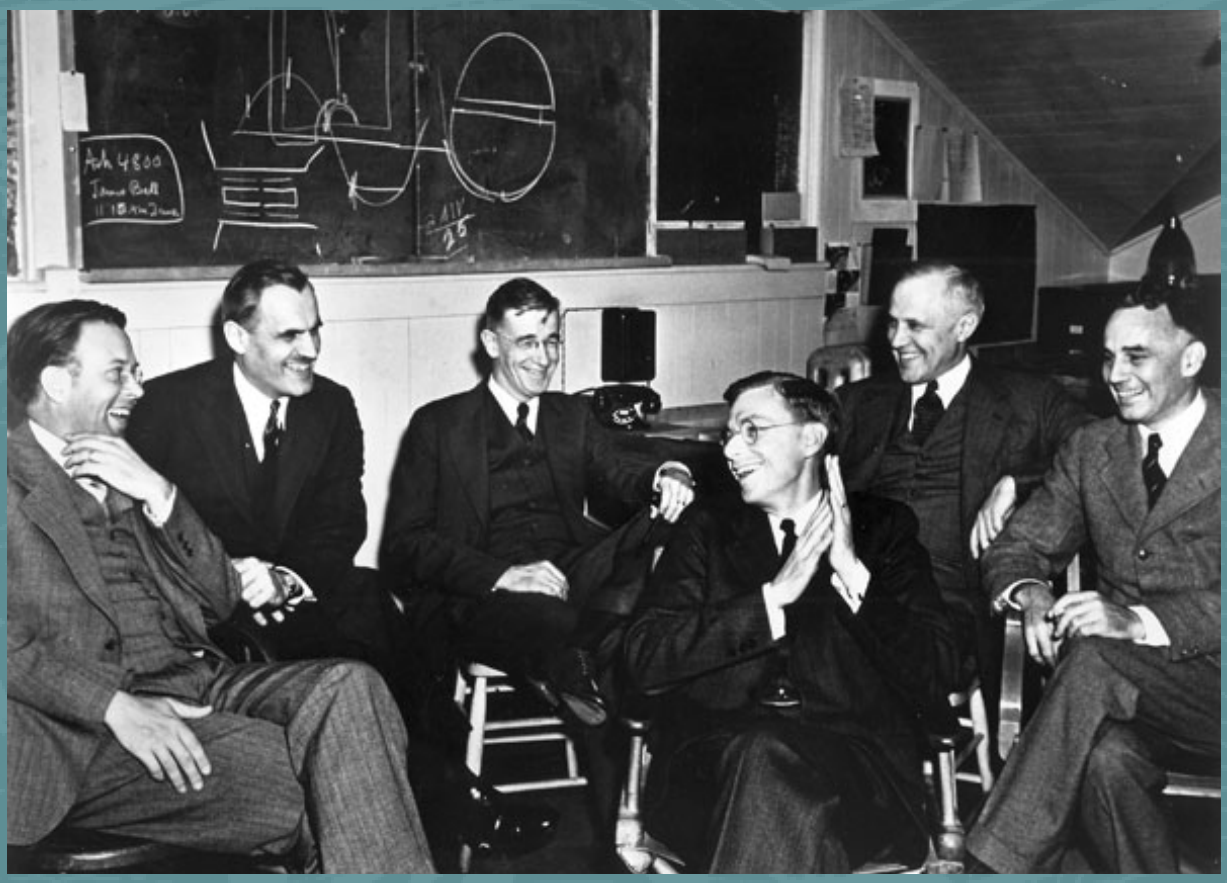
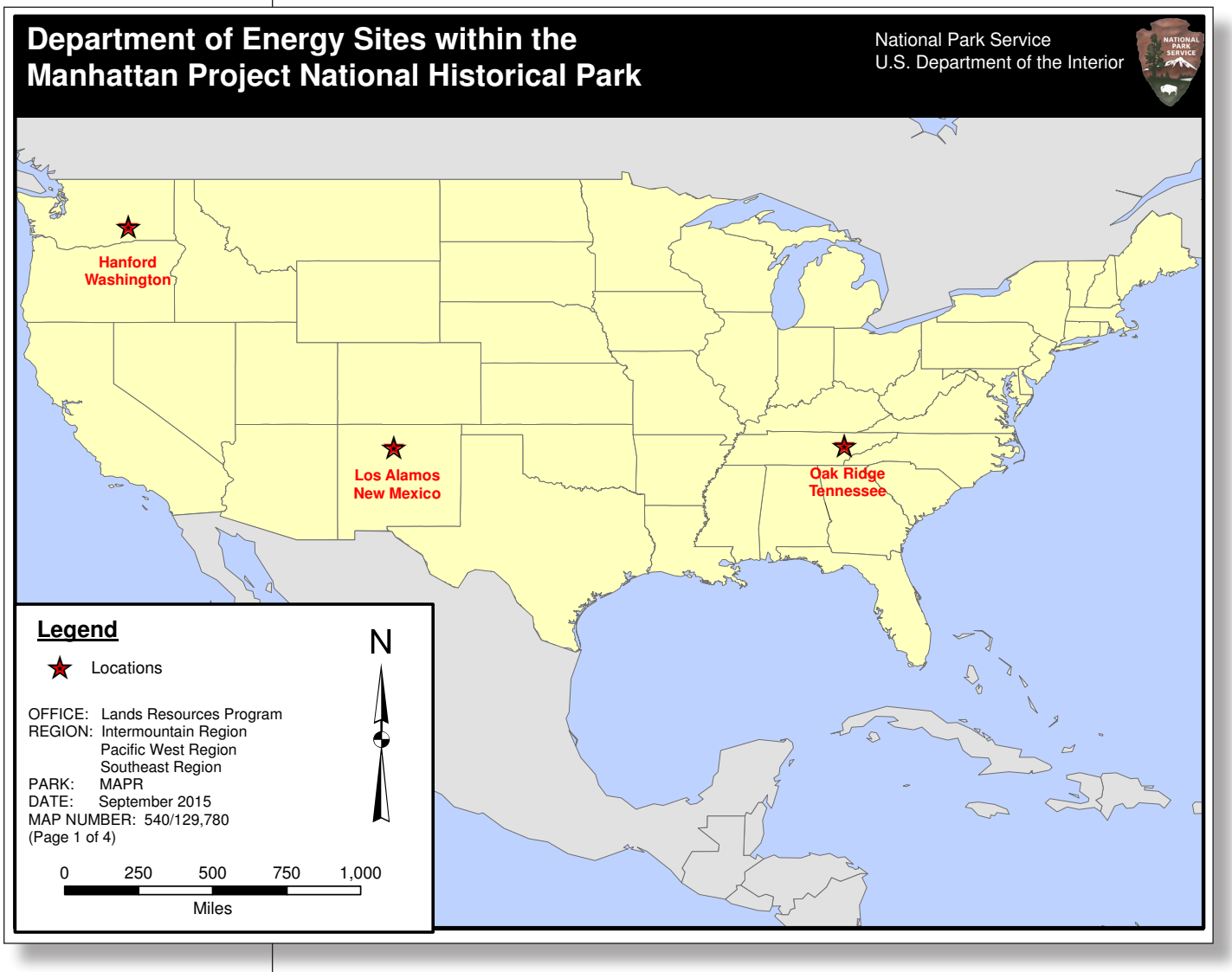
Scholars' Forum Report
November 9-10, 2015



Manhattan Project National Historical Park
New Mexico, Tennessee, Washington


Department of Energy Sites within the
Manhattan Project National Historical Park
National Park Service
U.S. Department of the Interior
Hanford
Washington
Los Alamos
New Mexico
Oak Ridge
Tennessee
Legend
Locations
OFFICE: Lands Resources Program
REGION: Intermountain Region
Pacific West Region
Southeast Region
PARK: MAPR
DATE: September 2015
MAP NUMBER: 540/129,780
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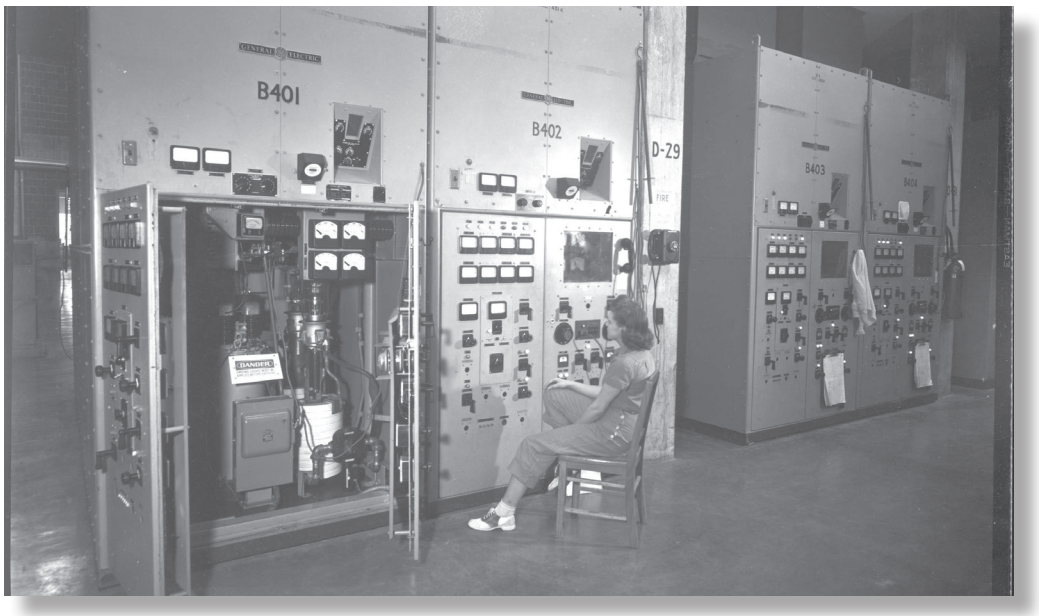
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B402
D-29
B403

Contents

Cover Photo

A meeting regarding the 184-inch cyclotron project, held at the University of California, Berkeley, on March 29, 1940. Left to right: Ernest O. Lawrence, Arthur H. Compton,Vannevar Bush, James B. Conant, Karl T. Compton, and Alfred L. Loomis.

The photograph is reprinted in Richard G. Hewlett and Oscar E. Anderson, Jr., The New World, 1939-1946: Volume I, A History of the United States Atomic Energy Commission(Washington: U.S. Atomic Energy Commission, 1972), opposite page 33.

Background

In December 2014, Congress authorized a new park called the Manhattan Project National Historical Park, which will be jointly administered by the National Park Service and the Department of Energy. Sites that comprise the park are at Oak Ridge in Tennessee, Los Alamos in New Mexico, and Hanford in Washington State. The agreement for how these sites will be managed was signed on November 10, 2015. The National Park Service will interpret the Manhattan Project and the Department of Energy will ensure the public access, safety, environmental remediation, and historic preservation of its Manhattan Project properties.

Over many years, the National Park Service has found that we best serve the American public when we bring together a group of the leading experts in the country to help us develop the interpretive plan for a new park. To that end, we invited a group to join us to participate in a scholars' forum in Washington, DC on November 9-10, 2015.

On November 9, the participants had two responsibilities: to share their expertise with the group, so all gained better understanding of the issues important for NPS to interpret; and, the group spent time brainstorming potential themes that the group thought were significant for us to include in an interpretive plan. On November 10, the group narrowed down the ideas from the first day into a manageable number of primary theme topics with sub-themes that will become the basis for developing our interpretive framework for the new park.

