Idaho National Engineering and Environmental Laboratory Cultural Resource Management Plan

August 2004

Prepared for the
U.S. Department of Energy
Idaho Operations Office
ABSTRACT

As a federal agency, The U.S. Department of Energy has been directed by Congress, the U.S. president, and the American public to provide leadership in the preservation of prehistoric, historic, and other cultural resources on the lands it administers. This mandate to preserve cultural resources in a spirit of stewardship for the future is outlined in various federal preservation laws, regulations, and guidelines such as the National Historic Preservation Act, the Archaeological Resources Protection Act, and the National Environmental Policy Act. The purpose of this Cultural Resource Management Plan is to describe how the Department of Energy, Idaho Operations Office will meet these responsibilities at the Idaho National Engineering and Environmental Laboratory.

This Laboratory, which is located in southeastern Idaho, is home to a wide variety of important cultural resources representing the entire 12,000+-year span of human occupation of southeastern Idaho. These resources are nonrenewable; bear valuable physical and intangible legacies; and yield important information about the past, present, and perhaps the future. There are special challenges associated with balancing the preservation of these sites with the management and ongoing operation of an active scientific laboratory. The Department of Energy, Idaho Operations Office is committed to a cultural resource management program that accepts these challenges in a manner reflecting both the spirit and intent of the legislative mandates.

This document is designed for multiple uses and is intended to be flexible and responsive to future changes in law or mission. Document flexibility and responsiveness will be assured through annual reviews and as-needed updates. Document content includes summaries of Laboratory cultural resource philosophy and overall Department of Energy policy; brief contextual overviews of Laboratory missions, environment, and cultural history; and an overview of cultural resource management practices. A series of appendices provides important details that support the main text.
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ACRONYMS

The acronyms, abbreviations, initialisms, and symbols contained in the following list include those used to denote terms in both the body of this document and the appendices, with the exception of form examples (e.g., Figure 8) where both the acronym and full term are provided. Symbols are provided at the end of this list.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Term</th>
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<tr>
<td>A1W</td>
<td>large ship reactor (A for aircraft carrier, 1 for first model, and W for the designer, Westinghouse)</td>
</tr>
<tr>
<td>A&amp;M</td>
<td>Assembly and Maintenance building (TAN-607)</td>
</tr>
<tr>
<td>ACETS</td>
<td>Advanced Combined Environments Test Station</td>
</tr>
<tr>
<td>ACHP</td>
<td>Advisory Council on Historic Preservation</td>
</tr>
<tr>
<td>ACRS</td>
<td>Advisory Committee on Reactor Safeguards</td>
</tr>
<tr>
<td>A.D.</td>
<td>anno Domini (in the year of the Lord)</td>
</tr>
<tr>
<td>Admin</td>
<td>administration (administrative)</td>
</tr>
<tr>
<td>AEC</td>
<td>Atomic Energy Commission (also “USAEC,” DOE predecessor)</td>
</tr>
<tr>
<td>AEF</td>
<td>Argonne Experimental Facility</td>
</tr>
<tr>
<td>AFSR</td>
<td>Argonne Fast Source Reactor</td>
</tr>
<tr>
<td>AIP</td>
<td>agreement in principle</td>
</tr>
<tr>
<td>AIRFA</td>
<td>American Indian Religious Freedom Act</td>
</tr>
<tr>
<td>ALARA</td>
<td>as low as reasonably achievable</td>
</tr>
<tr>
<td>ALPR</td>
<td>Argonne Low Power Reactor</td>
</tr>
<tr>
<td>AMWTP</td>
<td>Advanced Mixed Waste Treatment Project</td>
</tr>
<tr>
<td>ANCR</td>
<td>Aerojet Nuclear Company Report (technical report designation)</td>
</tr>
<tr>
<td>ANL</td>
<td>Argonne National Laboratory</td>
</tr>
<tr>
<td>ANL-W</td>
<td>Argonne National Laboratory-West (INEEL)</td>
</tr>
<tr>
<td>ANLW</td>
<td>Argonne National Laboratory-West (archaeological field or project designator)</td>
</tr>
<tr>
<td>ANP</td>
<td>Aircraft Nuclear Propulsion</td>
</tr>
<tr>
<td>ANPP</td>
<td>Aircraft Nuclear Propulsion Program</td>
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</tbody>
</table>
anti-C  anti-contamination (protective clothing)
APEX  Atomic Products Division of General Electric (technical report designation)
APMP  Architectural Properties Management Plan
ARA  Army Reactor Area (renamed the Auxiliary Reactor Area)
ARPA  Archaeological Resource Protection Act of 1979
ARVFS  Advanced Reentry Vehicle Fuzing System
ATR  Advanced Test Reactor
B  building (designator)
BBWI  Bechtel BWXT Idaho, LLC
BCP  Baseline Change Proposal
BIA  Bureau of Indian Affairs
bldg.  building
BLM  Bureau of Land Management
Blvd.  boulevard
BM  Bingham county
BORAX  Boiling-Water Reactor Experiment
B.P.  before present (i.e., before 1950 A.D.)
BRX  Boiling-Water Reactor Experiment (archaeological field designator)
BT  Butte county
BV  Bonneville county
BWP  Buried Waste Program
BWXT  BWX Technologies, Inc.
C  Celsius
C1W  cruiser ship reactor (C for cruiser, 1 for first model, and W for the designer, Westinghouse)
ca.  circa, in approximately, around (abbreviation for Latin “circum”)
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
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<tbody>
<tr>
<td>CAB</td>
<td>Citizens Advisory Board</td>
</tr>
<tr>
<td>CCD</td>
<td>Corrosive Chemical Disposal Area</td>
</tr>
<tr>
<td>CDC</td>
<td>Capsule Driver Core</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>CERT</td>
<td>Controlled Environmental Radioiodine Tests</td>
</tr>
<tr>
<td>cf.</td>
<td>compare (Latin abbreviation for “conferre”)</td>
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<tr>
<td>CF</td>
<td>Central Facilities building designation</td>
</tr>
<tr>
<td>CFA</td>
<td>Central Facilities Area</td>
</tr>
<tr>
<td>CFLUP</td>
<td>Comprehensive Facility and Land Use Plan (INEEL)</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CFRD</td>
<td>corporate funded research and development</td>
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<tr>
<td>cm</td>
<td>centimeter</td>
</tr>
<tr>
<td>Co.</td>
<td>Company</td>
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<td>COM</td>
<td>communication</td>
</tr>
<tr>
<td>CP-1</td>
<td>Chicago Pile #1</td>
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<tr>
<td>CPP</td>
<td>Chemical Processing Plant (used primarily as an SSC designation)</td>
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<tr>
<td>Cr.</td>
<td>creek</td>
</tr>
<tr>
<td>CRBR</td>
<td>Clinch River Breeder Reactor</td>
</tr>
<tr>
<td>CRCE</td>
<td>Cavity Reactor Critical Experiment</td>
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<tr>
<td>CRM</td>
<td>cultural resource management (also “Cultural Resource Management,” e.g., INEEL CRM Office)</td>
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<tr>
<td>CRMO</td>
<td>Cultural Resource Management Office (also “CRM Office”)</td>
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<tr>
<td>CRMP</td>
<td>Cultural Resource Management Plan</td>
</tr>
<tr>
<td>CRWG</td>
<td>Cultural Resources Working Group</td>
</tr>
<tr>
<td>D$_2$O</td>
<td>deuterium oxide (also “heavy water,” two parts deuterium and one part oxygen)</td>
</tr>
<tr>
<td>DC</td>
<td>Defense Communication (technical report designation)</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>D.C.</td>
<td>District of Columbia</td>
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<tr>
<td>DCS</td>
<td>distributed control system</td>
</tr>
<tr>
<td>DD&amp;D</td>
<td>deactivation, decontamination, and demolition</td>
</tr>
<tr>
<td>DEQ</td>
<td>Idaho Department of Environmental Quality</td>
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<tr>
<td>DEW</td>
<td>Defense Early Warning (later the Ballistic Missile Early Warning System)</td>
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<tr>
<td>DOD</td>
<td>Department of Defense</td>
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<tr>
<td>DOE</td>
<td>Department of Energy</td>
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<tr>
<td>DOE-HQ</td>
<td>Department of Energy, Headquarters</td>
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<tr>
<td>DOE-ID</td>
<td>Department of Energy, Idaho Operations Office (now DOE Idaho)</td>
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<tr>
<td>DOE/ID</td>
<td>DOE Idaho (technical report designation)</td>
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<td>Department of Energy, Idaho Operations Office (formerly DOE-ID)</td>
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<tr>
<td>E</td>
<td>east</td>
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<tr>
<td>EA</td>
<td>environmental assessment</td>
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<tr>
<td>EBOR</td>
<td>Experimental Beryllium Oxide Reactor</td>
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<tr>
<td>EBR-I</td>
<td>Experimental Breeder Reactor (e.g., EBR-I)</td>
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<tr>
<td>EBWR</td>
<td>Experimental Boiling Water Reactor</td>
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<td>EC</td>
<td>environmental checklist</td>
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<tr>
<td>ECCS</td>
<td>Emergency Core Cooling System</td>
</tr>
<tr>
<td>ECF</td>
<td>Expended Core Facility</td>
</tr>
<tr>
<td>ECW</td>
<td>ECW Press (Essays on Canadian Writing, et seq.)</td>
</tr>
<tr>
<td>ed.</td>
<td>edition</td>
</tr>
<tr>
<td>e.g.</td>
<td>for example (Latin abbreviation for “exempli gratia”)</td>
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<tr>
<td>EG&amp;G</td>
<td>EG&amp;G Technical Services, Inc. (originally Edgerton, Germeshausen, and Grier, Inc.)</td>
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<tr>
<td>EH</td>
<td>Environmental, Safety, and Health (DOE-HQ division)</td>
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<tr>
<td>EIS</td>
<td>environmental impact statement</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>EM</td>
<td>Environmental Management Office of the Department of Energy</td>
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<tr>
<td>e-mail</td>
<td>electronic mail (also “E-mail”)</td>
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<tr>
<td>EO</td>
<td>Executive Order</td>
</tr>
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<td>EOCR</td>
<td>Experimental Organic Cooled Reactor</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>ER</td>
<td>environmental restoration</td>
</tr>
<tr>
<td>ERDA</td>
<td>Energy Research and Development Administration (DOE predecessor)</td>
</tr>
<tr>
<td>ESRF</td>
<td>Environmental Sciences and Research Foundation</td>
</tr>
<tr>
<td>et al.</td>
<td>and others (abbreviation for Latin feminine plural “et aliae,” masculine plural “et alil,” or neutral plural “et alia”)</td>
</tr>
<tr>
<td>etc.</td>
<td>and so forth (abbreviation for Latin “et cetera”)</td>
</tr>
<tr>
<td>ETR</td>
<td>Engineering Test Reactor</td>
</tr>
<tr>
<td>ETRC</td>
<td>Engineering Test Reactor Critical Facility</td>
</tr>
<tr>
<td>et seq.</td>
<td>and those that follow (abbreviation for Latin “et sequens”)</td>
</tr>
<tr>
<td>EXT</td>
<td>external (INEEL technical report designation)</td>
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<tr>
<td>FAA</td>
<td>Federal Aviation Administration</td>
</tr>
<tr>
<td>FAST</td>
<td>Fluorinel Dissolution Process and Fuel Storage (project and facility, CPP-666)</td>
</tr>
<tr>
<td>FAV</td>
<td>Fast Attack Vehicle (canceled project)</td>
</tr>
<tr>
<td>Fax</td>
<td>facsimile</td>
</tr>
<tr>
<td>FCF</td>
<td>Fuel Cycle Facility (renamed “Fuel Conditioning Facility”)</td>
</tr>
<tr>
<td>FDP</td>
<td>Fluorinel Dissolution Process</td>
</tr>
<tr>
<td>FET</td>
<td>Field Engineering Test (LOFT facility, formerly FETF)</td>
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<tr>
<td>FETF</td>
<td>Flight Engine Test Facility (now FET)</td>
</tr>
<tr>
<td>FFA/CO</td>
<td>Federal Facility Agreement and Consent Order</td>
</tr>
<tr>
<td>FONSI</td>
<td>finding of no significant impact</td>
</tr>
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<td>FPR</td>
<td>fuel processing restoration</td>
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<td>Abbreviation</td>
<td>Definition</td>
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<tr>
<td>FRAN</td>
<td>Fast Burst Reactor (nuclear effects reactor)</td>
</tr>
<tr>
<td>FS&amp;R</td>
<td>Filling, Storage, and Remelt System</td>
</tr>
<tr>
<td>ft</td>
<td>feet (foot; also “ ‘ ”)</td>
</tr>
<tr>
<td>FY</td>
<td>fiscal year</td>
</tr>
<tr>
<td>GCRE</td>
<td>Gas-Cooled Reactor Experiment</td>
</tr>
<tr>
<td>GE</td>
<td>General Electric Company</td>
</tr>
<tr>
<td>GIS</td>
<td>geographical information system</td>
</tr>
<tr>
<td>Govt</td>
<td>government</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>H₂O</td>
<td>water (two parts hydrogen and one part oxygen)</td>
</tr>
<tr>
<td>HABS</td>
<td>Historic American Buildings Survey</td>
</tr>
<tr>
<td>HAER</td>
<td>Historic American Engineering Record</td>
</tr>
<tr>
<td>HBIS</td>
<td>Historic Building Inventory Survey</td>
</tr>
<tr>
<td>HEPA</td>
<td>high efficiency particulate air</td>
</tr>
<tr>
<td>HETO</td>
<td>Heritage Tribal Office (formerly Tribal CRM Office)</td>
</tr>
<tr>
<td>HFEF</td>
<td>Hot Fuel Examination Facility</td>
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<td>HIST</td>
<td>history (archaeological project designator)</td>
</tr>
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<td>HPTF</td>
<td>Health Physics Test Facility</td>
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<tr>
<td>HTGR</td>
<td>High Temperature Gas Cooled Reactor</td>
</tr>
<tr>
<td>HTRE</td>
<td>Heat Transfer Reactor Experiments</td>
</tr>
<tr>
<td>I-131</td>
<td>iodine-131</td>
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<tr>
<td>I.C.</td>
<td>Idaho Code</td>
</tr>
<tr>
<td>ICDF</td>
<td>INEEL CERCLA Disposal Facility</td>
</tr>
<tr>
<td>ICPP</td>
<td>Idaho Chemical Processing Plant (also “Chem Plant,” now INTEC)</td>
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<tr>
<td>ID</td>
<td>Idaho</td>
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<tr>
<td>ID</td>
<td>Idaho Operations Office (DOE)</td>
</tr>
<tr>
<td>IDO</td>
<td>Idaho Operations Office reports (issued by DOE and its predecessors for DOE Technical Information Division distribution)</td>
</tr>
<tr>
<td>IDT</td>
<td>Idaho Department of Transportation</td>
</tr>
<tr>
<td>i.e.</td>
<td>that is (abbreviation for Latin “id est”)</td>
</tr>
<tr>
<td>IEDF</td>
<td>INEEL Engineering Demonstration Facility</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>IET</td>
<td>Initial Engine Test</td>
</tr>
<tr>
<td>IF</td>
<td>Idaho Falls, Idaho</td>
</tr>
<tr>
<td>IFR</td>
<td>Integral Fast Reactor</td>
</tr>
<tr>
<td>IHS</td>
<td>Idaho Historical Society</td>
</tr>
<tr>
<td>IHSI</td>
<td>Idaho Historical Sites inventory</td>
</tr>
<tr>
<td>ILTSF</td>
<td>Intermediate Level Transuranic Storage Facility</td>
</tr>
<tr>
<td>IMACS</td>
<td>Intermountain Antiquities Computer System</td>
</tr>
<tr>
<td>in.</td>
<td>inch</td>
</tr>
<tr>
<td>Ind.</td>
<td>individual</td>
</tr>
<tr>
<td>Inc.</td>
<td>Incorporated</td>
</tr>
<tr>
<td>INEC</td>
<td>Idaho Nuclear Energy Commission</td>
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<tr>
<td>INEEL</td>
<td>Idaho National Engineering and Environmental Laboratory</td>
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<tr>
<td>INEL</td>
<td>Idaho National Engineering Laboratory (now INEEL)</td>
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<tr>
<td>INTEC</td>
<td>Idaho Nuclear Technology and Engineering Center (formerly ICPP)</td>
</tr>
<tr>
<td>IRC</td>
<td>Idaho Research Center</td>
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<tr>
<td>ISF</td>
<td>Intermediate-Scale Facility (waste disposal demonstration site)</td>
</tr>
<tr>
<td>ISM</td>
<td>Integrated Safety Management</td>
</tr>
<tr>
<td>ISU</td>
<td>Idaho State University</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
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</tr>
<tr>
<td>ITDF</td>
<td>Idaho Transportation Department facility</td>
</tr>
<tr>
<td>IWPF</td>
<td>Idaho Waste Processing Facility (PREPP-II)</td>
</tr>
<tr>
<td>JCAE</td>
<td>Joint Committee on Atomic Energy, U.S. Congress (now dissolved)</td>
</tr>
<tr>
<td>JF</td>
<td>Jefferson county</td>
</tr>
<tr>
<td>km</td>
<td>kilometer</td>
</tr>
<tr>
<td>kV</td>
<td>kilovolt</td>
</tr>
<tr>
<td>L</td>
<td>series designator for nonnuclear, large-break, loss-of-coolant accident teaching reactors</td>
</tr>
<tr>
<td>LAN</td>
<td>local area network</td>
</tr>
<tr>
<td>LCCDA</td>
<td>Liquid Corrosive Chemical Disposal Area</td>
</tr>
<tr>
<td>LCRE</td>
<td>Lithium Cooled Reactor</td>
</tr>
<tr>
<td>LDRD</td>
<td>laboratory-directed research and development</td>
</tr>
<tr>
<td>LESAT</td>
<td>Lockheed Environmental Systems and Technologies Company</td>
</tr>
<tr>
<td>LITCO</td>
<td>Lockheed Idaho Technologies Company (contractual company name of LMITCO)</td>
</tr>
<tr>
<td>LLC</td>
<td>Limited Liability Company</td>
</tr>
<tr>
<td>LLMWPF</td>
<td>Low Level Mixed Waste Processing Facility</td>
</tr>
<tr>
<td>LMFBR</td>
<td>Liquid Metal Fast Breeder Reactor</td>
</tr>
<tr>
<td>LMIT</td>
<td>Lockheed Martin Idaho Technologies Company (abbreviated form of LMITCO used primarily as a document or activity designator)</td>
</tr>
<tr>
<td>LMITCO</td>
<td>Lockheed Martin Idaho Technologies Company (former INEEL M&amp;O contractor)</td>
</tr>
<tr>
<td>LOFT</td>
<td>Loss of Fluid Test</td>
</tr>
<tr>
<td>LPTF</td>
<td>Low Power Test Facility</td>
</tr>
<tr>
<td>m</td>
<td>meter</td>
</tr>
<tr>
<td>M&amp;O</td>
<td>management and operating (contractor)</td>
</tr>
<tr>
<td>MCP</td>
<td>management control procedure (INEEL)</td>
</tr>
<tr>
<td>Met Lab</td>
<td>Metallurgical Laboratory</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>mi</td>
<td>mile</td>
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<tr>
<td>Mil.</td>
<td>military</td>
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<tr>
<td>Misc.</td>
<td>miscellaneous</td>
</tr>
<tr>
<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>MK</td>
<td>Morrison Knudsen Corporation (now Washington Group International, Inc.)</td>
</tr>
<tr>
<td>ML</td>
<td>Mobile Low-Power reactor (e.g., ML-1)</td>
</tr>
<tr>
<td>MOA</td>
<td>memorandum of agreement</td>
</tr>
<tr>
<td>MOU</td>
<td>memorandum of understanding</td>
</tr>
<tr>
<td>MTA</td>
<td>Mobile Test Assembly</td>
</tr>
<tr>
<td>MTR</td>
<td>Materials Test Reactor</td>
</tr>
<tr>
<td>MWSF</td>
<td>Mixed Waste Storage Facility</td>
</tr>
<tr>
<td>N</td>
<td>north</td>
</tr>
<tr>
<td>NA</td>
<td>not applicable</td>
</tr>
<tr>
<td>NAGPRA</td>
<td>Native American Graves Protection and Repatriation Act</td>
</tr>
<tr>
<td>NaK</td>
<td>sodium-potassium alloy, used as a reactor coolant</td>
</tr>
<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
</tr>
<tr>
<td>n.d.</td>
<td>no date</td>
</tr>
<tr>
<td>NE</td>
<td>Nuclear Energy, Science, and Technology Office of the Department of Energy</td>
</tr>
<tr>
<td>NEA</td>
<td>Nuclear Energy Agency</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
</tr>
<tr>
<td>NESHAP</td>
<td>National Emissions Standards for Hazardous Air Pollutants</td>
</tr>
<tr>
<td>NHPA</td>
<td>National Historic Preservation Act</td>
</tr>
<tr>
<td>NIQI</td>
<td>Northern Intermountain Quarternary Institute</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute of Occupational Safety and Health</td>
</tr>
<tr>
<td>No.</td>
<td>number (also “#”)</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>P</td>
<td>policy (DOE)</td>
</tr>
<tr>
<td>PA</td>
<td>programmatic agreement</td>
</tr>
<tr>
<td>P&amp;W</td>
<td>Pratt and Whitney Aircraft Division (United Aircraft Corporation)</td>
</tr>
<tr>
<td>PBF</td>
<td>Power Burst Facility</td>
</tr>
<tr>
<td>PCB</td>
<td>polychlorinated biphenyl</td>
</tr>
<tr>
<td>PDD</td>
<td>program description document</td>
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<tr>
<td>PEW</td>
<td>process equipment waste</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Doctor of Philosophy</td>
</tr>
<tr>
<td>PIP</td>
<td>program implementation plan</td>
</tr>
<tr>
<td>PL</td>
<td>Portable Low-Power reactor (e.g., PL-3)</td>
</tr>
<tr>
<td>PL</td>
<td>Public Law</td>
</tr>
<tr>
<td>PM</td>
<td>Portable Medium Power Nuclear Power Plant (e.g., PM-2A)</td>
</tr>
<tr>
<td>PNDR</td>
<td>Partnership in Natural Disaster Reduction (replaces ACETS)</td>
</tr>
<tr>
<td>POL</td>
<td>policy (INEEL)</td>
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<tr>
<td>pp.</td>
<td>pages</td>
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<tr>
<td>PPCo</td>
<td>Phillips Petroleum Company</td>
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<tr>
<td>PREPP</td>
<td>Process Isolation Pilot Plant</td>
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<tr>
<td>Prog</td>
<td>program</td>
</tr>
<tr>
<td>PS</td>
<td>policies and standards of performance</td>
</tr>
<tr>
<td>PTI</td>
<td>Protective Technologies Idaho</td>
</tr>
<tr>
<td>PTR</td>
<td>Phillips Technical Report (PPCo internal report)</td>
</tr>
<tr>
<td>PUREX</td>
<td>Plutonium and Uranium Extraction</td>
</tr>
<tr>
<td>PWT</td>
<td>portable water treatment</td>
</tr>
<tr>
<td>Quad.</td>
<td>quadrant</td>
</tr>
<tr>
<td>R</td>
<td>range</td>
</tr>
</tbody>
</table>
R. river
R-2 Swedish test reactor designation
RadCon Radiological Control
RAL Remote Analytical Laboratory (CPP-684)
RCRA Resource Conservation and Recovery Act
Ref. reference
RESL Radiological and Environmental Sciences Laboratory
Rev. revision
RMF Reactivity Measurement Facility
ROB Research Office Building (at IRC)
ROW right of way
RSTA Reactives Storage and Treatment Area
RWMC Radioactive Waste Management Complex
S1W Submarine Thermal Reactor (also “STR”; S for submarine, 1 for first model, and W for the designer, Westinghouse)
S5G Submarine Reactor (high-speed submarine; S for submarine, 5 for fifth model, and G for the designer, General Electric)
SA spreading area
SAB spreading area B
SAIC Science Application International Corporation (involved in radioactive waste technology)
SARA Superfund Amendments and Reauthorization Act
SAREF Safety Research Facility
SAT Save America’s Treasures
SCIE Scientech, Inc.
SDA Subsurface Disposal Area
SE southeast
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>STR</td>
<td>Submarine Thermal Reactor</td>
</tr>
<tr>
<td>SUSIE</td>
<td>Shield Test Pool Facility</td>
</tr>
<tr>
<td>SW</td>
<td>southwest</td>
</tr>
<tr>
<td>SWEPP</td>
<td>Stored Waste Examination Pilot Plant</td>
</tr>
<tr>
<td>SWPP</td>
<td>service waste percolation pond</td>
</tr>
<tr>
<td>T</td>
<td>township</td>
</tr>
<tr>
<td>T</td>
<td>trailer (designator)</td>
</tr>
<tr>
<td>TAN</td>
<td>Test Area North</td>
</tr>
<tr>
<td>TB</td>
<td>temporary building (designator)</td>
</tr>
<tr>
<td>Temp.</td>
<td>temporary</td>
</tr>
<tr>
<td>TERO</td>
<td>Tribal Employment Rights Ordinance</td>
</tr>
<tr>
<td>TETF</td>
<td>Totally Enclosed Treatment Facility</td>
</tr>
<tr>
<td>THPO</td>
<td>Tribal Historic Preservation Office</td>
</tr>
<tr>
<td>THRITS</td>
<td>Thermal Reactor Idaho Test Station</td>
</tr>
<tr>
<td>TMI</td>
<td>Three Mile Island</td>
</tr>
<tr>
<td>TNT</td>
<td>trinitrotoluene</td>
</tr>
<tr>
<td>TRA</td>
<td>Test Reactor Area</td>
</tr>
<tr>
<td>TRANSCOM</td>
<td>Transportation Communication</td>
</tr>
<tr>
<td>TREAT</td>
<td>Transient Reactor Test Facility</td>
</tr>
<tr>
<td>TRL</td>
<td>Tritium Research Laboratory</td>
</tr>
<tr>
<td>TRU</td>
<td>transuranic (an element with an atomic number greater than 92, the atomic number of uranium)</td>
</tr>
<tr>
<td>TRUPACT</td>
<td>transuranic waste package containers</td>
</tr>
<tr>
<td>TSA</td>
<td>Transuranic Storage Area</td>
</tr>
<tr>
<td>TSF</td>
<td>Technical Support Facility</td>
</tr>
<tr>
<td>TST</td>
<td>test (archaeological field project designator)</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>U-235</td>
<td>uranium-235</td>
</tr>
<tr>
<td>UAV</td>
<td>unmanned aerial vehicle</td>
</tr>
<tr>
<td>UCNI</td>
<td>unclassified controlled nuclear information</td>
</tr>
<tr>
<td>UK</td>
<td>unknown</td>
</tr>
<tr>
<td>U of I</td>
<td>University of Idaho</td>
</tr>
<tr>
<td>UREP</td>
<td>Utilities Replacement Expansion (also “Enhancement”) Project</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>USAEC</td>
<td>U.S. Atomic Energy Commission (also “AEC,” DOE predecessor)</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code (also “U.S.C.”)</td>
</tr>
<tr>
<td>U.S.C.</td>
<td>United States Code (also “USC”)</td>
</tr>
<tr>
<td>USDOE</td>
<td>U.S. Department of Energy (also “DOE”)</td>
</tr>
<tr>
<td>USFS</td>
<td>U.S. Forest Service</td>
</tr>
<tr>
<td>USGPO</td>
<td>U.S. Government Printing Office</td>
</tr>
<tr>
<td>USGS</td>
<td>United States Geological Survey (also “U.S.G.S.”)</td>
</tr>
<tr>
<td>U.S.G.S.</td>
<td>United States Geological Survey (also “USGS”)</td>
</tr>
<tr>
<td>USS</td>
<td>United States Ship</td>
</tr>
<tr>
<td>UTM</td>
<td>universal transverse mercator (map measurement)</td>
</tr>
<tr>
<td>v.</td>
<td>against (abbreviation for Latin “versus”)</td>
</tr>
<tr>
<td>VCO</td>
<td>Voluntary Consent Order</td>
</tr>
<tr>
<td>VIS</td>
<td>misnomer for “InelViz” (software developed for INEEL to display meteorological data and plume dispersion modeling data)</td>
</tr>
<tr>
<td>VMF</td>
<td>Vehicle Monitoring Facility</td>
</tr>
<tr>
<td>VVE</td>
<td>Vapor Vacuum Extraction</td>
</tr>
<tr>
<td>W</td>
<td>west</td>
</tr>
<tr>
<td>WAG</td>
<td>waste area group</td>
</tr>
</tbody>
</table>
WCF  Waste Calcining Facility
WEDF Waste Engineering Development Facility
WERF Waste Experimental Reduction Facility (now WROC)
WINCO Westinghouse Idaho Nuclear Company, Inc. (former ICPP M&O contractor)
WIPP Waste Isolation Pilot Plant (DOE facility in New Mexico)
WM waste management
WMC Waste Management Complex (building designation)
WMF Waste Management Facility (building designation)
WMO Waste Management Office
WOW Woman Ordnance Worker
WRC Weapons Range Complex
WROC Waste Reduction Operations Complex (formerly WERF)
WRRTF Water Reactor Research Test Facility
WTB Wireless Test Bed
WW2 World War II
YDB yard B, west side of CPP-601
ZPPR Zero Power Plutonium Reactor
ZPR Zero Power Reactor

