2005 SUPPLEMENT ANALYSIS

of the

INL Site Portion of the April 1995 Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement

June 2005

United States Department of Energy
Idaho Operations Office

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Acronym List

1995 EIS	Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement, Volume 2
AMWTP	Advanced Mixed Waste Treatment Project
AMWTP EIS	Advanced Mixed Waste Treatment Project EIS
ANL-W	Argonne National Laboratory – West (name changed to Materials and Fuels Complex)
ATR	Advanced Test Reactor
CA	Composite Analysis
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant (ICPP)
CX	Categorical exclusion
D&D	Decontamination and Decommissioning
DOE	Department of Energy
DOE-CH	Department of Energy, Chicago Operations Office
DOE-HQ	Department of Energy, Headquarters
DOE-ID	Department of Energy, Idaho Operations Office (NE-ID)
EA	Environmental Assessment
EBR-II	Experimental Breeder Reactor II
EC	Environmental Checklist
EIS	Environmental Impact Statement
ER	Environmental Restoration
ER & WM	Environmental Restoration and Waste Management
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FONSI	Finding of no significant impact (DOE environmental assessment)
HLW	High Level Waste
Idaho HLW&FD EIS	Idaho High-Level Waste and Facilities Disposition Final EIS
ICDF	INEEL CERCLA Disposal Facility
ICPP	Idaho Chemical Processing Plant (name changed to INTEC)
INEL	Idaho National Engineering Laboratory (name changed to INEEL)
INEEL	Idaho National Engineering and Environmental Laboratory (name changed to INL Site)
INL	Idaho National Laboratory
INL Site	Name for the geographical area previously known as the INEEL
INTEC	Idaho Nuclear Technology and Engineering Center
ISFSI	Independent Spent Fuel Storage Installation
LLW	Low-level waste
MFC	Materials and Fuels Complex (Formerly ANL-W)
MLLW	Mixed low-level waste
MTHM	Metric Tons of Heavy Metal
NEPA	National Environmental Policy Act

NI PEIS	(Nuclear Infrastructure PEIS) Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States including the Role of the Fast Flux Test Facility
NRC	Nuclear Regulatory Commission
NRF	Naval Reactors Facility
PA	Performance Assessment
PEIS	Programmatic Environmental Impact Statement
RCRA	Resource Conservation and Recovery Act
RESL	Radiological and Environmental Sciences Laboratory
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RWMC	Radioactive Waste Management Complex
SA	Supplement Analysis
SBW	Sodium Bearing Waste
SHPO	State Historic Preservation Office
SNF	Spent Nuclear Fuel
TAN	Test Area North
TMI	Three Mile Island
TRA	Test Reactor Area
TRU	Transuranic
TSCA	Toxic Substances Control Act
USGS	United States Geological Survey
VVE	Vapor Vacuum Extraction
WERF	Waste Experimental Reduction Facility
WIPP	Waste Isolation Pilot Plant
WM	Waste Management

1.0. EXECUTIVE SUMMARY

In April 1995, the Department of Energy (DOE) and the Department of the Navy, as a cooperating agency, issued the Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (1995 EIS). Volume 1 of the EIS analyzed alternatives for managing existing and reasonably foreseeable inventories of the Department's spent nuclear fuel through the year 2035. Volume 2 included a detailed analysis of environmental restoration and waste management activities at the INL Site. It also looked at long-term impacts of spent fuel management on the INL Site. The analysis supported facility-specific decisions regarding new, continued, or discontinued environmental restoration and waste management operations through the year 2005. The term "1995 EIS" throughout this analysis will refer to only Volume 2 of the 1995 EIS unless specifically noted.

DOE NEPA implementing procedures (10 CFR Part 1021.330(d)) require that a Supplement Analysis (SA) of a site-wide EIS be completed every five years to determine whether the site-wide EIS remains adequate. While the 1995 EIS was not a true site-wide EIS in that several programs were not included, most notably reactor operations, this method was used to evaluate the adequacy of the 1995 EIS. The decision to perform a Supplement Analysis was supported by the multi-program aspect of the 1995 EIS in conjunction with the spirit of the requirement for periodic review.

The first Supplement Analysis was issued in November 2002 (2002 SA). This second Supplement Analysis (2005 SA) examined the changes to activities at the INL Site since the 2002 SA. The 2005 Supplement Analysis did not re-do the analyses conducted in the 2002 SA but evaluated actions from that time forward. The 2005 SA reviewed all NEPA documentation prepared since the 2002 Supplement Analysis to determine what operations have already received NEPA analysis and where previously existing analysis had been supplemented. It also examined INL Site operations program by program to determine what changes had taken place and whether they were within the analyzed scope of the 1995 EIS. Changes in each environmental discipline that was analyzed in the 1995 EIS were also reviewed. Additionally, the decisions made in the 1995 EIS Record of Decision (ROD) were reviewed to assess their adequacy.

The cover letter of the Record of Decision for the 1995 EIS makes the following statement "The Record of Decision also documents the Department's decisions regarding environmental restoration and waste management operations at the Idaho National Engineering Laboratory through the year 2005." The 1995 EIS Volume 2 analysis for decisions does not end in 2005. The Ten-Year plan was used as a planning horizon to identify reasonably foreseeable activities used for analysis to meet a continuing environmental restoration and waste management mission at the INL Site including support for managing of spent nuclear fuel on the INL Site. The Preferred Alternative identified in the ROD was a modification of the Ten-Year Plan and included long-range environmental restoration and waste management activities.

Program / Project Analysis

The 2005 SA found no gaps in the Program / Project Analysis. All of the decisions in the ROD to continue a project, implement a project or defer the decision on a project were either analyzed in the 1995 EIS or in subsequent NEPA or CERCLA documentation.

There were 49 projects analyzed in the 1995 EIS. Decisions were made and documented in the ROD for 42 of them. No decisions were made on the other 7 projects. Of the 42 projects analyzed:

12 Were Completed
15 Are Ongoing
5 Have Not Yet Been Initiated
7 Have Been Deferred
3 Have Been Cancelled

Also, 37 of the 42 projects analyzed in the EIS and documented in the ROD have undergone additional NEPA or CERCLA analysis.

Environmental Discipline Analysis

Five of the environmental disciplines analyzed indicated current values that exceeded the bounding values analyzed in the 1995 EIS. The Team determined that none of the exceeded values were significant because other NEPA analysis was completed, mitigation measures were taken, or other permitting processes were followed. These environmental disciplines where bounding values were exceeded are:

1. Cultural Resources – Impacts to historic properties were greater than analyzed in the 1995 EIS due to the accelerated D&D of facilities. Impacts to cultural resources from wildfires were considered in the 2005 SA, but were not analyzed in the 1995 EIS. These impacts were mitigated through the actions agreed to in the Memoranda of Agreements and programmatic agreement with the SHPO for specific D&D activities as well as the broader program described in the INEEL Cultural Resources Management Plan and the Wildland Fire Environmental Assessment.
2. Air Resources – Emissions from four pollutants exceeded the 1995 EIS baseline. Further analysis of the impacts of these increases indicates that air concentrations would all still be significantly below Idaho acceptable ambient air concentrations which are the basis for the decisions in the ROD.
3. Health and Safety – analysis in this environmental discipline identified the same air pollutants as in the Air Resources section.
4. Facility Accidents – Analysis showed that the 1995 EIS used different input assumptions, models, and codes to come to determine results. This is not

significant because the Idaho HLW & FD EIS provided a bounding accident analysis for the entire INL Site.

