manhattan Project are variously owned and adaptively used. Owned by the Department of Energy, the New Bethel Baptist Church has been renovated for use for occasional gatherings and as an interpretive center commemorating pre-war area residents displaced by the Manhattan Project. The Luther Brannon house is privately owned. In 1975 the J.B. Jones House was acquired from the Department of Energy by the Anderson County Board of Education and is used as a recreational facility for the Daniel Arthur Rehabilitation Center. The Freels Bend Cabin was preserved as a picnic area for Manhattan Project and Atomic Energy Commission employees and continues to serve as a Department of Energy-owned recreation area with limited access.

### ***American Museum of Science and Energy***

The American Museum of Science and Energy is open to the public on a daily year-round basis except for major holidays (admission fee). Department of Energy and the Oak Ridge National Laboratory currently funds the American Museum of Science and Energy in Oak Ridge and are currently looking for a plan to ensure the long-term viability of the museum. The Department of Energy is interested in divesting itself of involvement with the museum, and is considering the transfer of ownership to the American Museum of Science and Energy Foundation.

**Table C: Summary of Ownership of Oak Ridge Sites**

Property	Ownership
American Museum of Science and Energy	Department of Energy
Oak Ridge Attractions	Private
Oak Ridge Heritage and Preservation Association	Private
Individually-Listed National Register Properties New Bethel Baptist Church Luther Brannon House J.B. Jones House Freels Bend Cabin	Private
Woodland-Scarboro Historic District	Private
Oak Ridge Historic District	Private
Y-12 Beta-3 Racetracks	Department of Energy
K-25 Gaseous Diffusion Process Building	Department of Energy
X-10 Graphite Reactor National Historic Landmark	Department of Energy
Oak Ridge National Laboratory Historic District	Department of Energy

## **Dayton**

### ***Unit I – Central Research Department Headquarters***

This structure was demolished in 1980.

### ***Dayton Project Unit III***

Since 1950, Dayton Project Unit III has been owned by the Dayton Board of Education and used as a maintenance facility for the city's school system.

### ***J.K. McIntire Company Building***

The building, which has been vacant and used for storage for some 20 years, is privately owned. During recent years, the current owner has engaged in cleaning up the building and is interested in its preservation and adaptive reuse

### ***Charles A. and Margaret T. Thomas Home***

This is a privately owned residence located south of the Dayton city limits; it is currently occupied.

**Table D: Summary of Ownership of Dayton Sites**

<b>Property</b>	<b>Ownership</b>
Dayton Project Unit III	City of Dayton, Dayton School Board of Education
J.K. McIntire Company Building,	Private
Thomas Home	Private



## **APPENDIX E:**

### **NATIONAL REGISTER OF HISTORIC PLACES CRITERIA OF EVALUATION (36 CFR PART 60)**

### **NATIONAL HISTORIC LANDMARKS CRITERIA FOR EVALUATION (36 CFR PART 65)**

#### **National Register of Historic Places Criteria**

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and...

##### **Criterion A**

...that are associated with events that have made a significant contribution to the broad patterns of our history; or

##### **Criterion B**

...that are associated with the lives of persons significant in our past; or

##### **Criterion C**

...that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

##### **Criterion D**

...that have yielded, or may be likely to yield, information important in prehistory or history.

A property being nominated to the National Register may also merit consideration for potential designation as a National Historic Landmark. Such consideration is dependent upon the stringent application of the following distinct set of criteria.

#### **National Historic Landmarks Criteria**

The quality of national significance is ascribed to districts, sites, buildings, structures, and objects that possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archeology, engineering, and culture and that possess a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association, and:

##### **Criterion 1**

...that are associated with events that have made a significant contribution to, and are identified with, or that outstandingly represent, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained; or

##### **Criterion 2**

...that are associated importantly with the lives of persons nationally significant in the history of the United States; or

##### **Criterion 3**

...that represent some great idea or ideal of the American people; or

**Criterion 4**

...that embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for a study of a period, style or method of construction, or that represent a significant, distinctive and exceptional entity whose components may lack individual distinction; or

**Criterion 5**

...that are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity of exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture; or

**Criterion 6**

...that have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts and ideas to a major degree.

**National Historic Landmark Exclusions**

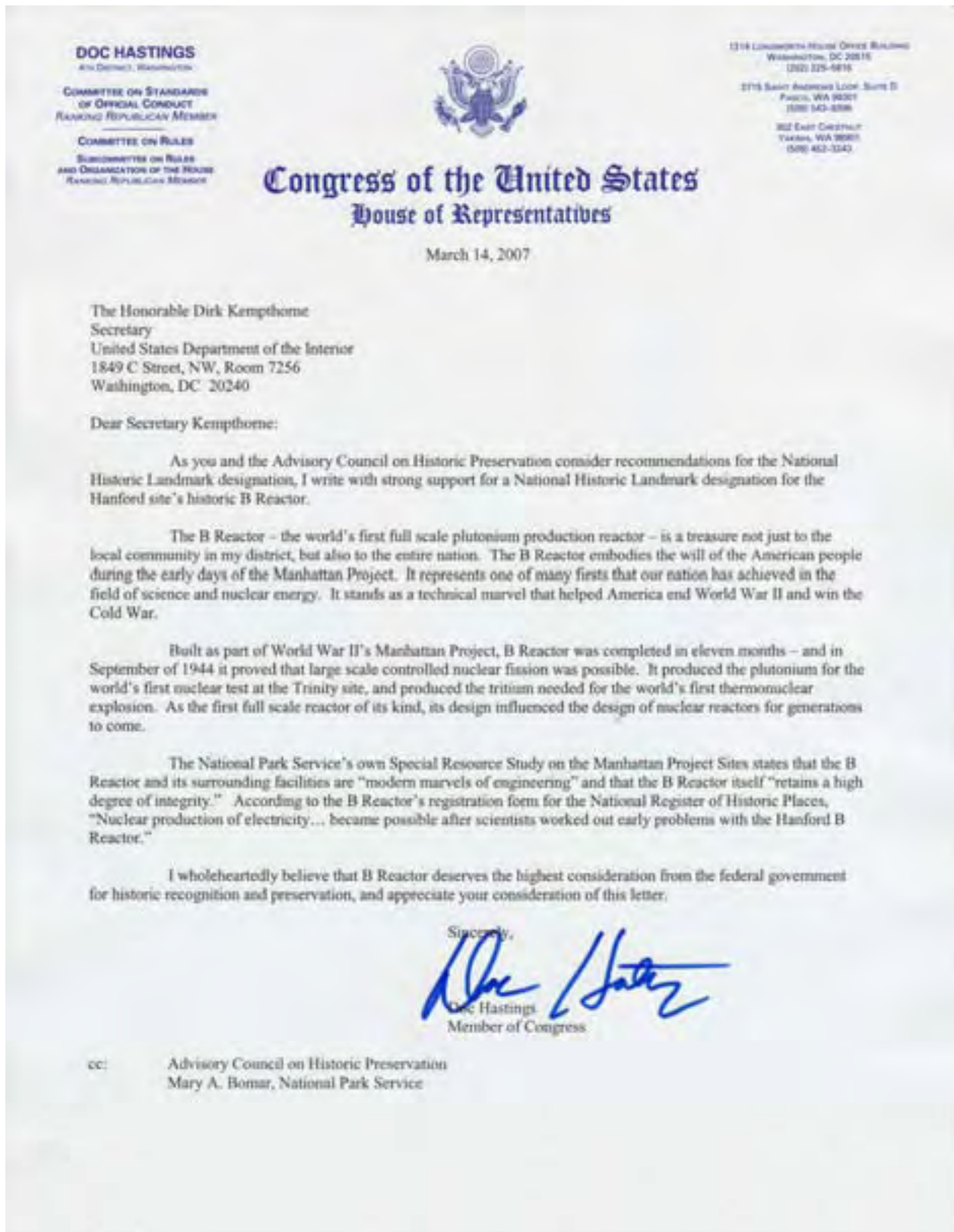
Ordinarily, cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, and properties that have achieved significance within the past fifty years are not eligible for designation. If such properties fall within the following categories they may, nevertheless, be found to qualify:

1. A religious property deriving its primary national significance from architectural or artistic distinction or historical importance; or
2. A building or structure removed from its original location but which is nationally significant primarily for its architectural merit, or for association with persons or events of transcendent importance in the nation's history and the association consequential; or
3. A site of a building or structure no longer standing but the person or event associated with it is of transcendent importance in the nation's history and the association consequential; or
4. A birthplace, grave or burial if it is of a historical figure of transcendent national significance and no other appropriate site, building, or structure directly associated with the productive life of that person exists; or
5. A cemetery that derives its primary national significance from graves of persons of transcendent importance, or from an exceptionally distinctive design or an exceptionally significant event; or
6. A reconstructed building or ensemble of buildings of extraordinary national significance when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other buildings or structures with the same association have survived; or

7. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own national historical significance; or
8. A property achieving national significance within the past 50 years if it is of extraordinary national importance.