& and
x by
0 degrees (temperature)
> greater than
feet (foot; also “ft”)
< less than
≤  less than or equal to
#  number (also “No.”)
%  percent
+  plus
²  square (squared, also “sq.”)
GLOSSARY

The terms defined in this glossary fall under one of two general categories: (1) terms that are sufficiently technical in nature as to merit clarification; (2) commonly used terms that convey a meaning within this document that differs from or is more specific than that conveyed elsewhere.

abrader. Small, generally flat piece of stone that exhibits linear grooves produced by the repeated rubbing (abrasion) of bone or wood to fashion needles, arrow shafts, perforators, etc.

adaptation. The process of change in response to environmental conditions or other external stimuli.

adverse effect. A type of impact that may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register of Historic Places. This includes any impact that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Adverse effects may also include reasonably foreseeable effects caused by an undertaking that may occur later in time, be farther removed in distance, or be cumulative. Consideration is given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property’s eligibility for the National Register [36 CFR § 800.5(a)(1); see 36 CFR § 800.5(a)(2) for examples]

Advisory Council on Historic Preservation (ACHP; also referred to as “Advisory Council”). An independent federal agency that advises the U.S. president and U.S. Congress on historic preservation and oversees review under Section 106 of the National Historic Preservation Act (NHPA). The Advisory Council is made up of a 20-member panel of presidential appointees, as well as agency heads, parties named in the NHPA, and a small staff with offices in Washington D.C. and Denver, Colorado. [National Preservation Institute, “Integrating Cultural Resources in NEPA Compliance,” September 2003]

aeolian. Pertaining to, caused by, or carried by the wind. Aeolian sediments are those formed as a result of wind.

alluvial. Deposited by flowing water, as in a riverbed, a floodplain, a delta, or a fan.

altithermal. A climatic period corresponding to the Archaic cultural periods from 7500 to 3500 before present (B.P.). The altithermal climate was an extended warming period with apparent long droughts resulting from the shift of major latitudinal wind patterns.

anthropology. The scientific and humanistic study of human kind's present and past biological, linguistic, social, and cultural variations from an all-encompassing holistic approach, with major subfields of archaeology, physical anthropology, cultural anthropology, and anthropological linguistics.

archaeological context. The physical setting, location, and cultural association of artifacts and features within an archaeological site.

archaeological site. A definable area containing artifacts and/or features representative of human activities preserved in a geological context. Any place or locality where there is evidence of past human activity. An archaeological site can be as ephemeral as a surface scatter of flakes covering a few square feet to the remains of an earthlodge village covering several tens of acres. Sites can include, but are not limited to, stone circles, lithic scatters, rockshelters, quarries, burials, petroglyphs, vision quest structures, conical timbered lodges, buffalo jumps, miners' cabins, and homesteads.
archaeology. The scientific study of the physical evidence of past human societies. Archaeology's initial objective is the construction of descriptive cultural chronology; its intermediate objective is the description of past lifeways; and its ultimate objective involves discovery of the processes that underlie and condition human behavior.

architectural property. Various types of buildings, structures, and objects serving human needs related to the occupation and use of the land. Their function, materials, date, condition, construction methods, and location reflect the historic activities, customs, tastes, and skills of the people who built and used them. On the Idaho National Engineering and Environmental Laboratory, this term generally refers to post-1942 structures, buildings, and objects.

area of potential effect. A geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of any historic properties in the area. [36 CFR § 800.16(d)]

assemblage. A discrete collection of artifacts from a given site, stratum, or area. A group of artifacts related to each other based upon recovery from a common archaeological context.

assessment. Evaluation of a federal project in regard to the effect it may have on cultural resources. Under 36 CFR 800.5, assessment is defined as application of the “Criteria of Effect” (36 CFR 800.9a) in consultation with the State Historic Preservation Office.

artifact. Any object manufactured, used, or modified by humans.

basalt. A dark-colored igneous rock of volcanic origin. Fine-textured varieties were utilized by prehistoric people in stone tool manufacture.

biface. A chipped stone artifact that has been flaked on both sides.

cairn. A memorial or landmark consisting of regular or irregular piles of locally available rock. Cairns are used as trail markers or burial markers or to mark offerings, sacred places, or caches.

Cenozoic. The latest of four geologic eras encompassing the last 65 million years.

Clovis point. A fluted lanceolate projectile point, often found at mammoth kill sites. It is associated with the Clovis culture, which is the earliest defined archaeological culture in the New World and thought to have arrived through an ice-free corridor from Asia approximately 11,000 to 12,000 B.P..

Cody complex. Late Paleo-Indian cultural complex dating approximately 7000 B.C. characterized by parallel-flaked lanceolate projectile points and tanged, asymmetric Cody knives.

complex. A term used to integrate a number of traits or items that are known to be associated with one another. A temporal continuity represented by persistent configurations in single technologies or other systems of related forms.
compliance. Adherence to specific provisions of any law, executive order, regulation, authorization, or similar legal instrument. In cultural resource management, compliance is most commonly used to mean documented observance of the regulated procedural requirements of the National Historic Preservation Act, although the word is generally not favored by the Advisory Council due to its connotations of resistance and coercion. [Bureau of Land Management Cultural Resource Management Manual, 8100, 1988]

conservation. The protection, preservation, data recovery, and management actions directed toward cultural resources. The term is based on the premise that cultural resources are nonrenewable and emphasizes use and taking action.

consultation. The process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process. [36 CFR § 800.16(f)]

consulting parties. Persons or groups the federal agency consults with during the National Historic Preservation Act Section 106 process. They may include the State Historic Preservation Office; the Tribal Historic Preservation Office; Indian tribes and native Hawaiian organizations; representatives of local governments; applicants for federal assistance, permits, licenses, and other approvals; or any additional consulting parties. [Based on 36 CFR § 800.2(c)]

Additional consulting parties may include individuals and organizations with a demonstrated interest in the undertaking due to the nature of their legal or economic relation to the undertaking or affected properties, or their concern with the undertaking’s effects on historic properties. [36 CFR § 800.2(c)(6)]

cultural resources. Unique and nonrenewable evidence of past human activity identifiable through field surveys, historic documentation, or oral evidence. This includes archaeological, historical, and architectural sites, structures, districts, and landscapes with important public or scientific uses or value, as well as objects, locations, and landscapes of importance to a culture or community for traditional, religious, or other cultural reasons.

culture. The integrated system of learned behavior patterns that are characteristic of the members of a society and not the result of biological inheritance.

debitage. Lithic waste material (i.e., flakes) resulting from stone tool manufacture and maintenance.

Department of Energy (DOE). Federal agency responsible for managing the cultural and environmental resources under their purview, such as the Idaho National Engineering and Environmental Laboratory.

determination of eligibility. A decision that a district, site, building, structure, or object meets or does not meet the National Register of Historic Places criteria for evaluation. [36 CFR § 60.3(c)]

diagnostic artifact. An artifact with characteristic traits such that it can be placed in a specified cultural context, time period, and geographic area.

early prehistoric period (also paleo-Indian tradition or period). A period comprising several cultures and complexes that date between 12,500 to 28,000 B.P. and best known for the nomadic hunters of now extinct big game at the close of the Pleistocene or glacial period.
effect. Alteration to the characteristics of a historic property that qualify it for inclusion in or eligibility for inclusion in the National Register of Historic Places. [36 CFR § 800.16(I)]

environmental assessment (EA). A concise public document for which a federal agency is responsible. The EA serves to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI)
- Aid an agency’s compliance with the Act when no EIS is necessary
- Facilitate preparation of an EIS when one is necessary.

The EA includes a discussion of the need for the proposed undertaking and alternatives, a discussion of the environmental impacts of the proposed action and alternatives, and a list of agencies and persons consulted. [NEPA; 40 CFR 1508.9]

ethnography. The systematic recording of human cultural systems.

ethnographic. Pertaining to data on the geographic distribution, origins, and relations of races or ethnic groups during a particular historic period.

Euro American. European immigrants to the Americas who settled in Idaho in the early to mid 1800s.

evaluation. The process of determining eligibility of a property for listing on the National Register of Historic Places. [Based on criteria set forth in 36 CFR Part 60.4]

fauna. A Latin term that refers to animals.

finding. Factual assessment by a party, usually an agency, that is subject to review by other parties to the National Historic Preservation Act Section 106 process. [Based on ACHP, “Section-by-Section Questions & Answers,” www.achp.gov/106q&a.html]

feature. Nonportable evidence of human activities produced by activities such as digging pits for storage, setting posts or foundations for houses, or constructing hearths for cooking. Features are often distinguished by soil discolorations or artifact concentrations.

federal undertaking (see “undertaking”). A broad range of federal activities, including construction, rehabilitation and repair projects, demolition, licensing, permitting, loans, loan guarantees, grants, property transfers, and many other types of federal involvement. Whenever one of these activities affects a historic property, the sponsoring agency is obligated to seek comments from the Advisory Council on Historic Preservation.

fire hearth. A feature preserved in an archaeological site consisting of the remains of a fireplace. Stone liners and charcoal are commonly found in fire hearths.

floodplain. The portion of a river valley adjacent to the channel, built of sediments deposited by the stream, and covered with water when the river overflows its banks at flood stages.
flora. A Latin term that refers to plants.

flute. A flake scar that runs from the base of a projectile point down the middle portion toward the tip on both sides. It is a characteristic trait of the Clovis and Folsom projectile points.

Folsom point. A spear point characterized by a single, well-made flute on each side and fine pressure flaking. Folsom points were made from about 11,000 to 12,000 B.P. and are generally found in western North America, often in association with extinct bison.

geographic information system (GIS). The computer hardware, software, and procedures designed to support the capture, management, manipulation, analysis, and display of spatial data. GIS is useful in planning and managing problems related to elements on a landscape such as modeling, creating maps, and understanding complex events (e.g., population trends, weather, traffic patterns, location of critical facilities of certain types, and floodplain histories).

Great Basin. The area of internal drainage in the western United States comprising Nevada, eastern California, southeastern Oregon, southern Idaho, and western Utah.

historic architectural property. Any manmade building, structure, or object that is either on or eligible for listing on the National Register of Historic Places.

historic context. An organizing structure for interpreting history and grouping information about historic properties that share a common theme, geographical location, and time period. [National Register bulletin (NRB) 16A, “How to Complete the National Register Registration Form,” Appendix IV, p.2]

An important theme, pattern, or trend in the historic development of a locality, state, or the nation at a particular time in history or prehistory. [NRB 30]

historic landmark. Historic properties that possess exceptional value or quality in illustrating or interpreting the heritage of the United States.

historic landscape. A geological area that historically has been used by people or shaped or modified by human activity, occupancy, or intervention; and which possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. [NRB 30]

historic period. A period described by written documents, such as the period in southeastern Idaho coinciding with the arrival of Lewis and Clark, which represents the beginning of recorded accounts and events in the area (circa 150 B.P. onward).

historic property. Any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places. It includes artifacts, records, and remains that are related to and located within such properties, as well as properties of traditional religious and cultural importance to an Indian tribe or native Hawaiian organization and that meet National Register criteria. [36 CFR § 800.16(f)]

Any property listed in or eligible for the National Register. The listed properties are of local, regional, or nationwide importance. [NHPA, Section 106]
Holocene. An epoch of the Quaternary period from the end of the Pleistocene, approximately 10,000 B.P. to the present time.

Ignimbrite. Opaque, glassy volcanic rock favored for prehistoric stone tool manufacture.

Incised. A decoration found on pottery and consisting of lines drawn into wet clay. When fired, the arrangement of lines leaves a permanent design on the vessel surface.

Indian Tribe (see “Tribes”). Legal definition for the governing body and group of people of any Native American tribe, band, nation, or other group that is recognized as an Indian tribe by the secretary of the Interior and for which the United States holds land in trust or restricted status for that entity or its members. Such term also includes any native village corporation, regional corporation, and native group established pursuant to the Alaska Native Claims Settlement Act. [43 USC 1601 et seq.]

Integrity. The ability of a property to convey its significance through its location, design, setting, materials, workmanship, feeling, and association. [NRB 15, “How to Apply the National Register Criteria of Evaluation,” p. 44]

Authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic or prehistoric period. [NRB 16A, “How to Complete the National Register Registration Form,” Appendix IV, p.2]

Inventory. The process and product of locating cultural properties within appropriate contexts and identifying or documenting them sufficiently for National Register eligibility decisions. The inventory process includes archival checks, literature reviews, field surveys, and descriptive documentation.

Isolated find. Area of limited human activity, practically defined as an occurrence of less than 10 artifacts.

Keeper of the National Register of Historic Places. The individual delegated the authority by the National Park Service to list properties and formally determine their eligibility for the National Register of Historic Places. [Based on 36 CFR § 60.3(f)]

Lacustrine. Pertaining to or produced by a lake or lakes.

Lake Terreton. An extensive shallow inland lake that covered a large portion of the northeastern Snake River Plain during the Pleistocene period.

Lanceolate. Lance- or leaf-shaped, referring to projectile points. Most commonly used in reference to chipped stone knives (bifaces) or projectile points that are long, slender, and come to a point at one or both ends.

Late prehistoric period. A cultural manifestation dating between 1300 and 150 B.P. on the northeastern Snake River Plain and marked by adoption of the bow and arrow. It is divided into two subperiods; late prehistoric I (1300 to 750 B.P.) and late prehistoric II (750 to 150 B.P.) based on changes in projectile point structure and form. Prehistoric ceramics also emerge as a diagnostic artifact of this period.
lava tube. During basaltic eruptions, fast-moving lava crusts over and forms tunnels filled with fast-moving streams of lava. As an eruption wanes, the lava in these tunnels drains out, leaving empty caves known as lava tubes within the cooled flows.

lifeway. The "what" and "who" of human culture, including settlement pattern, population density, technology, economy, organization of domestic life, kinship, social stratification, ritual, art, and religion.

lithic. Of or relating to stone.

locus. A predicted archaeological site locality.

material culture. All physical items made or modified by human beings.

memorandum of agreement (MOA). A document that records the terms and conditions agreed upon to resolve the adverse effects of an undertaking upon historic properties. [36 CFR § 800.16(o)]

memorandum of understanding (MOU). Similar to a MOA, a document expressing an understanding among parties regarding regulations, actions, relations, etc.

midden. An accumulation of debris by biological agents such as packrats or humans. It may include plant matter, bone, and shell fragments. For prehistoric sites, a layer of soil stained to a dark color by the decomposition of organic refuse such as food bones, fragments of stone tools, charcoal, pieces of pottery, or other discarded materials. For historic sites, a similar layer of soil, but with appropriate historic material remains, often in a much thinner deposit.

middle prehistoric period. A cultural manifestation and ecological adaptive strategy dating between 7500 to 1300 B.P. on the northeastern Snake River Plain. It is divided into three subperiods; early (7500 to 5000 B.P.), middle (5000 to 3500 B.P.), and late (3500 to 1300 B.P.). These subperiods are based on changes in projectile point structure and form. This Archaic lifeway is characterized by a varied resource utilization, including seasonal round adaptations, big and small game hunting, and gathering of vegetal and seed foods.

mitigation. Action that reduces or compensates for the damage caused to historic or prehistoric properties during a federal undertaking. Examples of mitigation include project modification to avoid properties, detailed documentation of properties, relocation of structural properties, and salvage of properties through controlled excavation and data recovery.

National Park Service (NPS). A bureau of the United States Department of the Interior that manages national parks, monuments, and historic sites. The NPS acts as a steward for historic areas in the National Park System, administers preservation programs, maintains the National Register of Historic Places, sets standards for preservation related activities, and provides technical preservation information and guidance.

National Register criteria. The criteria established by the secretary of the Interior for use in evaluating the eligibility of properties for the National Register of Historic Places. [36 CFR § 800.16(r)]
National Register of Historic Places (NRHP; also referred to as “National Register”). A list of formally nominated and recognized properties judged important to national and local history due to their significance to American history, architecture, archaeology, engineering, and culture. The National Register is maintained by the U.S. Department of the Interior, National Park Service. It was created by the NHPA in 1966 and authorized and expanded by 36 CFR 60, which also describes the protocol for nomination to the National Register. 36 CFR 63 provides the procedures for federal agencies and state historic preservation offices to follow when agreement is reached on the eligibility of property to the National Register.