High Level Theme Topics

By the end of the workshop, the participants had agreed to a number of primary topics that could be developed further into full interpretive themes. These topics included:

- Big Science
- Concepts
- Science and Technology
- War Context
- People
- Place
- Secrecy / Censorship
- Consequences / Impact of Using Bomb
- Decision to Use the Bomb
- Legacy
- Scale
- Peace

Day 1

The group gathered and went through introductions along with a brief discussion of each participant's vision of how the Manhattan Project might be interpreted. One of the first activities was to capture some of these ideas.

Big Picture Ideas on How to Interpret the Manhattan Project

- Larger context and connections
  - Outside three sites
  - Larger World War II context
  - Include map of all sites related to the Manhattan Project vs. actual three sites (e.g., Manhattan, Wendover, Chicago, etc.)
- Engineering and technology stories
- Science / Health / Public Health
  - Learning, new development, connections
- "Web of Connections"
- International story/context
  - Great Britain/scientists
- Story of decision to drop bomb and legacy
- Displacement stories
  - Local, rural, Native American
  - Loss of land vs. wages
- Timeline
  - Prior to the United States entry into World War II, a committee was formed under the National Bureau of Standards (1939)
  - In December 1941 the project was put under the direction of the Office of Scientific Research and Development
  - After the US entered World War II (after December 7, 1941), the War Department was added as joint management and in June 1942, Brigadier General Leslie R. Groves was placed in charge of all of the Army activities. The project was then code named "Manhattan Project".
  - Managed as the Manhattan Engineer District by the Army Corps of Engineers from October 1945 to December 1946
  - Atomic Energy Commission established by the Atomic Energy Act on August 1, 1946 to manage the development, use, and control of atomic energy.

Potential Interpretive Theme Topics

- Leadership/teamwork
  - Brigadier General L. R. Groves / Colonel K. D. Nichols
  - Robert Oppenheimer
  - Risk management
- Impact on families
  - Secrecy, loss, displacement
- Common sacrifice – many ways
- Understand environmental context
  - Why were sites chosen?
  - Criteria for site selection
- Social and economic context – Great Depression, World War II impacts, media focus on war, family members serving in the war
- Military story / context
- Explain basic physics – accessible to general public
- Built environment to give story context
  - Young people, dangerous environment
- Physics: Is it even possible?
  - Oral histories
- War ethics -> Soldiers -> Workers -> Civilians
- World War II – Civilian terror (Shouldn't this be World War II?)
- Scientific discussion – Ethics of nuclear weapons and power
- Background history / context
  - German bomb effort
- Scale of effort – 600,000 people involved
- Prototype Template – Secrecy, military/industrial complex, big science, project management.
- Foundation for nuclear air force in Cold War
- Controversy from scientists – avoid use of the bomb?
  - Ethics
  - Leo Szilard, Hungarian scientist
- Secrecy, spies, closed cities, security
  - Social impacts, science
- Multiple countries with a-bomb efforts
  - Lead in to Cold War
- Control of weapons
  - Civilian vs military
  - Decision to use
  - Cold War
  - Context today
- Human consequences
- How to support peace in future? Ask questions.

Hanford Themes.

Specific to Hanford.

- Manufactured plutonium, which has all kinds of implications
- Heavily industrial process, requiring lots of space and generating lots of waste. Much more space and waste than in other two sites.
  - The least glamorous site – engineering, operations, etc.
  - No Nobel Prize winners
- Process required development and use of world's first production reactor. There were 3 by the end of World War II and 8 by 1955.
- Immense scale – top of technologies to make things work. And Hanford DID work, no setbacks or process failures (xenon poisoning)
- Builders aware of some of the risks involved; made sure everything, workers were separated in order to minimize the costs of accidents
- Also made use of natural features (river, gravel, winds, hills, soils) to build, operate plant and deal with wastes (other sites did too)
- Contractor was DuPont – different company and culture, its own way of doing things; experience making hazardous military materials.
- Richland was not fenced – rest of the site was
- All sites did some amount of environmental monitoring
- Richland Lab did early environmental monitoring (e.g., effects of radiation on salmon), like other sites, this environmental monitoring was mostly secret, so results were not known until much later
- Huge labor turnover (300,000 workers to supply a workforce that at peak was 50,000)
- Hanford only site threatened by enemy action
- Had to import a workforce; isolated

Hanford Commonalities with Other Sites.

- Mobilization for war
  - Extingencies, emergencies
  - Rapid development
- Communities (residential)
  - Housing (temp., cheap)
  - Segregation
  - Site security / Censorship / Spying
- Indian tribes (need for their voices to be heard)
- Process of finding, acquiring, developing, downsizing, etc.
- Labor force issues
  - Recruitment and retention (carrots, sticks)
- Economic impact
  - Local
  - Enduring into Cold War, cleanup eras
  - Research (but Hanford much slower to commit to research, get a national laboratory)

Los Alamos

Specific to Los Alamos.

- It was a small industrial site.
- Compartmentalization did not exist there.
- Los Alamos had an international collection of scientists, some who were Nobel Prize winners or future awardees.
- At Los Alamos, the work went from theory to assembly, from blackboard to bomb bay.
- Los Alamos was an experimental laboratory that explored a variety of fields—physics, chemistry, engineering, math, computer, metallurgy, explosives. Los Alamos oversaw and conducted the full gamut of work on the bomb, from creation to deployment in Japan.
- One group that Los Alamos displaced was the Boys Ranch with its existing structures and interesting characters there.
- There is a direct and immediate connection between Los Alamos and Hiroshima and Nagasaki. The weapons came from Los Alamos, scientists went to the Japanese cities soon after the end of the war, and came back to northern New Mexico and showed their photos and movies about the effects of atomic bombs to the public. The targeting committee had politicians, military officers, and scientists from Los Alamos. Project Alberta also came from Los Alamos, which included not only the bombs, but buildings for Tinian Island and staff at Tinian Island. Tinian Island served as a departure point for the planes carrying the bomb to Japan.
- Los Alamos scientists played an important role in the post war debate about atomic policies, beginning with the McMahon bill and continuing with those like Oppenheimer who served on the Atomic Energy Commission's General Advisory Committee.
- Protestors come to Los Alamos on the anniversaries of bombing of Hiroshima and Nagasaki.
- The first atomic weapon fatalities in the United States happened in Los Alamos.
- Soldiers from New Mexico were some of first casualties of the war, with the 505th National Guard units in the Philippines, and Navajo Code Talkers in the Pacific theater.
- The lab at Los Alamos served as a model for the post-war national labs at Sandia, Lawrence-Livermore, Rocky Flats, Pantex, and assisted with the rise of the military-industrial complex.
- Los Alamos was operated by the University of California and the town was run like a college campus.

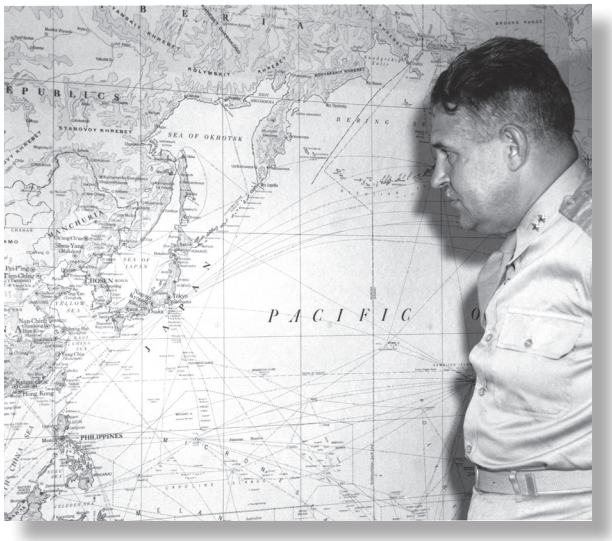
Los Alamos Commonalities with Other Sites.

- All three sites reflect both the relief about the end of the war, but also the ethical issues that arose with this weapon that was more terrible than any imagined, and that if nothing else, the Manhattan Project National Historical Park can show how horrible war is and provide an opportunity to end war.
- The social story about how all three project sites were instant cities and struggled to function with the wartime challenges.
- All three sites were disposable, throwaway areas, sacrificed because they were marginal.
- All three sites were relatively isolated.
- Initially, all three sites were built just for the war.
- For Los Alamos and Hanford, the influence of the American West is important.
- All three sites recruited locally.
- All three sites displaced a variety of people already on-site.
- All three sites have an opportunity to interpret the effects of radiation on the human body.
- All three sites had groups of soldiers who possessed scientific and technical backgrounds, who were assigned to entities called Special Engineering Detachments, also known as SEDs. Many of the GIs worked side by side with the scientists during the Manhattan Project and many would be successful scientists in their own right-including Val Fitch, who was awarded a Nobel Prize in Physics in 1980.
- Soldiers who wore the Manhattan Project arm patch were honored by those headed to the invasion of Japan.
- The Manhattan Project still affects all of us today.

Oak Ridge

Specific to Oak Ridge.

- Admin center – oversight (after Manhattan)
- Process developed to separate Uranium-235 from Uranium-238
- X-10 reactor in Oak Ridge would be the basis of design for Hanford's reactors
  - Semi works
- Extensive rainfall in Oak Ridge, Tennessee, averaging 60-inches or more per year provided one of many challenges to the X-10 project
  - Environmental (groundwater chasing)
  - Did not understand geology at the time of selection
  - Political influence in selection
- Uranium storage today – dealing with nuclear legacy
  - Weapons from other nations
- Science lab
- Nuclear medicine and nuclear power research
  - First radiation studies (cattle from Trinity Site)
  - First radio isotopes used for medicine
- Medical research – Taylor / Kennedy
- Congressional / Cabinet visits during World War II?
- Production and research at one site
- Ties to Manhattan Site research (gas diffusion)
- Most people, most $ (60+%)
- Human interest stories
  - Women
  - Racial segregation
  - Displacement (some 3x)
- James Edward Westcott photo documentation – popular slice of life



- Creating community – legacy of government management
  - Education – Oak Ridge hired professional teachers whereas. in Los Alamos the scientists wives filled the role of educators
  - 'Coney Island' – Happy Valley
  - Oak Ridge Boys
- Knoxville – Interaction – Bus System
  - Hanford – Isolated
  - Los Alamos – Scientist
- Bus system – Connections across all sites or within sites?
- Different context?
- Economic impact – During war and after - Community / Farm post war
- Similar story in New Mexico / Hanford?
- Largest roofed building – K-25 (at that time)
  - Industrial scale infrastructure
  - Hanford but less so at Los Alamos
  - US Army Corps of Engineers – mobilization – Large companies
- Oak Ridge provided 10% of US power during war (to be confirmed)
- The Manhattan Project spurred the development of the national lab system
- Oak Ridge was the only site located east of the Mississippi River.
- Supplied 1st plutonium sample to Los Alamos for analysis
- Oak Ridge and Hanford employment / facilities on the scale of auto industry at the time
  - Larger with contractors, suppliers, etc.
- Largest spring fed pool in the US
- Geography – Ridge / Valley
- Uranium enrichment – explore various processes

Oak Ridge Commonalities with Other Sites.