## APPENDIX F: RELEVANT CORRESPONDENCE AND NEWS RELEASES





JUN-20-2007 06:49

P.02



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**REGION 10 HANFORD/INL PROJECT OFFICE**  
309 Bradley Boulevard, Suite 115  
Richland, Washington 99352

June 5, 2007

Rory Westberg  
Deputy Regional Director  
National Park Service  
Pacific West Region  
909 First Avenue, Fifth Floor  
Seattle, Washington 98104-1060

Re: Public Safety and Environmental Issues Related to Future B Reactor Use at Hanford (PWR-DRR)

Dear Mr. Westberg:

This letter is in response to your two questions raised in regard to preservation of B Reactor for future public use. In the opinion of the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA), the public, employees, and site volunteers can safely enter the reactor building provided ongoing surveillance and maintenance continues into the future. Hazards associated with the facility were identified and mitigated as part of a removal action under the Superfund law in 2002.

In regard to the potential environmental risks posed by B Reactor in its current configuration versus cocooning the building, the risks to the Hanford Reach and the Columbia River are essentially the same -- as long as the building is appropriately maintained. The majority of the radionuclides are within the reactor core and under both conditions the core remains in place. The main difference between a cocooned reactor and B Reactor is the roof structure. Cocooned reactors have a metal roof with a life expectancy of 75 years. The B Reactor is slated to be reroofed this year with a polyurethane material with a life expectancy of 20 years. As stated previously, ongoing surveillance and maintenance will be required to ensure environmental protection.

In summary, Ecology and EPA believe the B Reactor could be maintained in a safe configuration to allow for future public access. In addition, the reactor could possibly become the centerpiece for long-term institutional memory of the Hanford legacy. We look forward to working with you on the study group and are designating Ron Skinnarland of Ecology ([rski461@ecy.wa.gov](mailto:rski461@ecy.wa.gov), 509/372-7924) and Dennis Faulk of EPA ([faulk.dennis@epa.gov](mailto:faulk.dennis@epa.gov), 509/376-8631) to represent our agencies.

Sincerely,

Handwritten signature of Nicholas Ceto.

Nicholas Ceto, Program Manager  
Hanford Project Office

Handwritten signature of Jane Hedges.

Jane Hedges, Program Manager  
Nuclear and Mixed Waste

cc: Michael Weis, DOE  
Keith Dunbar, NPS



The Deputy Secretary of Energy  
Washington, DC 20585

December 3, 2007

The Honorable Doc Hastings  
U.S. House of Representatives  
Washington, DC 20515

Dear Congressman Hastings:

Thank you for your October 18, 2007, letter urging the Department of Energy (DOE) to prepare a heritage tourism assessment of Hanford's historic B-Reactor. I am pleased to inform you that this assessment is already underway, and I expect a final report from the Department's Office of History and Heritage Resources (OHHR) by March 2008.

The OHHR report, being prepared in coordination with the Richland Operations Office, will evaluate a range of options for B-Reactor and determine the costs, liabilities, and other logistical and institutional issues associated with each option. I expect this report to meet the goals of Executive Order 13287, "Preserve America," which directs Federal agencies to identify assets that could contribute to local economic development and to work with communities to explore partnership and public access opportunities.

As part of the DOE-wide heritage tourism assessment, the OHHR B-Reactor study is being conducted in partnership with the President's Advisory Council on Historic Preservation. The Office of History and Heritage Resources is also working with the National Park Service on the Manhattan Project Special Resource Study. Information derived from the B-Reactor study will support the evaluation of management alternatives being developed by the National Park Service study during FY 2008.

If you or your staff have questions or would like an update on the status of the B-Reactor study, please contact me or Ms. Lisa E. Epifani, Assistant Secretary for Congressional and Intergovernmental Affairs, at (202) 586-5450.

Sincerely,

*Clay Sell*

Clay Sell

*P.S. We will do all we can  
to preserve this national treasure.  
B-Reactor has my personal attention.  
You have my personal commitment.  
ls.*



Printed with soy ink on recycled paper



## Department of Energy

Washington, DC 20585

February 28, 2008

### MEMORANDUM FOR THE DEPUTY SECRETARY

**FROM:**

JAMES A. RISPOLI *JARispoli*  
ASSISTANT SECRETARY FOR  
ENVIRONMENTAL MANAGEMENT

**SUBJECT:**

**ACTION:** Declaration of Departmental Policy  
Regarding the Preservation of the Hanford B Reactor

**ISSUE:** The Department of Energy needs a clear decision path for the future of Hanford's B Reactor, the Manhattan Project facility that made the plutonium for the second of the two atomic bombs that helped end World War II.

The issue has been discussed for years by the Department and others in various contexts without resolution. Recently, serious efforts to evaluate preservation have been undertaken outside of the Department. At the direction of Congress, the Department of the Interior is considering the reactor for both National Historic Landmark status and preservation as a publicly accessible museum or exhibit via a multi-year study by the National Park Service (NPS).

Prolonged indecision is a concern, given the contract implications for Hanford and the ongoing local interest. These and other considerations compel us to seek a clear path forward on this important public issue.

**BACKGROUND:** Hanford's B Reactor was the world's first full-scale nuclear reactor and created the plutonium for both the first atomic test at Trinity and for the bomb dropped on Nagasaki, Japan, that helped end World War II. The B Reactor was a first-of-a-kind facility/device that used some of the twentieth century's newest and most innovative and revolutionary technologies. The development of nuclear weapons—in which the B Reactor played a key role—not only helped end the Second World War but also ushered in the atomic age and determined how the next war—the Cold War—would be fought.

Due to its association with events of national and international significance (the Manhattan Project and the Cold War) and its retention of a high degree of physical integrity, the B Reactor qualifies as a nationally significant property according to the evaluation criteria contained in the National Historic Preservation Act. The B Reactor has been designated one of the Department's Manhattan



Printed with soy ink on recycled paper



Project "Signature Facilities" and within the next several months may be named a National Historic Landmark by the National Park Service.

In accordance with the 2004 Manhattan Project National Historic Park Study Act, the National Park Service is evaluating whether Hanford's B Reactor (along with facilities at Los Alamos and Oak Ridge) should be preserved and made available for public access. Park Service study options range from making the B Reactor a full unit of the National Park Service to recommending that the Department partner with the local community to provide summer public tours. The final report must be approved by both Secretaries of Interior and Energy.

In a separate action, the B Reactor has also been nominated for National Historic Landmark status, and the Landmarks committee in December 2007 responded favorably to the testimony of historians, academics, and U.S. Representative Doc Hastings (R-WA), and submitted a unanimous recommendation in support of the nomination.

Within the Department, the Office of History and Heritage Resources (OHHR) has been directed to put together a report evaluating management options for the B Reactor, including what would be required to make the reactor available for public access. The review will cover the key institutional issues such as legal liability, long term mortgage costs, funding mechanism options, impacts to Hanford's ongoing cleanup, and the nexus between operating the B Reactor as a museum and President Bush's Executive Order on Heritage Tourism (i.e., leveraging this unique government property as an economic resource for the local economy).

**SENSITIVITIES:** None

**POLICY STATEMENT:** While questions remain to be answered regarding the potential for increased public access to the B Reactor, it is imperative that the Department take no actions to *preclude* the preservation of the B Reactor and options for public access.

Therefore, I am today recommending that:

- 1) It become the policy of the Department that the B Reactor will be maintained in a state that preserves its historical significance;
- 2) The Department take immediate steps to assist the Secretary of the Interior in the review of the designation of the B Reactor as a National Historic Landmark to facilitate a decision in the earliest possible timeframe;
- 3) The Office of History and Heritage Resources be directed to complete the Department's study of the Reactor by May 1, 2008;
- 4) The Office of Environmental Management be directed to determine contractual modifications necessary for the B Reactor to be managed as a maintenance rather than a closure facility.

APPENDIXES, SELECTED REFERENCES, AND PREPARERS

This policy is intended to apply only to the Hanford B Reactor. Other Department properties with potential historic value should be evaluated and handled on an individual basis.

APPROVE:

Clay Self .

DISAPPROVE:

DATE:

2-29-2008

For Immediate Release  
March 10, 2008



*Preserving America's Heritage*

Contact: Bruce J. Milhans  
202-606-8513  
bmilhans@achp.gov

## **ACHP Supports Department of Energy Policy Statement on Historic Hanford Nuclear Reactor**

WASHINGTON, DC – The Advisory Council on Historic Preservation (ACHP) today expressed its strong support for the U.S. Department of Energy's (DOE) policy statement on the historic nuclear B Reactor at Hanford, Washington.