5. Waste Management – The average yearly disposal rates for LLW and MLLW exceeded the estimates in the 1995 EIS due to the accelerated cleanup initiatives. Although the yearly rates are higher, the total inventory estimates for disposal analyzed have not changed. The maximum allowed inventory of LLW will not be exceeded and hence the cumulative impacts of LLW disposal at the RWMC will not be affected by increased yearly disposal rates over the period noted. If the total LLW inventory were to be exceeded, then additional analysis would be required to determine whether the resulting impacts would exceed federal standards. The disposal of MLLW offsite has not increased the total impacts of this activity which is primarily related to transportation.
6. Water Resources – The 1997 WAG 3RI/FS estimated that in the absence of mitigation I-129 could reach the INL Site southern boundary at the mcl concentration of 1 pCi/l in the 1992-2025 timeframe while the 1995 EIS concluded that no contaminants would migrate off-site above mcls. The Idaho HLW & FD EIS discussed the WAG 3 analysis and concluded that subsequent mitigation efforts have likely acted to reduce the possibility of off-site migration of I-129 above mcl concentrations.

Conclusions

The 2005 SA conclusions are as follows:

1. The 1995 EIS is still adequate for informing the DOE decision makers and the public of the environmental risks and impacts of actions taken within the scope of the 1995 EIS and for existing Environmental Restoration and Waste Management operations at the INL Site.

2. There are no new significant circumstances, information, or changes identified within this analysis of the 1995 EIS that would compel preparation of a new EIS or Supplemental EIS for the current INL Site Environmental Restoration and Waste Management activities.

3. Future DOE decisions on major federal actions at the INL Site including those supporting the new laboratory mission or decisions on projects that were deferred or cancelled in the ROD will require further analysis through the NEPA process.

4. The 1995 EIS analysis may be used as a baseline for cumulative impacts. Future DOE decision makers should ensure that any data referenced from the 1995 EIS included in future NEPA analysis is still current and valid.

5. The 1995 EIS Volume 2 analysis for decisions does not end in 2005. The Ten-year plan was used as a planning horizon to identify reasonably foreseeable activities used for analysis to meet a continuing environmental restoration and waste management mission at the INL Site.

2.0. INTRODUCTION

In April 1995, the Department of Energy (DOE) and the Department of the Navy, as a cooperating agency, issued the Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (1995 EIS). The 1995 EIS analyzed alternatives for managing The Department's existing and reasonably foreseeable inventories of spent nuclear fuel through the year 2035. It also included a detailed analysis of environmental restoration and waste management activities at the Idaho National Engineering and Environmental Laboratory (INEEL). The analysis supported facility-specific decisions regarding new, continued, or planned environmental restoration and waste management operations.

The Record of Decision (ROD) was signed in June 1995 and amended in February 1996. It documented a number of projects or activities that would be implemented as a result of decisions regarding INL Site operations. In addition to the decisions that were made, decisions on a number of projects were deferred or projects have been cancelled.

DOE National Environmental Policy Act (NEPA) implementing procedures (found in 10 CFR Part 1021.330(d)) require that a Supplement Analysis of site-wide EISs be done every five years to determine whether the site-wide EIS remains adequate. While the 1995 EIS was not a true site-wide EIS in that several programs were not included, most notably reactor operations, this method was used to evaluate the adequacy of the 1995 EIS. The decision to perform a Supplement Analysis was supported by the multi-program aspect of the 1995 EIS in conjunction with the spirit of the requirement for periodic review.

The purpose of the SA is to determine if there have been changes in the basis upon which an EIS was prepared. This provides input for an evaluation of the continued adequacy of the EIS in light of those changes (i.e., whether there are substantial changes in the proposed action, significant new circumstances, or new information relevant to environmental concerns.) This is not to question the previous analysis or decisions based on that analysis, but whether the environmental impact analyses are still adequate in light of programmatic changes. In addition, the information for each of the projects for which decisions were deferred in the ROD needs to be reviewed to determine if decisions can be made or if any additional NEPA analysis needs to be completed. The Supplement Analysis is required to contain sufficient information for DOE to determine whether 1) an existing EIS should be supplemented, 2) a new EIS should be prepared, or 3) no further NEPA documentation is required.

The 2005 SA addresses the following in identifying whether the 1995 EIS is adequate for describing the potential bounding environmental impacts of INL Site operations.

1) Does the SA provide a basis for decisions on outstanding issues from the 1995 EIS ROD.

2) Describes the scope of EISs and EAs completed since the 2002 SA for Environmental Restoration, Waste Management, Spent Nuclear Fuel, and Infrastructure projects undertaken to support these programs.

3) Compares current conditions relative to the 1995 EIS and analyzes and determines the significance of the differences. Documents gaps, if any, to each of the major programs and each of the major environmental disciplines and evaluates the significance of the gap. The analysis considers:
   - Scope of the previous analysis
   - Methodology
   - Changes in assumptions
   - Whether the analytical tools used in the 1995 EIS are still valid
   - Whether the accident scenarios and probabilities are still accurate and bounding
   - How the current environmental monitoring data compares with what was previously used
   - Cumulative impacts
   - Changes in regulatory requirements
   - A comparison between actions proposed in the 1995 EIS with the actions that were implemented, deferred, or dropped from consideration

The analysis used Alternative B in the 1995 EIS as the baseline for the analysis. The option chosen in the ROD was a modified Alternative B. From the standpoint of determining whether the existing analysis is bounding, Alternative B is sufficiently defined in the 1995 EIS to allow a comparison.

The 2005 SA generally uses a date of October 1, 2004 as the cut-off date for programmatic and environmental discipline data as the best available information. If more recent data was available or if calendar year data was used it is noted in the analysis.

The product of the 2005 SA is a recommendation to the Manager, Idaho Operations Office concerning the adequacy of the INL Site portion of the 1995 EIS. The Programmatic Spent Nuclear Fuel portion of the 1995 EIS is not addressed in the 2005 SA. The approval authority for the project deliverables is the Manager, Idaho Operations Office. The action for the Manager is to determine from this analysis one of three options:

1) A new EIS is needed
2) A supplemental EIS is needed
3) No additional NEPA is needed

As with the 1995 EIS, the Naval Reactors Idaho Branch Office participated in the 2005 Supplement Analysis. ANL-W through the DOE-Chicago Office participated in the 2002 SA. However, since that time, ANL-W has become a part of the Idaho Operations Office and staff at the facility participated in the 2005 SA.