Native Americans. Of, or relating to, persons whose ancestors aboriginally occupied the Americas. A tribe, people, or culture indigenous to the Americas.

northwestern plains. The area somewhat arbitrarily described as including all of Wyoming, the drainage of the Yellowstone and Madison Rivers up to the Missouri River in northern Montana, western South Dakota and Nebraska, the southwestern corner of North Dakota, and the area along the northern border of Colorado.

object. A material thing of functional, aesthetic, cultural, historical, or scientific value that may be, by nature or design, movable yet related to a specific setting or environment. [36 CFR § 60.3(j)]

obsidian. Volcanic glass that, because it can be worked to an extremely sharp edge and point, was highly prized for chipped stone implements. Also, because of its reflective qualities when in thin, flat sections, it was used for mirrors.

obsidian hydration. The technique of dating obsidian artifacts by measuring the microscopic amount of water absorbed from the surface into the rock.

oral history. Verbally transmitted information about past events. Although information about unwritten events can be useful, such history is subject to the vagaries of human perceptions and mental recall.

petroglyph. Any form of prehistoric rock art or carvings that are ground, etched, or carved onto a stone surface. Carvings in rock thought to express artistic or religious meaning.

pictograph. A rendering, often painted on the walls of caves or on cliffs, that represents a form of nonverbal communication often employed by prehistoric people. Paintings on rock thought to express artistic or religious meaning.

Pioneer Basin. An area in southeast Idaho that includes the Big Lost River and its small tributaries as they flow across the northeastern Snake River Plain.

Plano. Several lanceolate type projectile points representative of a variety of cultures dating around 10,500 to 7,500 B.P. These cultures were known for big game hunting, and most known sites are associated with extinct bison kills. A variety of Plano-age projectile points have been defined and include Plainview, Scottsbluff, Agate Basin, Hell Gap, Alberta, Eden, and Angostura.

Pleistocene. A geologic epoch, usually thought of as the Ice Age, which began about 1.6 million years ago and ended with the melting of the large continental glaciers, creating the modern climatic pattern about 11,500 years ago.
pluvial. Of or pertaining to rain. Also refers to the wetter periods during a major, extended dry period.

Prehistoric period. The period prior to the historic, before any written languages were present (in Idaho, before 150 B.P.).

preservation. Cultural resource identification, evaluation, recordation, documentation, curation, acquisition, protection, management, rehabilitation, restoration, stabilization, maintenance, research, interpretation, conservation, and education and training. Any combination of the aforementioned activities. [NHPA, Section 301 (8)]

programmatic agreement. A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program, complex undertaking, or other situations in accordance with 36 CFR § 800.14(b). [36 CFR § 800.16(t)]

Within the context of this document, a programmatic agreement is a document executed between an agency or facility and advisory groups that may take the place of multiple memoranda of agreement when actions are programmed, repetitive, or perceived to have similar impacts on cultural resources.

projectile point. Any stone, bone, metal, or wood spear point, dart point, or arrow point.


protohistoric period. A period represented in the archaeological record that exhibits the arrival of European trade items and influence, yet before the actual arrival of Euro American settlers.

provenience. The location of an artifact or object described in terms of map grids, stratified levels, and/or depth from ground surface. It provides for scientific control of artifacts and associations once the items have been removed from the context of the site. The three-dimensional location of an artifact or feature within an archaeological site, measured by two horizontal dimensions and a vertical elevation.

Quaternary period. The most recent geologic period, dating from approximately two million years ago to the present. The Quaternary subsumes the Pleistocene and Holocene epochs.

radiocarbon analysis (dates, dating). A physiochemical method of estimating the length of time since the death of an organism. A process that provides dates by counting the radioactive decay of carbon in the remains of once-living plants and animals (e.g., charcoal, wood, bone, shell).

reconnaissance. A field survey of a given area designed to locate and record all cultural resources.

riparian. A vegetative zone that parallels a perennial water course.

scraper. A stone implement used to remove fat from the under side of a skin, smooth wood, scrape leather, etc. Different types are described in terms of the shape and/or position of the cutting edge, e.g., side scraper, end scraper, snubnosed scraper, thumbnail scraper, scoop scraper.
seasonal round. Scheduled movement of human groups through various ecozones in the course of a year. Movement carefully planned to coincide with the seasonal availability of specific floral and faunal resources.

Section 106. The section of the National Historic Preservation Act that requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. [NHPA, Section 106; also 36 CFR Part 800, “Protection of Historic Properties”]

Section 110. The section of the National Historic Preservation Act that sets out the broad historic preservation responsibilities of federal agencies and is intended to fully integrate historic preservation into ongoing programs of all federal agencies. [NHPA, Section 110; also introduction to the secretary of the Interior’s “Standards and Guidelines for Federal Agency Historic Preservation Programs”]

sensitivity. A generalized evaluation of the likelihood of encountering cultural resources within a given geographic locale. Areas known to contain high densities of prehistoric cultural resources are considered to be archaeologically sensitive.

settlement pattern. The distribution of human populations throughout their habitat.

significance. The importance of a historic property in one or more areas, such as history, architecture, archeology, engineering, or culture. [NRB 16A, “How to Complete the National Register Registration Form,” Appendix IV, p. 3; also based on NRB 15, “How to Apply the National Register Criteria for Evaluation,” p. 7]

sink (sinks, sink area). Low areas on the northeastern Snake River Plain near the foothills of the Lemhi and Lost River ranges where the Big Lost River, Little Lost River, and Birch Creek cease all overland flow and sink through porous basalt bedrock to the underground Snake River Plain aquifer.

site. The location of a significant event; prehistoric or historic occupation or activity; or building or structure, whether standing, ruined, or vanished. The location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure. [NRB 16A, “How to Complete the National Register Registration Form,” Appendix IV, p. 3]

Snake River Plain. Broad curved depression extending more than 500 kilometers across southern Idaho. It is marked by basaltic lava flows, prominent volcanic buttes, alluvial and lacustrine features, and deposits of aeolian silts and sands within a semiarid sagebrush-steppe vegetation community.

stakeholder. Those individuals, groups, host communities, and other entities in the public and private sectors that are interested in or affected by Department of Energy activities and decisions.

State Historic Preservation Office (SHPO). The office designated pursuant to Section 101(b)(l) of the National Historic Preservation Act to administer a state historic preservation program or a representative who acts for the SHPO. [36 CFR § 800.16(v)]
stewardship. To protect and manage property through the philosophy of cultural resource management and law and with the premise that cultural resources are a national heritage. This governmental, corporate, and individual responsibility has been translated into actions where individuals and groups have assumed on-the-ground responsibilities (monitoring, patrolling, rehabilitation, education, and interpretation) for specific prehistoric and historic sites. (For more information on the application of stewardship in cultural resources see Smith and Ehrenhard, 1991.)

strata. The various layers of human or geological origin that comprise archaeological sites.

structure. A construction made for purposes other than creating shelter, such as a bridge. [NRB 16A, “How to Complete the National Register Registration Form,” Appendix IV, p. 4]

subsistence. To obtain the food and shelter necessary to support life. A subsistence lifestyle is adapted to the exploitation of different resources in different areas and during different seasons of availability.

surface site. An area in which archaeological remains occur on stable ground surfaces.

territory. The familiar surroundings or home range that is claimed by a group of people.

test excavation. A small-scale, controlled excavation unit placed within an area that is thought to contain buried cultural material. Commonly conducted in 1 x 2 meter units or in 50 x 50 centimeter square-shovel probes within which soil is removed in 10-centimeter levels.

Tribes (see “Indian Tribe”). Those Native Americans that are federally recognized as the Shoshone-Bannock tribes.

typology. The study and systematic classification of types. The study of the differences and similarities exhibited in cultural materials. The ordering of artifacts based on form, function, technology, material, color, shape, or any other qualifiable characteristic(s).

undertaking (see “federal undertaking”). A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency. This includes activities carried out by or on behalf of a federal agency; carried out with federal financial assistance; requiring a federal permit, license, or approval; and subject to state or local regulation administered pursuant to a delegation or approval by a federal agency. [36 CFR § 800.16(y)]

United States Department of the Interior. Federal agency whose land managing responsibilities are generally administered through the National Park Service, Bureau of Land Management, and Bureau of Reclamation. The Interior Department has strong cultural resource advisory, regulatory, and preservation responsibilities for all federal lands through its offices of Departmental Consulting Archaeologist and Archaeological Assistance, National Park Service programs, National Register of Historic Places, Historic Preservation Fund, and close working relationship with the Advisory Council on Historic Preservation.
INTRODUCTION

The Department of Energy (DOE) is committed to compliance with legal mandates that require consideration of cultural resources. This section of the Idaho National Engineering and Environmental Laboratory (INEEL) Cultural Resource Management Plan (CRMP) outlines that commitment and the basic philosophy of cultural resource management at the INEEL.

Cultural resources on the INEEL include, but are not necessarily limited to, the following broad range of items and locations:

- Archaeological materials and sites that date to the prehistoric, historic, and/or ethnohistoric periods
- Standing structures, buildings, and objects that are over 50 years of age, of exceptional importance, important through their association with momentous events (e.g., Cold War, reactor testing, and World War II), and/or contain significant workmanship and design
- Cultural and natural places, landscapes, select natural resources, and sacred areas or objects that have importance for Native Americans and others.

Legal Basis for Cultural Resource Management

As a federal agency, DOE has been directed by the U.S. Congress and the U.S. president to provide leadership in the preservation of prehistoric, historic, and other cultural resources on lands it administers and to manage these resources in a spirit of stewardship for future generations. The management of INEEL cultural resources is driven and guided by various federal laws, regulations, executive orders, DOE policies and orders, supplementary State of Idaho statutes and legislation, and INEEL procedures.

Several laws direct the inventory of cultural resources on federal land, guide the nomination of sites to the National Register of Historic Places, provide mechanisms to protect cultural resources during land-use activities, and provide legal penalties as a consequence for their destruction. Preeminent among these are the National Environmental Policy Act of 1969 (NEPA), the Archaeological Resource Protection Act of 1979 (ARPA), and the National Historic Preservation Act of 1966 (NHPA), as amended, and their implementing regulations.

The NEPA outlines the federal policy of general environmental protection by requiring information gathering, planning, and assessment in advance of projects or actions that occur on federal land or are federally licensed or funded. It requires the use of natural and social sciences in planning and decision-making with regard to project impacts on the environment and extends protective provisions to important historic, cultural, and natural aspects of our national heritage. Federal agencies must prepare detailed statements (environmental impact statements [EISs] and environmental assessments [EAs]) outlining the scope, environmental impacts of, and alternatives to the action planned and allow for and consider public comments. The NHPA provides direction for integrating NEPA and NHPA Section 106 requirements. (Categorical exclusions under NEPA do not apply under the NHPA.)

The ARPA establishes definitions, permit requirements, and criminal and civil penalties, among other provisions, to strengthen the basic tenets of the Antiquities Act of 1906. Felony-level penalties are established for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource located on public or Indian lands. This act also prohibits...
the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained in violation of any provision of the act. Finally, ARPA fosters increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data.

The NHPA establishes the National Register of Historic Places and defines historic properties as those that meet National Register criteria and are, therefore, eligible for listing on the National Register. Properties that are eligible for listing are afforded the same protection under the law as those that are listed. NHPA Sections 106 and 110 are particularly important for the identification, management, and protection of INEEL’s cultural resources.

The protective provisions of the NHPA apply only to those resources that are determined to be eligible or potentially eligible for nomination to the National Register of Historic Places. Many Native American sacred sites, traditional cultural areas, and sites or features of local interest are not eligible for listing on the National Register, but nonetheless are cultural resources and are no less important to local tribal people and stakeholders. Other laws, such as the NEPA, American Indian Religious Freedom Act, and the American Folklife Preservation Act, recognize their importance and the Department of Energy, Idaho Operations Office (DOE Idaho) is committed to their protection at the INEEL.

Appendix A provides an annotated list of laws, regulations, policies, Executive Orders, and INEEL procedures that guide the management of cultural resource on the INEEL. Appendices C and D provide discussions of how these requirements are implemented on the INEEL.

**DOE Cultural Resource Management Philosophy**

The INEEL CRMP was initiated by and reflects the philosophy of DOE Idaho, as stated in the following directive:

“The INEL [Idaho National Engineering Laboratory, now known as the Idaho National Engineering and Environmental Laboratory] possesses a rich and varied prehistory and history. It must be emphasized that cultural resources are limited and non-renewable; that once damaged or destroyed, the information those resources contained is irretrievably lost. Since the INEL has been a federal reservation for over 50 years where public access has been restricted, we are in a unique position to implement management programs which can protect these resources and the information that can be learned from them for the future. As with all other relevant federal regulations, DOE-ID is committed to rigorous compliance” (DOE-ID 1990).

Indeed, in the years since this 1990 memorandum was issued, DOE Idaho has taken many steps to integrate cultural resource management into INEEL missions and activities. Department of Energy, Headquarters (DOE-HQ) has facilitated this effort through ongoing activities to raise the level of awareness within the entire DOE complex concerning the importance of the agency’s cultural resource-related legal responsibilities. These efforts have culminated in the issuance of a formal DOE policy governing cultural resources (U.S. DOE 2001). This policy formalizes DOE’s goal to preserve and protect INEEL cultural resources within a collaborative framework consisting of stakeholders and preservation partners.
Purpose of this Cultural Resource Management Plan

This CRMP outlines the necessary processes and procedures for maintaining INEEL cultural resources in a spirit of stewardship for future generations and in a manner that is consistent with the intent of executive and legislative mandates. To be useful for this purpose, the CRMP must:

- Respond to existing and changing Executive Orders and federal, state, and DOE requirements for historic preservation
- Outline processes to identify, evaluate the importance of, and take appropriate action for protection of INEEL cultural resources in accordance with legal requirements, regulations, professional standards, and stakeholder wishes
- Outline a process for communicating and consulting with the Idaho State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP or Advisory Council), the Shoshone-Bannock Tribes, and other INEEL stakeholders as mandated by law
- Provide guidance on regulatory compliance to INEEL employees and decision-makers, and serve as a tool for managing cultural resources during day-to-day activities as well as long-term land use planning
- Serve as a manual and reference book for individuals with responsibility for INEEL cultural resources
- Provide a good example of how an effective balance can be established between ongoing DOE missions and programs and cultural resource preservation and enhancement
- Encourage and enhance educational, interpretive, and research opportunities for DOE Idaho-managed cultural resources consistent with the overall DOE management objectives.

Ultimately, the CRMP is intended to meet the following INEEL cultural resource management objectives:

- Serve as a policy and management commitment by DOE Idaho and the INEEL Cultural Resources Management (CRM) Office
- Streamline the compliance process regarding properties managed by DOE Idaho
- Serve as the foundation for a programmatic agreement between the Idaho SHPO and Advisory Council.

The content of this document is responsive to guidance issued by DOE-HQ (DOE 1995), but the overall format closely follows earlier draft INEEL plans (cf. Miller 1995).

Scope of this Cultural Resource Management Plan

This CRMP encompasses the INEEL properties managed by the management and operating (M&O) contractor for DOE Idaho. This includes those properties used to support INEEL missions as a national laboratory, as well as those properties managed by the Idaho Completion Project (ICP) to support the INEEL environmental cleanup mission.

Because Argonne National Laboratory-West (ANL-W) is physically located on the INEEL, this CRMP discusses the historical programs associated with that facility. However, ANL-W is currently operated by the University of Chicago under the direction of DOE’s Chicago Operations Office. As such, ANL-W and the cultural resources contained within its administrative boundaries do not fall under the purview of this CRMP. Plans are presently underway that may result in the inclusion of ANL-W as an INEEL facility, at which time ANL-W cultural resources will be managed in accordance with this CRMP.
The Naval Reactors Facility (NRF), which is managed by DOE-Bettis, is also located at the INEEL and, therefore, discussed in this CRMP. However, NRF and the cultural resources presently within its administrative boundaries are specifically excluded from management under this CRMP.

**Organization of this Cultural Resource Management Plan**

The INEEL CRMP is intended to be a dynamic, flexible document suitable for multiple uses. It is designed to accommodate updates in response to changes in regulations, legislation, and/or DOE mission, as well as progress in cultural resource programs at the INEEL. The main body of this document, which is divided into five sections with supporting subsections, is general in scope and, as a result, somewhat abbreviated.

A section entitled, “Cultural Resources of the INEEL,” follows this section. It provides a broad description of the environment, cultural history, and past and present missions of the INEEL with special attention to the important cultural resources preserved there.

The next section, entitled, “INEEL Cultural Resource Management,” is the “working” portion of the plan where the cultural resource management program is outlined. Among other things, this section includes general discussions of responsibilities for cultural resource protection and management, compliance strategies, and future goals and objectives. This section is followed by the “Summary” section and “References” section.

Following the “References” section is a series of appendices. Referred to throughout the document, these appendices address specific topics with detail, description, and supporting material that enhance the general discussions contained within the main text. Most of the appendices can also be distributed separately for clarification or information on specific aspects of INEEL cultural resource management. The appendices will also be reviewed each year and updated as needed. The following topics are addressed in the appendices:

- Appendix A—Annotated summary of the statutory and regulatory basis for cultural resource management, including sections on DOE and INEEL policies and requirements
- Appendix B—Summary of Native American interests, including sections on DOE policy and DOE Idaho-specific programs and regulatory guidance
- Appendix C—Strategies and procedures for the management of archeological resources
- Appendix D—Strategies and procedures for the management of historic architectural resources
- Appendix E—Research designs employed by the archaeology and history programs
- Appendix F—Historic contexts that provide supplemental historical information about the area now encompassed by the INEEL
- Appendix G—Sitewide programmatic agreement
- Appendix H—Inventory of known archaeological resources on the INEEL
- Appendix I—Inventory of DOE Idaho architectural properties
- Appendix J—Inventory of cultural resource projects
- Appendix K—Schedule of activities and priorities.
- Appendix L—INEEL cultural resource monitoring plan.
Professional Qualifications and Training

Professional qualification standards are an important element of the secretary of Interior's standards and guidelines, with which all INEEL cultural resource investigations must comply. These standards ensure that a consistent level of expertise is applied nationally to the identification, evaluation, registration, documentation, treatment, and interpretation of cultural resources. They also assure credibility in the practice of historic preservation at all levels. In the past, the Idaho SHPO has refused to review cultural resource studies done by persons who do not meet the minimum standards, as set forth in 36 CFR Part 61, “Professional Qualification Standards,” and have made retention of qualified internal INEEL cultural resource staff a condition for allowing DOE Idaho and its contractors the autonomy for decision making outlined in this plan (Idaho SHPO May 22, 2003). The following subsections describe the minimum qualifications to supervise and report on cultural resource studies on the INEEL and to make recommendations based on those studies.

Architectural History

Architectural history is the study of the development of building practices through written records and design, and the examination of structures, sites, and objects in order to determine their relationship to preceding, contemporary, and subsequent architecture and events. Professionals in this field must have a graduate degree in architecture or art history, historic preservation, or a closely related field, with coursework in American architectural history. In lieu of the aforementioned graduate degrees, professionals must have an undergraduate degree in architectural history, art history, historic preservation, or a closely related field, plus one of the following:

- At least two years of full-time experience in research, writing, or teaching in American architectural history or restoration architecture with an academic institution, historical organization, agency, museum, or other professional institution
- Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history.

Cultural Anthropology

Cultural anthropology is the description and analysis of cultural systems, which includes systems of behavior (economic, religious, and social), values, ideologies, and social arrangements, and includes the study of past societies. Minimal professional qualifications include a graduate or undergraduate degree in anthropology or a closely related field such as ethnography, plus both of the following:

- Minimum of two years of full-time professional experience applying the theories, methods, and practices of cultural anthropology to the identification, evaluation, registration, documentation, or treatment of historic and prehistoric properties
- Products and activities that demonstrate the successful application of acquired proficiencies in the discipline to the practice of historic preservation.

Historic Architecture

Historic architecture is the practice of applying artistic and scientific principles to the research, planning, design, and management of the built environment with specialized training in the principles, theories, concepts, methods, and techniques of preserving historic buildings and structures. The minimum professional qualifications in historic architecture are a professional degree in architecture or a state license to practice architecture, plus one of the following:

- One year of graduate study in architectural preservation, American architectural history, preservation planning, or a closely related field, with emphasis on detailed investigation of
historic structures, preparation of research reports on such structures, and preparation of plans and specifications for preservation projects.

- Minimum of one year of full-time professional experience on historic preservation projects with the same emphasis.

**Historic Landscape Architecture**

Historic landscape architecture is the practice of applying artistic and scientific principles to the research, planning, design, and management of both natural and built environments with specialized training in the principles, theories, concepts, methods, and techniques of preserving cultural and historic landscapes. Professionals in this field must have a five-year professional degree in landscape architecture plus both of the following:

- Three years of full-time professional experience applying the theories, methods, and practices of landscape architecture to the identification, evaluation, registration, documentation, or treatment of historic properties.

- Products and activities that demonstrate the successful application of acquired proficiencies in the discipline to the practice of historic preservation.

The aforementioned three years of full-time professional experience may be replaced with one year of comparable experience if it is accompanied with a state-recognized license to practice landscape architecture. The other qualification requirements still apply.

**Historic Preservation**

Historic preservation is the application of strategies that promote the documentation, protection, treatment, continued use, and interpretation of prehistoric and historic resources. Professional standards in this field call for a graduate degree in historic preservation or a closely related field of study such as environmental studies, plus both of the following:

- Two years of full-time professional experience applying the theories, methods, and practices of historic preservation to the identification, evaluation, registration, documentation, or treatment of historic properties.

- Products and activities that demonstrate the successful application of acquired proficiencies in the discipline to the practice of historic preservation.

The aforementioned graduate degree may be replaced with an equivalent undergraduate degree if it is accompanied with four years of the previously described full-time professional experience, products, and activities.

**History**

History is the study of the past through written records, oral history, and material culture and the examination of that evidence within a chronological or topical sequence in order to interpret its relationship to preceding, contemporary, and subsequent events. The minimum professional qualifications in history are a graduate degree in history or a closely related field. In lieu of the aforementioned graduate degrees, the professional must have an undergraduate degree in history or a closely related field plus one of the following:

- At least two years of full-time experience in research, writing, teaching, interpretation, or other demonstrable professional activity with an academic institution, historical organization, agency, museum, or other professional institution.

- Substantial contribution through research and publication to the body of scholarly knowledge in the field of history.
Archaeology

Archaeology is the study of past human lifeways through the systematic observation, analysis, and protection of their material remains. The professional standard for archaeologists calls for a graduate degree in archaeology, anthropology, or a closely related field, plus all of the following:

- At least one year of full-time professional experience or equivalent specialized training in research, administration, or management
- Demonstrated ability to carry research to completion
- At least one year of full-time professional experience at a supervisory level in the study of archaeological resources of the prehistoric or historic periods, as applicable.
CULTURAL RESOURCES OF THE INEEL

This section describes the natural environment of the INEEL and past and present human land use. Contextual overviews of this lengthy span of occupation are introduced along with summary descriptions of the cultural resource base. Preliminary research designs are included in Appendix E and more detailed historic contexts are provided in Appendix F.