"The 105-B Reactor, the world's first full-scale plutonium production reactor, is one of seven federal facilities the Advisory Council on Historic Preservation recommended be preserved and interpreted to present the history of the Manhattan Project and its key role in the victory of the Allies against the forces of fascism and empire in World War II," said John L. Nau, III, ACHP chairman. "The ACHP is very pleased with the issuance of this directive, as well as with the entire Department of Energy effort to create an understanding of the Manhattan Project by working to make the places where history took place accessible to the public."

The reactor was completed in September 1944 and produced plutonium for the Trinity device (the first atomic weapon ever exploded), for the bomb dropped on Nagasaki, Japan, on Aug. 9, 1945, and for Cold War-era weapons until the reactor's closure in 1968. The Manhattan Project was a top-secret, top-priority program to develop atomic weapons before World War II adversaries created similar super weapons. The drama behind development of the program played out at several key sites in the United States that include the University of Chicago, the Oak Ridge Reservation in Tennessee, the Hanford Reservation in Washington, and two sites in New Mexico: the Los Alamos National Laboratory and Trinity Site near Alamogordo.

The DOE desire to preserve key heritage resources and present this history was aided by a panel of experts convened by the ACHP on behalf of DOE. This panel issued a report in February 2001 with recommendations and preservation options for Manhattan Project Signature Facilities at Hanford and Oak Ridge.

The ACHP report noted: "Because of their pivotal role in World War II and the history of science and technology, the Signature Facilities deserve commemoration as national treasures. DOE needs to recognize this and convey to its employees, contractors, and the public that these Signature Facilities are as representative of the paramount events of the 20th Century as the Gettysburg National Military Park and the Golden Spike National Historic Site are of the 19th Century."

DOE's Signature Facilities are those defined as "nationally significant historic properties that best convey and interpret the scale and importance of the Manhattan Project, and provide the core for the Department's ability to successfully interpret, whether in situ or through museum or other interpretive setting, its Manhattan Project mission of developing atomic bombs during World War II."

—more—

ADVISORY COUNCIL ON HISTORIC PRESERVATION  
1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004  
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

In 2006 DOE and the ACHP entered into a formal interagency partnership whereby the ACHP is assisting DOE to assess the heritage tourism potential of its Signature Facilities.

The National Park Service, U.S. Department of the Interior, is now in the process of developing a separate report to Congress (due spring 2009) on the feasibility of including certain Manhattan Project sites into a "Manhattan Project National Historical Park." Reactor 105-B is one of the sites under consideration for inclusion.

—end—

**NOTE:** The legislation directing the preparation of the special resource study of the Manhattan Project called for the study to be prepared in consultation with the Department of Energy (DOE). The Department of Energy has been an active partner with the National Park Service in the preparation of the special resource study. Department of Energy staff helped develop the alternatives, participated in meetings, and provided information, input, and comments as needed.

In May 2008, the DOE planning team members submitted comments on the initial NPS internal review draft of the special resource study/environmental assessment. In June 2009, the DOE planning team members submitted additional comments on the second internal review draft.

Those draft comments are included here to give a sense of the DOE planning team's issues and concerns regarding the document; however, it must be stressed that these comments are draft.

**DRAFT   DRAFT   DRAFT**

**May 2008  
Review of Draft MAPR SRS/EA**

Office of History and Heritage Resources  
U.S. Department of Energy

The Manhattan Project National Park Study Act, Public Law 108-340, directed the Secretary of the Interior, in consultation with the Secretary of Energy, to conduct a special resource study to determine the feasibility of designating one or more Manhattan Project sites as a unit of the National Park Service (NPS). The Department of Energy's (DOE) Deputy Secretary directed the Office of History and Heritage Resources (OHHR) to represent the Department in this process. OHHR has taken this mandate seriously and has been an active partner with NPS in the preparation of the special resource study, participating in meetings and providing information, input, and comments as needed.

The draft MAPR SRS/EA overall reflects the time, effort, and dedication that the NPS team has devoted to the study. Parts One and Two and the first two sections of Part Three—Evaluation of Significance and Evaluation of Suitability—ably describe the background and the sites and rightly highlight the significance of the Manhattan Project story. The draft study, in two separate places (p. 10 and p. 30), quotes a panel of experts convened by the Advisory Council on Historic Preservation to the effect that the development and use of the atomic bomb was “the single most significant event of the 20<sup>th</sup> century.” The draft study concludes that the Manhattan Project sites 1) “meet all four of the national park system criteria, and three of six national historic landmark criteria” in terms of significance and 2) “meet the National Park Service's established suitability criteria for consideration as a new unit of the national park system.”

Given these favorable evaluations, the third section of Part Three—Evaluation of Feasibility—is surprisingly negative. The draft study lists a variety of factors of “concern” to NPS that, taken together, discount the feasibility of any of the Manhattan Project sites becoming some sort of unit

**DRAFT   DRAFT   DRAFT**

DRAFT DRAFT DRAFT

within the national park system. When the concerns are looked at individually, however, none of them appear to be overwhelming and some do not accurately evaluate the potential problem:

**Boundary Configurations:** The draft study states that designating park boundaries would be “problematic” because the boundaries are not necessarily readily discernible and DOE would not necessarily agree. OHHR questions the basis on which this determination was made. NPS has not asked DOE as part of the study to consider possible boundaries. In fact, DOE has been examining boundary issues at all three sites. At Hanford, boundaries are being reconsidered around the B Reactor because recent discussions have focused on upgrading the road and creating a corridor from B Reactor west to the public rest area on the highway. At Oak Ridge, a recent map in a proposal to reconfigure the Y-12 facility places the “historical buildings”—including the Beta-3 Racetracks—outside the boundaries of the high-level security perimeter. At Los Alamos, discussions have been ongoing for years about the possibility of moving the security fence at the Gun Site and allowing for public access. As for the NPS’s regional administrative issues, it is hard to make a case that internal organizational challenges should have a bearing on feasibility.

**Current and Potential Uses of the Study Area and Access:** Public access to DOE’s Manhattan Project sites admittedly is a concern. DOE, as noted above with the boundary issue, currently is reviewing the issue of making facilities more accessible due to their historical significance. Working with the NPS and Congress, DOE believes that boundary issues can be resolved.

**Landownership Patterns:** The core properties at the three DOE sites are under DOE jurisdiction. DOE owns them. Exclusion of all privately owned properties, in a worst case scenario, would neither measurably diminish the significance of the DOE facilities nor exclude the core historic facilities themselves being designated as possible Park Service units.

**Levels of Local and General Public Support:** The draft study states that DOE did not “officially indicate” that it would support the establishment of a NPS unit and it would therefore be “inappropriate” for NPS to propose that these sites be designated a NPS unit. During the course of the study, DOE has never been asked “officially” if it would support a NPS unit, but OHHR consistently has indicated to the NPS its strong preference for the “biggest arrowhead” possible if the Manhattan Project sites are to be preserved. DOE has fully cooperated with the intent of the Manhattan Project National Park Study Act to determine the feasibility of designating one or more Manhattan Project sites as a unit of the Park Service. If designation is determined to be feasible and Congress determines that a Park Service unit should be created, DOE would fully cooperate with that determination.

**Existing Degradation of Resources:** The draft study states that there are enough resources in reasonably good condition and “this element of feasibility is not applicable. “ After saying this, OHHR questions the reasoning behind the study’s claim that the “establishment and operation of such an NPS unit would not be feasible due to . . . quality of some resources on the sites, which would not satisfy expectations for an NPS unit.”

DRAFT DRAFT DRAFT

DRAFT DRAFT DRAFT

**Costs and Staffing Requirements:** The draft study states that an NPS unit would not be feasible due to “potentially very high costs to manage and administer the unit.” Yet no cost estimates are given, and the study only asserts that “taking into account the potential safety and security measures not employed in typical NPS units, it is likely that the overall annual operating cost for a Manhattan Project NPS unit would likely exceed that of many traditional large parks.” This assertion, however, is insupportable as the study also assumes that safety, security, and maintenance will be DOE’s ongoing responsibility. Given these DOE responsibilities for ensuring the safety, security, and upkeep of these historic facilities, responsibilities that cannot be delegated to another party, it becomes probable that the annual operating cost for the NPS would be less, likely significantly less, than that of many traditional large parks.

This negative approach to feasibility is disappointing and, given the facts, not persuasive to DOE.