- Scale - $, electricity, number of people, buildings, bus systems
  - Government owned – contractor operated -> Complex
- Science
  - First plutonium, parallel processes
  - U-235 – X-10 pilot, modern day uranium dismantling/nonproliferation
  - Beneficial uses – first radio isotopes, radiation research (health, physics)
  - Neutron science (Oak Ridge National Laboratory, materials spallation, etc.)
- Life in the enclaves of science
  - Society, photos, Coney Island, education system, economic impact, Westcott, climate, ridge and valley, alphabet houses, young (average age 27) recreation program
  - Creating community
- The whole energy story in one place
  - National Nuclear Security Administration, established in 2000
  - Energy efficiency
  - Environmental management
  - Basic science
  - Empirical research

Day 2

During Day 2, the group started by reviewing the previous day's work and synthesizing potential themes (found below). The group discussed potential missing themes and the list of High Level Theme Topics and Subtopics.

Common Themes

- Exigency / urgency (context of World War II)
- Compartmentalization
- Espionage / secrecy
- Regional impact / social and economic
- Health / environmental effects
- Interconnectedness
- Modern legacy
- Transition / Federal role in each community
- Big Science

High Level Theme Topics and Subtopics

To close out the forum, the group developed the following list of high level topics and explanatory sub-topics. These topics will evolve into Interpretive Themes and Subthemes and the interpretive planning process develops.

Big Science.

- How to build a bomb
- Plutonium
- Uranium separation
- Nuclear medicine
- Nuclear power
- Health physics
- American physics leadership – '50s (materials processing – chemical, metallurgy)
- Birth of National Lab System
- War mobilization effort
- High explosives development, high speed photography
- Cyclotron decade – environmental studies
- Nuclear physics
- International collaboration / Atoms for Peace
- Nuclear physics
- Applied physics
- Materials processing
- Concepts
- Creating fissile material
- Chain reaction

- "Story" (history) vs. basic scientific concepts
- Development of military-industrial complex
- Science and Technology
- Science/industry/state
- Organizational structure
- War Context
- New Deal
- Post WWI
- Mobilization
- Security
- Military/Air Power
- Missions to drop bomb (other sites – Wendover, Tinian Island, etc.)
- People
- Leaders (military, political, scientific)
- Workers
- Spies
- Hierarchy
- Displacement effects
- Military/science/civilian
- Families/children experiences
- Military vs scientists
- Segregation/local communities (minorities)
- Temporary workers
- Skills/education
- Upward mobility
- "Baby Boom"
- Place
- Displacement
- Geography
- Federal presence
- "Temporary" construction – alphabet homes
- Secret cities/isolation
- Segregation
- Culture
- Economic impact – continuing

Secrecy / Censorship.

- Mutually assured destruction
- No first use
- Nonproliferation
- 'Ban the Bomb' / International control (one world)
- Scientific efforts to stop bomb / limit further use
- Military reorganization to fight nuclear war
- Development of tactical nuclear weapon
- Atomic Energy Commission
- Consequences / Impact of Using Bomb
- Survivors / down-winders / accidents
- Cultural impacts / society
- Nonproliferation efforts
- Human consequences / radiation and waste management
- Peace efforts
- Press reaction / worker reaction to learning about bomb effort
- Historical background leading to the dropping of the bomb; humanitarian consequences; future-oriented display
- Decision to Use the Bomb
- Military situation
- Diplomatic context (Russia, Japan)
- Bombs available
- Ethical debate (scientists)
- Evolution of history / thinking
- Human consequences
- Political situation
- Momentum / scale of effort
- Revenge
- Timing
- Race
- Legacy
- Human consequences
- Environmental and health impacts / environmental justice
- National Security State
- Mutually Assured Destruction / Cold War / Arms Race
- US change in power globally
- Military – standing army
- Science and tech legacy
- Secrecy / protection of research
- "Atoms for Peace"
- Civil defense / testing

Scale.

- $2.2 billion (1% for bomb vs. World War II)
- Space
- Electricity
- Materials
- Manpower
- Air power
- People (600,000+)
- Ambition
- Raw material -> Output ratio
- Size of explosion

Peace.

- Given past, how do we create peace?
- Looking toward future
- Numbers and costs

These are other ideas or issues related to interpreting the Manhattan Project that may be helpful for future operations.

- On-site vs. online resources
- NPS World War II subject page
- Engage communities – 3 sites plus associated sites
- Dealing with sites / resources outside park
- Use oral histories to connect to larger stories
- Connect stories to curriculum (state / local)
- Review academic analysis of “atomic museums”
- Engage science teachers – right level

Attachments

The attachments included as part of this report include a diversity of ideas written by a wide-ranging group of scholars. The hope is that these documents will provide additional clarity to the process of interpreting the Manhattan Project National Historical Park.

November 6, 2015

Mr. Jonathan B. Jarvis
Director
National Park Service
United States Department of the Interior

Dear Mr. Jarvis:

We hope this letter finds you in the best of health and spirits.

First of all, let us express our deepest gratitude to you for providing an opportunity for Mr. Yasuyoshi Komizo, Chairperson of the Hiroshima Peace Culture Foundation, and Dr. Masao Tomonaga, Honorary Director of the Japanese Red Cross Nagasaki A-bomb Hospital, to speak at the Scholars' Forum regarding the development of the Manhattan Project National Historical Park. We offer our profound respect for your consideration and commitment.

As you know, we have conveyed the views of Hiroshima and Nagasaki on the establishment of the park several times in the past, but on the special occasion of the forum, we would like to reiterate our perspectives once again.

It is our hope that the Manhattan Project National Historical Park will develop to have significant meaning to future generations in the sense that the park will lead people to a factual understanding and fair judgment of nuclear weapons. By doing so, the park can contribute to raising awareness of the humanitarian consequences of such weapons and preventing their proliferation.

For this to happen, it is essential to present, based on objective material, facts to visitors. In particular, in terms of exhibitions, it is necessary to fully describe what happened to the people under the mushroom clouds. In other words, exhibitions must reveal the inhumanity of nuclear weapons by clearly showing that the atomic bombs were dropped mainly on innocent civilians such as women, children and the elderly, creating a large number of victims. Furthermore, throughout the last 70 years, the bombings have continued to cause physical and psychological suffering to the survivors due to the aftereffects of radiation. It is also important to introduce the harsh reality of the international community in which the nuclear age unveiled by the Manhattan Project still continues today with nearly 16,000 nuclear weapons in existence. In this way, the park can contribute to the realization of a world free from such weapons.

The cities of Hiroshima and Nagasaki are happy to offer A-bomb artifacts, photos and panels among other materials so that the damage wrought by the bombings can be communicated objectively. These materials represent the first-hand experiences of A-bomb victims and survivors and their lives after the bombings. They thus poignantly reveal as historical fact the humanitarian consequences brought about by nuclear weapons.

On the other hand, we are deeply concerned about the possibility of exhibits that would strengthen the long-standing perception of the atomic bombings as justifiable acts and that would celebrate the development of nuclear weapons as a symbol of national power, affirming nuclear deterrence. We are aware that in the United States the argument that the atomic bombs ended the war and saved between 100,000 to one million American and Japanese lives still persists, even 70 years after the bombings. However, interpretations based on such perceptions are not in line with the purpose of the park, which is to convey fact. Moreover, such interpretations run counter to the ever-expanding global awareness of the inhumanity of nuclear weapons, could undermine American efforts for nuclear non-proliferation, and could further delay the realization of a world without nuclear weapons, a world which President Obama himself advocates.

The wishes of the A-bombed cities, as described above, are entrusted with Mr. Komizo and Dr. Tomonaga. We sincerely ask you to listen to their views and opinions and to reflect the voices of the A-bombed cities in the park's interpretive framework. We have also compiled a message with the same content of this letter for the participants of the forum with the hope that they will fully understand the wishes of Hiroshima and Nagasaki. We would greatly appreciate it if you could circulate the message to the forum participants in advance.

Lastly, we would like to ask for your special leadership in making the park a place which will contribute to the realization of a world free from nuclear weapons and the assurance of a bright future for humanity, through close cooperation with the National Park Service, the Department of Energy and the cities of Hiroshima and Nagasaki. We offer our most sincere wish for the success of the forum as well as the good health and prosperity of everyone involved.

Sincerely yours,

MATSUI Kazumi
Mayor
The City of Hiroshima

TAUE Tomihisa
Mayor
The City of Nagasaki

Message

We would like to send a message from the A-bombed cities of Hiroshima and Nagasaki to the experts and scholars who are attending the forum regarding the establishment of the Manhattan Project National Historical Park.

It is our hope that the Manhattan Project National Historical Park will develop to have significant meaning to future generations in the sense that the park will lead people to a factual understanding and fair judgment of nuclear weapons. By doing so, the park can contribute to raising awareness of the humanitarian consequences of such weapons and preventing their proliferation.

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The wishes of the A-bombed cities, as described above, are entrusted with Mr. Yasuyoshi Komizo, Chairperson of the Hiroshima Peace Culture Foundation, and Dr. Masao Tomonaga, Honorary Director of the Japanese Red Cross Nagasaki A-bomb Hospital. We sincerely ask all of you to listen to their views and opinions and to reflect the voices of the A-bombed cities in the park's interpretive framework.

Lastly, we wholeheartedly request that you allow us to strive with you in making the Manhattan Project National Historical Park a place which will contribute to the realization of a world free of nuclear weapons and the assurance of a bright future for humanity.

MATSUI Kazumi
Mayor
The City of Hiroshima

TAUE Tomihisa
Mayor
The City of Nagasaki

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Envisioning the Manhattan Project National Historical Park

Cynthia C. Kelly
November 8, 2015

The Manhattan Project has a complex and controversial place in American and world history. Many agree with President Harry S Truman who said on August 6, 1945 that the atomic bomb was "the greatest achievement of organized science in history." The atomic bombs brought an end to World War II and have deterred another world-scale war for over 70 years. The alliance of the military, industry and academia continued to catapult American science and technology and the economy for decades after the war.

For others, the creation of the atomic bomb is not a cause for celebration. Many consider the dropping the bombs on Japan as morally wrong. The Manhattan Project led directly to the Cold War nuclear arsenals and proliferation of nuclear materials have imperiled the world ever since.

With many deeply held and polarized views, the interpretation of the Manhattan Project National Historical Park will be challenging. The new park should present the larger historical context, offer multiple perspectives including from the participants, and promote critical reflection.

The story encompasses a cross-section of America. With scientists from elite universities, refugees from Nazi-controlled Europe, African-American and Hispanic construction crews, and newly graduated high school girls, the 600,000 people who worked on the Manhattan Project represented the diversity of the American experience. The new park will also include the stories of the Native American tribes, agricultural settlers, and Hispanic communities who were evicted from the sites and whose lives were indelibly changed by the Manhattan Project.

The stories of the three self-contained "secret cities," built hastily in isolated, frontier settings will appeal to a broad audience. The Manhattan Project participants were largely young, patriotic and resourceful. At the same time, fear of espionage led to the birth of intelligence and counterintelligence agencies and the national security state. As Leo Szilard said, "The greatest legacy of the Manhattan Project is the secrecy stamp."

As one of the few national parks to focus on American science, technology, and industry, the park should feature the extraordinary innovations required to harness the energy of the atom and produce enriched uranium and plutonium. It should also address the moral responsibility of the Manhattan Project scientists and the relationship between science and society.