Description of the Idaho National Engineering and Environmental Laboratory

The INEEL is a federal reserve with an area of approximately 2300 km² (890 mi²) covering portions of five counties on the northeastern edge of the Snake River Plain in southeastern Idaho (Irving 1993; DOE-ID 1996). The INEEL, which is currently under DOE Idaho jurisdiction, supports activities and research related to environmental restoration, nuclear energy research and development, and Department of Homeland Security technologies development and demonstration. With the exception of areas permitted for livestock grazing through the Bureau of Land Management (BLM), limited hunting overseen by the Idaho Department of Fish and Game, and travel along public highways, general public access to the INEEL area has been restricted since the 1940s.

Past and Present Land Use

During World War II, the U.S. Navy set aside the core area of what was to become the INEEL, through public land withdrawal and purchase, as the Naval Proving Grounds (NPG), a naval gun testing range and aerial bombing range. Beginning in 1949, the Atomic Energy Commission (AEC), a predecessor agency to DOE, increased the size of the NPG, designated the new larger area as the National Reactor Testing Station (NRTS), and began important research on nuclear energy and engineering. In 1974, changing missions led DOE to rename the NRTS reserve to the Idaho National Engineering Laboratory (INEL). In 1975, it was designated as a National Environmental Research Park, recognizing the ecological diversity and research potential of the large and relatively undisturbed land area included within its boundaries. In 1997, increasing emphasis on environmental restoration and stewardship was reflected in another name change to the current designation of Idaho National Engineering and Environmental Laboratory. In 1999, the U.S. secretary of energy designated a large portion of the INEEL as a “Sagebrush-Steppe Ecosystem Reserve,” recognizing the important and largely undisturbed resource inventories preserved there.

Several geographically separated facility areas have been developed at the INEEL. Some continue to be active; others have been remediated in accordance with federal requirements and are marked only by soil caps and monuments that warn of the contamination beneath. One facility, the Experimental Breeder Reactor I (EBR-I), is designated as a National Historic Landmark and has been converted to an interpretive center for the public. All INEEL facility areas stand in relative isolation to each other. In between are large expanses of undeveloped high desert terrain dotted with auxiliary structures, roads, and trails (see Figure 1). The primary developments are:

- Argonne National Laboratory-West
- Army [Auxiliary] Reactor Area
- Central Facilities Area
- Experimental Breeder Reactor I
- Idaho Nuclear Technology and Engineering Center (Idaho Chemical Processing Plant)
- Naval Reactors Facility
- Power Burst Facility
- Radioactive Waste Management Complex
- Test Area North
- Test Reactor Area.
Figure 1. Physiographic setting of the Idaho National Engineering and Environmental Laboratory with acronyms showing locations of major facilities.
Most INEEL lands and facilities are under the direction of DOE Idaho. ANL-W, currently operated by the University of Chicago under the direction of DOE’s Chicago Operations Office, will be falling under the same purview in the near future. The NRF is under the direction of DOE’s Office of Naval Reactors. Day-to-day operations are managed by (M&O) contractors selected by the Department of Energy.

Prior to 1949, the region that now includes the INEEL was utilized rather sporadically by explorers, Oregon trail emigrants, ranchers, homesteaders, canal builders, stagecoaches, and freighters. Old trails, basalt foundations, trash dumps, and canal works are testament to the tenacity of these early historic occupants. At the same time, and extending at least as far back as 12,000 years ago, Native American hunter-gatherers found a multitude of useful resources on the high desert that would become the INEEL. Remnants of their activities suggest that groups like this visited the area regularly, but probably seasonally, for thousands of years.

The sections to follow contain additional details on past land use at the INEEL as well as the cultural resources that preserve a record of it. The discussions begin with a description of the natural setting and landscape, which have been important in different ways to all of the people who have lived and worked in the region. Native American prehistorical and historical land use, which is tied so intimately to the resources that the landscape offered, is discussed next. Euro American immigrants made various efforts to use INEEL lands during the historic period. These efforts, which are addressed in the subsequent discussion, may have failed because of a general lack of understanding of the high desert setting and landscape. The final land use discussion in this section focuses on more recent historic activities associated with the INEEL and its predecessors. Historical highlights drawn from the World War II and nuclear science and engineering contextual period of significance (1942 to 1970) are provided for major INEEL facilities and programs. This discussion concludes with the potential impacts to all types of cultural resources as a result of ongoing and future operation of the INEEL.

Natural Setting

The INEEL is located in the northeastern portion of the Snake River Plain near the foothills of the Little Lost, Lemhi, and Bitterroot mountains in southeastern Idaho (Bonnichsen and Breckenridge 1982; Kuntz et al. 1984; Link and Hackett 1988; Nace et al. 1972; Nace et al. 1975). The general region is a high altitude “cold desert” or, more accurately, a sagebrush-grassland steppe, with minimal precipitation of 23 cm (9 in.) annually, mostly falling as winter snow and early spring and fall rains. Seasonal and daily temperature extremes vary widely.

The Snake River Plain is a large topographic depression approximately 50 to 100 km (31 to 62 mi) wide that extends from the Idaho communities of Payette in the west, to Twin Falls in the south, and up to Ashton 300 km (186 mi) northeast, forming a curved swath across southern Idaho (Kuntz 1978; Hackett and Morgan 1988). The Plain is divided into two distinct parts: the western Snake River Plain (Payette to Twin Falls) and the eastern Snake River Plain (Twin Falls to Ashton), which are defined by geologic and geophysical features unique to each (Kuntz 1978). The eastern Snake River Plain, where the INEEL is situated, is a broad, flat Cenozoic volcanic feature that is filled by thick sequences of rhyolitic tuffs overlain by 1 to 2 km (0.6 to 1.2 mi) of basaltic lava flows and interbedded sediments (NRF Geotechnical Investigation 1991).

The northern border of the eastern Snake River Plain near the INEEL is formed by the northernmost extent of the fault-block mountains of the Basin and Range Province (Lost River, Lemhi, Bitterroot). Far to the south of the INEEL, fault-block mountains of this province also form the southern boundary of the eastern Snake River Plain. To the west, the rolling terrain of the Plain itself continues uninterrupted. The Yellowstone Plateau lies to the east-northeast and is an
extension of the Snake River Plain (Kuntz 1978) and the geologic events that created it. Mountain ranges to the east of the INEEL region are part of the northern Rocky Mountain Province.

On the INEEL, the Snake River Plain is composed of many superimposed flows of basaltic lava extruded from low-shield volcanoes, fissures, and tubes over the past two million years during the Quaternary period (Greeley 1982; Mabey 1982; Morgan and Hackett 1989). Over time, these original lava flows have weathered, alluvial and lacustrine deposits have accumulated on top of them in low-lying areas, and a widespread but variable veneer of aeolian sediment has been deposited across the entire region. The result is a subdued modern topography and landscape typified by low, rolling hills punctuated by occasional volcanic features. Elevations range from 1454 to 1652 m (4769 to 5387 ft) above sea level with isolated rhyolitic domes, or buttes, that reach a maximum height of 2304 m (7557 ft).

The topographic results of Quaternary volcanic activity on the INEEL are quite uniform across the area. Common features include low relief pressure ridges, pressure plateaus, collapse depressions, and fissures (Greeley 1982). Though pronounced changes in topographic relief are generally rare, several striking volcanic features are present. The most prominent of these are three buttes (Big Southern, Middle, and East Buttes) that dominate the horizon from any vantage point on the INEEL. These buttes served as important prehistoric and historic landmarks and appear on the earliest maps of this area (Preston 1978).

The Big Southern Butte, just south of the southwestern INEEL boundary, is a 300,000-year-old rhyolite dome complex and largest of the three buttes. It rises 760 m (2493 ft) above the Snake River Plain and has a diameter of 6.5 km (4 mi) at its base (Spear and King 1982; Kuntz et al. 1989). It consists of two coalesced domes that grew by internal expansion and an uplifted section of older basalt flows approximately 350 m (1148 ft) thick on its northern flank (Spear and King 1982). The Middle Butte and East Butte are within the boundaries of the INEEL. The Middle Butte is an uplifted block of basalt lava flows with a rhyolite core. Its exact age has not been determined. The lava flows capping the Middle Butte are approximately 75 m (246 ft) thick and the presence of a rhyolite core is inferred from magnetic and gravity data (Spear and King 1982; Kuntz et al. 1989). The East Butte is a 600,000-year-old rhyolite dome. It rises approximately 350 m (246 ft) above the surrounding terrain and was formed by the same geologic processes that created the Big Southern Butte—subsurface expansion of highly viscous lava (Kuntz et al. 1989).

Other unique volcanic features in the area include rifts, lava tubes, craters, and locally prominent pressure ridges. All of these features exhibit a high density of prehistoric archaeological sites, reflecting their use as vistas, shelters, and hunting and ambush sites; and as areas where water, plant and animal foods, and other raw materials of economic and cultural importance might be found.

While volcanic features dominate much of the contemporary landscape of the INEEL, a large portion of the facility is contained within what is known as the Pioneer Basin (Butler 1968). This basin incorporates three important features; the alluvial deposits of the Lost Rivers (Big Lost, Little Lost, and Birch Creek), the sink areas of these same watercourses, and the lake bed of ancient Lake Terreton.
The Big Lost River enters the INEEL at its southwestern border and flows northeast approximately 48.3 km (30 mi) through the Laboratory. The river channel is presently dry throughout most of the year, but probably flowed year-round before upstream irrigation depleted local water flows. The river also flooded, occasionally severely, in the recent and distant geologic past. Evidence of these events is seen in the extensive deposits of alluvial material that have accumulated near the watercourse and in some expanses that extend up to 8 km (5 mi) away. The myriad of abandoned stream channels and meander scars that cross the Big Lost River floodplain also testify to higher water levels in the past. These alluvial features probably gained much of their present character during the Pleistocene epoch when higher moisture levels increased stream flow and provided the energy necessary for their creation (Pierce and Scott 1982).

The Big Lost River, the Little Lost River, and Birch Creek all terminate in sink areas near the northern boundary of the INEEL. It is here that the watercourses cease all overland flow and enter the underground Snake River Plain aquifer by seeping through fine sediments and porous basalt bedrock. If unimpeded by modern water control projects, most surface water on the INEEL would eventually drain to one of these areas (Lewis and Jensen 1984).

During the Pleistocene epoch, when high discharge from the Big Lost River combined with increased flows from the Little Lost River and Birch, Beaver, and Camas creeks, the sink areas were completely submerged by the waters of Lake Terreton. This shallow inland lake once covered approximately 233 km² (35 mi²) of INEEL land now occupied by sagebrush grassland, playas, and low dunes and extended far to the east (Butler 1978; Nace et al. 1975). While the lake probably reached maximum extent at the close of the last glacial period, paleontological studies (Bright and Davis 1982) suggest that the basin may have partially filled as recently as 700 years ago. Decreases in the amount of available moisture during the Holocene and modern water diversion practices have transformed the lake into a dry and relatively barren expanse of silts, clays, and sand dunes. Usually, the only standing water held by the basin today occurs in early spring when runoff is high and the sinks become marshy.

The basaltic plains of the INEEL also contain a number of scaled down and isolated versions of Pleistocene Lake Terreton. The area commonly known as Rye Grass Flats near the main INEEL entrance is one example. Playas such as this generally occur in low-lying areas atop the older lava flows. However, unlike Lake Terreton, which was dependent upon the discharge of local rivers and streams, the moisture levels in these features are maintained exclusively through the seasonal flow of intermittent drainages or high precipitation rates. Today, the small playas rarely hold water, but in the past, when moisture levels were higher, each of the basins probably offered a shallow, semi-reliable source of water on a seasonal basis. The grasses and forbs that would have thrived in the moisture-laden soil would have attracted game animals and a rich aquatic community would have been supported as well. Prehistoric cultural materials found in abundance near the playa deposits offer evidence to suggest that hunters once took advantage of this suite of useful resources.

The relatively permanent water sources at the Big Southern Butte, the Lost Rivers, the sinks, and, during prehistoric times, Lake Terreton, were essential and well known to all inhabitants occupying or crossing the Snake River Plain. There are high concentrations of prehistoric sites in those areas, and well-used early historic trails and wagon and stage roads connect them (often replaced by modern railroads and highways). Many of these areas contain evidence of historic attempts to store water and divert streams for agriculture.

All of the geographic features described in the previous paragraphs are blanketed by a discontinuous layer of windblown Holocene sands and silts. These aeolian deposits are derived from distant upwind sources and from the eroded rocks of nearby mountain ranges, which are redeposited by mountain streams at the northern margin of the
The thickness of these deposits is variable, ranging from a thin dusting on top of the more recent lava flows to accumulations of more than 3 m (10 ft) in low-lying areas and at flow margins (Nace et al. 1975). Wind action has also produced and continues to influence a series of dune fields in the north-central portion of the INEEL downwind from the sinks and the Lake Terreton basin. The abundance of prehistoric sites in this area indicates that human populations apparently took advantage of the relative comfort provided by these accumulations of soil and sand and, at times, the nearby aquatic resources.

**Flora and Fauna**

Plant life on the INEEL is strongly influenced by climate and topography and is generally similar to other cool desert environments of the Great Basin and the Columbia Plateau. Communities range from shadscale steppe at lower altitudes, to several sagebrush- and grass-dominated communities, to juniper woodland along the foothills of the nearby mountains and buttes. Although the relative dominance and boundaries of these general communities have expanded and contracted in response to variation in available moisture and temperature regimes, palynological data indicate their continued presence since the late Pleistocene glacial periods (Davis and Bright 1983).

A total of 20 to 22 distinct vegetation cover types have been identified on the present day INEEL (McBride et al. 1978). Although the specific makeup of each cover type varies according to differences in soil composition and available moisture, big sagebrush (Artemesia spp.) is a component of almost every identified community and occurs on approximately 80% of the INEEL (French et al. 1965; Harniss and West 1973). A variety of grasses, cacti, forbs, and low shrubs dominate the understory in nearly every cover type.

Differences in vegetation cover are significant in the archaeological study of the INEEL because many of the vegetation communities and their corresponding topographic situations provide microenvironments within the basaltic terrain. In turn, these microenvironments provided people with a number of opportune camping locations. Pressure ridges, in particular, offered shelter throughout much of the area. These protected areas were probably attractive mainly as shelter from prevailing winds, but they also tend to trap moisture in deep aeolian deposits and, thus, support a variety of useful plants in the spring and early summer. The Big Lost River channels, sink areas, and playas would have also provided a variety of useful vegetable materials as well as water for people and livestock. The variety of native plant species on the eastern Snake River Plain and the INEEL (Atwood 1970) can be surprising to the casual modern observer, but a great number of these were known and used in a variety of sophisticated ways by indigenous people (Anderson et al. 1996).

A total of 219 resident and seasonal vertebrate species live on or frequent the INEEL today (Arthur et al. 1984; Reynolds et al. 1986). Birds constitute the largest single class of wildlife in this census, although many of these are migratory. Small mammals are the most common year-round residents. Of special concern in this section are species that are known or expected to have been utilized by people. Many of these, including mammoth and camel, are now extinct in North America. However, archaeological sites near the INEEL, such as Bison Rockshelter and Veratic Rockshelter (Swanson 1972), Owl Cave (Butler 1978, 1986; Miller 1982, 1990), and Jaguar Cave (Dort 1975; Guilday and Adams 1967; Kurten and Anderson 1972), provide documentation of these animals’ past presence and indications of their importance to prehistoric people. It is certain that many species also provided welcome meals and useful products for early historic explorers and Oregon Trail emigrants on their way through the area, as well as early homesteaders who tried to make a living there.

The most abundant big game animal currently in residence on the INEEL is the pronghorn (Antilocapra americana). It is
estimated that up to 40% of the pronghorn population of Idaho (as well as many from Montana) may utilize the area during the winter months (Hoskinson and Tester 1980). Deer, elk, and mountain sheep are also occasionally observed on the INEEL. Other big game animals, such as bison, no longer inhabit the area but were also utilized by prehistoric and early historic populations. Bison and Veratic Rockshelters, Owl Cave, and Wilson Butte Cave contained bison remains with associated cultural materials. Test excavations at a small prehistoric site near the Power Burst Facility (PBF) on the INEEL also indicate that bison were once hunted within the INEEL boundaries (Ringe 1988).

Prehistory: Paleontology and Paleoecology

Fossils of several different time periods have been found in southern Idaho near and on the INEEL, from truly ancient marine invertebrates in the limestones of the central and eastern mountains to packrat middens and trees a few centuries old on the basaltic plains. Fossils of interest from the Pleistocene and Holocene have primarily been recovered from lake, marsh, and river deposits of the Snake and Lost River systems; lava tubes, rockshelters and caves; and archaeological sites. These finds and a few subsequent investigations allow a glimpse into the prehistoric biology and ecology of the Snake River Plain. They suggest direction for future scientific work and form the basis for a preliminary interpretation of past conditions.

Much of the paleoecological work has centered on the eastern Snake River Plain Pleistocene and Holocene epochs. This work has been research oriented and conducted at lava caves and rockshelters on the Plain proper as a paleontological effort or in conjunction with archaeological investigations (cf. Bright and Davis 1982; Butler 1968, 1972, 1978; Davis and Bright 1983; Dort and Fredlund 1984; Dort and Miller 1977; Fredlund and Dort 1986; Miller 1982, 1983, 1990; White et al. 1984). Gradually, as a result of this work and other investigations, a panorama of the western North American Pleistocene-Holocene transition is beginning to emerge. It begins with the recession of major continental glaciers and a decline in montane glaciation. A period of increased aridity follows.

The last of the Pleistocene megafauna, such as mammoth (*Mammuthus columbi*), large bear (*Arctodus simus*), camel (*Camelops hesternus* and *Camelops sp.*), and dire wolf (*Canis dirus*), became extinct by 9000 before present (B.P.). Boreal species such as caribou (*Rangifer tarandus*) were isolated at higher altitudes or displaced to northern latitudes.Major inland pluvial lakes, probably including Lake Terreton on the INEEL, shrank and vegetation zones were altered. Although the climatic mechanisms responsible for this change are poorly understood, severe seasonal temperature fluctuations and lack of effective moisture are recognized at a number of paleontological and paleoecological sites. The altithermal (i.e., warming period), which varies in timing and severity with geographic location, appears to be a drier period than present. The effects of the altithermal reached a maximum at approximately 7000 B.P. in western North America. Climatic adjustments following the altithermal period, interpreted to be a continuation of an interglacial period, led to the establishment of modern conditions.

Prehistory: The First Americans

Systematic archaeological investigation of southeastern Idaho prehistory essentially began in 1958. Since that time, several major excavations have been completed, including Wilson Butte Cave southwest of the INEEL (Gruhn 1961, 1965), the Birch Creek sites and Bison and Veratic Rockshelters north of the INEEL (Swanson 1972), the Wasden site and Owl Cave just east of the INEEL (Butler 1978; Butler 1986; Miller 1982, 1990), and the Wahmuza site to the south (Holmer 1986b; Jimenez 1986). Three decades of intensive survey and test excavation projects on the INEEL (cf. Reed et al. 1987a, 1987b; Ringe 1995; Miller 1995) have also contributed to a greater understanding of the region. These projects have
helped to document human use of the eastern Snake River Plain by hunting and gathering populations for a span of at least 12,000 years and provide the database for regional chronological sequences (cf. Butler 1986; Franzen 1981; Ringe et al. 1988; Swanson 1972) and analyses of settlement and subsistence (cf. Reed et al. 1987a, 1987b; Ringe and Braun 1993; Ringe 1995).

The prehistoric cultural chronology (see Figure 2) for southeastern Idaho is broken into three major periods: Early prehistoric, middle prehistoric, and late prehistoric. These periods are marked by major changes in weapon systems and in the type of projectile points that were used (Ringe et al. 1988). A fourth period, the protohistoric, begins with the first appearance of Euro American trade goods in archaeological assemblages that still reflect a reliance on traditional practices of hunting and gathering. The most recent cultural period recognized in southeastern Idaho is the historic, which is marked by the settlement of Euro American people in the region.

**Early Prehistoric Period: 15,000 to 7,500 B.P.**

One of the most significant features of eastern Snake River Plain prehistory is its time depth. The earliest evidence of human occupation in the region is found at Wilson Butte Cave where cultural deposits have been radiocarbon dated to the late Pleistocene epoch at 14,500 years B.P. (Gruhn 1965). Environmental conditions during the terminal Pleistocene epoch were probably considerably cooler and wetter than they are today. However, palynological (pollen) studies in the region (Davis and Bright 1983) indicate that vegetation during this time was essentially modern. The principal difference between then and now is in the distribution of vegetation zones.

During the Pleistocene epoch, the mountains north of the Snake River Plain were wooded and glaciated (Knoll 1977), and the mountain valleys probably supported an alpine tundra biome (Sadek-Kooros 1972). Many of the higher prominent points on the Plain may have also supported a coniferous forest (Bright 1966). The Plain itself was characterized by sagebrush-grassland steppes, much as it is today (Bright and Davis 1982). Small internal playas probably held shallow stands of water, and equally shallow Lake Terret on was probably at maximum extent, covering more than 91 km$^2$ (35 mi$^2$) in the northeastern portion of the INEEL and extending a considerable distance to the east (Bright and Davis 1982). This environment supported a diverse fauna, including now-extinct forms of mammoth, camel, and horse, whose fossils have been found on the INEEL, and also several modern species, such as bison and mountain sheep (Ringe et al. 1987). The archaeological record indicates that the economy of early prehistoric people was based mainly on this large game, although it is certain that a wide variety of smaller animals and local plant resources were also exploited. The sagebrush grasslands and internal playas of the area would have provided excellent browse for Pleistocene animals and productive hunting and gathering opportunities for people.

Large lanceolate spear points of several varieties are the diagnostic artifacts of the early prehistoric period, suggesting that a spear hunting technology was in place. The earliest known styles, Clovis and Folsom, are leaf shaped in outline and exhibit characteristic channel flake scars (or flutes) that extend from the base to near the tip of the implements. The best information on the dates associated with these early implements comes from the Wasden site and Owl Cave, a collapsed lava blister near the INEEL (Butler 1978, 1986; Miller 1982, 1990). The earliest cultural levels at Wasden revealed fragments of fluted points in association with the remains of mammoth, bison, and camel. Radiocarbon dates place this association between 10,000 and 12,000 B.P. Several Folsom points have also been recovered from undated surface contexts on the INEEL (Butler 1970; Reed et al. 1987a, 1987b; Ross et al. 1986).

Around 10,000 B.P., fluted points become rare in the archaeological record and unfluted lanceolate and stemmed forms began to occur in more significant numbers, a trend that continued until approximately 7500 B.P.
Figure 2. INEEL prehistoric chronological sequence.
This change may be related to the extinction of some forms of Pleistocene megafauna and a concomitant change in the style of weapons used to bring down the creatures that remained. From approximately 10,000 B.P., the environment gradually warmed, although cold pulses were still common (Currey and James 1982). These changing conditions may have contributed to the demise of some megafauna species. Mammoths were gone from the Plain by approximately 11,000 B.P. and others, such as the camel and Pleistocene horse, were gone by 9000 B.P. (Ringe et al. 1987).