The feasibility concerns, when combined with the unconvincing “Reason for Dismissal” in Part Four in the section on Management Alternatives No Longer Under Consideration, portray the process, the National Park Service, and, by association and implication, the Department of Energy in a less-than-favorable light. In the “Reason for Dismissal,” the study emphasizes that the team and NPS managers have concerns that DOE might not be a reliable and trustworthy long-term partner. This position is difficult to maintain when, by law, DOE must continue to be responsible for ownership, maintenance, security, and safety issues. In this section, questionable assumptions presented earlier are used again as the study notes that “there is still a concern regarding the potentially large financial liability the National Park Service might assume for the cleanup and maintenance of the sites.” DOE is and always will be responsible for addressing these issues. Similarly, on safety, the draft report states that “there are still concerns regarding who would pay what costs and whether the National Park Service could find itself in a position where it would need to make a judgment over safety issues arising from the proximity of visitors and employees to radioactive materials.” To restate, DOE has long-term legal responsibilities for all three Manhattan Project sites. DOE takes these responsibilities very seriously and has neither intent nor ability to evade its responsibilities in areas where the federal government is legally liable.

The study also notes, as a “Reason for Dismissal,” that it “is unlikely that sufficient funds would be available for the National Park Service to manage and administer the park.” No estimates of funding needs are given, but, even if they were, a declaration on the likelihood of Congress providing adequate funding is beyond the scope and determination of this study. Including as a reason for dismissal a prediction that sufficient funding would not be provided by Congress is not relevant to an analysis of feasibility.

OHHR has assumed from the beginning of the process that a full consideration of the NPS unit alternative is the central focus for the study. OHHR, as noted, has pushed for the biggest arrowhead, the biggest NPS endorsement, possible. Given NPS’s deserved reputation for preserving and showcasing the nation’s premier cultural and natural assets, this endorsement provides the greatest chance of success for preserving these assets, promoting heritage tourism, and bringing DOE on board as a preservation partner. NPS’s dismissal of the park service unit alternative sends a strong message that could lead to the conclusion that if NPS does not consider the Manhattan Project properties worthy of preservation at the highest level, neither should DOE.

DRAFT DRAFT DRAFT

DRAFT   DRAFT   DRAFT

OHHR recommends that Part Three—Evaluation of Feasibility—be rewritten and that the NPS unit alternative be reinstated. Absent additional factors not included in the study, the alternative would appear to be feasible. The evaluation should state this, but include as well a full analysis of the challenges, both administrative and financial, in addition to a thorough evaluation of the unique opportunities presented. OHHR firmly believes that a Manhattan Project National Park, with its NPS, DOE, and stakeholder partnership, could serve as a model for the preservation of the nation's most significant cultural assets in an era of scarce resources.

Dr. F. G. Gosling  
Federal Preservation Officer and Chief Historian  
U.S. Department of Energy  
Office of the Executive Secretariat  
Washington, DC

DRAFT   DRAFT   DRAFT



**DRAFT   DRAFT   DRAFT**

**Review of June 2009 Draft MAPR SRS/EA**

Office of History and Heritage Resources  
U.S. Department of Energy

The Manhattan Project National Park Study Act, Public Law 108-340, directed the Secretary of the Interior, in consultation with the Secretary of Energy, to conduct a special resource study to determine the feasibility of designating one or more Manhattan Project sites as a unit of the National Park Service (NPS). The Department of Energy's (DOE) Deputy Secretary directed the Office of History and Heritage Resources (DOE/OHHR) to represent the Department in this process. DOE/OHHR has taken this mandate seriously and has been an active partner with NPS in the preparation of the special resource study, participating in meetings and providing information, input, and comments as needed.

This review is a follow-up and supplement to DOE/OHHR's May 2008 review of the 2008 Draft MAPR SRS/EA.

DOE/OHHR is pleased to see the inclusion of Alternative E: Manhattan Project National Historical Park in the study and the selection of Alternative E as the best and preferred option. DOE/OHHR concurs with the study's findings, contrary to those of the 2008 Draft MAPR SRS/EA, that a Manhattan Project National Historical Park is feasible. In this sense, the 2009 Draft MAPR SRS/EA is a clear and marked improvement over the 2008 draft.

Two issues nonetheless remain of concern: 1) exclusion of the Oak Ridge and Hanford sites from the Alternative E: Manhattan Project National Historical Park, and 2) proposed boundaries that appear to place the most significant historic assets, those owned by DOE, outside of the proposed park unit.

Los Alamos, Oak Ridge, and Hanford should be considered and treated as co-equals. Manhattan Project activities came together at Los Alamos, which has perhaps the greatest public name recognition, but Oak Ridge and Hanford are equally significant and indispensable, both in the development and deployment of the atomic bomb and for a balanced public interpretation of the Manhattan Project. Both Oak Ridge and Hanford have first-of-a-kind or one-of-a-kind facilities and devices that used some of the century's most innovative and revolutionary technologies and remain in essentially the same condition as they did during the Manhattan Project. At Oak Ridge, the Y-12 Beta-3 racetracks are the only surviving production equipment from the electromagnetic isotope separations process that produced the bulk of the uranium-235 for the Hiroshima weapon. At Hanford, the B Reactor was the world's first large-scale plutonium production reactor and produced plutonium for the Trinity device and the Nagasaki weapon. Both sites have strong community support for preservation and interpretation of the local Manhattan Project heritage. At both sites, public tours of Manhattan Project assets are ongoing.

DOE/OHHR is aware that costs involved in operating a Manhattan Project National Historical Park are of major concern. The 2009 Draft MAPR SRS/EA continues to assert that a new national park unit for the three primary Manhattan Project sites "would likely be very expensive." As with the 2008 draft, DOE/OHHR believes that the annual operating costs for NPS would be less, likely significantly less, than that of many traditional parks. The 2009 draft contends that for Alternative E at Los Alamos costs would not be expected to be prohibitive because a relatively

**DRAFT   DRAFT   DRAFT**

DRAFT DRAFT DRAFT

small NPS staff would be needed to administer and operate the park, proximity of Bandelier would allow for efficiencies of administration and operations, and local partners and volunteers would be relied on to assist in serving the public. These same conditions would apply to Oak Ridge and Hanford, with the possible exception of the proximity of shared NPS personnel, and even here it is conceivable that Hanford could share NPS staff with the new Ice Age Floods National Geologic Trail. In addition, DOE/OHHR continues to favor location of the park headquarters at Oak Ridge (the Manhattan Project was managed from Oak Ridge; in addition, roughly 60% of the Project's budget was spent on facilities at Oak Ridge), which might warrant it a more robust ranger presence. In any event, costs for operating park units at all three sites need not be large. (See attached outline prepared by DOE/OHHR in 2008 of a possible three-site Manhattan Project National Historical Park.)

Linked to the exclusion of Oak Ridge and Hanford is the apparent disinclination to include DOE-owned assets in the proposed park unit at Los Alamos. Although the "exact size and boundary of the NPS site is not known," the draft study indicates that the park unit would either be identical with the Los Alamos Scientific Laboratory National Historic Landmark or contain selected historic properties within the landmark. This would include "one or more of the 'Washtub Row' properties of the Ranch School including the Oppenheimer House along with the Fuller Lodge building." None of the five DOE-owned historic properties cited for inclusion in the "Project Y" Manhattan Project National Historic Landmark District proposed in the Los Alamos Cultural Resources Management Plan (2006) would be part of the park unit. The five properties, which combined cover only about ten acres, are the V-Site, the Gun Site, the concrete bowl, the Fat Man Quonset hut, and the Slotin building.

DOE/OHHR has no objection to including the Oppenheimer house and Fuller Lodge in the proposed park unit. How scientists lived and where they met and socialized is an important part of the Los Alamos story. As such, these properties warrant park service recognition and protection. The more significant story, however, is the work that was done at Los Alamos. The five DOE properties are the surviving remnants of the nation's most well-known and oft-cited scientific research and development effort. At the Gun Site, scientists performed ballistic tests for the gun method, which brought two subcritical masses of fissionable material together at high speed to form a supercritical mass. At the V-Site, scientists assembled the plutonium device that was tested at the Trinity site. These historic properties also warrant park service recognition and protection.

Similarly, a Manhattan Project National Historical Park should at a minimum include the major DOE-owned historic assets at all three sites, including the X-10 Graphite Reactor and the Y-12 Beta-3 Racetracks at Oak Ridge and the B Reactor at Hanford. These are undoubtedly the "crown jewels" of the Manhattan Project historic assets. They should be recognized as such and accordingly be brought under the protection of the NPS arrowhead. The Graphite Reactor and the B Reactor are the first research and production reactors in the world, and the Beta-3s are the only surviving machines of their kind. These are the assets that actually produced the "special material" that made the atomic bomb—and the atomic age—possible. Given their centrality to what a panel of experts convened by the Advisory Council on Historic Preservation called "the single most significant event of the 20<sup>th</sup> century," the park service should be telling their story, not DOE.