The decision to drop the atomic bombs on Japan and their impact on Hiroshima and Nagasaki are critical issues. Did Truman really "decide" or was the use of the bomb all but inevitable? How did the competing objectives of the Soviet Union, United States and Japan complicate negotiations for ending the war? Audiences should be able to listen to scholars with differing views, some asserting that the entry of the Soviet Union was the decisive factor and others arguing that the atomic bombs were critical to prompt the surrender of Japan. Stories of the atomic bomb survivors, hibakusha, photographs, paintings, and poetry will help convey the human dimensions of the impact of the atomic bombs.

A final section should address the diverse legacies of the Manhattan Project, from nuclear weapons to nuclear power, medicine and other beneficial uses. The environmental contamination, cleanup of the former nuclear weapons sites and continuing work of the national laboratories will bring the story to the present. We look forward to working with the National Park Service as it interprets this important history.

Frameworks for Manhattan Project Historic Sites

Bruce Hevly, University of Washington (bhevly@u.washington.edu)

I am sure that scholars working on nuclear history have a number of commitments and concerns in common. As a historian of science and technology, though, I have three areas of particular concern that I believe should be represented in the interpretive plans under discussion.

1. Nuclear history should be treated within the social, intellectual, economic, political and military contexts of the relevant period, and not treated as a distinct, otherworldly case. Nucleonics and its foundations in nuclear physics are often treated as a glow-in-the-dark special case within the history of World War II, with Albert Einstein and J. Robert Oppenheimer as totemic figures. This approach leads to a Los Alamos-centric, "physicists' history" of the Manhattan Project that draws attention away from other key actors and aspects (for example, the role of Gen. Leslie Groves). As Thomas Hughes has shown, Oak Ridge, for example, might be understood in the context of its roots in the Tennessee Valley Authority, attempts to create a New South, and debates over the character of the South in an industrial age. Hanford reflects in many ways the history of the Army as an agent of change in the West, as well as the New Deal development of the Columbia River and hopes for the rational management of the Columbia drainage on the model of the TVA. Hanford's history as a chemical engineering facility is easily overlooked. Los Alamos, as Lillian Hoddeson argued, resembles very much the kind of corporate research enterprise pioneered in the US by ATT, GE, and DuPont. These broader historical frames are difficult to discern when we treat nuclear history as something distinctive by nature.

2. In particular, Manhattan Project sites should be treated as part of U.S. industrial heritage (including corporate research and development enterprises). They should be seen as representative of a much broader industrial effort devoted to the Anglo-American nuclear weapons effort during World War II. While the production and design centers at Oak Ridge, Hanford and Los Alamos saw the majority of effort under the aegis of the Manhattan Project (along with the Metallurgical Lab at Chicago, the weaponization facility at Sandia, and the Alamagordo test site) it seems important to remember the breadth of efforts undertaken in industrial facilities around the US and Canada by contract to the OSRD and the US Army. Niels Bohr accurately predicted that the production of nuclear weapons would require turning a nation into a factory, and the US undertook such a commitment. Among the costs of the project – environmental, moral, and economic – was the diversion of resources away from other segments of the Arsenal of Democracy, to the disadvantage of other segments of the war effort. Nuclear weapons were more a product of industry than of academic science.

3. In history of science and technology, as in other realms of historical scholarship, one of the most important precepts is that the world could have been very different than the one we now inhabit. We might have come to see the world (even the natural world) in a very different way than we now do. This is simply to say that technological determinism (here, science-based technological determinism) is to be avoided. Future visitors to these sites should find venues in which big, important questions are presented as unsettled and open for ongoing debate, on the levels of technical development, policy decisions, economic and moral costs and consequences.

INTERPRETIVE THEMES FOR THE MANHATTAN PROJECT NATIONAL HISTORIC PARK

The National Park Service (NPS) should stress themes that the three Manhattan Project sites have in common as well as themes/subthemes that are unique to each site.

Themes common to all three sites include:

- **Acquisition** - removal of local populace, community sacrifice.
- **Construction**:
    1) Infrastructure and operational facilities - accelerated wartime schedules.
    2) Research and experimentation concurrent with construction activities - wartime urgencies allowed little time for testing new technologies.
- **Production** - tied to accelerated wartime schedules.
- **Scientific Inquiry/"Openness" vs. Military Secrecy**
    1) Compartmentalization/"need to know."
    2) Lack of congressional oversight on appropriations & Project activities at each site; Congress "stonewalled."
- **Social and Working Conditions and Activities**
    1) Higher wages/opportunities drew large numbers of single men and women from all over the county; but expressed frustrations over "need to know" and secrecy led to high turnover in employment.
    2) Gender & racial segregation in employment, housing, and mess halls.
    3) Construction camps typical of "boomtown" camps in American West.
    4) Focus on "alphabet" government homes at all three sites (especially Richland).

Themes/subthemes unique to Hanford Site:

- **Acquisition**
    1) Focus on "Community Sacrifice" - Removal of local ranchers & farmers, residents of Hanford, White Bluffs and Richland and Wanapum Indians.
    2) Interpret pre-1943 remains of farmsteads, irrigation features, infrastructure, and Hanford & White Bluffs town sites as well as B Reactor and T plant.
    3) Hanford was the largest government wartime procurement (670 square miles).
- **Construction**
    1) Hanford Construction Camp; world's largest trailer park.
    2) HEW Village: Richland government homes and planned community, with conflicts between DuPont/architect Pehrson vs. Groves/Army over housing types/styles and purpose.
    3) Production areas separated by large distances for safety & security reasons, with duplication of services/buildings in each area in case of sabotage/accidents.
- **Production**

1) Three plutonium production areas: 100 Area - B Reactor (irradiation), 200 Area - T Plant (chemical separations), 300 Area - how do you interpret since prominent fuel manufacturing facilities have been demolished (Buildings 313, 314)?

- **Social and Working Conditions and Activities**
  1) No fence around Richland like Los Alamos & Oak Ridge - but similar military censorship/secrecy.
  2) Racial segregation - no African-Americans & Latinos in Richland; minorities mainly lived in Hanford Construction Camp or Pasco.
  3) Focus on Hanford Construction Camp (constructed over original Hanford town site): became nation's largest voting precinct, trailer park and general delivery post office, including schools, churches, commercial area, and was the fourth largest community in Washington in 1944 with population of circa 50,000.

David Harvey
November 9, 2015

My views on what should be presented in the MPNHP stem a good bit from my experience researching and writing my book, a tad from my science degrees, a fair amount from years interacting with players in the MP communities and, most significantly, speaking across the United States on this subject. When a group of people so intimately familiar with the subject matter get together, it is too easy for us to lose sight of the fact that these parks are not for scientists or historians, let alone Manhattan Project experts. They are to inspire and enlighten the general public so that current and future generations see the value in preserving these sites and the history that goes along with them. The accuracy of the science and history are important, of course, but I trust the MPNHP team to get that right. The real challenge is engaging visitors coming to the park who, for the most part, do not know the first thing about what the Manhattan Project is.

The key players that many of us take for granted—Groves, Fermi, Szilard, maybe even Oppenheimer—are lost on the majority of folks. Most people in America don't know about Oak Ridge and Hanford. The science behind the bomb is beyond most individuals as well. But the interest is absolutely there. Based on travel to 26 states thus far and talking to literally thousands of people ranging from middle schoolers to WWII vets, I can tell you that people's curiosity seems to be geared toward a fascination with the bomb itself, the secrecy and security surrounding the project and how people felt about the aftermath. They are interested in these topics as they apply to the individual experience. They want to hear about how people felt, why they worked on the project and how their lives were affected afterward.

Based on my experience, I believe the approach at all three sites should be to:
1. entice visitors with the personal,
2. then present them with the practical.

Over the years various organizations—some represented at that meeting, some not—have been gathering oral histories and video histories. These interviews were done with scientists, janitorial workers, you name it. There is always a personal way into these topics, whether you are discussing physics or you are discussing dorm life. Every step of the way, use the stories of individuals to draw visitors into a topic. Children, women, people of color…balance is a must. Visitors want to be able to see themselves at times in these exhibits, put themselves in the history.

My thoughts on **content** did not change much over the course of the two days. You took extensive notes on themes and topics so I won't go into them here.

I envision common information that is identical at all three sites pertaining to the **origins** of the project. Once we know how the project came to be—why and how, all within WWII context—then each site can go from there, sharing the course of the project through its site-specific lens. Each site's development, its living conditions, its science, its community. We return to common information at all three sites when we discuss the bombings and the end of the war, showing the results of the combined efforts of the three sites. The devastation must be presented, as we have discussed.

Legacy—which I believe did not get enough discussion during the two-day forum—can also be site-specific and, where possible, pinned to existing structures that people can visit. This legacy should cover everything from cancer clusters and environmental clean-up to nuclear medicine.

There is so much information—too much—for the park. One of the biggest challenges I had writing a nonfiction book for a general audience was how to decide what to keep in and what to leave out. I spent a lot of time and effort on presenting enough science and making it as understandable as possible. I know from experience it can be challenging. I kept a post-it on my desk that read, "In your zeal to be complete you might end up being confusing." These exhibits need to tell a story—all sides of it—because stories are what keep people interested.

Visual presentation—infographics, the giant map I mentioned at the meeting—can be an enticing way to present information with words. It will be very easy for these exhibits to get far too text heavy. We have access to many visuals and can have more developed. I believe this is key.

I noticed at the meeting that there is a lot of concern about blowback, protests, etc. because of the nature of the material. I am very familiar with the Enola Gay exhibit situation. (I also mention it in my book's afterward.) I read all the articles coming out about the park. Again, I interact with many, many members of the public. I understand the issue. However, the idea that there is a way to design and present this content and this park so that you can somehow eliminate the possibility of protests, criticism and more, is not just implausible but also stands to negatively impact the exhibits themselves. In short, ya just can't please everybody. I am convinced of the sincere desire to present all sides of history by most everyone at that meeting. Everyone will do their best. That's all we can do.

Denise Kiernan
Writer, Producer

Andy Kirk
Summary Thoughts

All three of the initially included sites are vast cultural landscapes connected to surrounding ecosystems and human communities despite the efforts throughout their histories to isolate and contain their activities within sharply defined boundaries. In-depth interpretations of the broader nature of these places prior to their selection as locations for the Manhattan Project should be a critical part of the visitor experience at all of the sites. The pre-project history of site environments should include local understandings of these places and environments, indigenous peoples' insights and details on the history and relationship between the broader site environments and the regional communities affected. Interpretation of a wider range of resources should be used to augment existing interpretations of earlier periods of landscape use and regional life. There are nice examples of this kind of interpretation at all of the included sites but more nuanced enhancements and further insights from recent efforts to interpret historic landscapes across the NPS should be a part of this new designation.

After contextualizing the environmental and cultural landscapes that came to house the Manhattan Project facilities close attention should paid to the process of site selection and the environmental criteria and cultural considerations that informed the decision making process resulting in the choice of these particular sites. I think that the general public will want to know details about how these decisions were made beyond the obvious assumption that war time urgency led to quick action based on necessity. Site selection documents included in the *Manhattan District History* are examples of the type of material that could be used to explain the specifics of land acquisition, the process of condemnation, and cultural and environmental considerations (Book 1, Vol 10 for example). Information on this part of the process will speak to visitor's questions about fundamental issues like—how and where can you undertake a project like this? How were these places chosen and why? Were there other choices? What were the immediate and lasting consequences for the landscapes and people? What did the regional residents know given the secrecy of the project throughout the war and how were they dealt with after? The site selection history could be combined with discussions of what was known about the human health and safety and environmental consequences of project activities to give visitors a strong sense of the history of the creation of the sites prior to learning the details of the science and technology developed there.