Projectile point styles from this time are lanceolate in outline, and many are stemmed, or shouldered. Most point styles are called by names originally coined in the northwestern plains where a number of well-stratified sites have been investigated. This includes lanceolate varieties such as Agate Basin and Milnesand, and stemmed or shouldered varieties known as Alberta, Eden, Scottsbluff, and Hell Gap (Frison 1978; Wormington 1957). Two lanceolate point varieties known as Haskett and Birch Creek were initially defined and continue to be found in many cave and surface sites on the Snake River Plain and the INEEL. Haskett points were first recognized in south-central Idaho where they were associated with bison bones and radiocarbon dates between 9800 and 10,000 B.P. (Butler 1978; Sargeant 1973); but they also have a wide distribution in surface sites throughout the region, including the INEEL (Reed et al. 1987a, 1987b). Birch Creek points were found in direct association with a series of 8000-year-old bison kills at the Wasden site and Owl Cave (Butler 1978, 1986; Miller 1982) and at Bison and Veratic Rockshelters in the Birch Creek valley (Swanson 1972). Evidence from all locations, dated or not, suggest that the people who used these points were relying heavily on animal species such as bison and mountain sheep, which survived the transition from the Pleistocene to the Holocene epoch.

Middle Prehistoric Period: 7500 to 1300 B.P.

The close of the early prehistoric period and the beginning of the middle prehistoric period is marked by a major change in projectile point structure and form, probably corresponding to a major shift in hunting technology. Large spear points characteristic of the earlier period are almost entirely replaced by smaller notched and stemmed forms. This transition probably represents the adoption of an atlatl (spear thrower) technology, which may have been more effective in exploiting newly evolved species that survived the Pleistocene-Holocene transition. The presence of ground stone in middle prehistoric contexts at some sites such as Wilson Butte Cave (Gruhn 1961) and the Birch Creek Rockshelters (Swanson 1972) also suggests that plant foods such as camas may have gained increased importance during this time. However, all available evidence suggests that hunting still remained the dominant economic endeavor. Thus, the middle prehistoric period on the eastern Snake River Plain is marked by some changes in lifestyle, but it does not represent a major break from the previous early prehistoric period.

The environment during the middle prehistoric period was changing and transitional. A general warming trend continued, reaching a point of maximum warmth and dryness at approximately 3800 B.P. (Currey and James 1982), but all evidence seems to indicate that these conditions did not produce dramatic environmental changes in the area. Pleistocene Lake Terreton probably declined to its present seasonally marshy state, and the internal playas held little, if any, standing water. However, pollen profiles indicate that modern xeric (dry) vegetation was present throughout the interval (Davis and Bright 1983). This essentially modern habitat supported many animals that were of economic importance to human populations, including modern bison and antelope on the grasslands and mountain sheep and deer in the higher elevations.
Projectile point forms from middle prehistoric contexts suggest that this was a time of some cultural reorganization and mobility. The archaeological record reflects this in a proliferation of point styles, which appear to have correlates in the northwestern plains and the Great Basin. It appears that people from these surrounding areas were moving in and out of the eastern Snake River Plain, perhaps in response to deteriorating environmental conditions (Benedict 1979; Madsen 1982).

The diagnostic time markers of the initial portion of the middle prehistoric period are Bitterroot or Northern Side-Notched points (Swanson 1972; Greiser 1984; Gruhn 1961) and sporadic stemmed-indented base points that resemble the Pinto series of the Great Basin (Holmer 1986a). Both forms occur in contexts ranging from 7500 to 5000 B.P. at sites such as the Birch Creek Rockshelters (Swanson 1972), and further south at Weston Canyon Rockshelter (Miller 1972). At both of these sites, mountain sheep appear to have been the preferred prey in an economy that continued to be focused on the acquisition of game animals.

Between approximately 5000 and 3500 B.P., large side-notched points decrease in frequency, and around 4500 B.P., stemmed-indented base points become the dominant style of dart in the region. Large corner-notched varieties and new small lanceolate forms also make their first appearance around 4000 B.P., but did not become dominant until later. Once again, mountain sheep and bison appear to have been the favored game.

During the latter part of the middle prehistoric period, from approximately 3500 to 1300 B.P., eastern Snake River Plain assemblages continue to contain a wide variety of point styles, although the predominant type changes from stemmed-indented base to large corner-notched points. These resemble the Elko series in the Great Basin (Holmer 1986a; Thomas 1981) and the Pelican Lake type in the northwestern plains (Greiser 1984; Reeves 1983). Lanceolate points such as the Wahmuza lanceolate (Holmer 1986b) and the Humboldt (Holmer 1986a) or McKeans lanceolate (Greiser 1984) are also common in middle prehistoric assemblages. No major changes in the basic hunting adaptation are indicated during this subperiod.

**Late Prehistoric Period: 1300 to 150 B.P.**

The late prehistoric period is the best represented and the most debated on the eastern Snake River Plain. It embraces Swanson’s (1972) Lemhi Phase in the Birch Creek valley, Gruhn’s (1961) Dietrich Phase on the Plain, and Jimenez’s (1986) Ahvish Phase in the Snake River bottoms. The period is marked by another probable change in weapon technology—adoption of the bow and arrow, probably used concurrently with the atlatl and dart weaponry of the earlier middle prehistoric period.

Archaeologically, the late prehistoric period is recognized by a decrease in projectile point size. Small corner-notched points that closely resemble the Rosegate Series of the Great Basin (Thomas 1981) occur first and remain dominant until approximately 700 B.P. Small points with low side notches known as Avonlea in the northwestern plains (Greiser 1984) also occur between 1300 and 700 B.P. These two styles are followed by small side- and tri-notched arrow points. Known as Desert Side-Notched points (Holmer 1986a; Thomas 1981), they dominate assemblages from approximately 700 to 300 B.P. when stone-tipped arrows began to be replaced by firearms of Euro American manufacture. Aboriginal ceramics also appear as diagnostic time markers of the late prehistoric period. This pottery commonly occurs in eastern Snake River Plain assemblages after 700 B.P., but evidence from the Wahmuza site suggests that ceramics were in use at the much earlier date of approximately 1,200 B.P. (Holmer 1986b). Finally, the larger lanceolate and corner-notched forms of the middle prehistoric period also continue to persist in small numbers throughout the entire late prehistoric period.
Modern environmental conditions prevailed throughout the entire late prehistoric period, except for a few cold pulses and a brief period of increased moisture at 700 B.P. when Lake Tereteton is thought to have once again filled its shallow basin (Davis and Bright 1983). A typical Holocene fauna, including modern bison, was also present throughout this period.

Available evidence suggests that subsistence strategies continued to be based largely on the hunting of large game animals. Plant foods must have also played some role in late prehistoric economics; however, there is little evidence to suggest that they were as important in the diet as they were in the Great Basin, the Columbia Plateau, and even in southwestern Idaho. When they are found in the eastern part of the state, plant processing tools usually consist of mortars and pestles, which would have been used to process root crops such as camas or bisquitroot. The general lack of grinding stones suggests that seed products were not common dietary elements, perhaps because they are generally more costly than root crops or big game animals in terms of pursuit and processing time relative to caloric returns (cf. Simms 1984).

Excavations at the following sites provide some indication of the overall economic activities of late prehistoric populations:

- Wahmuza site (Holmer 1986b), an open campsite on the Fort Hall bottoms of the Snake River
- Baker Caves (Plew et al. 1987), a series of three small lava tubes on the Plain east of Minidoka
- Aviators’ Cave on the INEEL (Lohse 1989).

The excavated assemblages from these sites suggest that people were spending the winter months at camps along the Snake River where they probably relied on stored foods, such as bison, deer, and camas or bisquitroot. These stored resources were obtained on an annual subsistence round that probably included the INEEL area. During the winter, these people also probably made short forays into the surrounding sagebrush grasslands and mountain ranges to obtain fresh meat, and apparently did some fishing in nearby rivers and streams. During the warmer months, people apparently dispersed to hunt and gather throughout the region and probably created many of the sites found on the INEEL as they foraged.

**Protohistoric Period: 300 to 150 B.P.**

The nomadic hunting and gathering lifestyle of the late prehistoric period continued in southeastern Idaho even after the introduction of European horses and trade goods about 200 to 300 years ago. However, adoption of the horse by some groups at this time led to significant changes in aboriginal lifeways. These changes included increases in exploitative range, interaction with other groups, warfare, and changes in leadership roles.

**History: Native Americans**

The INEEL is included within a large territory once inhabited by two linguistically distinct American Indian groups—the Shoshone and the Bannock. Both aboriginal groups (and a variety of subgroups within the Shoshone family) shared a common way of life that allowed them to effectively utilize a wide variety of locally available resources. Early explorers, anthropologists who visited the area, and tribal oral histories have left a record of these groups that is incomplete but still useful in providing clues about the lifeway that was practiced. Because of the overall continuity expressed in the prehistoric record of the area, the information provided by these early historic and tribal sources is also important in the inferential interpretation of archaeological sites.

Prior to the introduction of the horse, the sociopolitical organization of the Shoshone and the Bannock tribes was fluid. Individuals and even entire families could move as freely from
one social unit to another as they moved from one food resource to another (Liljeblad 1957). The introduction of equestrian mobility around the start of the 19th century caused development of a more distinct, formalized band organization. Use of horses allowed the Shoshone and the Bannock Tribes to increase their exploitative range, to congregate in larger groups for longer periods of time, and to protect their possessions from groups of marauding Blackfoot Indians who also frequented the area (Steward 1938).

The absence of a restrictive sociopolitical organization is a reflection of the highly nomadic lifestyle of the Shoshone and Bannock tribes. The groups were continually on the move in order to utilize a variety of seasonally available resources, and, in contrast to their linguistically related kin in the Great Basin, probably enjoyed a relative abundance of food and other material resources. A large proportion of this general abundance was found in and near rivers and streams (e.g., Snake River and Big Lost River) that flow through even the driest and most desolate parts of southern Idaho. This led to an entire complex of subsistence, religious, and social activities that centered on the riverine habitat (Clark 1986). Consequently, many of the larger Shoshone and Bannock villages were located near waterways. However, because the dispersed nature of the resource base required these groups to be highly nomadic, these villages were not occupied on a continuous, year-round basis. Instead, they were probably utilized again and again only during the winter months when weather forced less mobility. During the remainder of the year, native groups apparently dispersed to utilize resources that were often found far from these wintering grounds.

This unique seasonal round, as augmented by the horse, has been documented by early anthropologists (Murphy and Murphy 1960, 1986; Steward 1938). These researchers report that the Shoshone and the Bannock tribes of southeastern Idaho gathered in large winter villages, primarily along the Snake River in the Fort Hall area. During the winter, they lived on stores of meat, fish, and plant foods. In addition, they fished in nearby streams and made short forays into neighboring areas to supplement their supplies with fresh meat. When winter came to a close, the people split into smaller groups and traveled to other areas in southern Idaho as resources became seasonally available.

Many different areas were visited during these annual expeditions. In the spring, groups traveled to salmon fishing areas along the Snake River west of Twin Falls and to the camas prairies in central Idaho near Fairfield and Dubois (Murphy and Murphy 1960). Two main routes were followed during this springtime expedition: one followed the Snake River, and thence north by a number of routes; and the other proceeded from the Fort Hall and Idaho Falls area across to the Big Lost River and thence west, skirting along the southern edge of the mountains. This latter route may have caused the Native Americans to pass directly through the INEEL area.

In the late summer and early autumn, big game hunting became an important activity, and most groups moved east to participate. Many followed a trail from the Idaho camas prairies east along the edge of the mountains to the Big Lost River. From there, the routes separated depending on the destination. Some groups traveled up the Little Lost River, crossed east to the Lemhi River and over Lemhi Pass, and continued east onto the Great Plains. Other groups headed toward the Snake River near Idaho Falls, and then north over Monida Pass. Still others followed a route along the Snake River to the Jackson Hole and Yellowstone area. Some groups also returned to Fort Hall and then went south to the Bear River Valley and into northern Wyoming. Finally, some groups chose to go north to the Salmon River area for the late season salmon run.

It is important to stress that these are only the major routes and destinations, and that all of the small groups probably ranged widely throughout the entire region. It is also important to note that the Snake River Plain forms a
natural east-west corridor for trade and travel and an area that must be traversed for north-south travel along the river valleys. As such, it was frequented by other groups as well as the Shoshone and Bannock tribes. For example, the Nez Perce from northern Idaho frequently came into southeastern Idaho to trade and travel to the Great Plains.

The preceding discussion indicates that the INEEL area appears to have served as a natural corridor for the seasonal movements of the Shoshone and Bannock tribes. Although there are no large winter villages reported in the area, some relatively large camps were observed by visitors. In the early 1830s, Ferris (1940, pp. 185 and 186) encountered over 200 Indians traveling near the three buttes and also reported a camp consisting of nearly 200 lodges on the Big Lost River. Wyeth (1899, p. 228) also reported Indians camped near the Big Lost River. Although the INEEL area was probably not used as a wintering grounds, it seems certain that it was frequently visited, either in transit to other areas, as a destination for groups interested in obtaining obsidian from the Big Southern Butte or Howe Point, or for those attracted by food resources such as bison, which are reported to have existed in great numbers in the INEEL area (Haines 1969; Ross 1956; Work 1923).

A list of animals utilized by the Native Americans of southeastern Idaho, as reported ethnographically (Shimken 1947; Steward 1938), would include all of the following and more: ants, badgers, bears, beavers, birds, bird eggs, bison, caterpillars, chipmunks, cicadas, crickets, deer, doves, eagles, elk, fish, grasshoppers, ground squirrels, marmots, mountain lions, mountain sheep, muskrats, owls, packrats, pronghorn, quail, rabbits, and sage grouse. The Shoshone and Bannock people also knew and utilized many plants for food and other practical purposes (Anderson et al. 1997). Indeed, it is likely that virtually every plant on the high desert was used in some way at some time of the year. Most, if not all, of these animals and plants continue to be available on or near the INEEL and are still important to tribal members.

From approximately 1810 to 1850, the Native Americans in southeastern Idaho remained relatively undisturbed by the small groups of trappers, traders, miners, and emigrants who worked on or simply passed through Shoshone-Bannock territory on their way to California and Oregon. However, conflicts began to arise after gold discoveries and Euro American settlement in the 1860s. In the late 1860s, treaties were signed between the Tribes and the U.S. government in an attempt to reduce conflicts.

**History: Euro American**

From 1805, when Lewis and Clark explored what is now central Idaho, until gold was discovered in the early 1860s, exploration and development in southeastern Idaho was sparse, with the exception of early Mormon settlement. The socioeconomic development that was once dependent on the trapping and trading of fur became dependent on more abundant resources such as water, land, and minerals. Cattle and sheep were soon introduced, and while agriculture eventually became the leading economic force in southeastern Idaho as a whole, another resource—people—became instrumental in the development of the INEEL.

**Fur Trapping and Trading**

The settlement of the American West owed itself, as much as anything, to a hat. The hat was made of a beaver pelt, and, during the 1820s and 1830s, no dedicated follower of fashion would settle for anything less (Reisner 1979). Therefore, it is no surprise that the first Euro Americans to explore the INEEL region were the fur trappers, also known as mountain men. In 1816, Donald Mackenzie organized the Snake River Expeditions to explore territory that includes what we now call the INEEL. He was followed in 1823 by Antoine Goddin, who trapped beaver extensively in the Little Lost
Osborne Russell spent time on the eastern Snake River Plain in late 1835 and described in his journal (one of the more reliable for this time period) large buffalo herds, the three buttes, and the Lost River sinks (Haines 1969). In 1834, a trading and supply post, Fort Hall, was established south of the INEEL’s present-day boundary by Nathaniel Wyeth (Trego n.d.). Today, the remains of this early establishment are located within the boundaries of the Fort Hall Shoshone-Bannock Reservation.

While mountain men are generally credited with opening the door to settlement of the American West, it may be more accurate to say that they nearly slammed it shut. Indeed, the terrors they endured were hardly apt to draw settlers, and the written accounts that they left had to weigh heavy on the settlers’ minds. These accounts described arid plains that could support little more than wild bunchgrass; entire regions that alternated between fierce heat and stinging cold; incessant winds; streams that flooded a few weeks each year and went dry the rest; hostile Indians, grizzly bears, and wolves; grasshopper plagues; hail, followed by drought, followed by hail; and flecks of precious metal that never panned out. Although they made it clear that it was possible to live off the land in better years, the life that these rugged individuals led—one of a trapper, a hunter, a fortune seeker—was not what the vast majority of American emigrants sought (Reisner 1979).

**Emigrants**

As promises of abundant land, game, rivers, ores, and agreeable climates in California, Oregon, and Washington spread to the east, a thin ribbon of civilization began to trickle out to the resources-rich west. This trickle eventually became a stream with the establishment of the Oregon Trail in 1836. In order to avoid Indian hostilities along the Snake River, Tim Goodale eventually established a northern extension of the Oregon Trail through the area along an established fur-trading route, and emigrant wagons used it as early as 1852. A portion of Goodale’s or Jeffrey’s Cutoff (Dykes 1989; Idaho Historical Society n.d.; Merrill 1990) is still recognizable in the southwestern corner of the INEEL (see Figure 3). Later, the cutoff was used for cattle drives from Idaho, Washington, and Oregon to shipping points in Wyoming. After heavy stock losses in the 1880s, cattle drives were curtailed and seasonal sheep drives traversed the route for another decade until the railroad was constructed across southern Idaho.

**Transportation and Mining**

The mining booms of the middle to late 1800s created a need for transportation systems between the newly established mining towns north of the INEEL, such as Mackay and Leadore, and their supply stations in older towns, such as Idaho Falls and Blackfoot further to the south. Freighting and staging became a major business, and a number of companies were formed in order to meet the demand for mining equipment, passenger service, dry goods, and other supplies. Old wagon roads and trails became stage and freight lines virtually overnight (see Figure 3), and several new trails were forged across the desert (Trego 1935).

Because of the freshwater springs that bubble from its slopes within the otherwise dry desert, the Big Southern Butte served as a stop for nearly all stage, freight, and later rail lines. Berryman and Rogers, Joe Skelton, and Henry Leatherman, three of the earliest freighters to cross the desert from Idaho Falls and Blackfoot to Arco, all used the Big Southern Butte as a way station (Olsen 1978; Trego 1928). In 1901, completion of the Oregon Shortline railroad between Blackfoot and Arco signaled the end of stage and freight lines in the area (Sedgewick n.d.). As horse-drawn wagons became obsolete, many drivers took up small farms and ranches in the area.

Gold discoveries in the 1860s and 1880s in central Idaho brought many miners, and boomtowns sprang up in areas just north and west of present day INEEL boundaries.
Figure 3. Historic trails of the INEEL with dates that indicate the year in which roads and trails were surveyed, not necessarily the year they were first used.
Many of the towns folded when initial expectations of productivity in the surrounding mines were not realized (Bottolfsen 1926a).

One last minor boom occurred in 1925 when gold was discovered in the Lost River sinks, but within a month it was realized that the gold was in such minute quantities that extraction was not economically feasible (Crowder 1981; Olsen 1978).

**Ranching**

As transportation through the desert became more reliable, homesteaders began to make their way into the area. Many of these early occupants began ranching in the northern reaches of the present-day INEEL. Sources report that there were six or seven ranches in operation on the Little Lost River and Birch Creek in 1882 (Edelman n.d.). Among these early cattlemen were:

- The Hawley brothers, whose descendents still operate a large ranch on the Big Lost River near Howe (Edelman n.d.)
- The Hollands, who also raised cattle near Howe and routinely ran their stock between there and the Big Southern Butte (Petitie 1977; Gerard 1982)
- Dave Wood, who maintained several ranches in the area, one of which was located on the Birch Creek sinks (Oberg 1970)
- Frank Reno, whose family still operates a ranch in the Birch Creek sinks area today (Edelman, n.d.).

The disastrous winters of the 1880s killed so much stock that the local cattle industry never quite recovered, and sheep were moved into the grazing areas once dominated by cattle.

Major sheep drives across the INEEL area began in the 1860s, and the growth of this new industry paralleled that of the cattle industry (Wentworth 1948). As the demand for mutton and wool increased and sheep became a profitable commodity, many cattle ranchers added flocks to their cattle herds or completely switched to raising sheep. By the early 1900s, sheep were very common in the area and are still moved today from pastures near the Big Southern Butte across the INEEL area to Howe. Many of the isolated historic sites encountered within the boundaries of the INEEL are remnants of the small temporary camps created by sheep and cattle drivers as they moved their stock through the region around the end of the 19th century.

**Homesteading and Agriculture**

While the northern portion of what is now the INEEL was used primarily by ranchers, the western and northeastern portions were geared toward homesteading and agricultural pursuits. The first settlers in the area were members of the Mormon church who established residence near the northeastern boundary in 1855 (Clements n.d.). In these early days, farming was oriented toward family subsistence because transportation systems were not adequate to ship any supplies or produce in or out of the area. After freight and wagon lines became firmly established in the 1880s, settlers came to the area in larger numbers and began to farm for commercial as well as subsistence purposes.

Most of the homesteaders arriving in the late 1800s settled along the Big Lost River. The first permanent settlers arrived in 1878, and the first official water right claim was recorded in 1879 (Bottolfsen 1926b). Many settlers were prompted to move into the area by the Homestead Act of 1862, which allowed the head of a family to obtain 160 acres of land by residing on it and cultivating it for a period of five consecutive years. The Desert Claim Act of 1877 also encouraged settlement in the Big Lost River area by permitting families to acquire 640 acres of land if water could be brought to it (Bottolfsen 1926b).

Water was a rare commodity in the desert areas of the eastern Snake River Plain and the
success of farming efforts in the area hinged on the homesteaders’ ability to obtain it. With passage of the Carey Land Act in 1894 (Scott 1983; Williams 1970) and passage of the Desert Reclamation Act in 1902, the federal government stepped in to assist homesteaders in this endeavor. The 1894 act set aside one million acres of public land in Idaho for homesteading, provided that the settlers participate in state-sponsored irrigation projects; and the 1902 act provided the funding necessary to reclaim these arid and semi-arid acres.

Southeastern Idaho was a major beneficiary of this federal aid and, as a result, the years from 1905 to 1920 saw a dramatic upswing in agricultural activity on land within and around the present-day boundaries of the INEEL. The population of Idaho Falls quadrupled from approximately 1,262 in 1900 to 4,827 in 1910, and this growth is directly attributed to the promise of irrigable land. Irrigation companies formed, and with financial backing by the federal government, proceeded to start construction on a number of dams, including the Mackay Dam on the Big Lost River upstream of the INEEL, and canal projects that brought much-needed water to homesteaders (Pettite 1983). The town of Powell/Pioneer sprang up along the Oregon Shortline in the southwestern portion of the INEEL to supply local residents with necessary mercantile goods and serve as a stock-shipping station (Gerard 1982; Schmalz 1963). Unfortunately, gross miscalculations of precipitation and water flow in the area coupled with ignorance of the fractured bedrock strata and porous gravels of the Big Lost River led to the failure and ultimate abandonment of all but a few of these projects in the 1920s (Pettite 1983; Staley 1978). Many of the small homesteads on and around the INEEL were forced to fold, although a few notable exceptions in and around the Mud Lake area east of the INEEL and far upstream in the Big Lost River valley continued to flourish. Many of the historic sites located within the INEEL boundaries are representative of these short-lived efforts to reclaim the high desert for agricultural purposes.