DRAFT DRAFT DRAFT

DRAFT DRAFT DRAFT

DOE/OHHR is aware that managing a park unit containing DOE-owned assets presents unique challenges not only for NPS but also for DOE. Some assets—those free of all environmental and other liabilities and outside of the current security fence—could be turned over to the park

service. Most assets, including the reactors, separation facilities, and majority of Los Alamos properties, would remain DOE owned. DOE would continue to be responsible for maintenance, safety, and security at all DOE-owned facilities and sites. As DOE/OHHR pointed out in its response to the 2008 draft, DOE has long-term legal responsibilities for all three Manhattan Project sites. These responsibilities cannot be delegated to another party. DOE takes these responsibilities very seriously and has neither intent nor ability to evade its responsibilities in areas where the federal government is legally liable.

DOE/OHHR recommends that Alternative E: Manhattan Project National Historical Park be rewritten to include Oak Ridge and Hanford and the DOE-owned historic assets at Los Alamos as part of the park unit.

### Manhattan Project National Historical Park

#### Salient characteristics:

- Full NPS park service unit, with DOE and local communities as junior partners
- Three sites: Oak Ridge, Hanford, and Los Alamos, with Oak Ridge as headquarters
- NPS presence at kiosk at local museum or at NPS-owned historic asset, with at least nominal NPS presence at each site
- NPS brochure and other applicable publications and NPS website

#### Responsibilities:

- Administration and Interpretation: NPS park superintendent would be in charge of overall interpretation, design and location of exhibits in facilities and NPS kiosks, communications (brochures, etc.), assignment of NPS personnel; DOE and local communities would assist in these activities as needed at NPS request; DOE and local communities would be responsible for interpretation and exhibits at local museums
- Ownership: DOE would continue to own all facilities and sites that have ongoing safety and/or security issues; buildings and sites free of any restrictions could be turned over to NPS; local museums and non-DOE owned buildings and sites would not change ownership
- Operation and Maintenance: DOE would be responsible for maintenance, safety, and security at all DOE-owned facilities and sites; if any non-restricted DOE properties are turned over to NPS, an interagency agreement could be worked out for operation and

DRAFT DRAFT DRAFT

DRAFT.....DRAFT.....DRAFT

- maintenance; nominal NPS interpretive presence at all three sites; most interpretive and desk duties performed by local community workers and volunteers
- Staffing: NPS nominal presence at each site, maybe additional seasonal rangers; local communities—workers and volunteers—would provide most of the site staffing (maybe
- wearing a NPS hat with logo but no uniforms) and do tours (where applicable with DOE support)
- Funding and Budget: NPS responsible for NPS staffing, kiosks, possible NPS-owned properties, and design and interpretive work; DOE responsible for overall operation and maintenance of DOE-owned properties; local communities responsible for local-owned properties and volunteer workers

Dr. F. G. Gosling  
Federal Preservation Officer and Chief Historian  
U.S. Department of Energy  
Office of the Executive Secretariat  
Washington, DC

DRAFT    DRAFT    DRAFT

# **APPENDIX G: NATIONAL PARK SERVICE INTERPRETIVE THEMES AND THEME SUB-TOPICS IN REVISION OF THE NATIONAL PARK SERVICE'S THEMATIC FRAMEWORK, 1996**

## **Theme I. Peopling Places**

1. Family and the life cycle
2. Health, nutrition, and disease
3. Migration from outside and within
4. Community and neighborhood
5. Ethnic homelands
6. Encounters, conflicts, and colonization

## **Theme II. Creating Social Institutions and Movements**

1. Clubs and organizations
2. Reform movements
3. Religious institutions
4. Recreational activities

## **Theme III. Expressing Cultural Values**

1. Educational and intellectual currents
2. Visual and performing arts
3. Literature
4. Mass media
5. Architecture, landscape architecture, and urban design
6. Popular and traditional culture

## **Theme IV. Shaping the Political Landscape**

1. Parties, protests, and movements
2. Governmental institutions
3. Military institutions and activities
4. Political ideas, cultures, and theories

## **Theme V. Developing the American Economy**

1. Extraction and production
2. Distribution and consumption
3. Transportation and communication
4. Workers and work culture
5. Labor organizations and protests
6. Exchange and trade
7. Governmental policies and practices
8. Economic theory

**Theme VI. Expanding Science and Technology**

1. Experimentation and invention
2. Technological applications
3. Scientific thought and theory
4. Effects on lifestyle and health

**Theme VII. Transforming the Environment**

1. Manipulating the environment and its resources
2. Adverse consequences and stresses on the environment
3. Protecting and preserving the environment

**Theme VIII. Changing Role of the United States in the World Community**

1. International relations
2. Commerce
3. Expansionism and imperialism
4. Immigration and emigration policies

## **APPENDIX H: UNITS IN THE NATIONAL PARK SYSTEM THAT ARE ASSOCIATED WITH WORLD WAR II THEMES**

The sites listed here have World War II as a major component of their interpretive story and resource management concerns. Additional NPS sites, not listed, contain resources related to World War II.

### **National Park Service Units**

Boston National Historical Park, Boston, Massachusetts  
Eisenhower National Historic Site, Gettysburg, Pennsylvania  
Fort Moultrie National Monument (Fort Sumter National Monument), Sullivan's Island, South Carolina  
Fort Point National Historic Site, San Francisco, California  
Golden Gate National Recreation Area, San Francisco, California  
Gulf Islands National Seashore, Ocean Springs, Mississippi  
Harry S Truman National Historic Site, Independence, Missouri  
Home of Franklin D. Roosevelt National Historic Site, Hyde Park, New York  
Manzanar National Historic Site, Independence, California  
Minidoka Interment National Monument, Hagerman, Idaho  
Rosie the Riveter/World War II Home Front National Historical Park, Richmond, California  
Tuskegee Airmen National Historic Site (c/o Tuskegee Institute National Historic Site), Tuskegee Institute, Alabama  
USS *Arizona* Memorial, Honolulu, Hawaii  
War in the Pacific National Historical Park, Piti, Guam

### **Affiliated Areas**

Aleutian World War II National Historic Area, Unalaska, Alaska  
American Memorial Park, Saipan, Commonwealth of Northern Mariana Islands  
Port Chicago Naval Magazine National Memorial, Danville, California

## **APPENDIX I: MANHATTAN PROJECT RELATED SITES**

Though it involved over thirty different research and production sites, the Manhattan Project was largely carried out at three secret scientific cities: Los Alamos, New Mexico; Oak Ridge, Tennessee; and Richland, Washington. The Tennessee site was chosen because of the vast quantities of cheap hydroelectric power already available there (due to the Tennessee Valley Authority) and necessary to produce uranium-235 in giant ion separation magnets. The Hanford site near Richland, Washington, was chosen for its location near the Columbia River, a river that could supply water to cool the reactors that would produce the plutonium. All the sites were suitably far from coastlines and therefore less vulnerable to possible enemy attack from Germany or Japan. The Los Alamos National Laboratory was built on a mesa that previously hosted the Los Alamos Ranch School. The site was chosen primarily for its remoteness.

### **Manhattan Project Principal and Associated Sites**

Oak Ridge, Tennessee: Clinton Engineer Works (Site X – Manhattan District Headquarters [from the summer of 1943])

- X-10 Graphite Reactor, (a Manhattan Project Signature Facility<sup>2</sup>) - The X-10
- K-25 Gaseous Diffusion Process Building (a Manhattan Project Signature Facility)
- Y-12 Beta-3 Racetracks (a Manhattan Project Signature Facility)
- S-50 Thermal Diffusion Plant

Hanford, Washington (Site W)

- B Reactor (a Manhattan Project Signature Facility)
- Chemical Separations Building (T Plant)(a Manhattan Project Signature Facility)
- 305 Test Pile –
- Plutonium Production Reactors
- "Queen Marys" Chemical Separation Buildings –
- Richland, Washington

---

<sup>2</sup> Signature Facilities" were approved by the Department of Energy's (DOE) Departmental Corporate Board on Historic Preservation in December 1999. Taken together, the eight Signature Facilities provide the core for DOE's ability to successfully interpret, whether in situ or through museum or other interpretive setting, the Manhattan Project mission of developing atomic bombs during World War II. These Signature Facilities do not preclude protection and preservation of other historic facilities in the various nuclear weapons complexes. Just as these facilities constitute the core for DOE-wide preservation, access, and interpretation, other sites may have site-specific Signature Facilities that best interpret that site's Manhattan Project mission from a local, state, regional, national, or international perspective.