Finally, although the testing sites are not currently included it seems important to interpret that history as fully as possible in the MAHP and build on existing interpretation of test site selection and programs in relation to the process that created the three included sites during the Manhattan Project. The process of site selection for the Trinity test revealed much about evolving thinking on how to conduct experimentation of this scope and where it could possibly be done safely and the size of the risk moving forward after the war. Operation Crossroads and early activities in Nevada should be included or enhanced in interpretation as the MAHP legislation specifically calls for interpretation of legacies.

J. Samuel Walker

Scholars' Forum for the Manhattan Project National Historical Park

November 9-10, 2015

I was interviewed this summer by a Japanese journalist who was doing a story on the 70th anniversary of Hiroshima. In the midst of our conversation, he asked me, "How can you have a national park to celebrate the building of a weapon as terrible as the atomic bomb?"

My answer was that the park is intended to explain, inform, and educate rather than to celebrate, and he wondered how we would draw the line.

I think the questions that the very well-informed and thoughtful journalist asked me get to the heart of the purpose of this workshop--and beyond. There are no easy answers to important questions surrounding the Manhattan Project, and I think that has to be our starting point.

These are the questions that I see as the keys to envisioning the purpose, scope, and value of the park.

First, and perhaps most importantly, how will the national parks' presentations differ from the museums, artifacts, and buildings that are there now? I know from my visits that Los Alamos and Oak Ridge have very good museums at their sites, and I'm not sure what, if anything, the designation of a national park will change in their exhibits. The principal change I see is that placing the Manhattan Project sites under the auspices of the National Park Service will give them more visibility, presumably more visitors, more media attention, and perhaps more controversy.

From my perspective, I think that there are two topics that need to be addressed and that seem certain to attract attention and stir controversy.

The first is the severe environmental abuse that took place at all three sites, and especially at Hanford. I don't think there is or should be any controversy over the fact that staggering problems exist at the sites. But there is and will continue to be sharp differences over the health effects, real and potential, of the practices at the three sites. This is an issue that cannot be ignored, but neither can it be settled conclusively.

The other issue, of course, is the old stand-by—the use of the atomic bomb against Japan. The bitterness and ill-will this issue arouses are well-known, but the answers of how to deal with it in a national park setting are much less so.

Manhattan Project National Historical Park
Summary Vision – Ray Smith

The Manhattan Project National Historical Park is the nation's 409th national park. As such it represents a milestone in the national park system. It is also established near the 100th anniversary of the National Park System. The Manhattan Project is a fitting subject for this the nation's newest national park!

The Manhattan Project is arguably the most significant scientific achievement in the history of the world. The Nuclear Age ushered in by the tremendous release of energy associated with fission has changed the world forever. Yet as important as the science is, the people are far more significant and must be the foremost focus.

The actual use of atomic bombs in warfare changed global conflict forever, or at least for the past 70 years. Richard Rhodes, author or editor of 25 works of fiction, history and memoir including *The Making of the Atomic Bomb*, which won a Pulitzer Prize, a National Book Award and a National Book Critics Circle Award, in a recent visit to Oak Ridge, TN, pointed out that a graph of the number of deaths caused by war had risen exponentially until peaking in 1943 at 60,000,000. The number then took a nose dive, and, by 1946, had reached less than 2,000,000. It has remained near that low number since. He attributed this lack of a world war since World War II as primarily being because of the existence of nuclear weapons. He quoted Robert Oppenheimer as saying that the atomic bomb not only ended World War II--it would also prevent additional world wars because such global wars would no longer be considered as a means to resolve conflicts.

The visit to Oak Ridge, TN, by Richard Rhodes served to educate several hundred people about the basics of the Manhattan Project. As he said several times, the present younger generation has never experienced anything close to the horror of World War II, and many of the youngest don't even recall the Cold War or Vietnam. They are blessed with that, but understanding how the existence of nuclear weapons contributed and continues to contribute to this lack of world war is more difficult to explain to these generations.

I believe it is imperative that the MPNHP focus on the major theme of the Nuclear Age while maintaining the needed balance between the technological advances such as nuclear medicine (which had its origin in Oak Ridge, TN) and nuclear energy (which also had its origin in Oak Ridge, TN.) and the horrible killing power of nuclear weapons which literally hold the ability to completely destroy the world! Nuclear Weapons are truly a "double-edged sword" and both aspects must be included in the interpretation of the MPNHP.

I recently assisted the NHK (Japan's Public Broadcasting Company) as they created a documentary film about one of the Calutron Girls in Oak Ridge. They focused on her grandchildren and how they perceived what their grandmother had done during World War II. They asked them how they felt about her role in helping to create the atomic bomb that was dropped on Hiroshima. The Manhattan Project is a complex and highly charged event in our history. It is good to see Japan attempting to remind their people of the history of World War II. We must do the same as the present generation and future generations do not know from experience the horrors of war!

We also will face historians who will attempt to take special care to produce data supporting their particular belief about the use of atomic bombs. Some will argue that dropping the atomic bomb was unnecessary. Some will fault President Truman. Some will point out the harmful effects of radiation and will abhor anything that includes that. Our interpretation must provide a balanced approach to such arguments.

It is vital for the interpretation of the history of the Manhattan Project to contain thoughtful and insightful methods for conveying the facts and details of its history. Video media, internet virtual museums/tours, books, documentary films, internet social media and webpages must all be used to the fullest possible extent to reach the various populations while still including the elderly and growing elderly who still enjoy national park visitor centers.

The park we are helping envision is something that can be used to transition the national park's methods by trying out new and creative approaches without abandoning the tried and true methods that have worked so well for years for the Park personnel who are indeed our nation's storytellers. I am excited to be a part of this great adventure with so much potential!

I envision the Manhattan Project National Historical Park as being the national park with the most advanced delivery and interpretation imaginable and that it will quickly become a recognized national and international leader in methods and technology as well as a real beacon highlighting the people story as the key elements.

November 6, 2015

Thanks so much for including me in the scholar's planning meeting on Project Manhattan National Historical Park. Several things are self-evident. While all three of the major sites have their own stories to tell, each should also make an effort to integrate their story into the larger national history. That means using a map or some other means of identifying all of the sites, large and small, contributing to the effort. Presenting the wartime context of the project is essential. The story of the science and technology of the bomb is part of the blanket narrative that can be developed for all three sites to share. Each can then develop a discussion of what occurred locally. Clearly, there should also be a balance between the technical and the human. While the story of the scientists, engineers, military officers and managers who made the project a success is a shared legacy, each site will have its own human stories to tell.

Potentially controversial elements will obviously have to be handled with care. While it is true that the notion of mutually assured destruction played a key role in preventing the use of nuclear and thermonuclear weapons in a world war after 1945, events might just as easily have taken a catastrophically different turn. Reference to the famous Doomsday Clock of the Bulletin of the Atomic Scientists, a journal founded by Project Manhattan veterans, information on the rapid growth of nuclear stockpiles, and the fear of nuclear war in popular culture might help to underscore the fragility and the danger of the post-war geopolitical stand-off.

In one way or another, I think it is also important to present the price paid for the success of Project Manhattan, from an honest portrayal of the effects of the bomb on Hiroshima and Nagasaki to the suffering resulting from post-war atomic testing. Recent critiques of atomic museums have called attention to the need for presenting the plight of "down winders." Obviously, such material has to be presented in a carefully crafted balance. To ignore these realities, however, would be a disservice to history.

I was a bit surprised that during our discussions, no one called attention to the growing scholarly literature reviewing and commenting on current "atomic museums." I would urge everyone involved in planning content for the various Project Manhattan sites to digest what these experienced scholars and museum commentators have to say:

Arthur Molella, "Atomic Museums of Partial Memory," The Journal of Museum Education, Vol. 29, No. 2/3, Museums of Memory (Spring/Summer - Fall 2004), pp. 21-25

W. Patrick McCray, "Viewing America's Bomb Culture: The Atomic Testing Museum, Las Vegan, Nevada," The Public Historian, Vol. 28, No. 1 (winter 2006), 152-155

Matt Wray, "A Blast From the Past: Preserving and Interpreting the Atomic Age," American Quarterly, Vol. 58, No. 2 (Jun., 2006), pp. 467-483

Kenneth Arnold, The National Atomic Museum, Albuquerque, New Mexico: Where "Weapon Shapes" Are Not Enough,Technology and Culture, Vol. 30, No. 3 (Jul., 1989), pp. 640-642

Mark Fiege, "The Atomic Scientists, the Sense of Wonder, and the Bomb," *Environmental History,* Vol. 12, No. 3 (Jul., 2007), pp. 578-613

Again, I appreciate the opportunity to be involved, and look forward to continuing our discussions as the project moves forward.

Tom Crouch, PhD
Senior Curator, Aeronautics
National Air and Space Museum
Smithsonian Institution

Thoughts on the Manhattan Project National Park (MAPR)

The MAPR needs to present a balanced history of not just the Manhattan Project, but the impact that atomic energy has had on the world since 1945. The units need to interpret the promise and the peril of atomic energy, centering on the development of nuclear weapons and their military applications, but also including the other uses of atomic energy from electrical production to nuclear medicine and the cultural and social transformations caused by the Manhattan Project. In short, the park should show how the Manhattan Project revolutionized war and peace, governments and science, and society. Historians in the future will look back on the Manhattan Project and point out that what happened at Hanford, Los Alamos, and Oak Ridge was one of the most important events of the 20th century.

Specific activities and resources that could be part of the MAPR:

- The public is interested in a variety of narratives about the Manhattan Project. The roles played by scientists, engineers, military personnel, politicians, families, and spies all fascinate people about the MAPR story.
- MAPR should develop and partner with existing archives, museums, and historical societies at the three sites to collaborate on the multiple narratives of this discontinuous park. For example, MAPR could help in creating bibliographies and document collections that researchers, students, and the public can access, both on-site as well as on-line.
- MAPR needs to directly engage with the public about the history of Manhattan Project by holding debates about the decision to bomb Japan, conducting living history events that recreate life in 1945 during World War II, and creating lesson plans for teachers to use.
- There are multiple sources that recount the Manhattan Project. Utilize these to provide a balanced and multiple perspectives account of the Manhattan Project and its legacy. In short, the MAPR must tell all sides of the story including the Japanese as well as the American ones.
- Use the Manhattan Project as a platform to interpret the Cold War since its influence extends beyond World War II. Granted the Smithsonian's *Enola Gay* exhibit illustrates the pitfalls that this entails, but with careful preparation, such an approach would engage the public in the key questions concerning the Manhattan Project and show its impact on the world since 1945.

Questions for the NPS concerning MAPR:

- What access will visitors have to the surviving Manhattan Project buildings? What historic properties remain at Hanford, Oak Ridge, and Los Alamos and what are their preservation needs?
- How will MAPR engage with visitors who have negative opinions and may even protest about the Manhattan Project?
- How will these three units collaborate? Will additional sites be added later? How will the NPS and MAPR interact with DOE?
- How will MAPR connect with K-12 and university students? What web presence will it have?

Jon Hunner, New Mexico State University, (jhunner@nmsu.edu)

Vision for the Manhattan Project National Historical Park
Heather McClenahan, Executive Director
Los Alamos Historical Society

The Manhattan Project National Historical Park should be the central information point for visitors about the Manhattan Project: What it was, why it existed, who played a part in it, why it is important to U.S. and world history.