The geographical site has changed names since the 1995 EIS was issued. The 1995 EIS referred to the site as the INEL. This was changed to the INEEL and now the Laboratory is called the INL Site. For this document, the site geographical location will be referred to as the INL Site.

3.0. 1995 ENVIRONMENTAL IMPACT STATEMENT

This section discusses the scope of the 1995 EIS as it relates to the INL Site's ER&WM and Spent Nuclear Fuel activities and the timeframe for decisions supported by the 1995 EIS. Activities addressed in the 1995 EIS primarily include those that deal with managing INL Site radioactive (high-level, transuranic, low-level, and mixed) wastes, hazardous waste, industrial waste, and spent nuclear fuel handling and storage activities. Specific activities are also identified as being out of scope of the 1995 EIS. The 1995 EIS provided the analyses required under the NEPA for certain projects required to implement these programs at the INL Site. The following is a summary of the scope that was evaluated. More detailed information is available in Vol. 2 of the 1995 EIS sections 2.1.2 and 2.2.5 – 2.2.11.

3.1. Environmental Restoration and Waste Management Activities

Waste management activities discussed in the 1995 EIS were evaluated at both the site-wide (by waste stream management) and project-specific levels. The evaluation of the INL Site's waste management program addressed site-wide impacts associated with the treatment, storage, and disposal of wastes generated by ongoing remediation, nuclear energy, energy research, and defense programs. Examples of project-specific analysis related to waste management activities at the INL Site include constructing replacement capacity for high-level waste tanks and evaluating the potential environmental consequences of incineration (for example, the Waste Experimental Reduction Facility).

For environmental restoration, potential impacts at the INL Site were addressed only at the site-wide level. For example, the 1995 EIS evaluated the potential site-wide impacts associated with deactivation, decontamination, and decommissioning facilities scheduled for closure or reuse. Project-specific impacts of activities were not specifically quantified at that time, so they were only generally evaluated. Project-specific impacts were planned to be quantified and evaluated in the future, as appropriate, as part of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) actions, in accordance with the Federal Facility Agreement and Consent Order. In the 1995 EIS, deactivation, decontamination, and decommissioning were included in the Environmental Restoration program.

Environmental restoration and waste management activities could not be separated entirely because environmental restoration is a major waste generator. Waste generated during environmental restoration activities will in part dictate future waste management planning and actions.

Specific infrastructure activities at the site that support waste management and environmental restoration activities were included in the 1995 EIS. In addition, there were a small number of projects included that do not directly support the WM or ER programs but were deemed important to include for the purpose of presenting a complete analysis.

3.2. Spent Nuclear Fuel Activities

The 1995 EIS addressed all INL Site activities related to spent nuclear fuel (SNF) handling. The SNF portion was a programmatic analysis (volume 1 of the 1995 EIS) that addressed facilities across the DOE Complex including: Hanford, INEL, Savannah River Site, Naval Nuclear Propulsion Program, Other Generator/Storage Locations, and the Nevada Test Site and Oak Ridge Reservation capabilities. The 1995 EIS evaluated (a) interim storage and management for SNF at specified locations until ultimate disposition, (b) fuel stabilization as required for environmentally safe storage and protection of human health (for both workers and the public), (c) increased safe storage capacity, replacing facilities that did not meet prevailing standards and provided additional capacity for newly generated SNF, (d) research and development initiatives to support safe storage and safe disposal, and (e) SNF generated by the Naval Nuclear Propulsion Program

3.3. Timeframe

The Record of Decision (supported by Volume 2 of the 1995 EIS) describes how DOE would manage its spent nuclear fuel and environmental restoration and waste management activities at the INL Site using a ten-year period from 1995 to 2005 to identify potential projects that were analyzed.

Volume 2 evaluated impacts of projects expected to be implemented within a ten-year timeframe because it was believed too much uncertainty existed to analyze project-specific impacts at the INL Site beyond the year 2005. However, there were some projects evaluated that went beyond 2005 (for example, the Waste Immobilization Facility). This is because actions taken in the ten-year timeframe could determine whether these other projects would be needed. In addition, it was assumed any facility constructed or used during the ten-year timeframe might require deactivation, decontamination, and decommissioning in the future.

The spent nuclear fuel program was analyzed from 1995 – 2035 since that is the date all spent nuclear fuel is to be "road ready" to leave Idaho for the national geologic repository for spent nuclear fuel.

3.4. Activities Outside the 1995 EIS Scope

Various activities at the INL Site fell outside the scope of the 1995 EIS and thus were not addressed. Included in those activities are actions that may occur as a result of the new laboratory mission. The new mission includes reactor research and national security activities. In general, Volume 2 evaluated impacts of operations associated with the ER&WM and Spent Nuclear Fuel Programs (by incorporation of Vol. 1 Appendix B & D) at the INL Site. It did not evaluate any long-term stewardship activities that may be necessary following completion of projects or closure of facilities. However, some non-ER&WM and non-spent nuclear fuel activities were addressed in appropriate sections when they were relevant to understanding either the affected environment or activities expected to occur at the INL Site over the following ten years. Such activities include, for example, the generation of waste to be handled by the ER&WM Program and those activities related to road maintenance, utilities, fire protection,

emergency preparedness, and security. Potential effects of selected non-ER&WM and non-spent nuclear fuel activities were included, when appropriate, in the analysis of cumulative impacts.

3.5. Projects included in the 1995 EIS

The Department decided to implement the preferred alternative, identified in Volume 2 of the EIS, the Modified ten-Year plan (Modified Alternative B), for the INL Site. The projects within the scope of the preferred alternative are identified in Section 3.4 of Volume 2, Part A of the 1995 EIS. A listing of all these projects and their current status can be found in section 5, Program / Project Analysis.

3.6. Evaluation of the Decisions Made in the ROD

The question has been raised that The Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement DOE/EIS-0203-F environmental restoration and waste management activities expire in June of 2005. The environmental restoration and waste management activities are described in Volume 2 of the 1995 EIS. The EIS Volume 2 analysis clearly does not expire in June 2005.

The Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement DOE/EIS-0203-F (1995 EIS) provides analyses to make program level decisions on spent nuclear management and site specific decisions on environmental restoration and waste management activities on the INL Site.

Several alternatives were developed to meet the purpose and need for agency action as described in Volume II. The Ten –Year Plan Alternative and Preferred Alternative are discussed.
Alternative B (Ten-Year Plan)

Under Alternative B (Ten-Year Plan), existing environmental restoration and waste management facilities and projects would continue to be managed. In addition to current facilities and projects, those proposed for 1995 through 2005 would be implemented to meet the current INL Site mission and to comply with negotiated agreements and commitments. The mission and negotiated agreements with the regulators extend beyond the year 2005. Under this alternative, spent nuclear fuel, environmental restoration, and waste management activities would be continued to meet expanded spent nuclear fuel and waste handling needs. These activities would be needed to comply with regulations and agreements and would result from acceptance of additional offsite materials and waste. Waste generation from onsite sources would increase because of increased decontamination and decommissioning and environmental restoration activities.