History: 1942 to Present

In 1942, the U.S. Navy established a presence on what is now the INEEL to test naval ordnance. After World War II, nonnuclear military munitions testing continued until the AEC acquired the former ordnance test area for development of a remote installation devoted to the testing and development of nuclear reactor technologies. Prototypes of the nation’s three commercial power reactor concepts—the pressurized water reactor, the boiling water reactor, and liquid-metal-cooled breeder reactor—were first developed and tested at this National Reactor Testing Station (now INEEL). Since its formation back in 1949, basic research critical to design, safe operation, and licensing of nuclear power and propulsion reactors has taken place at the Laboratory.

Military Ordnance Testing

During World War II, the U.S. Naval Ordnance Plant was established in Pocatello, Idaho, as a place to manufacture, assemble, and reline Navy weapons. Nearly all of the guns used by the Pacific Fleet were eventually sent to the plant for relining, and this was the most common activity that was conducted there. Before the guns could be shipped back for active duty, they had to be test fired to ensure that their aim was true. The Arco Naval Proving Ground (NPG) was established some 60 miles northwest of Pocatello as a remote place to test the guns for combat readiness. While operating during World War II, it was one of only six such facilities in the United States, and the only one capable of test firing the 16-inch battleship guns of the Pacific Fleet. The Arco NPG included some 270 square miles of land along with infrastructure, including operational support facilities and housing for military and civilian personnel. This infrastructure is primarily located at what is today the Central Facilities Area (CFA) on the INEEL but also included rail lines for gun transport and downrange activities and various targets, spotting towers, and detonation areas. The Army Air Corps, flying
out of Pocatello, also established two practice bombing ranges near the Arco NPG at this time, one located southwest of CFA and the other southeast (Scientech Inc. 1993; Braun 1996; Stacey 2000).

After the end of World War II, ordnance testing at the Arco NPG continued in the form of explosives storage and transportation tests. Structures were built and then loaded with explosives that were intentionally discharged to assess the effects to the structures and surrounding area of such explosions and to determine safe storage of military ordnance. One such test occurred on August 29, 1945, when approximately 250,000 pounds of powder explosives were detonated. It was the largest nonnuclear explosion up to that time (EG&G Idaho 1986). Craters and debris from this and other ordnance tests still remain on the INEEL landscape.

Between 1968 and 1970, during the Vietnam War, massive 16-inch naval guns were again heard on the Idaho desert. Another naval firing site, located southwest of CFA, was established and used for test firing the guns of the battleship New Jersey. Since AEC research facilities were by then scattered throughout the original downrange area of the Arco NPG, the guns tested during the Vietnam War were aimed in the opposite direction. From the firing site located a few miles south of the CFA, the guns were aimed southward across uninhabited territory toward the Big Southern Butte. Craters can still be found on the northern flank of this local landmark (Braun 1996; Coloff 1965).

Land and infrastructure associated with the Arco NPG was acquired from the Navy by the AEC in 1949 and formed the nucleus of the future INEEL.

Nuclear Science and Engineering

The federal government initially established the INEEL as the National Reactor Testing Station in 1949. Its purpose was to provide an isolated location where prototype nuclear reactors could be designed, built, and tested. The Naval Proving Ground buildings acquired by the AEC became known as the Central Facilities Area. As its name suggests, CFA served as a centralized support services facility for the reactor testing operations, containing such jointly used services as a fire department, medical dispensary, cafeteria, crafts shops, and motor vehicle repair and maintenance facilities (Braun 1996). Since establishment of the NRTS, 52 “first of a kind” reactors have been constructed at the INEEL.

The following contextual overview and the supporting text in Appendix F focus on major nuclear-era research and testing programs by facility area and is not intended as a comprehensive history. A more complete and definitive context, including an inventory of INEEL buildings administered by DOE Idaho for post-1942 INEEL activities, can be found in the INEEL Historical Context Report (Arrowrock 1997). A popular history of the INEEL (Stacey 2000) and several Historic American Engineering Record reports (Stacey 1994, 1997a, 1997b; Pace and Braun 2000) provide additional detail.

Experimental Breeder Reactor I. The first reactor built at the INEEL, Experimental Breeder Reactor I (EBR-I), achieved initial criticality on August 24, 1951, and achieved many more historical firsts during its operational lifetime. On December 20, 1951, shortly after initial startup, the facility became the first reactor in the world to produce usable quantities of electricity. Subsequently, in 1953, EBR-I proved the concept that reactors designed to operate in the high-energy neutron range are capable of creating more fuel than is consumed (breeding). In July of 1963, EBR-I became the first reactor in the world to produce usable electricity with plutonium as the major fuel component and, later, also demonstrated the feasibility of using liquid metal as a reactor coolant. The reactor was decommissioned in 1964, named as a National Historic Landmark in 1966, and opened for public visitation in 1975 (INEL 1969; Braun 1994).
**Test Reactor Area.** The first reactor built expressly for testing reactor core and fuel materials, the Materials Test Reactor (MTR) achieved startup on March 31, 1952 at the Test Reactor Area (TRA) facility. Experiments conducted at the MTR influenced the choice of fuel elements and core structural materials for every reactor constructed in the United States since MTR startup. After more than 125,000 operating hours, the MTR was finally shut down on April 25, 1970, and was formally decommissioned in 1974. Since that time the MTR building has been maintained and used for office space and storage.

To enhance the nation’s reactor testing capability the Engineering Test Reactor (ETR) was completed in 1957, just a few hundred feet south of the MTR at the TRA facility. At the time of initial operations, the ETR was the largest and most technically advanced materials test reactor in the world. Like the older MTR, the original ETR mission was to evaluate fuels, coolant, and moderator characteristics for future reactor designs. The demand for expanded and more technically advanced reactor testing capability was so great that even before the ETR became operational, planning was underway for yet another, even more advanced test reactor at the INEEL.

Construction on the Advanced Test Reactor (ATR) began in 1961, and at that time it was the largest single construction project ever undertaken in the state of Idaho. Located approximately 200 yards north of the old MTR reactor building, the ATR began operations in 1967. The ATR performed experiments similar to those conducted at the MTR and ETR facilities, with the U.S. Navy being the primary customer. While the ETR was shut down for the last time in 1982 and now stands vacant, the ATR remains in operation, still performing its materials testing mission. All of the TRA reactors have made vast and fundamental contributions to the development of nuclear science and engineering (INEL 1969; Braun and Marler 1996).

**Radioactive Waste Management Complex.** To accommodate increasing amounts of radioactive wastes being generated by the new reactors, the RWMC was established in the southwestern corner of the INEEL in 1952. From 1954 to 1970, transuranic (TRU) wastes from the nation’s national defense programs were disposed of in the RWMC’s Subsurface Disposal Area (SDA) (DOE-ID 1996). In 1970, TRU wastes began to be stored aboveground in an expanded TRU waste storage area (INEL 1969). At the facility’s Stored Waste Examination Pilot Plant (SWEPP), the TRU waste has been vented, examined, and certified for eventual disposal at a permanent national repository, such as the Waste Isolation Pilot Plant in New Mexico. The Advance Mixed Waste Treatment Project, which began operation in 2003, will expand the complex’s waste management operations to include treating 65,000 cubic meters of INEEL low-level and TRU waste currently stored at the Transuranic Storage Area, and prepare the wastes for shipment out of Idaho. The RWMC presently consists of the SDA, the TRU waste storage area, an administrative complex, and the operations zone. Although most of the aboveground structures were built after 1970, many of the buildings and features at the RWMC are important for the role they have played in the development of radioactive waste management technology and for their illustration of shifting public attitude toward nuclear energy.

**Naval Reactors Facility.** Also in the early 1950s, work began at the INEEL to develop reactor prototypes for the U.S. Navy. The initial power run of the prototype reactor (S1W) for the world’s first nuclear submarine, the USS Nautilus, was conducted at the INEEL on May 31, 1953, proving that atomic propulsion of ships was possible. The U.S. nuclear Navy was born and, in 1958, a propulsion reactor prototype designed for use in surface ships (A1W) was also designed and built at the NRF. The A1W prototype facility consists of a dual-pressurized water reactor plant within a portion of steel hull designed to replicate the aircraft carrier, USS Enterprise. A1W was the first ship propulsion
system designed to have two reactors providing power to the propeller shaft of one ship. Located immediately south of the A1W reactor building, the S5G reactor is a prototype pressurized-water reactor designed to operate in either a forced or natural circulation flow mode. Coolant flow through the reactor is caused by thermal circulation rather than pumps. The S5G prototype plant was installed in an actual submarine hull section capable of simulating the rolling motions of a ship at sea (INEL 1969). A historic context and building inventory assessment report that addresses the historical significance of NRF facilities has been completed under the direction of DOE’s Office of Naval Reactors.

**Boiling Water Reactor Experiment.** In 1953, the first of five reactors was constructed at the Boiling Water Reactor Experiment (BORAX) area to prove the feasibility of reactors in which the coolant/moderator boils in the reactor core and passes steam directly to the turbine for power generation. The BORAX tests also meant to demonstrate the efficiency of power production from this type of direct-cycle system. After BORAX I was deliberately destroyed in 1954 to determine this type of reactor’s safety under extreme conditions, BORAX II was constructed in the same area for further safety parameter tests and to try new core combinations.

The next reactor in the series, BORAX III, was built in 1955 to determine if boiling water reactors could generate power. The determination was made when BORAX III became the first reactor to light an American town (Arco, Idaho) on July 17, 1955.

BORAX IV operated from 1956 to 1958 and demonstrated the stability of ceramic cores of uranium-thorium oxide fuel elements. The last reactor in the series, BORAX V, produced superheated (dry) steam wholly by nuclear means for the first time in order to increase the efficiency of this type of design and reduce the costs of nuclear power.

Although no surface structures remain from the BORAX programs, there is no question of the importance they had in the development of reactor safety parameters and the nuclear power program (INEL 1976).

**Test Area North.** In the 1950s and early 1960s, the Aircraft Nuclear Propulsion (ANP) program was conducted at Test Area North (TAN). During the course of this program, which was designed to prove the feasibility of nuclear powered aircraft, three Heat Transfer Reactor Experiments (HTRE-I,-II, and -III) were tested. Although no nuclear-powered aircraft were ever built, HTRE test results proved the feasibility of using heat from nuclear power to operate aircraft turbojet engines. Three additional low-power reactors were operated in support of this program; the Shield Test Pool Reactor, the Critical Experiment Tank, and the Hot Critical Experiment.

Following the development and success of the Intercontinental Ballistic Missile program and the desire to pursue space exploration, the ANP program was terminated in 1961 by presidential Executive Order. Two prototype nuclear aircraft engines used in the HTRE tests are presently on public display near the EBR-I reactor complex. Although many of the structures associated with the ANP have either been demolished or stand vacant, the Hot Shop and ANP hangar designed to house prototype aircraft still exist and support current ongoing programs at TAN.

Begun conceptually in 1962 soon after the ANP program ended, the Loss of Fluid Test (LOFT) program underwent numerous changes and redesigns before conducting its first nonnuclear tests at TAN in 1976. LOFT consisted of a series of simulated loss-of-coolant accidents. In 1978, the first nuclear tests began at the LOFT containment facility. The LOFT reactor was the only nuclear reactor in the world capable of repeatedly simulating loss-of-coolant incidents similar to those that might occur in commercial power reactors. In 1979, the LOFT scientists and reactor played a vital role in
predicting activity within the Three Mile Island (TMI) reactor core as scientists struggled to manage and control the TMI reactor core meltdown. Successful testing continued at LOFT until 1982, when an international consortium took over operations and continued testing until 1986, when the program officially ended. The Water Reactor Research Test Facility (WRRTF), originally constructed to house reactor shielding tests associated with the ANP program, was reused during the LOFT program to conduct nonnuclear simulations of thermal-hydraulic features of commercial nuclear reactors. After a long history of significant contributions to nuclear science and engineering, many structures associated with LOFT and other, less significant programs now lack missions and have been vacated (INEL 1969; Stacey 1994).

Idaho Chemical Processing Plant (now Idaho Nuclear Technology and Engineering Center). In 1953, the INEEL’s most important reactor support facility, the Idaho Chemical Processing Plant (ICPP), began the process of recovering and reprocessing unburned, enriched uranium from “spent” reactor fuel elements. The ICPP was initially designed and built as a five-year demonstration facility, but the increasing Cold War nuclear arms race led to an increased demand for nuclear fuel, and the ICPP soon became a full-scale production facility. Spent reactor fuel elements were transported to the ICPP to extract enriched uranium, which was then shipped to another AEC laboratory at Savannah River, Georgia, for use as fuel in reactors producing plutonium and tritium for nuclear weapons. In addition to its groundbreaking work in fuel reprocessing technology, the ICPP became a leader in the development of new technologies to manage nuclear wastes. The waste calcining facility (WCF) developed at the ICPP in the mid-1950s transformed highly acidic radioactively contaminated liquid wastes into granular pellets that are much safer and easier to store until radioactive components in the waste are rendered safe through natural decay. ICPP calcining operations continued after WCF closure with its successor, the New Waste Calcining Facility (NWCF). Although fuel reprocessing at ICPP ended in 1992 and the final waste calcining campaign occurred in June, 2000, their contributions to the history of nuclear science have been significant. New missions at the ICPP, including many that are focused on storage and manipulation of spent fuel, are reflected in a new name, the Idaho Nuclear Technology and Engineering Center (INTEC) (INEL 1969; Stacey 1997; Pace and Braun 2000).

Army Reactor Area. Work began at the Army Reactor Area (ARA) in 1957 to develop compact, portable reactors to generate electricity in remote locations and, eventually, one water-cooled reactor and two gas-cooled reactors were constructed at three of the four ARA sites (ARA-II, ARA-III, and ARA-IV). Support facilities, including a hot cell, were just to the south of ARA-II at a location known as ARA-I. In January 1961, an incident at the Stationary Low Power reactor (SL-1), located at the ARA-II facility, resulted in a steam explosion, leading to the first fatalities in U.S. history directly related to nuclear reactor operations. After nearly nine years of operations, the Army program at ARA was terminated in 1965 due to reactor maintenance problems, an inability to define a current mission, and questions related to cost effectiveness. After the Army terminated their reactor programs, the name was changed to the Auxiliary Reactor Area and the remaining facilities were used for a few years in support of various other research programs. After standing vacant for several years, decontamination and dismantlement of the ARA structures began in 1993 (INEL 1962; Stacey 1997).

Special Power Excursion Reactor Test area and Power Burst Facility. In 1955, the Special Power Excursion Reactor Test (SPERT) area was established to implement the AEC’s water-cooled reactor safety testing program. Four SPERT reactors were designed, built, and operated in the 15-year period between initial startup of SPERT-I on June 11, 1955, and final shutdown of SPERT-IV in 1970. The purpose of the SPERT reactors was to study a wide range of
variables such as core configuration, plate design, coolant flow, and reflector moderator and temperature coefficients. In general, research was directed toward “runaway power,” which was the major safety concern at that time. Following shutdown, the SPERT area was renamed the Power Burst Facility in 1970 and SPERT-II, -III, and -IV were converted to the Waste Engineering Development Facility, the Waste Experimental Reduction Facility, and the Mixed Waste Storage Facility for the treatment, storage, disposal, and recycling of radioactive hazardous, mixed, and industrial and commercial wastes. These three facilities are now collectively called the Waste Reduction Operations Complex (WROC).

The SPERT I reactor was demolished in 1985; however, at the PBF area just north of SPERT I studies continued on the effects of abnormal conditions on nuclear fuels (INEL 1969). After years of successful operation and failed attempts to attract new programs, PBF is presently being decontaminated and dismantled.

**Argonne National Laboratory-West.** In 1953, the same year that Argonne’s EBR-I proved the breeding concept, design began on the next generation of breeder reactors. It was planned that Experimental Breeder Reactor II (EBR-II) would both serve as a prototype for commercial breeder reactors and as a testing and development center for fuel reprocessing technologies. Construction began in 1961 at the ANL-W facility, and EBR-II achieved criticality in 1963. In 1964, the first fuels were reprocessed and the reactor began producing electricity. Eventually EBR-II produced enough electricity to provide power to the entire INEEL. The original design tests were accomplished by 1965, and the reactor was then used as an irradiation facility for the testing of reactor components. EBR-II was shut down for the last time in 1994. Other major reactor experiment facilities at ANL-W include the Zero Power Plutonium Reactor (ZPPR) and the Transient Reactor Test Facility (TREAT) (INEL 1969).

Although DOE-Chicago’s contractor, the University of Chicago, initiated a building inventory and assessment of ANL-W in 1996, it has not been completed.

**Miscellaneous Programs.** Other reactor concepts tested at the INEEL include the Organic Moderated Reactor Experiment (OMRE), constructed southwest of CFA and operated from 1957 to 1963. The OMRE was designed to test the use of liquid hydrocarbons as a coolant and moderator. After deactivation in 1963, the facility remained unused until 1977, when it was finally dismantled.

The Experimental Organic Cooled Reactor (EOCR) was built adjacent to the OMRE facility and was designed as a continuation of studies conducted at that facility. EOCR was approximately 90% complete when the program was canceled in 1962 and, though the reactor was in place, it was never brought to criticality (INEL 1969). The EOCR reactor building was subsequently used briefly for office space, then as a training facility for security forces when it was renamed as the Security Training Facility. After standing in the desert for 38 years, the EOCR facility was removed in 1999.

**Current Operations**

The LOFT facility at TAN was the last new reactor testing facility to be constructed at the INEEL, and the years since the end of the LOFT program have seen a continuing decline in the reactor testing mission. New construction has tapered off in recent years, and much of that which has been done is directed toward the replacement of aging infrastructure. There has also been a correlative increased and accelerated emphasis on the deactivation, decontamination, and demolition (DD&D) of older buildings and structures. The ATR is the only DOE Idaho reactor still operating, and all other remaining INEEL reactor facilities are in various stages of shutdown and decontamination, awaiting new missions or dismantlement. Fuel processing and waste calcining at INTEC have ended, and the
original Waste Calcining Facility and Fuel Reprocessing Complex have undergone or are undergoing DD&D. INEEL programmatic emphasis shifted away from reactor development and Cold War-related work toward hazardous and radioactive waste management, environmental cleanup, environmental technology development, and long-term environmental stewardship. The labor force at the INEEL (including the NRF and ANL-W) peaked in 1992 with some 12,700 employees (Stacy 1999). In the intervening years the number of employees has steadily declined to a current total of approximately 6600. This dramatic reduction has resulted in much of the built environment now standing unused and vacant.

The INEEL has recently been named lead DOE Laboratory for the development of the next generation of nuclear reactor technology and for the development and testing of Homeland Security technologies, but it is unclear, as yet, how and when these new missions will coalesce into a revitalized facility.
INEEL CULTURAL RESOURCE MANAGEMENT

This section summarizes the overall approach to managing cultural resources on the INEEL. Topics of discussion include the effects of activities on cultural resources; overall management of cultural resources (identification, evaluation, and protection) resources; and future priorities for the INEEL Cultural Resource Management Program. Appendices C and D complement this general discussion by providing strategies and procedures for the management of archaeological and historic architectural resources.

Past, Present, and Potential Effects of INEEL Activities on Cultural Resources

The INEEL remains an active scientific facility where programs and projects are in constant change. Historically, INEEL missions have also varied tremendously, resulting in a variety of needs by multiple tenants and organizations. INEEL-related activities have had an undeniable impact on cultural resources of all types. In some cases, the impacts have been beneficial. For instance, restrictions on grazing and other public access for portions of the INEEL have protected exposed surface artifacts at thousands of prehistoric and early historic archaeological sites, and general maintenance activities and reuse have prolonged the life of many historic buildings and structures.

However, some impacts have been damaging to INEEL cultural resources. For example, reuse of buildings where historically important activities took place has sometimes meant the removal of original equipment and systems associated with those activities. In other instances, historic buildings have been demolished to eliminate or reduce maintenance costs and contamination problems or to make room for newer facilities, while archaeological sites and sensitive Native American sites have been adversely affected by facility and infrastructure construction.

In general, the potential impacts to cultural resources at the INEEL fall into the following categories:

- Natural forces (e.g., wind erosion, water erosion, flooding, range fires, rodent activity, and gravity)
- Vandalism (e.g., graffiti, unauthorized artifact collection, unrestricted offroad vehicle use, and neglect)
- Construction (e.g., facilities, roads, utilities, wells, landfills, borrow pits, fencing, trenching, and visual changes to landscape)
- Maintenance and renovation (e.g., scavenging equipment, neglect, and removal or alteration of historic features)
- Deactivation, decontamination, and dismantlement (e.g., asbestos abatement, landscape changes, and demolition of buildings and structures)
- Habitat modification (e.g., spread of noxious and/or exotic weeds, flood control, fire rehabilitation, hazardous materials, artificial changes such as ponds, and grazing)
- Contamination (e.g., cleanup, sampling and characterization, and ordnance removal)
- Operations (e.g., security activities, environmental monitoring, and cleanup)
- Emergency response (e.g. fire fighting and containment, and flood control).

Depending on facility missions over time, some activities tend to have greater cumulative impacts on cultural resources than others. At present, with the focus on accelerated INEEL
cleanup, DD&D is the most significant activity in terms of impacts to cultural resources.

Shortly after initial passage of the National Historic Preservation Act in 1966 and the National Environmental Policy Act in 1969, the INEEL began to incorporate cultural resource concerns into land use and management decisions. Today they are routinely considered as part of environmental compliance at the Laboratory.

Responsibility for Resource Management

Comprehensive planning is especially important for DOE because the agency manages large amounts of land distributed over a diverse geographic area. The wealth of cultural resources potentially impacted by activities on DOE lands is also diverse and region-specific. Because of the wide variety of its holdings, DOE-HQ has delegated primary responsibility for cultural resource management to local DOE field offices. DOE operations office managers, field office managers, and lead program secretarial officers assume primary responsibility for implementing cultural resource policies. At the INEEL, the Environmental Technical Support Division of DOE Idaho takes responsibility for oversight of the INEEL Cultural Resource Management Program through a designated cultural resources coordinator. The INEEL CRM Office, which is operated by DOE Idaho’s M&O contractor, is responsible for day-to-day cultural resource management on the INEEL. This office is staffed with professional archaeologists and historians who meet or are closely overseen by staff who meet secretary of Interior qualification standards.

Cultural resource concerns and responsibilities are also integrated into broader DOE objectives through a Cultural Resource Management Program based at DOE Headquarters. Here, the DOE assistant secretary for Environment, Safety and Health; the director of the Office of Management and Administration; and the designated federal preservation officer are responsible for developing and coordinating cultural resource management and historic preservation policy and guidance with broad DOE impact. Other offices that provide policy and guidance of value in the cultural resources arena include the DOE Office of History and the assistant secretary for Congressional and Intergovernmental Affairs, who provides input concerning relationships with Native American governments and other public interest groups.