1. Visitors Centers

Based on the recommendation in the MPNHP Resource Study, develop Visitors Centers in each community in conjunction with local partners. The park should have the same "feel" in all three communities. The Visitors Centers would serve as interpretive centers with context and interconnected stories, be connected virtually to one another, and serve as "clearing houses" where rangers send visitors out to other Manhattan Project resources that exist around the communities. This model is similar to the New Orleans Jazz National Historical Park. (http://www.nps.gov/jazz).

2. Themes

a. People/Social History
   i. Scientists and their families
   ii. Military
      1. In Los Alamos (SEDs, MPs, etc.)
      2. In the Pacific, including POWs
   iii. Local Pueblo and Hispanic populations whose lives were affected and who were an essential part of the project
   iv. Local historical figures such as Edith Warner, Dorothy McKibbin, Evelyn Frey
   v. Stories of people affected by the bombings, both American and Japanese
   vi. Responses to the bomb
b. Research & Science
c. Impacts
   i. Science (national lab growth, big government/big science)
   ii. Northern New Mexico
   iii. Military
   iv. International Relations
   v. Cold War
   vi. Environmental/Health
   vii. Government
      1. Civilian control of nuclear resources (AEC, DOE)
      2. The growth of government-run multi-disciplinary science labs
d. What happened to people after the war?

3. Context

It is vital the National Park Service explain to visitors the context of WWII in which the atomic bombs were used: the depravations of four years of war; the costs in human lives, money, and material; the horrors of the war in the Pacific; the political pressures faced by Truman to bring the troops home (and how each American death was his responsibility).

Kate Brown

The non-profit, Hanford Reach Interpretive Center tells two stories today. As the name suggests, it celebrates the great American landscape of basalt flows and ice age floods, and acclaims the "crucial role" of the Manhattan Project in ending WWII. These stories are bookends, soothing, palliative and full of silences, of a much larger story.

Here is one story the Reach Center could tell about the decades omitted between the creation of the Nagasaki plutonium bomb and the declaration of the Hanford Reach. Trisha Pritikin grew up in Richland, WA. Her father was a safety inspector at the Hanford Plant. Her parents were patriots. Her father acquired an aggressive radiation-induced thyroid cancer that exploded in tumors closing off his esophagus and invading his lungs and brain. Unable to speak, Pritikin's father continued to believe that the plutonium plant was perfectly safe because government sources had said so. Soon after her father died, doctors diagnosed Trisha's mother with a terminal case of malignant melanoma. Trisha learned only as an adult that she had an infant brother who had lived only a few months. At the age of 18, Trisha began to suffer from radiogenic autoimmune thyroiditis. Migraines, vertigo, memory problems, severe indigestion and intense fatigue dogged her days as she worked through university and law school. Over the decades, her list of health problems mounted to include a thyroidectory, hypoparathyroidism, muscle contracture, bouts of paralysis, and a penetrating, encompassing chronic fatigue. Pritikin's two children, in their twenties, suffer from mysterious, unspecific health problems related to auto-immune and neurological disorders, two major disease categories among survivors of the Chernobyl disaster. "Many of us have children," she writes, "who now suffer from birth defects and debilitating disease. We will never know whether these diseases have been passed genetically to our offspring, the results of our own exposures."

Pritikin's story of three devastated generations of a family echoes in communities surrounding the Hanford Reach, as it does in other areas that produced nuclear weapons for the global, nuclear arms race. From 1951 to 1959, the peak years of production, 25% of all babies born in Richland died within a year. That number far exceeds the state average at the time of 7%. Walla Walla and Spokane counties showed a similar significant jump in infant mortalities in the fifties. The well-financed Hanford Labs did not carry out studies on the exposures of civilian neighbors of the plant, but Juanita Andrewjeski kept a tally of what she recognized was a lot of "big strapping farmers" falling sick and dying. She kept her own map of premature deaths and birth defects, a map describing a territory, which farmers in Mesa, Washington had long dubbed the "death mile."

The exhibits at the Hanford Reach today tell a story of nation, determination and heroism. There are no victims, no sullied ground, contaminated water, or radioactive native sage in this narrative. The DOE-affiliated Bradbury Museum at Los Alamos, the Smithsonian-affiliated NTS museum in Las Vegas, and the American Museum of Science and Technology in Oak Ridge have also overlooked the impact of the Manhattan Project on public health. This reticence is part of a larger trend. For decades, U.S. courts, government agencies, and legislative action consistently ruled that while nuclear workers, who were monitored for their exposures, are to be compensated for their radiogenic diseases, children of workers and downwind neighbors, who have no technical proof of their exposures, cannot claim damages for the very same illnesses. In the past decade, the National Park Service has challenged the untenable silences at Civil War battlefield and plantation sites. I look forward to seeing, as the NPS celebrates the sacrifices of Americans who built and sustained the manufacture of nuclear weapons, the memorialization of those who made the greatest sacrifices—that of their own health and the lives of their family members.

ORGANIZING AND INTERPRETIVE THEMES
USED AT THE HANFORD SITE, RICHLAND, WASHINGTON

In 1996, the U.S. Department of Energy, Richland Operations Office (DOE-RL) used both the National Register Criteria and themes developed specific to the Hanford Site to identify the Hanford Site Manhattan Project and Cold War Era Historic District. These criteria were used to organize and evaluate approximately 2,000 buildings and structures by first constructing a matrix showing the distribution of property types by themes, and then evaluating the properties within each cell of the matrix to determine which contributed significantly to the theme. Those which made a significant contribution were included in the Historic District. In addition to selecting properties, the themes also established an interpretive narrative by which those properties could be interpreted in presenting the contributions made by the Hanford Site to the Manhattan Project and subsequent Cold War, as well as the collection of artifacts that would be used in that interpretation. Themes applied on the Hanford Site included the following:

- **Acquisition of Land and Construction of the Site:** This theme focused on the actions taken to obtain the land on which the Hanford Site was constructed, and the effects of those actions on the resident communities. It included subthemes such as Native American and Euro-American displacement, materials acquisition, assembling a workforce, and accelerated schedules.
- **Plutonium Production:** This theme captured information on the Hanford Site mission to produce weapons-grade plutonium. Principal subthemes were Fuel Manufacturing, Uranium Irradiation, and Chemical Separation. Specific information was gathered relating to technologies and equipment used, as well as research and development leading to process improvements.
- **Site Security:** This theme looked at measures taken to ensure mission secrecy, as well as to physically secure the Hanford Site. It included information on the use of Federal agents, U.S. Army resources, and the establishment of the Hanford Patrol.
- **Health and Safety:** This theme identified information and resources that related to worker health and safety, air dispersion studies, biological experimentation, and the development of Health Physics.
- **Environmental Management:** This theme is similar to Health and Safety; however, its primary consideration was environmental rather than biological. The theme returned information on meteorological studies, and waste management.
- **Social History:** This theme sought to personalize the workforce and place it in historic context. It collected information on early living and working conditions, transportation, and interactions with the local area. The collection of oral histories was a key objective under this theme.

The continuing effort to collect artifacts on the Hanford Site is also driven by the themes presented above. Since the purpose of collecting and preserving artifacts is education and interpretation, a leading priority at Hanford is to make the Hanford Collection available to NPS in interpreting the Manhattan Project both at Hanford and across the Historical Park.

These themes, and their application on the Hanford Site, are offered for consideration by NPS. Upon examination, they are applicable to each of the sites within the Manhattan Project National Historical Park with site-specific adaptations.

TEMarceau
November 9, 2015

Summary Vision

The thing about this national historic park that most intrigues me is that it is divided into three parts. That fact presents challenges. Of course, the story of each site on its own terms needs to be told well. Yet to interpret each part, one needs to explain how it fits in with the other parts. As someone who has studied the history of Hanford, I want to be sure the connections between Hanford, Oak Ridge, and Los Alamos are explored. This means understanding each site's role in the larger scientific and industrial enterprise. But it could also mean looking at other factors, such as similarities and differences between the communities created at each site by the Manhattan Project (e.g., types of housing), or how the different sites operated within a federal wartime effort to manage and control labor.

Besides contextualizing each site in terms of the others, there is also a need to link each site to the bigger story of the development of atomic bombs. This is a story that many prospective visitors will be familiar with, and I think it is best to anticipate their familiarity with that story and try to connect each of the three park sites to it. Elements of that bigger story are: a) the history of physics leading up to and during the Manhattan Project; b) the military, diplomatic, and political contexts in which U.S. leaders decided to develop, test, and use atomic bombs; c) the bombing of Hiroshima and Nagasaki; and d) the many aftermaths of the bombs, including the "Atomic Age," Cold-War build-up, environmental and health impacts, the ensuing debates about nuclear weapons and nuclear energy more generally, and so on. Aspects of this bigger story of course remain contentious, even 70 years later. Yet not addressing the bigger story in some way would mean doing less than we should do.

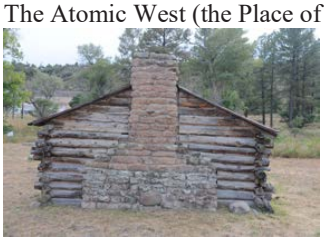
Regarding Hanford in particular, I urge that Native peoples in the vicinity be included in this process. I urge that park developers keep in mind the perspectives of local residents who see themselves as prime stakeholders in Hanford's story and who are likely to be a key audiences and boosters for the park. Finally, I urge that park developers commit to making the B Reactor as accessible as possible to visitors.

John Findlay
Univ. of Washington, Seattle

Manhattan Project National Historical Park Scholars' Forum, November 9–10, 2015
Selected Los Alamos National Laboratory Themes

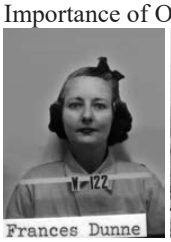
Displacement Stories (Hispanic Homesteaders):


The Atomic West (the Place of Los Alamos):



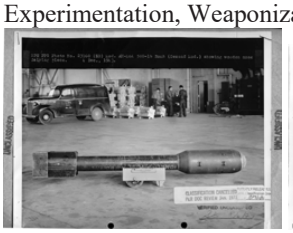

Overshadowed Contributions (the U.S. Navy, Other Military, Private Industry, Universities):


The Role of Women, Local Pueblos, SEDs, and the Importance of Oral History and Memoir:



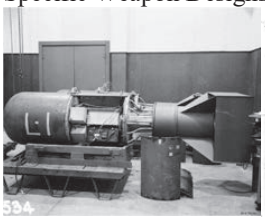
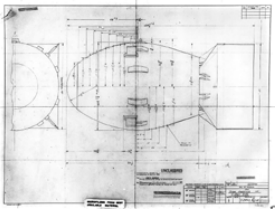
Historical Landscapes and the Built Environment:


The Importance of Applied Physics, Engineering, Experimentation, Weaponization, and Planning:



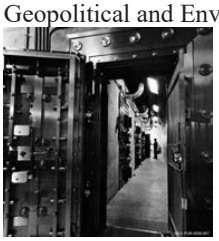

Themes of Youth, Risk, Wartime Urgency, Expediency, Safety, and Security:


Specific Weapon Designs and Related Technology:

Consequences:


Geopolitical and Environmental Legacies:

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Areas of Expertise/Relevant Publications:

Machen, Judith, Ellen McGehee, and Dorothy Hoard. *Homesteading on the Pajarito Plateau, 1887-1942*. Los Alamos, New Mexico: Los Alamos National Laboratory, 2012.