Preferred Alternative

Under the Preferred Alternative, similar to the activities described under Alternative B (Ten-Year Plan), existing environmental restoration and waste management facilities and projects would continue to be operated. In addition to existing facilities and projects, projects proposed under Alternative B for 1995 through 2005 would be implemented to meet the current INL Site mission and to comply with negotiated agreements and commitments. Spent nuclear fuel, transuranic, and mixed low-level waste would be received from other sites. The INL Site would receive waste and spent nuclear fuel depending on decisions based on Site Treatment Plans negotiated under the Federal Facility Compliance Act and the Waste Management Programmatic Environmental Impact Statement. The 1995 EIS does not have an expiration date. The transuranic waste and mixed low-level waste received from other DOE sites would be treated, and the residue returned to the original DOE site (generator) or transported to an approved offsite disposal facility, as negotiated under the Federal Facility Compliance Act with the State of Idaho and the Environmental Protection Agency, and with other affected States. Ongoing remediation and decommissioning and decontamination projects would be continued and additional projects would be conducted.

Therefore, the 1995 EIS Volume 2 analysis does not end in 2005. The Ten-Year Plan was used as a planning horizon for analysis of reasonably foreseeable activities to meet a continuing environmental restoration and waste management mission, including support to management of spent nuclear fuel on the INL Site. The Preferred Alternative was a modification of the Ten-Year Plan and included long range environmental restoration and waste management activities.

4.0. NEPA REVIEWS AFFECTING THE INL SITE

In order to understand the scope of operations that have been analyzed in NEPA documentation, the SA team reviewed NEPA documentation from the INL Site and from around the DOE Complex. A list of the INL Site related documents reviewed are given in this section. The majority of these documents can be found on the EH web site (http://tis.eh.doe.gov/nepa). (Note: this web site has been reduced since 9/11/01 for security reasons.) The balance is available through the Idaho Operations Office NEPA Compliance Office. Documents are included that were completed since the 2002 SA.

Any evaluation of the adequacy of existing NEPA analysis for specific projects should rely on the specific documents themselves.

DOE/EIS-0250D - Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, February 2002

DOE/EIS-0319 - Final Impact Statement for the Proposed Relocation of Technical Area 18 Capabilities and Materials at the Los Alamos National Laboratory, August 2002

DOE/EA-1393 - Programmatic Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Implementation of a Comprehensive Management Program for the Storage, Transportation, and Disposition of Potentially Reusable Uranium Materials, October 2002

DOE/EA 1438 - Environmental Assessment for the Future Location of Heat Source/Radioisotope Power System Assembly and Testing and Operations Currently Located at the Mound Site, August 2002.

DOE/EA-1372 - Idaho National Engineering and Environmental Laboratory Wildland Fire Management Environmental Assessment, April 2003.

Final Management Plan, EA ID-074-02-067, and Finding of No Significant Impact for the INEEL Sagebrush Steppe Ecosystem Reserve, May 2004.

DOE/EA-1448 - Geomorphic Investigations of the Big Lost River at site BLR-8 on the Idaho National Engineering and Environmental Laboratory, September 2002.

DOE/EIS-0310-SA-01 - Supplement Analysis for the Programmatic Environmental Impact Statement (PEIS) for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility. Amended Record of Decision for DOE/EIS-0310 published in Federal Register on August 13, 2004.

5.0. PROGRAM / PROJECT ANALYSIS

5.1. Introduction to Program / Project Analysis

All of the projects identified in the 1995 EIS and in the ROD were evaluated with their current condition and analyzed against the decisions made in the 1995 EIS. A gap was identified if any of the projects initiated were not analyzed in the EIS or analyzed with separate NEPA or CERCLA documentation.

5.2. Methodology

Each project identified in the 1995 EIS by Program area was identified, described, and a current status determined. All applicable NEPA or CERCLA documents were identified for each project. Any projects that were initiated without NEPA or CERCLA documentation were identified as having a gap. The Program / Project Subject Matter Experts (SMEs) performed the analysis of their respective programs and made recommendations on the gaps. These analyses and recommendations were reviewed by the SA Team. The analyses were compared to the Record of Decision

5.3. Programs / Projects Analyzed

The projects analyzed are identified by Program area in the following tables:

5.3.1. Spent Nuclear Fuel

There were seven Spent Nuclear Fuel projects analyzed in the 1995 EIS. There were four projects implemented as a result of the ROD as shown in Table 5.3.1-1 and two projects that were ongoing or planned as shown in Table 5.3.1-2. The reference after the project title is the section in the 1995 EIS Vol. 2 Part B that describes the project.