Los Alamos, New Mexico (Site Y – Los Alamos Laboratory)

- V-Site Assembly Building, Los Alamos (a Manhattan Project Signature Facility)
- DP Plutonium Processing Site
- S-Site Implosion Facility
- "Tech Area"
- Los Alamos: The Town
- Los Alamos Boys Ranch School
- The Setting: The Pajarito Plateau
- Metallurgical Laboratory (Met Lab), University of Chicago, Illinois (Chemistry Building and CP-1 – Chicago Pile #1 – site) (a Manhattan Project Signature Facility)
  - CP-2 and CP-3
  - "Instrument Shop"

Trinity Site, Alamogordo, New Mexico (a Manhattan Project Signature Facility) – Project Trinity

Dayton, Ohio – the Dayton Project

- J. L. McIntire Company Building
- Unit III, former Bonebrake Theological Seminary Site

Tower 270, Manhattan, New York (also known as 270 Broadway, Arthur Levitt State Office Building, and 86 Chambers Street) the building's location gave its name to the Manhattan Project.

- other sites in Manhattan, including the New York Friars' Club Building

University of California, Berkeley (Radiation Laboratory)

Washington, D.C. – various sites related to policy and events important to the story of the Manhattan Project

Columbia University, New York

Project Ames – Ames, Iowa

Rochester Health Project – University of Rochester

Project Camel – Inyokern, California

Uravan, Colorado (Vanadium Corporation)

Monticello, Utah (Vanadium Corporation)

Sylacauga, Alabama – Alabama Ordnance Works

Enola Gay Hangar, Wendover Airfield, Utah – Project Alberta

Smithsonian – National Air and Space Museum, Washington, D.C. - Steven F. Udvar-Hazy Center  
(exhibits the Enola Gay)

National Museum of the United States Air Force, Dayton, Ohio (exhibits the Bockscar)

Tinian, Northern Marianas Islands

Chalk River, Ontario, Canada

McGill University, Montreal, Canada

Trail, British Columbia, Canada

City of Hiroshima, Japan

City of Nagasaki, Japan

Other sites related to the development of nuclear physics (U.S. and international)

## **APPENDIX J: CRITERIA AND EVALUATION ASSOCIATED WITH ALTERNATIVE D: AN AREA AFFILIATED WITH THE NATIONAL PARK SYSTEM**

In cases where a study area's resources meet criteria for national significance but do not meet other criteria for inclusion in the national park system, the National Park Service may instead recommend an alternative status, such as affiliated area. Affiliated areas are nationally significant areas not owned or administered by the National Park Service, but which draw on technical or financial assistance from the Park Service. According to *NPS Management Policies 2006*, to be eligible for affiliated area status, an area's resources must meet the following criteria:

- meet the same standards for national significance that apply to units of the national park system
- require some special recognition or technical assistance beyond what is available through existing NPS programs
- be managed in accordance with the policies and standards that apply to units of the national park system
- be assured of sustained resource protection, as documented in a formal agreement between the National Park Service and the nonfederal management entity

Although it is not feasible for the National Park Service to own or manage the DOE properties at Oak Ridge, Los Alamos, or Hanford, these sites do meet the criteria, individually and collectively, to be an affiliated area of the national park system, as described as follows:

### **(1) Meet standards of national significance.**

Numerous historical Manhattan Project facilities at Oak Ridge, Los Alamos, and Hanford are nationally significant. In Oak Ridge, these include the X-10 Graphite Reactor National Historic Landmark, the K-25 Gaseous Diffusion Process Building, the Y-12 Beta-3 Racetracks, and the Oak Ridge National Laboratory National Historic District. In Los Alamos, nationally significant resources include the Los Alamos Scientific Laboratory National Historic Landmark, the Trinity Test V-Site, the "Little Boy" Gun Site, the "Fat Man" Quonset Hut, the Plutonium Recovery Concrete Bowl, and the Criticality Accident Laboratory and Staging Area (Slotin Building). In Hanford, nationally significant resources include the recently approved B Reactor National Historic Landmark and the T-Plant Chemical Separation Building.

### **(2) Require special recognition or technical assistance beyond what is available through existing NPS programs.**

National Park Service knowledge and expertise in interpretation and education is required to assist in the overall public understanding and appreciation of the Manhattan Project story. This would include assistance in the development of a long-range interpretation plan for the National Historic Sites and assistance in securing the necessary funding from Congress for the planning, design, development, and installation of interpretive media at sites related to the Manhattan Project, along with the funding necessary for the development and execution of interpretive programs at the sites.

Currently there are no national park units or other public sites that tell the story of the Manhattan Project or specifically protect historic resources related to the Manhattan Project. Designation by Congress as an affiliated area would enable the National Park Service to provide additional recognition and technical assistance to the sites and would provide the opportunity to expand and broaden the interpretive themes of the Manhattan Project for public education and appreciation.

In addition to technical assistance, affiliated area designation would provide additional benefits through a long-term partnership between the Department of Energy and the National Park Service and local partners, along with formal recognition of the historic Manhattan Project sites. The recognition associated with affiliated area designation would provide greater opportunities for the Department of Energy and private sector partners to leverage necessary funds from both public and private sector sources for operation, rehabilitation, or restoration of the historic structures associated with the project.

**(3) Management in accordance with the policies and standards that apply to units of the national park system.**

Areas that are recognized and identified as affiliated units of the national park system, must meet certain basic standards. For example, the preservation of aspects of the national historic landmark districts in Oak Ridge and Los Alamos would be required to meet the secretary of the interior's standards for historic preservation and the mandates of the National Historic Preservation Act of 1966.

An agreement between the Department of Energy and its partners and the National Park Service would need to be developed to address policies on other operational issues such as accessibility for disabled visitors; content and scope of interpretive programs; agreements with local nonprofit organizations regarding standards for the conduct of visitor interpretation and education programs and public tours; any potential use of concession operations, fees, fiscal controls; and other areas of possible concern. Prior to congressional designation as an affiliated area, further discussion with the Department of Energy would be necessary to ensure that DOE management standards and procedures for park management are acceptable to the National Park Service and that the Department of Energy is willing and able to carry them out.

**(4) Assurance of sustained resource protection, as documented in a formal agreement between the Department of Energy and the Manhattan Project National Historic Sites Preservation Board.**

Ownership and management responsibility would remain with existing entities under the affiliated areas concept. The Department of Energy would manage and operate those federal lands and facilities assigned their responsibility at Oak Ridge, Los Alamos, and Hanford. The Department of Energy would be responsible for the protection of these historic resources entrusted in their care and for complying with all applicable laws, regulations, and policies related to historic preservation.

If these DOE-managed historic Signature Properties at Oak Ridge, Los Alamos, and Hanford are designated as National Historic Sites and are designated by Congress as affiliated areas of the national park system, the National Park Service would be in a position to provide technical assistance and advocacy for the preservation of historic Manhattan Project resources entrusted in

the care of the Department of Energy. The DOE commitment to sustained resource protection would be included in a formal agreement following the establishment of the Manhattan Project National Historic Sites by Congress.

**Summary.** The DOE-managed Manhattan Project Signature Facilities and other nationally significant resources at Oak Ridge, Los Alamos, and Hanford meet the criteria for recognition as an affiliated area of the national park system. Affiliated area designation would provide the Department of Energy with increased technical assistance from the National Park Service in helping to interpret and protect the resources as they relate to the cultural heritage themes expressed in units of the national park system. In the long term, affiliated area designation could provide greater opportunities to leverage public and private funding through partnerships. National park system affiliated area status could provide greater recognition to the Manhattan Project sites that are outside of federal ownership, and would enhance the overall feasibility of managing these historic properties on a sustained basis and for public access and appreciation. Further detailed discussion and formal agreements between the Department of Energy and the National Park Service should occur prior to designation as an affiliated area to ensure that management standards and procedures for park management are acceptable to the both parties.

## **APPENDIX K: COST ESTIMATING DETAILS**

### **Alternative B**

The initial consortium coordination and meeting costs were estimated at one FTE (full-time equivalent) for one year: a GS 12, step 5, plus 30% benefits (\$84,500) and \$5,000 for travel. (Rounded to \$100,000.)

A management plan could be a first step in planning the consortium's actions. This plan would be funded by partners. The cost estimate was based on management plan costs for national heritage areas:

- For Crossroads of the American Revolution National Heritage Area in New Jersey, the federal government is estimated to spend \$300,000 for the development of a heritage area management plan over three years.
- The Housatonic National Heritage Area management plan is estimated to cost between \$80,000 and \$120,000. Hundreds of hours will also likely be voluntarily given towards the effort, as well as agency consultation (paid by individual agencies). This includes public meetings, data gathering, writing, and printing.

### **Alternative C**

The cost for the required feasibility study was estimated at \$100,000 based on the following:

- The Golden Spike Feasibility Study cost \$80,000, but was completed early because it was determined not feasible to be a national heritage area.
- The National Heritage Areas Partnership Act limits the amount of federal funding for feasibility studies to \$250,000 per study.

Technical assistance was not estimated because it can be paid for by national heritage area federal funding.

The management plan estimate is the same as for alternative B.

### **Alternative D**

Technical assistance was estimated at \$190,000 per year based on one GS-9, step 5, interpreter and one GS-12, step 5, historical architect, plus 30% benefits.