Primary Activities of the INEEL Cultural Resource Management Office

Federal law directs that cultural resources be protected during daily operations (“non-impact” activities) and project planning and implementation (“impact” activities) on the INEEL. These protective measures are to be “active” and include inventories, National Register nominations, site monitoring, scientific research, and public education. “Reactive” measures are also taken to maintain compliance with environmental requirements.

The INEEL CRM Office coordinates cultural resource-related activities on the INEEL with oversight by the DOE Idaho cultural resources coordinator. The activities of the INEEL CRM Office, set forth by law, regulation, and guidance, fall into three very broad categories of cultural resource identification, evaluation, and protection. The staff is also dedicated to sound overall management and resource maintenance, or enhancement, and elements of these objectives infuse all INEEL cultural resource management efforts.

The overall mission of the INEEL CRM Office, as outlined in this plan, is to provide DOE Idaho with a professional approach to managing the cultural resources under DOE Idaho’s jurisdiction.
As such, INEEL cultural resources are managed in such a manner as to:

- Promote appreciation and awareness of the value and sensitivity of cultural resources on the INEEL
- Encourage management accountability for INEEL cultural resources
- Achieve compliance with the spirit and intent of applicable executive and legislative mandates
- Foster innovative and cost-effective methods for taking cultural resources into early and careful consideration during INEEL undertakings in harmony with the overall DOE mission.

**NHPA Section 110 Goals**

NHPA Section 110 requires federal agencies to ensure that their procedures, with regard to NHPA Section 106, are consistent with regulations and guidance issued by the Advisory Council (NHPA Section 101). Federal agencies must provide a process for the development and implementation of agreements to guide the consideration and mitigation of adverse impacts to historic properties under their jurisdiction.

Section 110 also directs federal agencies to consider using historic properties, whenever feasible, prior to constructing, leasing, or buying new properties. It further directs that preservation-related, and all other activities that may impact historic properties, be carried out in consultation with other federal, state, and local agencies; Native American tribes; and the general public. Finally, it directs federal agencies to establish preservation programs to identify, evaluate, and nominate properties under their jurisdiction to the National Register and to maintain and manage such properties in a manner that considers their preservation.

DOE is committed to a comprehensive cultural resource management approach that addresses all cultural resources on the INEEL, regardless of the potential for adverse effects to them. The general processes discussed in this section describe DOE’s management approach and goals to enhancing resource preservation.

**Identification**

Efforts to identify cultural resources have been ongoing at the INEEL for more than three decades. Appendices H and I provide lists of the cultural resources that have been identified during this time, organized according to type. Every year more resources are added to this inventory through two basic processes. In one process, resources are inventoried for purposes of long-term planning and compliance with provisions in the National Historic Preservation Act and the Archaeological Resources Protection Act that require federal agencies to ultimately locate and evaluate all of the cultural resources on lands under their jurisdiction. In the second process of identification, cultural resources that may be subject to impact as a result of INEEL activities are inventoried.

Methods for identification of cultural resources on the INEEL vary according to the type of resource under consideration. For the most part, archaeological sites are identified through systematic pedestrian surface survey in most areas on the INEEL. Historic architectural properties, structures, and objects generally exhibit some type of surface manifestation as well, but not always, and INEEL archives are often consulted to identify these cultural resources. Direct communication is necessary to identify and characterize most Native American cultural resources such as sacred sites or traditional use areas at the INEEL. Even in areas that are widely recognized as sensitive to the Shoshone-Bannock Tribes, detailed inventory of the resources of potential concern and importance is impossible without tribal input.

DOE Idaho’s commitment to locating cultural resources on the INEEL is critical to
long-term stewardship of cultural resources. The archaeological sites, historic architectural properties, traditional cultural areas and sacred Native American sites scattered over the entire Laboratory cannot be understood in isolation. All are part, and only part, of larger human systems adapted specifically to the high desert landscape through several distinct time periods. Since the area is so large and its cultural history so complex, effective stewardship will only be accomplished through an ongoing program of resource identification and incorporation of the resulting information into contexts and research designs.

General cultural resource identification efforts are also important for overall land-use planning. In this case, surveys can be targeted in areas where there are special concerns. Examples might include zones that are subject to high levels of natural erosion where cultural resources may be subject to unmitigated impact, areas that are targeted for environmental cleanup, areas where future development may occur, areas that are poorly understood and under-represented in existing cultural resource inventories, and areas that hold promise for development to enhance public understanding of cultural resources and the INEEL. For these types of identification efforts, it is appropriate to target specific types of cultural resources, such as scientific equipment or important Native American plants, or any other resource that is poorly understood. The goal of every effort is enhanced understanding of the resource base.

Predictive modeling can further enhance the value of existing cultural resource inventories for land-use planning by providing information on the expected density and distribution of resources in areas that have never been surveyed. This information can be useful for planning future DOE activities to minimize damage to cultural resources. At facilities like the INEEL, with significant land holdings and numerous cultural resources, this type of predictive modeling effort is a valid way of working to satisfy the statutory requirements for 100% inventory of DOE Idaho cultural resource holdings.

Research. There are two primary approaches to conducting cultural resource research on the INEEL:

1. Develop strong research-based relationships with universities and provide support to other non-INEEL historical and archaeological research based on qualified and valid proposals. Work to develop joint funding proposals in areas of mutual interest and benefit with these external entities and join in the solicitation of support for research that fills gaps in the understanding of INEEL cultural resources.

2. Explore ways to optimize basic cultural resource research goals through the required compliance activities that demand most INEEL CRM Office resources. This can be done by conducting information-gathering activities under an umbrella of thoughtful research designs (Appendix E) and historical contexts (Appendix F). In this way, sufficient and sophisticated information can be gathered, and time and funding can be used optimally. This will allow recovery of the basic data needed to describe, characterize, and protect INEEL cultural resources while maintaining legal compliance and contributing to the scientific information base.

Unanticipated Discoveries. Even after advance surveys and other identification efforts, cultural resources are occasionally identified unexpectedly during implementation of INEEL projects. This is particularly true for archaeological and paleontological sites, which may have little or no surface manifestation; but important historic objects and records may also be discovered during a project.

The INEEL Stop Work Authority provides some mechanisms for protecting the
inadvertently discovered cultural materials from further damage. Through training, all INEEL employees are informed of their right and indeed, their obligation, to stop any work process that could adversely impact safety or the environment, including exposing or threatening resources of cultural importance. Employees are also generally encouraged to contact the INEEL CRM Office informally whenever they have questions or concerns about cultural resources or if they find something that they think will be of interest. As a final check for archaeological resource protection, environmental checklists that cover activities involving ground disturbance also include reminders of the INEEL Stop Work authority.

When INEEL employees suspect that sensitive cultural materials have been uncovered or if previously identified cultural resources are being subjected to unanticipated impacts, they are trained to stop or redirect their activities and immediately contact the INEEL CRM Office. When contacted, the INEEL CRM Office will advise the employee to establish a 30- to 50-meter protective buffer around the exposed archaeological or paleontological materials or to isolate the significant record or object. The DOE Idaho cultural resources coordinator will be contacted and will schedule a site visit to evaluate the situation within two working days of the discovery. Once notification has been made through the INEEL CRM Office, the DOE Idaho cultural resources coordinator will, in turn, notify other interested parties as the situation demands. For all archaeological sites, interested parties will include but not necessarily be limited to the Advisory Council, the Idaho SHPO, and the Shoshone-Bannock Tribes. When human remains are included in the find, the DOE Idaho cultural resources coordinator will also notify the appropriate county sheriff’s office. An invitation to consult on the resolution of adverse effects to the identified resource and participate in any associated activities will be included with this notification. Within two working days of the notification, interested parties will be asked to inform the DOE Idaho cultural resources coordinator of their intentions to participate.

**Emergency Situations.** Another means of identifying cultural resources on the INEEL is through inventories and assessments completed in response to emergency situations. Emergency activities are defined as those activities declared by the U.S. president, a tribal government, or the governor of a state, as necessary to safeguard human health and the environment during declared disasters, emergencies, or national security threats. Emergencies on the INEEL may be caused by either natural or manmade events.

During emergency situations on the INEEL, no actions necessary to preserve human health or property will be delayed to comply with historic preservation requirements. However, INEEL emergency responders can carry on the spirit of the mandates by consistently trying to minimize the overall impact of their activities. Emergency responders are also reminded that activities completed in anticipation of emergency situations (flood control, controlled burns, etc.) and those conducted after termination of the emergency are not exempt from cultural resources review.

Although activities conducted in the midst of an INEEL emergency are exempt from cultural resource review and consideration, the aftereffects of those activities must be evaluated. As soon as conditions allow after an emergency has ended, the INEEL CRM Office conducts archive searches and field inventories, as appropriate, to evaluate the scope of impact to cultural resources. Once the scale of impact is determined, consultation is initiated with the Idaho SHPO, Shoshone-Bannock Tribes, and other interested parties and stakeholders to develop strategies for any needed mitigation.

**Evaluation and Nomination to the National Register**

Methods for determining the significance of cultural resources on the INEEL play an important role in both long-term planning and
project-specific impact assessments. Regulations promulgated by the National Historic Preservation Act provide a general approach for evaluating significance. According to 36 CFR 60.4:

“The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that represent high artistic values, or that possess a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield, information important in prehistory or history.”

In addition to meeting one or more of the aforementioned criteria, properties at the INEEL must possess integrity in order to be eligible to the National Register. Integrity is defined as:

_The authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic period. If a property retains the physical characteristics it possessed in the past, then it has the capacity to convey association with historical patterns or persons, architectural or engineering design and technology, or information about a culture or people._

Integrity has seven qualities that apply to historic architectural properties:

1. Location
2. Design
3. Setting
4. Materials
5. Workmanship
6. Feeling
7. Association, which is the “direct link between a property and an event, or person...for which the property is significant...and is sufficiently intact that it can convey that relationship” (Advisory Council 1991).

A property normally must meet at least two of the seven qualities to be eligible for the National Register.

Clearly, some important cultural resources on the INEEL will not meet any of the evaluation criteria or will lack sufficient integrity. For instance, the significance of a traditional cultural area lies with those who have traditional ties there and can only be established by communicating directly with them. Another example is the presence of many architectural properties that, though they are less than 50 years old, have exceptional significance and are, hence, eligible for listing on the National Register. Therefore, while the National Register criteria are useful, they are not necessarily used alone in the process of evaluating significance at the INEEL.

Appendix E contains research designs for evaluating archaeological properties; these designs are being updated and expanded specifically for the INEEL. Appendix F contains
Significance evaluations play an important role in identifying cultural resources that should be protected from impact during INEEL-sponsored activities. These evaluations are also an important part of general cultural resource management activities on the INEEL. Significance is documented through data collection and established within the framework of historic contexts and research designs developed for each type of cultural resource known on the INEEL. Some properties exhibit characteristics that make them eligible for nomination to the National Register of Historic Places, others do not, but they are no less important in the overall management scheme.

The INEEL’s first reactor facility, EBR-I, is listed on the National Register of Historic Places, as a National Historic Landmark. DOE Idaho intends to nominate other properties in the future. Possibilities might include a multiple property nomination for historic buildings and structures, the nuclear powered jet engines presently on display at the EBR-I complex, Goodale’s Cutoff of the Oregon Trail, or the Middle Butte Cave rock art site and traditional cultural area. National Register nominations require detailed documentation in a format specified by the National Park Service. Data collection is often necessary to accumulate the required information. Methods for collecting data to meet eligibility requirements vary for archaeological sites, historic architectural properties, and traditional use or sacred areas.

For archaeological sites, surface mapping and collection, test excavations, and laboratory analyses provide the necessary data for nomination. Information in local archives and repositories may also be of value in understanding archaeological sites from the historic period. Information on resources from the more recent past is also available from current and former INEEL employees and in archival form, including collections that are housed and maintained at the INEEL.

Finally, information on traditional use areas and sacred sites, beyond general statements about large regions and features, is only available through communication with the local land users.

**Protection and Preservation**

Elements of resource protection and preservation are included in every aspect of the Cultural Resource Management Program. The paragraphs to follow include discussions of program elements that are part of long-term planning and the overall management goal of maintaining resource preservation.

**Monitoring.** An active security force monitors the INEEL via ground patrols and security surveillance of public points of access. When encountered, trespassers are removed immediately. Largely as a result of these restrictions, many archaeological sites on the INEEL are relatively undisturbed. In addition, vandalism of cultural resources seldom occurs because of their location in a secured area.

The INEEL CRM Office, for DOE Idaho, conducts monitoring activities to determine the effectiveness of DOE Idaho policies and to safeguard cultural resources from destruction and deterioration caused by natural or human processes. Each year, the INEEL CRM Office selects a few locations for monitoring based on such factors as relative importance of the resource, ease of public access, history of adverse effects, and proposed work in the area. INEEL monitoring forms are completed and a monitoring report compiled and submitted to DOE Idaho, who then undertakes appropriate actions to address findings following the process outlined in the INEEL Monitoring Plan in Appendix L.

The INEEL CRM Office staff has conducted monitoring of several historic architectural properties and has identified
impacts to resources. INEEL management has been notified of the impacts and is becoming increasingly aware of the need to address these issues. A future goal is to implement a comprehensive, sitewide monitoring program to identify, track, and reduce impacts to known cultural resources throughout the INEEL.

The INEEL CRM Office has notified INEEL security forces when discovering unlawful intrusions during archaeological site monitoring, which resulted in increased security patrols in some areas and the placement of additional “No Trespassing” signs in others. In other instances gravel barriers have been established to prevent stream erosion on highly significant archaeological locations, and barriers have been installed to prevent unauthorized access.

Cultural Resource Management Archives. Archival systems are created to protect, conserve, and make available information of value for the future. The INEEL cultural resource management archives include a library of cultural resource investigations on and around the INEEL as well as comprehensive databases and site forms for cultural resources. Presently, the databases contain administrative, locational, and descriptive information and archaeological data that are tied to the geographical information system (GIS) in use at the INEEL. Regular updates to the databases and GIS files ensure that archive searches and ongoing survey efforts are based on the most current information. Recently, work has begun on a new electronic system that will integrate all aspects of the archives into a single system that is easy to use and maintain. Although this electronic system will enhance the usefulness of the archives, it will not replace the hard copy cultural resource investigation records. These archived materials are stored in the INEEL CRM Office and duplicates of these hard-copy records are also maintained to a large extent at the Idaho SHPO and, for archaeological sites, at the Southeastern Idaho Regional Curatorial Center in the Idaho Museum of Natural History, Pocatello, Idaho.

Confidentiality. Archaeological records, such as those preserved within the INEEL CRM Office archives, are exempt from the Freedom of Information Act and are released on a strict need-to-know basis. On the INEEL, this information is recognized as “sensitive unclassified information” that can be distributed for “official use only.” The restrictions on distribution of archaeological site information are designed to protect these sensitive resources from looting and vandalism. Similar safeguards are also extended to all known Native American cultural resources on the INEEL.

To meet the criteria for confidentiality established by law [ARPA, NHPA, American Indian Religious Freedom Act (AIRFA)] and DOE procedure (Sensitive Unclassified Information), the INEEL CRM Office limits the circulation of detailed maps and site locational information. When not in use, this information is maintained in files in the INEEL CRM Office. When it is provided to INEEL project managers who need it for planning purposes, it is clearly labeled for “official use only.” Reports that are placed in public reading facilities as part of the NEPA review process are also carefully screened to remove all detail on resource location.

In contrast to archaeological and sensitive tribal resources, the locations of historic architectural properties are widely known by INEEL employees and the general public. However some restrictions on the distribution of information have recently been established in response to national terrorist alerts.

Curation. DOE is responsible for all artifacts and samples collected from the INEEL as well as their supporting documentation and must curate them in a repository that meets federal standards issued under 36 CFR 79 (Curation of Federally–Owned and Administered Archaeological Collections). This is an ongoing responsibility, as collection of artifacts and samples is expected to continue as part of the overall INEEL Cultural Resource Management Program. Those collections that have already
been made are located at the Southeastern Idaho Regional Archaeological Center in the Idaho Museum of Natural History on the Idaho State University campus in Pocatello, Idaho, and are managed according to terms expressed in a curation contract. Identification of post-1942 artifacts is conducted by a team comprised of INEEL CRM Office professionals and knowledgeable scientists and engineers. Once identified, the artifacts are tagged with information, such as year made and associated program, entered into the INEEL historical database, and moved to interim storage. Identification of a curation facility for post-1942 artifacts is a goal that will be implemented in consultation with the Idaho SHPO and other interested parties. Procedures for curation and disposition of post-1942 artifacts will also be drafted to guide artifact curation.

**Permitting.** Most cultural resource investigations on the INEEL are conducted in-house through the INEEL CRM Office. This group is staffed with professionals who meet the qualification standards contained in 36 CFR 61. Investigations by outside agencies, universities, or subcontractors are tracked and coordinated through the INEEL CRM Office, where records are also maintained.

**Reuse.** A culture of reuse of government properties at the INEEL began in 1949 with the Atomic Energy Commission’s acquisition of the World War II Naval Proving Ground and associated infrastructure, including architectural properties, for its reactor development and testing program. Although property reuse has continued to be an option to the present day, the waning early nuclear mission, combined with increasing environmental concerns beginning in the late 1960s, have resulted in mixed success for this endeavor.

Reactor development and new construction at the INEEL peaked in the late 1960s, and INEEL contractors began to seek external programs and customers to reuse existing INEEL architectural properties. A program known as “Work for Others” trained and encouraged employees to market INEEL staff and property capabilities to a wide variety of other government agencies and private businesses. As a result of the marketing effort, some INEEL employees worked on external programs for agencies such as the Department of Defense, and several INEEL structures were reused. For example, a large hangar located at TAN is now used by the U.S. Army its Abrams tank armor project.

In addition to active marketing efforts, a program was developed to identify “excess” INEEL architectural properties that were no longer needed and to screen those properties for reuse by all federal agencies. However, in addition to reuse, there also exists a need to clean up “legacy” waste left by past processes and, by the late 1980s, compliance with environmental laws and regulations became DOE’s paramount concern. In the early 1990s, many of the “Work for Others” programs and customers were gone and DOE transferred INEEL landlord responsibilities, including the management of INEEL architectural properties, from reactor development to environmental remediation and, later, to environmental management (Stacy, 2000 and personal communication with Ken Moor).

The mission of the Environmental Management Program is to treat and/or remove INEEL hazardous, radiological, and mixed wastes and identify contaminated architectural properties for DD&D. Properties identified as contaminated included those that contained materials such as asbestos, petroleum products, acids and bases, radionuclides, unexploded ordnance and explosive residues, polychlorinated biphenyls (PCBs), and heavy metals (Arrowrock, 2003). Although this meant that virtually all historic INEEL buildings and structures were slated for DD&D, internal and external opportunities for reusing them continue to be pursued.

In 2002, the secretary of Energy designated the INEEL as DOE’s lead laboratory for the development of the next generation of
nuclear reactors and, at the same time, accelerated environmental clean up. Landlord responsibilities shifted from environmental management to DOE’s Nuclear Energy Program and, in 2003, a transition team was formed to identify properties to transfer to the Nuclear Energy Program for continued use or reuse. This effort is ongoing and is intended to remain flexible as the new nuclear mission and necessary funding evolve, new customers and uses for some properties are identified, and the potential for reuse of other properties fades.

**Stakeholder Communication**

Both the NHPA (36 CFR 800.8) and NEPA, along with various executive orders and DOE policies, require stakeholder communication and systematic planning as the key for successful implementation. Systematic planning for public participation in INEEL cultural resource management will help DOE ensure that such participation takes place in a productive manner. It will further help ensure that the public’s interests regarding resource preservation and interpretation will be considered as the INEEL executes its primary missions.

The list of potential stakeholders is as varied as the resources themselves, including such diverse groups as local historical societies, museum associations, Oregon Trail enthusiasts, INEEL retirees, historical and scientific researchers, Native American tribes, and the general public. Systematic planning is underway to involve these diverse stakeholders at appropriate levels and at appropriate times.

Effective management and identification of diverse cultural resources, such as Native American cultural and traditional sites and one-of-a-kind reactor facilities, that are of importance to living people, requires well-planned communication with these stakeholders. The values and concerns associated with these resources cannot be understood unless the people who use and value them place them in appropriate context. Groups such as the INEEL Retirees Association, local and state historical societies, and professional organizations provide insights and information relevant to the management and disposition of post-1942 historical resources.

As a federal agency, DOE recognizes its trust responsibility to the Shoshone-Bannock Tribes. In the spirit of that responsibility, DOE Idaho has been active in outreach efforts with the Tribes. This has facilitated ongoing communication to identify and protect significant tribal resources located on the INEEL. A signed comprehensive agreement in principle (AIP) with the Shoshone-Bannock Tribes (DOE-ID-2002) commits DOE Idaho to conducting INEEL activities in a manner that will protect the health, safety, environment, and cultural resources of the Tribes and also outlines efforts that will help the Tribes to maintain economic self-sufficiency (Appendix B).

Cultural resource protection is an important part of the AIP and is coordinated through the INEEL Cultural Resources Working Group (CRWG) with membership from the Tribes, DOE Idaho, and the INEEL CRM Office. This group meets regularly to address issues and opportunities in a timely manner and in an environment of mutual respect. Recurring topics of discussion include cultural resource protection, Native American Graves Protection and Repatriation Act (NAGPRA) consultation, educational outreach, and overall management of all INEEL cultural resources, including sacred areas.

Tribal input is actively solicited for new and ongoing INEEL projects, and working guidelines developed by the CRWG facilitate these interactions. Under these guidelines, a designated Tribal point-of-contact receives quarterly reports on INEEL CRM Office activities that address resources of importance to them and is regularly informed of field projects. Invitations to comment on, visit, observe, and/or assist in any of the described activities are implicit in all communications. If necessary under law or if requested by the Tribes, formal
consultation may follow at any time. The holistic view regarding cultural resources and cooperative spirit encouraged in this group are designed to significantly enhance understanding and appreciation of all types of cultural resources within the INEEL community and the Tribes.

Native American Interests. Ongoing communication and consultation with the Shoshone-Bannock Tribes on cultural resource matters through the CRWG has resulted in the identification of several major areas of interest. In general these are:

- Protection of the integrity of archaeological sites and objects
- Treatment of archaeological sites and objects during impact assessments and scientific research
- Protection of the environment and landscape that houses prehistoric resources, traditional cultural places, and sacred sites
- Treatment of human burials and burial items
- Return of cultural patrimony and human skeletal remains (repatriation)
- Access to, free use of, and protection of traditional cultural places and sacred sites.

A variety of procedures has been developed and activities are conducted by the INEEL CRM Office and DOE Idaho to address the aforementioned areas of interest (see Appendix B for details). For example, the Tribes are involved in the protection and treatment of archaeological sites through the INEEL CRM Office’s routine transmittal of quarterly activity reports, archaeological survey reports, and other environmental documents. In the future, this communication should also help in the identification and ultimate protection of other types of resources that are of importance to the Tribes. The CRWG Communication Protocol also outlines a general process by which the Tribes are immediately brought into consultation whenever human remains are discovered on the INEEL. Plans to be developed in the future will guide repatriation of significant cultural items to the Tribes for culturally appropriate disposition. Finally, the Middle Butte Cave Agreement signed between DOE Idaho and the Tribes maximizes tribal access to an important cultural area on the INEEL within the limits of safety, health, and national security.