Table 5.3.1-1 Spent Nuclear Fuel Projects Implemented as a Result of the ROD

Project	Brief Description	Project Status	NEPA Reference	Gap
Expended Core Facility Dry Cell Project (NRF) C-4.1.1	Design, construct and operate a facility for the preparation of naval spent nuclear fuel for shipment to storage facilities.	This project supports the Idaho Settlement Agreement of which Naval Reactors is a signatory. Consistent with the Settlement Agreement, Naval SNF will be prepared at NRF for dry storage and ultimate shipment to a repository. Fuel processing and dry storage operations have been initiated utilizing features and equipment from the Dry Cell Facility. Process limitations identified with the Dry Cell Facility and the volume of naval SNF that must be processed and loaded into canisters for	DOE/EIS-0203F – DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement. The Programmatic EIS adequately analyzed impacts from fuel examinations, fuel processing, and dry storage preparation. The amount of SNF analyzed has not increased. Potential impacts to resources (e.g. soil, acres disturbed, water resources, wildlife, air, human health, waste management, and socioeconomics) are still adequately bounded in the Programmatic EIS.	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		dry storage led Naval Reactors to the conclusion that continuation of fuel processing in water pools was more likely to support the objectives of the Idaho Settlement Agreement and support fleet operating schedules than dry fuel processing. Construction is continuing to implement canister loading and dry storage operations at productions levels.	DOE/EIS-0251, Department of Navy Final Environmental Impact Statement for a Container System for the Management of Naval Spent Nuclear Fuel (Naval Container System EIS), adequately bounds the loading of naval SNF into canisters for above ground dry storage at NRF as well as the return of Naval SNF from INTEC. The potential need to adjust programmatic actions to meet the objectives of the Idaho Settlement Agreement and the fleet continues to be evaluated. The need for additional NEPA documentation will, as always, depend on the results.	
Increased Rack Capacity for CPP-666 C-4.1.2	Replacing and rearranging existing fuel storage racks in three of the six Fuel Storage Area pools (1,5,6) in CPP-666. Would also include decontamination of the racks being replaced and their disposition.	This project was to be implemented as a result of the ROD. However, since release of the original ROD, planning has been impacted by the release of two other documents: 1) the Idaho Settlement Agreement (10/95) and 2)	CX CPP-95-009	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		the Amended ROD (02/96). With reduced storage needs, reracking was required and achieved only for pool 1. Additional reracking could proceed if necessary. There is no plan to move forward on this project.		
Dry Fuel Storage Facility; Fuel Receiving, Canning/Characterization and Shipping C-4.1.4	Provide for the design, construction, and operation of a multi-functional dry storage project that would accommodate various fuel types and configurations in the current inventory on INL Site fuels. Project would vary depending on the alternative decided.	This project was to be implemented as a result of the ROD. Since release of the ROD, the project has been redefined from a traditional LICP to be built and operated by the M&O to a privatized procurement to be built and NRC licensed, and operated by a separate contractor. The contract was awarded on 5/19/00. This is an administrative change to the project with no significant differences in the inputs analyzed. The NRC has performed additional NEPA analysis for the facility. NRC license issued November	CX-CPP-96-009 CX-CPP-97-033 CX-CPP-98-010 NUREG-1773 – Environmental Impact Statement for the Proposed Idaho Spent Fuel Facility at the Idaho National Engineering and Environmental laboratory in Butte County, Idaho – Final Report, January 2004.	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		30, 2004		
Fort St. Vrain SNF Receiving and Storage (INTEC) C-4.1.5	Complete the transportation, receipt, and storage of up to 1,464 blocks of Fort St. Vrain spent nuclear fuel from the Public service Company of Colorado to INTEC.	This project was to be implemented as a result of the ROD. Since release of the original ROD, planning has been impacted by the release of four other documents: 1) the Idaho Settlement Agreement (10/95); 2) the Amended ROD (2/96); 3) the NRC's EA and FONSI for license transfer; 4) the NRC's EA and FONSI for exemption from the requirements of 10 CFR Part 20 and: 5) NRC's transferal of the license from PSC to DOE. As a result of the amended ROD, FSV transfers to the INL Site (for the purpose of long-term interim storage) were entirely eliminated. Transfers to the INL Site, for the purpose of repackaging for shipment to the repository, may begin only when "a permanent repository or interim storage facility for	DOE/EIS-0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement. Department of Energy Issuance of Environmental Assessment and Finding of No Significant Impact Regarding the Transfer of the Materials License SNM-2504 and Subsequent License Amendment for the Fort St. Vrain Independent Spent Fuel Storage Installation From The Public Service Company of Colorado to the U.S. Department of Energy; 04/02/97; 62 FR 15737 Department of Energy Issuance of Environmental Assessment and Finding of No Significant Impact Regarding the Proposed Exemption from Requirements of 10 CFR Part	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		spent fuel located outside of Idaho has opened and is accepting spent fuel from the INEL".	20; 03/03/99; 62 FR 10330 License No. SNM-2504.	

Table 5.3.1-2 Spent Nuclear Fuel Projects that were planned as a result of the ROD

Project	Brief Description	Project Status	NEPA Reference	Gap
Additional Increased Rack Capacity (CPP-666) C-4.1.3	Replaces and rearranges existing fuel storage racks in the remaining Fuel Storage Area pools (2,3,4)	The decision on this project was deferred for a future determination, i.e., this project was not selected in the ROD, and there is no plan to move forward on this project.	DOE/EIS-0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No
EBR-II Blanket Treatment (ANL-W) C-4.1.7	Modify the Fuel Cycle Facility to treat the EBR-II blanket fuel assemblies to a suitable form for safe, interim storage.	The decision on this project was deferred for a future determination, i.e., this project was not selected in the ROD. However, since the release of the original ROD, EBR-II Blanket fuel treatment has been covered by two other NEPA documents 1) EA-1148 (05/96) and its FONSI; and 2) the final EIS for management of sodium-bonded SNF (EIS-	DOE/EIS-0306 - Final Environmental Impact Statement for the Treatment and Management of Sodium-bonded Spent Nuclear Fuel	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		0306F, 07/00) and its ROD 65 FR 56565 (09/00). The project is currently operating.		
Electrometallurgical Process Demonstration (ANL-W) C-4.1.8	Allow the demonstration and testing of new spent nuclear fuel management process.	The decision on this project was deferred for a future determination, i.e., this project was not selected in the ROD. The project operated from 1996 to 1999 when it was completed.	DOE/EA-1148 - Electrometallurgical Treatment Research and Demonstration Project Environmental Assessment.	No

5.3.2. Waste Management

There were eighteen Waste Management projects analyzed in the 1995 EIS. There were two projects that were to continue as a result of the ROD as shown in Table 5.3.2-1. There were five projects implemented as a result of the ROD as shown in Table 5.3.2-2 and eleven projects that were ongoing or planned as shown in Table 5.3.2-3. The reference after the project title is the section in the 1995 EIS Vol. 2, Part B that describes the project.

Table 5.3.2-1 Waste Management Projects that were to continue as a result of the ROD.

Project	Brief Description	Project Status	NEPA Reference	Gap
TSA Enclosure & Storage Project C-2.8	Provide for the retrieval and re-storage of Transuranic Storage Area waste by constructing and operating the retrieval Enclosure, Waste Storage Facility, support facilities, and associated upgrades to utilities.	Completed.	No new NEPA analysis required. This project is to be implemented as a result of the ROD. All elements analyzed in the planned NEPA were constructed, with the final element	No

Project	Brief Description	Project Status	NEPA Reference	Gap
			completed in 1997. DOE-ID awarded a contract to a privatized contractor (Advanced Mixed Waste Treatment Project, AMWTP) which includes retrieval operations. Retrieval is proposed to commence in 2002 for a 6-year duration. The analysis of their retrieval method is contained in the AMWTP EIS (DOE/EIS-0290). DOE/EA-0692 – Retrieval and Restorage of Transuranic Storage Area Waste at the Idaho National Engineering Laboratory.	
Waste Characterization Facility (RWMC) C-2.9	Provide the design, construction, and operation of a Waste Characterization Facility at the RWMC. The WCF would provide facilities to open containers of contact-handled transuranic waste, reclassify low-level waste; obtain and examine samples; and repackage the characterized waste in an environment designed to contain alpha-type radiation.	Completed.	This project was to be implemented as a result of the ROD. The AMWTP contract was awarded by DOE-ID, which includes characterization; therefore the WCF was designed but not constructed. The visual examination portion of the characterization required for past and future shipments (until 3100 cubic meters project is complete) of TRU waste to the Waste Isolation Pilot Plant (WIPP) is being	No

Project	Brief Description	Project Status	NEPA Reference	Gap
			performed at the WIPP Waste Characterization Area located in the Hot Fuel Examination Facility at ANL-W.	