### **Alternative E**

Comparative costs were derived from National Park Service yearly budget figures for 2006. An additional \$300,000 was added to accommodate the cost of administering the formal agreements with the associated sites.

The grant amount is based on existing NPS preservation grant programs.

## SELECTED REFERENCES

### General

Atomic Energy Foundation

- 2004 *Preserving the Remains of the Manhattan Project: A Report for the U.S. Department of Energy/National Nuclear Security Administration.*

Bureau of Economic Analysis, Department of Commerce

- 2005 *Personal income by major source and earnings by NAICS industry.*  
<http://www.bea.gov/bea/regional/reis/> (accessed April 14, 2008).

Campbell, Richard H.

- 2005 *The Silverplate Bombers: A History and Registry of the Enola Gay and Other B-29s Configured to Carry Atomic Bombs.* Jefferson: McFarland & Company.

Department of Energy's Corporate Board on Historic Preservation

- 2001 *Recommendations and Preservation Options for Manhattan Project Signature Facilities at Oak Ridge and Hanford Reservations.* Prepared by a panel of experts convened by the Advisory Council on Historic Preservation.

Groves, Leslie R.

- 1962 *Now It Can Be Told: The Story of the Manhattan Project.* New York: Harper & Brothers.

Harlow, Russ. W.

- 1990 *Project Alberta: The Preparation of Atomic Bombs for Use in World War II.* Auckland: Exceptional Books, Ltd.

Maroncelli, James M., and Timothy L. Karpin

- 2002 *The Traveler's Guide to Nuclear Weapons: A Journey Through America's Cold War Battlefields.* Silverdale, Washington: Historical Odysseys Publishers.

National Park Service, U.S. Department of the Interior

- 2004 *World War II and the American Home Front: National Historic Landmark Theme Study (Draft)*

Rhodes, Richard

- 1986 *The Making of the Atomic Bomb.* New York, London, Toronto, Sydney: Simon & Schuster.

Smyth, Henry DeWolf

- 1945 *Atomic Energy for Military Purposes: The Official Report of the Atomic Bomb Under the Auspices of the United States Government, 1940-1945.* Princeton, New Jersey: Princeton University Press.

Teller, Edward

1962 *The Legacy of Hiroshima*. New York: Doubleday.

U.S. Census Bureau

1990 *Intercensal Estimates of the Resident population of /states and Counties 1980-1989*. <http://www.census.gov/popest/archives/1980s/e8089co.txt> (accessed December 28, 2007).

2000 *County Population Estimates for July 1, 1999 and Population Change for April 1, 1990 to July 1, 1999*. <http://www.census.gov/popest/archives/1990s/CO-99-02.html> (accessed December 28, 2007).

2006 *County Total Population, Population Change, and Estimated Components of Population Change: April 1, 2000 to July 1, 2006*. <http://www.census.gov/popest/datasets.html> (accessed December 28, 2007).

2007 *Time Series of Population Estimates by County: April 1, 2000 to July 1, 2001*. [http://www.census.gov/popest/archives/2000s/vintage\\_2001/CO-EST2001-07/](http://www.census.gov/popest/archives/2000s/vintage_2001/CO-EST2001-07/) (accessed December 28, 2007).

U.S. Department of Energy, Manhattan Project

1999a *The Signature Facilities of the Manhattan Project*.

1999b *The Manhattan Project: Making the Atomic Bomb*. Prepared by F.G. Gosling, History Division.

## Los Alamos, New Mexico

County of Los Alamos, New Mexico

2007 *FY 2006 Comprehensive Annual Financial Report Fiscal Year Ended June 30, 2006*. [http://www.losalamosnm.us/index.asp?Type=B\\_BASIC&SEC={DB4B5AC8-1618-4086-BBFA-A8FF03FA4CA8}&DE={65D5FB3A-FF4B-4DF4-A44B-E68D5D4B42F4}](http://www.losalamosnm.us/index.asp?Type=B_BASIC&SEC={DB4B5AC8-1618-4086-BBFA-A8FF03FA4CA8}&DE={65D5FB3A-FF4B-4DF4-A44B-E68D5D4B42F4}) (accessed December 28, 2007).

University of New Mexico, Bureau of Business and Economic Research

2004 *Revised Projected Annual Population Growth Rates for New Mexico and Counties, 2000-2030*. <http://www.unm.edu/~bber/demo/table2.htm> (accessed December 28, 2007).

U.S. Department of Energy, Los Alamos National Laboratory

2005 *A Plan for the Management of the Cultural Heritage at Los Alamos National Laboratory, New Mexico*. Prepared by Ecology Group.

U.S. Department of Energy/National Nuclear Security Administration, Los Alamos Site Office

2003 *Sentinels of the Atomic Dawn: A Multiple-Property Evaluation of the Remaining Manhattan Project Properties at Los Alamos (1942-1946)*. Historic Building Survey Report No. 215, Los Alamos National Laboratory. Prepared by Ellen D. McGehee, *at al.*, RRES-ECO Cultural Resources Management Team, Risk



Reduction and Environmental Stewardship Division, Los Alamos National Laboratory.

- 2005 "Section 3 – Property Summaries and Eligibility Recommendations." Updated version of table in *Sentinels of the Atomic Dawn: A Multiple-Property Evaluation of the Remaining Manhattan Project Properties at Los Alamos (1942-1946)* Historic Building Survey Report No. 215, prepared by *Ellen D. McGehee et al.*, RRES-ECO Cultural Resources Management Team, Risk Reduction and Environmental Stewardship Division, Los Alamos National Laboratory.

## Hanford, Washington

Battelle Pacific Northwest Laboratories, Parson Environmental Services, Inc., and P.W. Griffin  
1995 *105-B Reactor Facility, Museum Phase I, Feasibility Study Report*. Prepared for U.S. Department of Energy, Office of Environmental Restoration and Waste Management, Bechtel Hanford, Inc., Rev. 1.

Bechtel Hanford, Inc.

- 2000 *105-B Reactor Museum Feasibility Assessment (Phase II) Project*. Prepared for U.S. Department of Energy.

E.I. du Pont de Nemours & Co.

- 1946a *Construction of Hanford Engineer Works: History of the Project*. Wilmington, Delaware.

- 1946b *Operations of Hanford Engineer Works*. Wilmington, Delaware.

Gerber, Michele Stenehjem

- 1993 *Multiple Missions: The 300 Area in Hanford Site History*. Prepared for the U.S. Department of Energy, Office of Environmental Restoration and Waste Management, Hanford Operations and Engineering Contractor for the U.S. Department of Energy under Contract DE-ACO6-87RL10930.
- 1995 *Legend and Legacy: Fifty Years of Defense Production at the Hanford Site*. Prepared for U.S. Department of Energy, Office of Environmental Restoration and Waste Management, Westinghouse Hanford Company.
- 2002 *On the Home Front: The Cold War Legacy of the Hanford Nuclear Site*. Lincoln, Nebraska: University of Nebraska Press.

Harkewicz, Laura J.

- 2001 *The Phase One Interpretive Plan for the Hanford Site Manhattan Project/Cold War Landscape*. (Draft)

Historic American Engineering Records

- 1995 *D-Reactor Complex, 100-D Area, Hanford Site, Richland Vicinity, Benton County, Washington*. Record WA-127.

- 2001 *B Reactor (105-B Building), Area 100-B, Hanford Site, Richland Vicinity, Benton County, Washington*. Record WA-164.

Limerick, Patricia Nelson

- 1992 "The Significance of Hanford in American History," In *Washington Comes of Age: The State in the National Experience*, edited by David H. Stratton. Pullman, Washington: Washington State University Press.

Marceau, T.E., Bechtel Hanford Inc.

- 1998 *Hanford Site Manhattan Project and Cold War Historic District Treatment Plan*. Richland, Washington.

National Register of Historic Places Forms

- 1991 *Hanford B Reactor (105-B)*. Registration Form.
- 1997 *Historic, Archeological, and Traditional Cultural Properties of the Hanford Site, Washington*. Multiple Property Documentation Form.
- 2006 *Draft B Reactor, Hanford Site, Richland, Washington*. National Historic Landmark Nomination Form.

Sanger, S.L.

- 1995 *Working on the Bomb: An Oral History of WWII Hanford*. Portland, Oregon: Continuing Education Press, Portland State University, 1995.

Thayer, Harry

- 1996 *Management of the Hanford Engineer Works in World War II*. New York: American Society of Civil Engineers Press, 1996.

U.S. Department of Energy, Richland Operations Office

- 2003 *Hanford Cultural Resources Management Plan*. Prepared for U.S. Department of Energy, Assistant Secretary for Environmental Management, Richland, Washington.

U.S. Department of Energy, Hanford Cultural and Historic Resources Program

- 2002 *History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990*.