INEEL Archives. INEEL support service organizations have primary responsibility for the retention and preservation of INEEL records and perform these responsibilities using National Archives and Records Administration guidelines and DOE and federal records disposition schedules. INEEL archives hold photographic negatives and architectural and engineering drawings dating from the 1940s, extensive library holdings that include technical and nontechnical reports and documents, and other historical INEEL documents that are maintained in the INEEL records storage building and technical library. Many of the unclassified holdings are also available to employees through the INEEL Intranet system and may, with permission, be made available to non-INEEL researchers and scholars.

A multidisciplinary team will develop a comprehensive INEEL Archival Management Plan to identify and archive important, irreplaceable information and record artifacts. As an essential foundation for the dissemination of information about INEEL cultural resources and the laws that help preserve them, these archives, along with those managed by the INEEL CRM Office, will be provided to employees, stakeholders, and the general public.

Education and Training. Education and public outreach are essential cultural resource management activities with the following two compatible goals:

1. Inform people about local history and prehistory and recruit their participation in cultural resource preservation.
2. Inform people about the letter and intent of the laws protecting cultural resources and make them aware of the penalties for their violation.

**Training**—The INEEL CRM Office holds training sessions with INEEL project managers, environmental coordinators, and others as applicable, to increase knowledge, awareness, and appreciation of INEEL cultural resources, requirements for historic preservation, and their responsibilities to comply with these requirements.

The INEEL CRM Office has featured articles and/or photographs in INEEL and other publications to highlight important historic INEEL events, persons, artifacts, and INEEL CRM Office activities. INEEL CRM Office personnel have also conducted activities such as mentoring college students and providing training to local high school students and teachers while working on the INEEL as members of Science Action Teams.

**Public Outreach**—Access to an INEEL facility for educational and interpretive purposes began in 1975 with the opening of the EBR-I National Historic Landmark Visitors Center. The goal of its interpretive program is to educate the public about INEEL history and science in general. Grants have been secured to preserve the EBR-I structure and to update its exhibits in partnership with the “Save American Treasures” Program, Murdock Trust, Idaho Heritage Trust, and Museum of Idaho located in Idaho Falls.

INEEL CRM Office staff have also developed many effective tools to enhance knowledge of INEEL resources and promote cultural resource protection. Forums for such discussions include national, regional, and local professional conferences where facility history, archaeological research, and management strategies and tools are explained and shared. In addition, in 1999, a public history was prepared to commemorate the INEEL’s 50th anniversary. This book was widely distributed to INEEL employees, as well as libraries and schools.

Other efforts are oriented toward members of the general public in communities surrounding the INEEL. Tours of INEEL cultural resource sites have proven to be an especially popular and effective means of educating and communicating with the public. Throughout the year, INEEL CRM Office staff also visit many local schools and civic groups to give presentations on a wide variety of topics. Presentations are tailored specifically for different audiences and have included regional prehistory and history, nuclear history, careers in archaeology and history, cultural resource management and compliance, archaeological resource protection, artifact illustration, and Native American resources and sensitivities.

Future outreach goals include expanding the Public Education and Interpretation Program at the EBR-I Visitors Center to include interactive displays, educational videos, traveling exhibits, outdoor classrooms, and a nature trail (Braun and Marler, 1999). Partnerships will continue with local museums, interpretive centers, historical societies, and the Idaho State Tourism Office to educate residents and visitors about INEEL history and to nominate Highway 20 from Idaho Falls to Arco and Highways 22 and 33 along the INEEL’s north and west boundaries as scenic and historic byways. Roadside signs may then be erected to describe historic INEEL activities and the properties associated with them. A final outreach-related goal is to develop a broad, ongoing oral history program to capture important first-hand stories about INEEL land use and history.

**Specific Future Activities and Priorities**

In addition to the general cultural resource management goals described throughout the preceding text, there are a number of specific activities that could be enhanced or initiated to achieve those goals. A list of recurring activities, specific FY-04 activities, and proposed future activities is provided in Appendix K. The proposed future activities will be prioritized in the INEEL CRM Office annual work plan, based
on input from the Idaho SHPO, advisory Council, Shoshone-Bannock Tribes, and other stakeholders.

**Tailored 106 Project Review**

Timely and consistent consideration of cultural resources in the day-to-day operation of the INEEL is one of the most basic goals of cultural resource management at the Laboratory. It is also a requirement of NHPA Section 106, which requires federal agencies to consider the impact their activities will have on properties that are either listed on or eligible for listing on the National Register, and to afford the Advisory Council ample opportunity to comment on the proposed activities. Such consideration and comment are to be completed prior to initiation of the activities.

The NHPA Section 106 process is the legal mechanism used to determine if adverse effects to historic properties will occur, and if so, the nature and extent of the adverse effects, and to consult with the Idaho SHPO and other interested parties to develop strategies to mitigate those effects. Legally, the consulting parties have 30 days to review and comment at each step in the process. Figure 4 illustrates the Section 106 review process.

In the past, the INEEL has followed the Section 106 process on a project-by-project and property-by-property. This has been cumbersome and has the potential to result in costly project delays. Therefore, one of the main purposes of this plan is to tailor the Section 106 process to meet the needs of the INEEL.

Since only 7 to 8% of the 890-square-mile reserve has been inventoried for archaeological resources and only DOE Idaho-owned buildings have been inventoried within the built environment, DOE Idaho must also ensure that no cultural resources are inadvertently destroyed, transferred, or altered during ongoing operations. Both of these related concerns are met through a cultural resource review process that requires INEEL CRM Office involvement whenever a project is proposed that meets any of the following thresholds:

1. Ground disturbance outside the boundaries of fenced INEEL facility areas or within 50 ft of existing buildings or landscaped areas within unfenced facility areas

2. Demolition, major structural or landscape modification, or permanent closure of extant buildings and structures and/or removal of original equipment, features, or records

3. Any activities that may affect the EBR-I facility area, a National Historic Landmark

4. Any ground disturbance within or around the PBF, where sensitive cultural remains have been inadvertently discovered in disturbed and undisturbed contexts

5. Any activities proposed for known or suspected zones of Native American sensitivity and high resource density.

The cultural resource review process at the INEEL is usually initiated through completion of an environmental checklist. Under the INEEL NEPA compliance program, every reasonably foreseeable DOE Idaho-sponsored action on or off the INEEL is preceded by preparation of an environmental checklist that assesses the potential impact of the proposed work for a wide variety of environmental issues and assigns a level of documentation (i.e., categorical exclusion, environmental assessment, or environmental impact statement) required for implementation. The list of threshold activities mandating cultural resource review, as listed above, is included in a management control procedure (MCP) entitled MCP-3480, “Environmental Instructions for Facilities, Processes, Materials, and Equipment.” This MCP provides the direction and guidance for preparing environmental checklists at the INEEL.
Section 106 Review Process

Step 1: Initiate Section 106 Process
Establish undertaking
Identify appropriate SHPO/THPO
Plan to involve the public
Identify other consulting parties

NO UNDERTAKING/NO POTENTIAL TO CAUSE EFFECTS

UNDERTAKING MIGHT AFFECT HISTORIC PROPERTIES

Step 2: Identify Historic Properties
Determine scope of efforts
Identify historic properties
Evaluate historic significance

NO HISTORIC PROPERTIES AFFECTED

HISTORIC PROPERTIES MAY BE AFFECTED

Step 3: Assess Adverse Effects
Apply criteria of adverse effect

NO HISTORIC PROPERTIES ADVERSELY AFFECTED

HISTORIC PROPERTIES ARE ADVERSELY AFFECTED

Step 4: Resolve Adverse Effects
Continue consultation

MEMORANDUM OF AGREEMENT

FAILURE TO AGREE

COUNCIL COMMENT

Figure 4. National Historic Preservation Act Section 106 review process.
Thus, even those INEEL activities that are categorically excluded from NEPA review are screened for their potential impact to cultural resources.

**Activities and Properties Exempt From Cultural Resources Review**

The INEEL is an active scientific and engineering facility where thousands of work orders are processed each year.

To further streamline the Section 106 process, it is appropriate to define lists of activities and properties that are exempt from further cultural resource review. Thus, INEEL NEPA compliance personnel are also provided with a categorical list of property types that are not, themselves, considered significant or potentially eligible for nomination to the National Register under the National Historic Preservation Act. As such, actions that affect the aforementioned property types are exempt from review. These property types are listed in Table 1.

Most of the properties included on the exemption list are associated with the modern built environment at the Laboratory. While these resources may contribute to overall landscapes under different historic contexts and research designs, they are not likely to yield any additional information important in understanding those landscapes.

Generally, actions on property types 1 through 7 require no further NEPA or INEEL CRM Office consideration. (Certain exceptions apply to property type 1, as described in Table 1.) Proposed INEEL activities that may impact them can be completed without further cultural resource review. However, any proposed new construction of these property types or large-scale modification or demolition will be evaluated for potential effects to archaeological and Native American resources.

The INEEL CRM Office is involved in projects that may impact property type 8 even though this property type is exempt from NHPA Section 106 cultural resource review. This is because information on the location and official status of archaeological resources is distributed for “official use only” and is available only through consultation with the INEEL CRM Office. As needed and on a case-by-case basis, such properties will be reevaluated for eligibility by INEEL CRM Office professionals. If it is determined that the status of those properties has changed, then compliance processes outlined in this plan will be invoked.

In addition to exempt property types, INEEL NEPA personnel are also provided with a list of some routine INEEL activities that do not pose a threat to cultural resources. Projects that involve activities on this list are exempt from further cultural resource review. However, they are still covered by procedures that require employees to stop work and contact the INEEL CRM Office if cultural materials are unexpectedly encountered during any activity. Activities exempt from cultural resources review on the INEEL are listed in Table 2. Exemption lists are subject to annual stakeholder review along with other aspects of the overall Cultural Resource Management Program.

Despite the exemptions for certain activities and property types, the INEEL CRM Office conducts a large number of cultural resource reviews each year. Most of these reviews are prompted by one of the threshold criteria listed in the previous discussion. However, some reviews are associated with exempt activities and resources, particularly those that involve archaeological resources that are ineligible for nomination to the National Register or Isolated Finds. Appendix J provides a list of the cultural resource reviews conducted over the past three decades.

**Cultural Resource Review Process**

INEEL NEPA compliance personnel or project managers initiate the cultural resource review process as early as possible in the planning phase of a project.
Table 1. Property types for which actions are exempt from review.

<table>
<thead>
<tr>
<th>Property Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Post-1970 buildings, with exceptions</td>
<td>Activities or actions associated with buildings and structures constructed after 1970 are exempt from review, with the following exceptions: A property built after 1970 may be subject to review if it has been determined the exceptional historical importance of the property makes it eligible for inclusion on the National Register of Historic Places (e.g., LOFT buildings and structures).</td>
</tr>
<tr>
<td>2. Subsurface structures</td>
<td>These structures have minimal or no visible surface manifestations and include earthen and concrete-lined trenches, french drains, underground tanks, vaults, underground pipelines, sewer lines, and other structures that are typically located below ground and were never intended to be routinely accessed by people.</td>
</tr>
<tr>
<td>3. Storage tanks</td>
<td>These structures include surface and subsurface gasoline, diesel, propane, and water tanks used in routine facility operations. Associated concrete slab foundations, scaffolding, piping, or spill-management retaining walls are also included.</td>
</tr>
<tr>
<td>4. Wells and boreholes</td>
<td>These structures include characterization wells, monitoring wells, drinking water wells, industrial water wells, injection wells, and various types of test wells and boreholes. Wells associated with homesteading and other early historic uses of the area are not included.</td>
</tr>
<tr>
<td>5. Utility poles and towers</td>
<td>These structures include power lines, microwave towers, seismic data collection and transmission facilities, and other types of communication towers.</td>
</tr>
<tr>
<td>6. Utility structures</td>
<td>These structures provide housing or control of utility equipment or access to underground utility equipment, such as pump houses, electrical substations, boiler tanks, or equipment monitoring shacks.</td>
</tr>
<tr>
<td>7. Mobile trailers</td>
<td>These structures are used for temporary office space and/or storage.</td>
</tr>
<tr>
<td>8. Isolated finds</td>
<td>These archaeological resources consist of &lt;10 artifacts and no architectural features. They are unlikely to yield any information beyond that collected during initial recording.</td>
</tr>
</tbody>
</table>

Typically, the cultural resource review process is initiated during preparation of the environmental checklist, which provides the INEEL CRM Office with information on the nature and extent of the proposed activity. Exact dimensions and locations for all aspects of the proposed work (e.g., access roads, laydown areas, utility upgrade or removal, and proposed replacement or refinishing products) must be provided. INEEL CRM Office staff members use this information to determine if the proposed activity is an “undertaking” as defined in the National Historic Preservation Act and if so, to establish its “area of potential effect.”

The next review process steps for INEEL CRM Office staff are to determine whether the area in question has ever been surveyed for cultural resources, and if so, whether the survey met the minimum requirements described in Appendices C and D, whether there are any previously identified cultural resources in the proposed project area, and if the affected property is listed on an existing inventory.

Because the INEEL CRM Office maintains a complete record of cultural resource investigations and comprehensive resource inventories for the INEEL, most of these questions can be answered by accessing the INEEL CRM Office files.
Table 2. INEEL activities exempt from review.

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emergency response</td>
<td>Emergency activities, as declared by the U.S. president, a tribal government, or the governor of a state, that are necessary to safeguard human health and the environment during declared disasters, emergencies, or national security threats (including EBR-I).</td>
</tr>
<tr>
<td>2. Routine maintenance activities</td>
<td>Including, but not limited to, normal custodial services; electrical and plumbing installation or repair; repair of fire suppression systems, alarms, or communication systems; moving or assembly of interior furnishings; resurfacing of road, sidewalk, and parking areas; routine decontamination (through such activities as wiping down with rags, using strippable latex, and minor vacuuming, but excluding scabbing) of the surfaces of equipment, rooms, or other interior surfaces.</td>
</tr>
<tr>
<td>3. Replacement in kind</td>
<td>Replacement of fixtures or components of a property, such as matching paint with existing or similar paint color, refinishing materials with existing or similar colors, or replacing or installing carpeting with water-soluble glue. This exemption includes refinishing with products that have improved safety, environmental, or health considerations over the existing or original, as long as the color of the refinishing product is similar to or matches the existing original color.</td>
</tr>
<tr>
<td>4. Energy conservation measures</td>
<td>Including, but not limited to, modifications to heating, ventilation, and air conditioning systems; insulation to roofs, crawl spaces, walls, and floors; and caulking and weather stripping that are not visible and/or do not significantly alter or detract from those qualities that make the property eligible for nomination to the National Register of Historic Places.</td>
</tr>
<tr>
<td>5. Security systems</td>
<td>Installation, maintenance, or repair of security systems, including computer security, detection, monitoring, surveillance, and alarm systems.</td>
</tr>
<tr>
<td>6. Safety systems</td>
<td>Installation, maintenance, and repair or modification of personnel safety systems and devices within the built environment, such as radiation monitoring devices; emergency exit lighting systems; protective additions to electrical equipment; improvements to walking and working surfaces; and installation of protective railings, guards, or shielding.</td>
</tr>
<tr>
<td>7. Asbestos abatement</td>
<td>Removing or fixing asbestos for safety and health concerns, including lagging, insulating, painting, pipe and duct work, and panel removal. None of these activities may cause structural modifications or alter character defining features. Asbestos abatement activities strictly associated with the DD&amp;D of properties and that result in permanent, significant structural modification or alteration of the property are not included in this exemption.</td>
</tr>
<tr>
<td>8. Internal reconfiguration of active laboratories</td>
<td>Changes to the Internal configuration of active laboratories or other existing experimental or testing properties within the built environment to accommodate new experiments or tests.</td>
</tr>
<tr>
<td>9. Ground disturbance within fenced facility perimeters</td>
<td>Modifications to the ground surface within existing facilities (TAN, EBR-I, WRRTF, NRF, TRA, INTEC, RWMC, ANL-W) or within 50 ft of existing buildings in unfenced facility areas (CFA, ARA, BORAX). All activities under this exemption are subject to the INEEL Stop Work Authority (see Appendix A) should cultural resources be unexpectedly encountered at any time. This exemption does not apply to the PBF facilities.</td>
</tr>
</tbody>
</table>

Other sources of information that may be utilized include early land survey records, county land ownership records, local libraries and information repositories, current and former employees, local historians, and researchers who previously conducted investigations at the Laboratory.
If these literature and records reviews indicates that the proposed project area and/or affected historic resource type is unsurveyed, has only been partially surveyed, or was originally surveyed using methods less stringent than those described in Appendices C and D and in use today, INEEL project, program, and facility managers must provide support for completion of a cultural resource survey and evaluation. Early planning is crucial for timely completion of this work and implementation of the proposed project.

There are three possible outcomes at the end of the previously described scoping and identification efforts of the cultural resources review process. In broad outline, they are similar to those listed in the guidelines for implementation of Section 106 of the National Historic Preservation Act. This is intentional; they have been developed for compliance with this law. However, on the INEEL there are resources (e.g., traditional Native American gathering sites or sacred areas) that are not necessarily eligible for listing on the National Register. Although these resources may not be eligible, DOE Idaho is obligated to protect them under requirements other than the NHPA, such as the Agreement-in-Principle and NEPA. The tailored process outlined in this plan is also used to assess effects to noneligible resources. The three possible outcomes are:

1. **No Resources Affected.** No cultural resources are present within the area of potential effect for the proposed undertaking; or cultural resources are present in the area, but the proposed undertaking will have no effect on the characteristics that make the resources culturally important.

2. **No Adverse Effect.** Cultural resources are present within the area of potential effect, and the proposed undertaking does not meet the criteria of an adverse effect, or the undertaking can be modified or conditions put in place to avoid the adverse effect.

3. **Adverse Effect.** Cultural resources are present within the area of potential effect and the proposed undertaking may alter, directly or indirectly, any characteristic of a property that make it culturally important.

Because of the apparent and natural distinctions among the disparate types of cultural resources found on the INEEL, customizing the NHPA Section 106 process and other requirements in a manner that benefits both DOE and the resources is complex. Therefore, while undertakings are reviewed for potential effects on cultural resources and any given project will only have one effect determination, tailored resource-specific strategies and procedures have been developed. Appendix C relates detailed procedures for identifying, evaluating, and consulting on historic and prehistoric archaeological sites. Appendix D describes customized management approaches and strategies for the INEEL’s unique built environment.

For each undertaking, DOE will consider potential effects on all types of cultural resources, and will consult stakeholders accordingly. If it is determined that no resources will be affected by an undertaking or that no adverse effect will occur, documentation of negative findings or avoidance or protective measures will be maintained in the INEEL cultural resource management archives. This information will be provided to the Idaho SHPO, stakeholders, and consulting parties in a general annual report. Quarterly reports will also be provided to the Shoshone-Bannock Tribes.

In those instances when the effects of an undertaking will be adverse, measures to minimize or mitigate the potential impact will be developed in consultation with the Idaho SHPO, Shoshone-Bannock Tribes, and other interested parties and stakeholders. However, for historic property types in the built environment that have been fully inventoried and evaluated, mitigation will follow strategies outlined in Appendix D.
SUMMARY

Under the direction of three major federal laws (NHPA, ARPA, and NEPA) and their implementing regulations; State of Idaho statutes; and DOE-HQ policies, orders, and directives, DOE Idaho is responsible for the identification, evaluation, and protection of all cultural resources on the INEEL. To meet this obligation, a dynamic and evolving Cultural Resource Management Program has been instituted at the INEEL. Inventories of cultural resources on the INEEL are ongoing, as is public and employee awareness and education. Applicable laws and procedures are enforced and stakeholders are kept apprised of activities.

This management plan seeks to make cultural resources an integral part of the INEEL landscape and resource inventory and to consolidate historic preservation activities into the routine management and project-specific activities on the INEEL.

The INEEL, through the preparation of this plan, attempts to recognize and integrate the following diverse factors and issues that promote, guide, and require the protection and preservation of cultural resources:

- Complying with federal laws and regulations, state statutes, and DOE policies and orders concerning historic preservation and environmental protection, while supporting the missions and programs of the INEEL and DOE

- Responding to the need for information and compliance demanded by a research and development facility such as the INEEL, with its large land area, diverse resources, and varied programs, to meet short-term goals and anticipate and plan for long-term and future activities

- Interacting with non-INEEL offices and agencies that oversee and approve the management of cultural resources on the INEEL

- Interacting with tribes and other stakeholders in a spirit of trust and openness to ensure balance and effectiveness in the management of cultural resources on the INEEL

- Meeting the popular and nearly universal appeal of prehistory and history by sharing and promoting the fascinating 12,000 year history represented on the INEEL.

This Cultural Resource Management Plan addresses:

- Current activities to meet the needs of both federally mandated cultural resource protection and practical challenges to preservation and compliance

- The need to facilitate and participate in the programs and missions of the INEEL and the opportunity to conduct both cultural resource management and historical and scientific research through standardized practices, contexts, and research designs

- Specific future activities and long-term goals needed to ensure programmatic continuity and to stimulate the growth of an increasingly robust management program.

This plan is intended to be a living document, flexible and responsive to change. It is designed to accommodate revision based on:

- New laws, regulations, procedures, and agreements

- INEEL CRM Office annual plans and reports, and input and suggestions from oversight groups, stakeholders, and other interested parties

- The acquisition, through inventory and research, of new knowledge about INEEL cultural resources; application of this information to prediction, planning, and land-use on the INEEL; and sharing of this information through such mechanisms as the
compliance process, nominations to the National Register, technical and managerial reports, and popular and professional talks and presentations

- The continuing participation of Native Americans in INEEL cultural resource management through participation in the Cultural Resource Working Group; the solicitation of regular commentary on INEEL CRM Office plans, mitigation proposals, research and testing excavations, and the treatment of sites and artifacts, and by working with Native American authorities to obtain information about traditional land and resource use in order to protect and interpret areas and resources of concern.

As the dynamic INEEL Cultural Resource Management Program evolves, the overarching goal of the program will remain the protection of the valuable, irreplaceable cultural and historical treasures present on the INEEL.
REFERENCES

The following is a list of references used in the body and appendices of the INEEL Cultural Resource Management Plan. Additional references are provide in Appendix F, “Historic Contexts.”


Executive Order 13007, 1996, “Indian Sacred Sites.”

Executive Order 13175, 2000, “Consultation and Coordination with Indian Tribal Governments.”

Executive Order 13287, 2003, “Preserve America.”


Idaho Code, Chapter 5, title 27, “Protection of Graves.”

Idaho Code, Chapter 70, Title 18, Section 7035, “Idaho Cave Protection Act.”


Public Law 96-95, 1979, “Archaeological Resources Protection Act, as amended, as promulgated in 16 USC 470aa et seq.