Table 5.3.2-2 Waste Management Projects Implemented as a Result of the ROD

Project	Brief Description	Project Status	NEPA Reference	Gap
Tank Farm Heel Removal Project C-4.3.1	Provide for design, construction, and operation of equipment to perform tank internal rinsing and removal of the 5,000 to 20,000 heel from the eleven 300,000 gallon storage tanks at the INTEC tank farm.	In process	Is being accomplished under CXs, INTEC-01-017; INTEC 01-007, rev. 1, but cannot complete closure until ROD is issued for DOE/EIS-0287- Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement	No
Waste Experimental Reduction Facility Incineration (PBF) C-4.6.1	Provide RCRA-compliant treatment capability for DOE mixed low-level waste and reduce the volume of low-level waste before disposal.	Project was completed and is now closed under RCRA	INEL-96-014R2	No
Nonincinerable Mixed Waste Treatment (PBF) C-4.6.4	Upgrade facilities at the Waste Engineering Development Facility and provide treatment capabilities for some of the mixed low-level wastes that are not suitable for incineration.	Completed – but treatment alternatives and impacts were greatly reduced over originally planned scope. A majority of the onsite impacts from this project did not occur as several of the treatment processes	PBF-99-006	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		were performed at non-INEEL facilities.		
Sodium Processing Project (ANL-W) C-4.6.7	Provide for the modification of the Sodium Processing Facility to provide a system to convert sodium hydroxide to sodium carbonate.	The Sodium Process facility operated from 1999 to 2002 to treat 750 tons of elemental sodium hazardous waste at ANL-W.	DOE/EIS-0203F. - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement. Further use of the Sodium Process facility will be analyzed in the FFTF Decommissioning EIS DOE/EIS-0364 in 2005.	No
Calcine Transfer Project C-4.10.1	Provide facilities and equipment for the safe retrieval and transport of high-level waste calcine from the existing storage Bin Set #1 to a fully qualified storage facility.	Based on updated information and Structural Analysis this project is not required.	DOE/EIS-0287 - Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement-– page 2-29 as no longer required.	No

Table 5.3.2-3 Waste Management Projects planned as a Result of the ROD.

Project	Brief Description	Project Status	NEPA Reference	Gap
Greater than Class C Dedicated Storage (TRA & TAN) C-4.7.1	Provide for the design, construction, and operation of a Greater-Than-Class-C Low-Level Waste Dedicated Storage facility.	Cancelled	PBF-95-007	No
Waste Immobilization Facility (INTEC) C-4.3.2	Project would involve technology selection for calcining or treating sodium-bearing liquid waste and for	Contract DE--AC07-05ID14516– Retrieve and treat sodium bearing waste for disposal at WIPP –	DOE/EIS-0287 - Idaho High-Level Waste and Facilities Disposition Final Environmental Impact	No

Project	Brief Description	Project Status	NEPA Reference	Gap
	converting calcine waste into a form acceptable for disposal, followed by the design, construction, and operation of a Waste Immobilization Facility for processing these wastes.	Package and ship treated SBW and package and ship calcine	Statement- - part of the ICP RFP for selection of a technology to stabilize SBW – DOE/EIS-0287 - Idaho High-Level Waste and Facilities Disposition Final Environmental impact Statement- addresses both packaging and shipment of the SBW and Calcine including transportation.	
TAN Pool Fuel Transfer C-2.1	Remove spent fuel, fuel debris, and TMI canisters from the storage pool and place them in suitable interim dry storage.	Completed.	DOE/EA-1050 – Environmental Assessment for Stabilization of the Storage Pool at Test Area North. DOE/EA-1217 – Test Area North Pool Stabilization Project Update	No
Waste Handling Facility (ANL-W) C-2.10	The Waste Handling Facility would provide a central point for waste receipt, sorting, storage and transportation from ANL-W. The wastes would include low-level radioactive waste, mixed low-level waste, hazardous waste, polychlorinated biphenyl-contaminated waste, and solid (nonradioactive, nonhazardous) waste.	The decision on this project was deferred in the ROD for a future determination. The project was never implemented and there are no plans for its implementation. The Contaminated Equipment Storage Facility, an existing facility at ANL-W, was modified to accommodate the radioactive waste sorting	This facility modification was categorically excluded from further NEPA review by DOE-CH in 1998.	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		and repackaging functions originally planned for the Waste Handling Facility.		
Private Sector Alpha-contaminated MLLW treatment C-4.4.1	Provide for the processing of alpha-contaminated mixed low-level wastes, transuranic waste, and possibly small amounts of low-level waste and mixed low-level waste by the private sector.	Project is ongoing	DOE/EIS-0290 – Advanced Mixed Waste Treatment Project Final Environmental Impact Statement.	No
RWMC Modifications to Support Private Sector Treatment of Alpha-contaminated MLLW C-4.4.2	Additional waste retrieval, venting, and examination facilities operational by October 2000 to support both sending the waste offsite for treatment and receiving it back onsite after treatment.	Cancelled.	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No
Idaho Waste Processing Facility C-4.4.3	Provide for design, construction, and operation of an Idaho Waste Processing Facility that would treat and process both alpha-contaminated and transuranic wastes to met applicable requirements for land disposal.	Project in process – AMWTP.	DOE/EIS-0290 – Advanced Mixed Waste Treatment Project Final Environmental Impact Statement.	No
MLLW Disposal facility C-4.6.4	Provide for design, construction, and operation of a new permanent radioactive waste disposal facility.	Facility not contemplated at this time.	DOE/EIS-0287 - Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement –analyzed a LLW/MLLW disposal facility onsite if needed. Project P27, Full Separations Option as one example.	No

Project	Brief Description	Project Status	NEPA Reference	Gap
Remote Mixed Waste Treatment Facility (ANL-W) C-4.6.6	Provide design, construction, and operation of a new facility to remove and convert sodium and other hazardous waste from radioactive scrap and waste components.	Project has not started. The project is now named the Remote Treatment Project.	Design, construction and operation of the Remote Treatment Project will be analyzed in DOE/EA-1386 - Environmental Assessment for the Remote Treatment Project in 2005 (Draft)	No
Radioactive Scrap / Waste Facility (ANL-W) C-4.3.5	Qualify the Radioactive Scrap / waste facility for interim storage of high-level waste until a high-level waste repository is available.	Project is currently operating.	DOE/EA-1148 – Electrometallurgical Treatment Research and Demonstration Project Environmental Assessment. DOE/EIS-0306 – Final Environmental Impact Statement for the Treatment and Management of Sodium-bonded Spent Nuclear Fuel	No
Plasma Hearth Process Plant (ANL-W) C-4.10.2	Demonstrate the full-scale Plasma Hearth Process on actual mixed low-level waste that is difficult to treat by conventional thermal technologies.	Project was cancelled before the full-scale demonstration.	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No

5.3.3. Infrastructure

There were five Infrastructure projects analyzed in the 1995 EIS. There was one project implemented as a result of the ROD as shown in Table 5.3.3-1 and four projects that were ongoing or planned as shown in Table 5.3.3-2. The reference after the project title is the section in the 1995 EIS Vol. 2, Part B that describes the project.