McGehee, Ellen. "The Women of Project Y: Working at the Birthplace of the Bomb, Los Alamos, New Mexico, 1942-1946." Master's Thesis, University of New Mexico, 2004.

McGehee, Ellen, and John Isaacson. "Interpreting the Bomb: Contested History and the Proposed Manhattan Project National Historical Park at Los Alamos." *Journal of the West* 50, no. 3 (Summer 2011): 51-61.

McGehee, Ellen. "Commemorating Controversy: Place-Making at the Birthplace of the Bomb." Ph.D. Dissertation, University of New Mexico, 2015.

General Groves and Oak Ridge

by Robert S. Norris

A Paper for the National Park Service forum, November 2015

Choosing the site

Colonel Leslie Richard Groves was chosen to head the Manhattan Project on September 17, 1942. Two days later he ordered the purchase of 56,200 acres along the Clinch River in the hills of eastern Tennessee as the site for the uranium enrichment and plutonium factories.

I had always wondered how he could have made such a decision in so little time. In doing the research for my book (*Racing for the Bomb*) I discovered that Groves was not the first head of the Manhattan Project and that what came to be known as Site X and later Oak Ridge, and was initially known as the Clinton Engineer Works, had been under consideration as a site for at least four months.

When Vannevar Bush, FDR's science adviser, decided to hide the bomb project within the vast Army budget in early December 1941 it took some time for Chief of Staff General George C. Marshall and Secretary of War Henry L. Stimson to assign an officer to head the project. The task fell to officers of the Corps of Engineers and Col. James C. Marshall was selected on June 18, 1942. Marshall, a West Point graduate (a class ahead of Groves) and a competent engineer was the Syracuse District Engineer at the time. He requested as his assistant a Lt. Col. Kenneth D. Nichols a figure who will play a prominent role in Oak Ridge's history. From the very first day James Marshall got the job he reported to Colonel Groves who at the time was deputy chief of construction for the Corps of Engineers. So for three months prior to getting the job himself Groves was aware of what Marshall was doing or not doing. High on James Marshall's list was whether to seize and purchase the Tennessee site. But even prior to Marshall's selection in June the Clinch River site was being considered.

Arthur H. Compton was mainly responsible for this. Compton, a Nobel Prize winner, was the head of a group of scientists based at the University of Chicago who were investigating enrichment technologies and plutonium production. The Tennessee site was first investigated in April 1942 and, as Compton recounts in his 1956 book

Atomic Quest, he and several of his Chicago colleagues visited Tennessee in early May of 1942.

Clinch River was not the only site in eastern Tennessee or the only site under consideration. Compton informs us that his preference was in the Indiana dunes close to the shores of Lake Michigan. But by May Compton and the others had decided that, what came to be known as Oak Ridge, was the preferred site. It was near the TVA for electricity, it was isolated yet near a labor pool in Knoxville, there was a source of water, there was rugged terrain, with hills and valleys that would isolate damage in the case of an explosion, and there was a mild climate to permit winter construction. A contractor was also under consideration mainly at the recommendation of Groves. Groves had used the Boston firm Stone & Webster on many army construction projects during the mobilization period and he urged Marshall to sign them up.

Throughout the summer of 1942 Vannevar Bush and his colleagues were becoming increasingly dissatisfied with Marshall's indecision and slow pace. If the bomb had a chance of being built and playing a role in the war then things would have to move faster, much faster. Pressure by Vannevar Bush and James Conant was put on George Marshall, on Stimson and on the ranking officers of the Corps of Engineers to find a replacement. Specifically it was Lieutenant General Brehon B. Somervell (head of Army Service Forces) and Major General Wilhelm D. Styer (Somervell's Chief of Staff) that chose Colonel Leslie R. Groves on or about September 16th. Groves was informed by Somervell of his new assignment on the morning of September 17, in the hallway of what is now the Cannon House Office Building after testifying before the Military Affairs Committee. Groves was not pleased with the news. Apparently he had just been offered a position overseas where the war was going to be fought and where combat engineers were going to be needed. It was not to be.

While Oak Ridge had long been the top choice there was considerable difference over how much land should be seized. Compton mentions that he envisaged a site of two or three square miles, around 2,000 acres. After Groves assessed the situation he decided that eighty square miles or more than 50,000 acres would be better.

Building the atomic factories

Let us take a quick tour of Groves' involvement in the building of the major facilities at Oak Ridge. One of Groves' early decisions was to split the sites for uranium enrichment and plutonium production. The latter would go to Hanford, Washington, another piece of real estate, about ten times as large as Oak Ridge that was chosen by Groves. But it was decided to keep a small reactor at Oak Ridge to produce minute amounts of plutonium for experimental purposes. This would be X-10.

X-10: X-10 and the reprocessing facility that went with it were used by the Chicago and Du Pont scientists to help answer questions about the Hanford project and to supply plutonium samples to Los Alamos. Ground was broken in February 1943 and the air-cooled pile went critical nine months later on November 4, producing plutonium by the end of the month.

Y-12: Groves chose Stone & Webster to design and build the Y-12 electromagnetic isotope separation plant. The process was based on the ideas and concepts of Nobel Prize winner Ernest O. Lawrence and his Berkeley team. Groves had built Ordnance Works with Stone & Webster during the mobilization period and knew the president John Lotz and the chief engineer, August (Gus) Klein well. To operate Y-12 Groves selected Tennessee Eastman. Groves knew its President James C. White and convinced him to take the job, though neither the purpose nor the location were discussed. If General Groves walked into your office and wanted something it was virtually impossible to say no.

One example of this was Groves' solution to the priorities problem. Groves had just spent the previous two years grappling with the priority system whereby resources (steel, copper, and dozens of other items) were allocated to projects on a graduated scale, with AAA the highest. The competition for resources was fierce and success or failure often depended on what rating your project received. On September 19, the same day he bought Oak Ridge, Groves marched into Donald Nelson's office at the War Production Board with a letter in hand, to himself, only lacking Nelson's signature. The letter said that Director Nelson agreed to provide a AAA rating (or any lesser rating that Groves

determined) to the Manhattan District. Nelson of course knew nothing about the Manhattan Project, had never laid eyes on Groves, and initially refused to sign. At this point Groves applied a hammerlock on Nelson and told him he would recommend to Secretary Stimson that the Project be abandoned on the grounds that the Director of the War Production Board refused to carry out the wishes of President Roosevelt. At this point Nelson demanded to sign and there were no further problems concerning priorities for the remainder of the war.. As I said if General Groves walked into your office and wanted something it was virtually impossible to say no. He was a bureaucratic warrior of the first rank.

As for Tennessee Eastman, Groves and the Corps had just built the nearby Holston Ordnance Works to produce RDX, a more powerful explosive than TNT. I argue in the book that the way that Groves went about building Holston would be a model for the Manhattan Project. Other companies that were involved in Y-12 were Allis-Chalmers, General Electric and Westinghouse, all firms Groves had worked with before. Ground was broken on February 18, 1943 and by early 1945 the first amounts of weapon-grade uranium were shipped to Los Alamos. The complex eventually comprised some two hundred buildings spread over 825 acres with 22,500 employees. The cost to build and operate Y-12 during the Manhattan years was $477 million, which is approximately $10 billion in today's dollars.

K-25: The second enrichment process at Oak Ridge was the gaseous diffusion method based on research by the Nobel Prize winning scientist Harold Urey of Columbia University and his colleagues. As with his other atomic factories Groves recruited large industrial corporations to design, build, and operate what came to be known as K-25.

Designing K-25: To design K-25 Groves chose Percival C. (Dobie) Keith. Keith was a VP of the M.W. Kellogg Company and one of the top chemical engineers in the country. Keith, born in 1900, had grown up in Sharon, Texas and after college did three years of graduate work at MIT with a degree in chemical and electrical engineering. As an executive with Kellogg he was already knowledgeable about the secret research on isotope separation and had been on the OSRD Planning Board, a forerunner of the S-1 Committee, for one year. He first met Groves in December 1942 and they got on well.

Initially he refused the job but his former Professor W.K. Lewis of MIT told him to take it. He demanded to be given complete responsibility and Groves gave it to him. A subsidiary of Kellogg, known as Kellex, was formed and eventually 3,000 personnel worked at headquarters, on three floors of the Woolworth Building in lower Manhattan, and elsewhere.

Building K-25: To build the plant Groves chose the J.A. Jones Company of Charlotte, NC. J.A. Jones had built more Army camps under Groves' supervision than any other contractor in America and Groves knew Edwin Lee Jones, the eldest son of James Addison Jones well. The building was staggering in its scale, covering 43 acres. The main building resembled a squared-off letter U. Each side was 2,450 feet long and 400 feet wide, with the floor space approaching that of the Pentagon, another of Groves' construction projects that was completed in January 1943. The peak labor force to build it occurred in April 1944 at 19,680 with many of those housed in the temporary facilities at nearby Happy Valley.

Operating K-25: Groves recruited the Union Carbide & Carbon Corporation to operate K-25. Some of their affiliate companies were already involved in Manhattan Project activities. The company came highly recommended by Keith and DuPont. The key person was James A. Rafferty a chemical engineer by training and executive VP since 1939. He was a dynamo within the company, a leader in the new industry of deriving synthetics from petroleum. Groves met Rafferty at the Union Carbide offices on the corner of 42 Street and Madison Avenue in New York City around Christmastime 1942. They liked each other immediately and Rafferty assembled a team that worked with Kellex and Jones as it was being designed and built so that it would be operating properly it when it was done. The total cost to build and operate K-25 was $512 million, which is approximately $10.7 billion in today's dollars.

Three Problems at K-25: Let us briefly look at three seemingly overwhelming problems that had to solved if the gaseous diffusion method was to work. These examples show the ingenuity that expressed itself over and over during the Manhattan Project.

The first was to find someone to design and manufacture large metal diffusers, containers in which the barrier material that would separate the isotopes would be placed.

On March 20, 1943 K.T. Keller, the President of Chrysler was contacted and a meeting with Groves, Nichols, and Keith took place in Detroit on April 2nd. KT was quite a figure in his own right. Born dirt poor in 1885 he pulled himself up by his bootstraps and after working at General Motors for 14 years came to Chrysler. He was a tough character, knew everything about Chrysler and was made president in 1935. KT was briefed that several thousand of these diffusers would be needed and they had to be able to resist the highly corrosive uranium hexafluoride gas. The only material that would resist the gas was nickel. Making them out of solid nickel was out of the question as it would have consumed the entire national supply. The logical solution was to plate steel with nickel. The attempts thus far had not worked as the gas ate through the plating. Chrysler was known for its plating innovations and KT accepted the challenge, and received a $75 million contract. He gave the problem to Dr. Carl E. Heussner the Director of the plating laboratory and the problem was solved in less than two months by the end of May. Within Chrysler the secret project was known as X-100. To manufacture and plate the diffusers Chrysler converted a Dodge automobile plant (then making tank transmissions and truck parts) known as the Lynch Road factory in eastern Detroit. Absolute cleanliness standards were imposed. Chrysler would eventually deliver over 3,500 of diffusers to K-25.