Washington Department of Community, Trade, and Economic Development

- 2007 *Washington State County Travel Impacts 1991-2006*.  
[http://www.experiencewa.com/images/pdf/R\\_ImpactCounty91-2006.pdf](http://www.experiencewa.com/images/pdf/R_ImpactCounty91-2006.pdf).

Washington Office of Financial Management

- 2007 *Washington State County Growth Management Population Projections: 2000 to 2030*. <http://www.ofm.wa.gov/pop/gma/projections07.asp> (accessed December 28, 2007).

## Oak Ridge, Tennessee

AtkinsCrip Public Strategies, Oak Ridge Convention and Visitors Bureau, City of Oak Ridge, and Center for Historic Preservation at Middle Tennessee State University Economic Stewardship.

- 2007 *Creating the Living Story of "The Secret City: A Heritage Tourism Plan to Significantly Expand Oak Ridge Annual Visitation.*

Bechtel Jacobs Company LLC, Oak Ridge National Laboratory, and DuVall & Associates, Inc.

- 2001 *Cultural Resource Management Plan, Department of Energy, Oak Ridge Operation Office, Anderson and Roane Counties, Tennessee.*

City of Oak Ridge

- 2006 *Comprehensive Annual Financial Report For the Fiscal Year Ended June 30, 2006.*  
<http://www.cortn.org/FinancialReports/2006ComprehensiveAnnualFinancialReport.pdf> (accessed December 27, 2007).

National Register of Historic Places Forms

- 1975 *X-10 Reactor, Graphite Reactor, Nomination Form.*
- 1991a *Brannon, Luther, House.* Registration Form.
- 1991b *Clinton Engineer Works Townsite, Oak Ridge Historic District.* Registration Form.
- 1991c *Historic and Architectural Resources of Oak Ridge, Tennessee.* Multiple Property Documentation Form.
- 1991d *Jones, J.B., House.* Registration Form.
- 1992 *Listing of Multiple Properties at Oak Ridge in the National Register of Historic Places* (with appended National Register of Historic Places Registration Forms for (1) Oak Ridge Turnpike Checking Station; (2) Bear Creek Road Checking Station; (3) Bethel Valley Road Checking Station; (4) New Bethel Baptist Church; (5) George Jones Memorial Baptist Church; and (6) Freels Cabin.

Tennessee Advisory Commission on Intergovernmental Relations and the University of Tennessee Center for Business and Economic Research

- 2003 *Population Projections for the State of Tennessee 2005 to 2025.*  
[http://www.state.tn.us/tacir/PDF\\_FILES/Other\\_Issues/pop%20project.pdf](http://www.state.tn.us/tacir/PDF_FILES/Other_Issues/pop%20project.pdf) (accessed January 8, 2008).

Thomason and Associates, Preservation Planners

- 2003 *National Historic Preservation Act Historic Preservation Plan, Y-12 National Security Complex.* Prepared for Environmental Compliance Organization, Environment, Safety and Health Division, Oak Ridge Y-12 National Security Complex.
- 2004 *National Historic Preservation Act Historic Preservation Plan, Oak Ridge National Laboratory, Oak Ridge, Tennessee.* Prepared for UT-Battelle, LLC. Nashville, Tennessee.

U.S. Department of Energy, Y-12 National Security Complex

2004 *Interpretive Plan on Historic Preservation for the Y-12 National Security Complex.*

Wilcox, Jr., William J.

2001 *An Overview of the History of Y-12, 1942-1992: A Chronology of Some Noteworthy Events and Memoirs.*

## **Dayton, Ohio**

Roach, Edward

2005 *The Secret Story of Dayton and the Manhattan Project, 1943-1948.* Dayton: Dayton Aviation Heritage National Historical Park.

Honious, Ann

2005 "The Dayton Project, 1943-1948." Power Point presentation by Dayton Aviation Heritage National Historical Park to Manhattan Project Special Resource Study Conference.

National Register of Historic Places Forms

2001 *East Third Street Historic District.* Registration Form.

2006a *Dayton Power and Light Building Group.* Registration Form.

2006b *Unit III, Dayton Project.* Registration Form.

Ohio Department of Development

2007 *Ohio County Profiles: Montgomery County.*

<http://www.odod.state.oh.us/research/files/S0/Montgomery.pdf> (accessed December 28, 2007).

## PREPARERS

### PLANNING TEAM

#### **NPS Denver Service Center**

Carla McConnell, Project Manager / Community Planner / AICP. Responsible for managing the planning process, writing the “Management Alternatives” section, and directing overall document preparation; 15 years with the National Park Service; B.S. in Landscape Architecture and Master of Architecture

Gretchen Ward, Cultural Resources Specialist. Responsible for writing the “Affected Environment” and “Environmental Consequences” sections; 18 years with the National Park Service; B.A. in History, B.A. in Anthropology, and M.A. in Anthropology

Eric Petersen, Cultural Resources Specialist (former). Responsible for writing the “Background,” “Description of Resources,” and “Evaluation of Significance, Suitability, and Feasibility” sections; 7 years with the National Park Service; B.A. in Philosophy and Religion and M.A. in Anthropology

Harlan Unrau, Cultural Resources Specialist (retired). Responsible for writing the “Background,” “Description of Resources,” and “Evaluation of Significance, Suitability, and Feasibility” sections; 35 years with the National Park Service; B.A. and M.A. in History

Michael Rees, Natural Resources Specialist. Responsible for overall review of the document; 17 years with the National Park Service; B.A. in Environmental Studies and M.F.S. in Forest Science

Sarah Bodo, Community Planner. Responsible for writing “Affected Environment” and “Environmental Consequences” sections for Visitor Experience and Socioeconomics; 2 years with the National Park Service; B.S. in Finance and Master of Urban and Regional Planning

Merritt Malin, Landscape Architect/Planner (former). Responsible for initial scoping and development of the alternatives; 3 years with the National Park Service; A.A.S. in Architectural Engineering, A.A.S. in Civil Engineering, B.A. in Environmental Design, and Master of Landscape Architecture

Dave Kreger, Branch Chief. Responsible for technical review of the document; 17 years with the National Park Service; B.S. Environmental Resource Management.

#### **Department of Energy**

F.G. (Skip) Gosling, Federal Preservation Officer and Chief Historian, Department of Energy. Participation as full member of planning team and coordination of document review and response within Department of Energy; 20 years with the Department of Energy; Ph.D. in American History.

Terry Fehner, Deputy Federal Preservation Officer and Senior Historian. Planning team consultant, 21 years with the Department of Energy; Ph.D. in American History.

## **PUBLICATION SERVICES**

Jim Corbett, Visual Information Specialist, Denver Service Center  
June McMillen, Writer-Editor, Denver Service Center

## **NPS REGIONAL OFFICES AND PARKS**

The following personnel from National Park Service regional offices and parks contributed to development of the study:

### **Los Alamos, New Mexico**

Mary Padilla, Historic American Buildings Survey/Historic American Engineering Record  
Coordinator, Intermountain Regional Office (Santa Fe Office)  
Jason Lott, Superintendent, Bandelier National Monument  
Brad Traver, Superintendent, Bandelier National Monument (former)  
Darlene Koontz, Superintendent, Bandelier National Monument (former)  
Lynne Dominy, Chief, Interpretation, Bandelier National Monument  
Jennifer Carpenter, Park Planner, Bandelier National Monument

### **Hanford, Washington**

Stephanie Toothman, Chief, Cultural Resource Programs, Pacific West Region  
Keith Dunbar, Chief, Planning and Environmental Compliance, Pacific West Region

### **Oak Ridge, Tennessee**

Rich Sussman, Chief, Planning and Compliance Division, Southeast Regional Office  
David Libman, Park Planner, Southeast Regional Office

### **Dayton, Ohio**

Ruth Heikkinen, Outdoor Recreation Planner, Midwest Regional Office  
Dean Alexander, Superintendent, Dayton Aviation Heritage National Historical Park  
Lawrence Blake, Superintendent (retired), Dayton Aviation Heritage National Historical  
Park  
Ann Honious, Chief, Education and Resource Management, Dayton Aviation Heritage  
National Historical Park  
Edward Roach, Historian, Dayton Aviation Heritage National Historical Park

## **CONTRIBUTING AGENCIES AND ORGANIZATIONS**

Additionally, the Manhattan Project Sites Special Resource Study has built upon the efforts of the Department of Energy and its preservation partners, including the Atomic Heritage Foundation and the Advisory Council on Historic Preservation, which have previously identified the most significant sites associated with the Manhattan Project. The team has also consulted with other agencies or organizations and analyzed common interests and management potential for the Manhattan Project sites. These include state historic preservation offices, tribal historic preservation offices, and other appropriate tribal, local, state, and federal government agencies and interested nongovernmental organizations.