Table 5.3.3-1 Infrastructure Projects Implemented as a Result of the ROD.

Project	Brief Description	Project Status	NEPA Reference	Gap
Gravel Pit Expansions (Sitewide) C-4.9.2	Reopen and/or expand the use of natural resources contained within several gravel pits and one borrow area to provide gravel and fill material for existing and future road and other construction activities at the INEEL through June 2005.	The project has provided gravel to the state and Jefferson county on two occasions.	INEL-96-016R1	No

Table 5.3.3-2 Infrastructure Projects that were planned as a Result of the ROD

Project	Brief Description	Project Status	NEPA Reference	Gap
Health Physics Instrument Lab C-2.11	Provide the design, construction and operation of a replacement facility to accommodate the Health Physics Instrument Lab.	Completed.	DOE/EA-1034 – HPIL Replacement of the Idaho National Engineering Health Physics Instrumentation Laboratory, May 1995.	No
RESL Replacement C-2.12	Provide for the design, construction, and operation of replacement test, office, and storage facilities with the capability to support environmental surveillance programs, oversee certain DOE contractor activities nationwide, and provide services as a DOE standardization laboratory.	In initiation phase.	NEPA has not been initiated since only CD-0 has been received at this time. NEPA not required at CD-0.	No
Industrial / Commercial Landfill Expansion	Extend the boundaries of the CFA Landfill Complex to provide 91	Implemented most of the allowable expansion.	INEL-98-019, Landfill Complex Bulky Waste Pit	No

Project	Brief Description	Project Status	NEPA Reference	Gap
C-4.9.1	additional hectares (225 acres) of land for INL Site industrial solid waste disposal and operations through the year 2025 as a minimum.	Operations are ongoing.	Progression. The Environmental Checklist referenced the analysis in the 1995 EIS and notified the public that the expansion identified in the 1995 EIS would proceed in the ROD	
CFA Clean Laundry & Respirator Facility C-4.9.3	Provide for several alternatives for the existing building CFA-617 including new use, continue use as intended, or to decontaminate and decommission the facility.	Facility has been D&D'd. No new uses were identified.	CX-CFA-93-006 CX-CFA-93-017	No

5.3.4. Environmental Restoration

There were twelve Environmental Restoration projects analyzed in the 1995 EIS. There were five projects continued as a result of the ROD as shown in Table 5.3.4-1 and seven projects that were planned as shown in Table 5.3.4-2. The reference after the project title is the section in the 1995 EIS Vol. 2, Part B that describes the project.

Table 5.3.4-1 Environmental Restoration Projects that were continued as Discussed in the ROD

Project	Brief Description	Project Status	NEPA Reference	Gap
Remediation of Ground water Contamination (TAN) C-2.2	Reduce the concentrations of trichloroethylene, tetrachloroethylene, dichloroethylene, lead, Strontium-90, and other contaminates in the ground water surrounding the TSF-05 injection well at the Technical Support Facility.	Operating.	No additional NEPA analysis is required. This project is operating under a CERCLA ROD. Record of Decision, Declaration for the Technical Support Facility Injection Well (TSF-05) and Surrounding Ground water Contamination (TSF-23) and	No

Project	Brief Description	Project Status	NEPA Reference	Gap
			Miscellaneous No Action Sites Final Remedial Action, Operable Unit 1-07B, Waste Area Group 1, Idaho National Engineering Laboratory, as amended in August 2001.	
Pit 9 Retrieval C-2.3	Excavate and treat waste contaminated with radioactive and hazardous substances disposed of at Pit 9 of the SDA of the RWMC.	Operating.	No additional NEPA analysis is required. This project is operating under a CERCLA ROD. Declaration for Pit 9 at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory, Idaho Falls, October 1993, as amended. DOE-EA-0854 - Interim Action for Cleanup of Pit 9 at the Radioactive Waste Management Complex, Idaho National Engineering Laboratory	No
Vadose Zone Remediation (RWMC) C-2.4	Remove volatile organic contamination found in the unsaturated hydrogeologic zone (vadose zone) beneath the SDA of the RWMC by removing and treating vapors of volatile organic contaminants from soils and underlying rock.	Operating.	No additional NEPA analysis is required. This project is operating under a CERCLA ROD. Record of Decision, Declaration for Organic Contamination in the vadose Zone, Operable Unit 7-08, Idaho National Engineering	No

Project	Brief Description	Project Status	NEPA Reference	Gap
			Laboratory, Radioactive Waste Management Complex, Subsurface Disposal Area.	
ARA-II D&D C-2.5	D&D the radiologically contaminated buildings, structures, utilities, and other miscellaneous items at ARA-II.	Completed.	DOE/EA-0858 – PBF Decontamination and Selective Demolition of Auxiliary Reactor Areas II and III at the Idaho National Engineering Laboratory	No
Boiling Water Reactor Experiment V D&D C-2.6	D&D the remaining Borax-V facility by either Dismantlement or Entombment.	Completed.	INEL-91-029ADM	No

Table 5.3.4-2 Environmental Restoration Projects that were Planned as a Result of the ROD

Project	Brief Description	Project Status	NEPA Reference	Gap
ETR D&D C-4.2.2	Remove the ETR and associated support structures.	Characterization of hazardous materials and options for D&D were analyzed including costs for each option. EA was not completed, but will be offered to the new ICP contractor as information to determine path forward, whether NEPA or CERCLA	DOE/EA-1509 (Draft) Test Reactor Area Inactive Reactors Deactivation, Decontamination, and Decommissioning	No
MTR D&D C-4.2.3	Remove the MTR and associated support structures.	Characterization of hazardous materials and options for D&D were analyzed including costs	DOE/EA-1509 (Draft) Test Reactor Area Inactive Reactors Deactivation, Decontamination, and	No

Project	Brief Description	Project Status	NEPA Reference	Gap
		for each option. EA was not completed, but will be offered to the new ICP contractor as information to determine path forward, whether NEPA or CERCLA	Decommissioning	
Fuel Processing Complex (CPP-601) D&D C-4.2.4	Remove all contaminated equipment, decontaminate remaining facility surfaces, remove above grade portion of the facility, and entomb the structure in place.	Project started October, 2004 for inactivation	DOE/EIS-0287 - Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement- covered this activity – page 3-36 indicates that is addressed and Chapter 5 has the impacts addressed, activity including RCRA closure as clean closure / performance based closure or landfill closure. Inactivation under CX-03-016.	No
Fuel Receipt & Storage Facility (CPP-603) D&D C-4.2.5	Remove all contaminated equipment from underwater storage portion of CPP-603 and its ancillary support systems, decontaminate remaining affected facility surfaces, fill in and seal entry to affected basins, entomb affected basins in place.	Project started October, 2004	CERCLA – Non-Time Critical Removal Action Memorandum – DOE/NE-ID-1194, 01/06/05.	No
Headend Processing Plant (CPP-640) D&D C-4.2.6	Remove all contaminated equipment remaining after the completion of fissile material removal activity, close the waste	Project initiated February 2004 for inactivation.	DOE/EIS-0287 - Idaho High-Level Waste and Facilities Disposition Final Environmental Impact	No