The second problem had to do with designing and manufacturing compressor pumps to force the gas through the cascades at high velocity. The crucial problem was that the pumps needed to have seals that were leak proof. They had to be resistant to the corrosive gas and work without any lubricants which would contaminate the process. Groves went to Allis-Chalmers, of Milwaukee, WI which was already building the gigantic magnets for Y-12. They were told to build a pump plant — and did so in 57 days beginning in April 1943 — but without the precise design for the pump, a typical Manhattan Project procedure. Dobie Keith recruited George Watts, the chief engineer of Standard Oil of Indiana, who was given primary responsibility and Groves called President Edward Seubert to have him released. The pump was actually invented by Judson Swearingen and Allis-Chalmers delivered 7,000 compressors to Oak Ridge on time.

The third problem was to design and produce a porous barrier or membrane that would allow the lighter U-235 atoms of the uranium hexafluoride gas to pass through but not the heavier U-238 ones and not be destroyed in the process. Much of the work was done at Columbia University. The holes had to be tiny, one-ten thousandth of a millimeter, could not become clogged, and must be tough enough to withstand high pressures. The preliminary designs were thumb-sized while several million square feet of the material eventually would be needed. One promising candidate was the Norris-Adler barrier, but the design ran into problems at the Columbia pilot plant. The material was brittle and the holes got clogged. A competing design was offered by Clarence Johnson, a Kellex engineer, with much help from others. Groves was faced with choosing which design would be used to produce on a mass scale. He initially chose the Norris-Adler design and hoped there would be improvements and a plant in Decatur, Illinois was being built to produce it. But by January 1944 the design looked less promising. After an all night drive through Indiana and half of Illinois Groves arrived at the Decatur factory for a meeting. He announced his decision to the startled executives and ordered the almost finished plant stripped of the just-installed equipment and rebuilt to manufacture the Johnson-Kellex barrier material. By the summer of 1944 large quantities of the material were being shipped to the Lynch Road facility to be placed inside the diffusers and from there on to K-25.

S-50: Groves later acknowledged that one of his mistakes was not to have explored the liquid thermal diffusion process earlier. This had to do in part with the fact that it was a Navy research program. Eventually in the spring of 1944 it was brought to his attention that, by enriching the uranium through thermal diffusion the resulting slightly enriched uranium could be used as feed for the other two processes. Once convinced that linking the three enrichment processes together would speed things up Groves wasted no time in building S-50. He chose H.K. Ferguson, another company that he had had good experiences with and put one of his engineers, a Lt. Col. Mark Fox in charge. He told Fox that he wanted to begin operations in 120 days. When Fox complained Groves said now he wanted the first product in 90 days. When Fox complained again Groves said that now he wanted it in 75 days. Fox shut up after that and got busy. On September 17, 1944,

sixty-six days after ground had been broken, one-third of the plant was complete, enough to begin preliminary operations.

Groves' visits to Oak Ridge

Let's look for a moment at Groves' work habits and what he did on his visits to Oak Ridge. Groves had amazing stamina. His workday was normally twelve to fourteen hours long. Six-day weeks were routine and an occasional Sunday was not infrequent. Groves was extraordinarily effective in using his time to full advantage, awake or asleep. There was barely a minute wasted throughout the day. Just reading the daily log of calls, visits, and visitors in his appointment book makes one weary. Part of his secret — one that he no doubt shares with other leaders who have huge responsibilities — was his ability to focus on an issue or problem and work through it until it was solved or a decision was made. Groves was faced, of course, not with just one issue, problem, or decision but with dozens of them in a never-ending stream. His ability to compartmentalize them in his mind, making a decision and then moving on, kept the long list from overwhelming him.

Over a period of seven years Groves did not take a vacation and was never sick. There was an occasional day off here or there, but certainly not anything serious or sustained in the way of rest and relaxation. The intense period of mobilization and early wartime construction work from 1940 to September 1942 was followed by the even more intense three years that it took to build the bomb.

Throughout the latter period Groves was out of Washington more than half of each month. Initially he had to familiarize himself with the status of the project, mainly at university campuses. The next step was to decide upon the location of the major sites. In addition to selecting Oak Ridge he also chose the two other main sites in New Mexico and Washington State. By the spring of 1943 construction was well under way everywhere, and the purpose of his visits was to speed the projects' completion through constant, unrelenting pressure.

Much of his travel was by railroad aboard some of the celebrated trains of the day. Washington's Union Station was his point of embarkation to Chicago, Knoxville, San Francisco, Pasco, Washington, Santa Fe, Detroit, Boston, New York, Wilmington, Pittsburgh, Montreal, and elsewhere. A transcontinental trip could take three or four days.

According to Groves' appointment book, meticulously kept by his able assistant Jean O'Leary, he visited Oak Ridge 36 times from September 1942 until the summer of 1945. After the initial visit in late September 1942 he came to Oak Ridge 11 times in 1943, 18 times in 1944 and 6 times in the first half of 1945b, by my count. Normally he would spend just one day, but occasionally he would stay over night and either return to Washington the following day or continue on to points west.

Groves used the train as his mobile office. He normally traveled in civilian clothes, and his roomette became the temporary headquarters of the Manhattan Project. To cram more work into a day, upon leaving Washington Mrs. O'Leary or another aide would occasionally accompany him partway while he dictated letters, gave instructions, and kept on top of his busy schedule. After an hour or two the assistant would get off, take another train back to the office, send off the letters, file the reports, and schedule his future appointments. Sometimes an aide might travel to meet him as he was returning. If he had been in Los Alamos an aide might meet the General's train in Chicago, and return with him the rest of the way to Washington, briefing him on developments while he was gone, bringing him reports, mail, and news from the office. By the time the train pulled into Union Station, many hours of work had been accomplished. Another time saver was to schedule short meetings at the railroad station while en route to somewhere else. For example, the train trip to New Mexico went through Chicago; a brief meeting there with the Area Engineer could be used to solve problems and make decisions. When he could, Groves used Sundays to travel. To save valuable time on weekdays the general left in the late afternoon or evening and traveled overnight, arriving at his destination in the morning fresh and ready for action.

His usual routine when coming to Oak Ridge was to take the 4:30 P.M. train from Washington's Union Station and arrive in Knoxville at 6:55 A.M. the next morning. A car and driver would meet him and they would quickly proceed on Route 62 probably passing through the Solway gate and be in Oak Ridge by 8 o'clock. He would then spend the next eight hours or so conferring with District Engineer Col. Kenneth D. Nichols at the administration building, known as the "Castle," and with scientists, engineers and corporate officials and with army personnel. He might consult with Town Manager Capt. P. E. O'Meara or Roane-Anderson project manager Clinton Hernandez to see if things

were running smoothly for, by the summer of 1945, Oak Ridge's 75,000 inhabitants. He would often visit Y-12, K-25, X-10 and S-50 urging everyone to work harder and faster to produce the ingredient that might help shorten the war.

As he drove around he might see the Pine Valley Barber Shop at New York and Utah, Foster's Beauty Shop on Outer Drive, the Cafeterias for the Colored Hutments and the White Hutments, the Tulip Town Super Market in Grove Center, the five theaters, the nine schools, Reeders Service Station and Garage on the Oak Ridge Turnpike. He drove past the Type A through F modular houses, that had shot up like mushrooms, based on Skidmore, Owings and Merrill designs.. And if he looked carefully he might notice Mr. William J. Wilcox, Jr. working for Tennessee Eastman at Building 9203 or see James Westcott taking photographs.

If it was a one-day trip he would take the afternoon train back to Washington, arriving early the next morning and headed directly to the office for a full day of appointments. If he stayed overnight it was either at the Brannon house at 151 Oak Ridge Turnpike or at the Guest House, later known as the Alexander Inn. Groves was a fervent tennis player and it is possible that he might have played a set or two on the courts in front of the Guest House. It is also possible that he spent a night or two in the Oak Ridge Hospital, for security purposes possibly in the maternity ward, under the care of Dr. Charles Rea who tried to prescribe a short rest for him from the demanding pace he maintained.

In conclusion I have argued that Groves was the indispensable man in building the bomb. There have been few people who equaled his genius for getting things done. If time permitted I could have also presented Groves at Hanford, Groves at Los Alamos and Groves in Washington, DC to round out the tale. His skill at organizing this gigantic industrial, engineering and scientific project and bringing it to a successful culmination in a little over 1,000 days is truly impressive. Our nation needs such people from time to time and it is clear in Groves' case that he was the right man at the right place at the right time.

In coming to know Groves, as I have in writing his biography, he strikes me as distinctively American, exhibiting qualities that we like and prize. He is the can-do, no-nonsense individual who gets the job done no matter what. By the same token his

success in building the bomb has left us with numerous challenges of our own; threats of terrorist A-bombs, environmental problems without easy solutions, new aspirants and new arms races. Mastering these will require special skills. It would be good to have the General here to help.

Attendees

Kate Brown at University of Maryland, Baltimore County. She has written a highly acclaimed book, *Plutopia*, that deals with the environmental and ethical issues.

Tom Crouch at Air and Space Museum, Smithsonian Institution. He was involved in the controversy surrounding the Enola Gay. He also was the curator for the Japanese Internment Exhibit at the American History Museum.

John Findlay at University of Washington has co-authored a book on Hanford, and more particularly for us, he has worked very closely with the National Park Service on a number of projects.

David Harvey, Hanford--specialist in pre-Manhattan Project era and Manhattan Project built environment.

Bruce Hevly also at University of Washington was the co-author with Findlay on the Hanford book. They complement each other in that Hevly deals with the science side of the story, and Findlay deals with the history side.

Jon Hunner at New Mexico State University has written extensively on Los Alamos and Oppenheimer.

Cindy Kelly at the Atomic Heritage Foundation, whose mission is "Preserving and Interpreting the Manhattan Project: Dedicated to creating a Manhattan Project National Historical Park and capturing the memories of the people who harnessed the energy of the atom."

Denise Kiernan, who wrote a book on Oak Ridge, the *Girls of Atomic City*, which is highly regarded.

Andy Kirk at the University of Nevada Las Vegas has conducted an extensive oral history project on the Manhattan Project, and he, like John Findlay has worked extensively with the National Park Service.

Yasuyoshi Komizo, Chairman Hiroshima Peace Culture Foundation, retired from the Ministry of Foreign Affairs of Japan.

L John Lonnquest, Chief, Office of History, HQ US Army Corps of Engineers, Manhattan Engineer District was part of Army Corps of Engineers.

Thomas Marceau, Hanford specialist, tribal affairs and built environment.

Heather McClenahan, Executive Director, Los Alamos History.

Ellen McGehee, Historian, Los Alamos National Laboratory

Robert Norris at the Natural Resources Defense Council in Washington, DC, has written a highly regarded book in General Leslie Groves.

Don Shapero is the retired director of the Physics and Astronomy Committee at the National Academy of Sciences. As an accomplished physicist, he can help us all better understand the physics of the bomb.

D. Ray Smith, Historian/Y-12 contractor, responsible for the Y-12 History Center in the New Hope Center and with extensive popular publications re Y-12 and the Manhattan Project.

Dr. Masao Tomonaga, Researcher in the field of leukemia, especially atomic bomb survivor's cancer and leukemia.

J. Samuel Walker, Retired Historian of the Nuclear Regulatory Commission, author of major works on history of nuclear regulation and Prompt and Utter Destruction: Truman and the Use of Atomic Bombs Against Japan.

Experience Your America

Manhattan Project National Historical Park

New Mexico, Tennessee, Washington