Project	Brief Description	Project Status	NEPA Reference	Gap
	collection system under the terms of RCRA, decontaminate the remaining affected facility surfaces, and decommission the empty hot cell units.		Statement- addressed as a closure activity including RCRA closure as clean closure / performance based closure or landfill closure. Inactivation under CX-03-016 A	
Waste Calcine Facility (CPP-633) D&D C-4.2.7	Remove all contaminated equipment remaining after the completion of the phase out activities, close the five permitted tanks under RCRA, decontaminate remaining facility surfaces, and decommission the WCF and demolish to ground level and fill in the subsurface levels.	WCF has been closed and capped	DOE/EIS-0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement. DOE/EA-1149 – Closure of the Waste Calcining facility (CPP-633), Idaho National Engineering and Environmental Laboratory	No
Central Liquid Waste Processing Facility D&D (ANL-W) C-4.2.1	Remove excess, obsolete, contaminated equipment from the Central Liquid Waste Processing Area so that the Analytical Laboratory could use this floor space for other missions.	Project was completed in 1997.	DOE-CH CX April 1997	No

5.3.5. Projects That Were Analyzed in the 1995 EIS but Were Not Included in the ROD.

There were a total of 49 projects analyzed in the 1995 EIS. The ROD supported decisions on 42 of them. For consistency, these 7 other projects that were analyzed in the 1995 EIS but were not included in the ROD are listed in Table 5.3.5-1 for reference only.

Table 5.3.5-1 Projects That Were Analyzed in the 1995 EIS but Were Not Included in the ROD.

Project	Brief Description	Project Status	NEPA Reference	Gap
HLW Tank Farm Replacement C-2.7	Upgrade all valve boxes, transfer piping, and pressure/vacuum relief piping for INTEC tank farm systems that must remain in service through at least the "cease use' dates (March 2009 for five tanks; June 2015 for six tanks) established in the Consent Order for the eleven existing HLW storage tanks.	Project is complete. 2000 SA- Page 6-1.20	DOE/EIS-0287 – Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement	No
HLW Tank Farm New Tanks C-4.3.3	Replace five high-level liquid waste storage tanks and containment vaults with four new tanks, containment vaults, and support systems.	At this time no action is contemplated. 2000 SA 6-1.24	DOE/EIS-0287 – Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement Project P13, (3 new tanks) Steam Reforming Option and Direct Vitrification Options with and without calcine separations.	No
Shipping / Transfer Station (RWMC) C-4.5.5	Provide for design, construction and operation of a centralized Shipping / Transfer Station to accept waste directly from storage or from other INL Site facilities for transport offsite to other DOE sites.	Cancelled.	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No
New Calcine Storage C-4.3.4	Provide for design, construction, and startup of a new facility for	Bin set 7 is already built and no further action is	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear	No

Project	Brief Description	Project Status	NEPA Reference	Gap
	the storage of calcined high-level radioactive waste resulting from the operation of the NWCF.	contemplated for another bin set.	Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	
Spent Fuel Processing C-4.1.6	Hypothetical project to provide capability to process highly enriched spent nuclear fuel.	This project was not selected in the ROD. It was not included within the preferred alternative, and there is no plan to move forward on this project.	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No
Hazardous Waste Treatment, Storage & Disposal Facility C-4.8.1	Provide for a modern hazardous waste storage facility, and treatment facilities capable of treating INL Site RCRA regulated hazardous waste streams so that onsite disposal can be achieved at a RCRA approved INL Site facility.	Cancelled.	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No
MLLW Treatment Facility C-4.6.3	Provide for design, construction, and operation of a permitted treatment facility to treat both mixed low-level waste and low-level waste at the INL Site.	Cancelled.	DOE/EIS – 0203F - DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Final Environmental Impact Statement.	No

5.4. Summary of Program / Project Analysis

No gaps were identified from the analysis conducted in the Program / Project Analysis section. Project impacts were either analyzed in the 1995 EIS or in subsequent NEPA or CERCLA documentation.

There were 49 projects analyzed in the 1995 EIS. 42 projects were implemented as a result of decisions made in the ROD. Of the 42 projects:

12 Were Completed
15 Are Ongoing
5 Have Not Yet Been Initiated
7 Have Been Deferred
3 Have Been Cancelled

Also, 37 of the 42 projects analyzed in the 1995 EIS and documented in the ROD have had additional NEPA or CERCLA analysis conducted on them.

6.0. ENVIRONMENTAL DISCIPLINE ANALYSIS

6.1. Introduction to Environmental Discipline Analysis

A major focus of the 2005 SA is to analyze the current environmental effects from existing and identified actions and compare them to the bounding analysis of the 1995 EIS to determine if the analysis performed is still adequate to make decisions.

6.2. Methodology

The Subject Matter Experts (SME) for each environmental discipline evaluated and documented the current values of each of the environmental disciplines in the following sections and compared those to the bounding values in the 1995 EIS. Current values that exceeded the bounding values were identified as gaps and further analyzed for significance. Existing data was used where available. No new analysis of the 1995 EIS data was conducted. Identification of gaps were determined by the SMEs and reviewed with the entire SA Team.

6.3. Environmental Disciplines Analyzed

Each environmental discipline was analyzed separately as identified below:

6.3.1. Land Use

Summary

Overall land use at the INL Site has not changed. The preferred alternative in the 1995 EIS projected that 537 acres of undisturbed land could be disturbed. Since the 1995 EIS, approximately 511 acres of undisturbed lands have been disturbed by DOE activities. That number does not include emergency response actions related to wildland fires.

DOE has developed the Comprehensive Facility and Land Use Plan since the 1995 EIS was completed, The Comprehensive Facility and Land Use Plan provide a comprehensive resource of facility and land use planning information for the INL Site to guide land and facility use decisions. The previously noted changes in activities at the INL Site do not differ substantially from the planned uses of the INL Site.

The 1995 EIS provides a bounding analysis for the environmental impacts in the land use discipline. Additional analysis for this discipline is not required. However, any new project requiring a NEPA document that disturbs additional undisturbed lands will need to have additional review of the cumulative impacts.

Scope of 1995 Analysis

Section 4.2 of Volume 2 Part A of the 1995 EIS described the existing land uses on and around the INL Site and described land use plans and policies applicable to the surrounding area. Section 5.2 of Volume 2 Part A of the 1995 EIS provided an analysis of the impacts to INL Site lands and the area surrounding the site from existing and proposed activities. DOE compared proposed land uses and plans to existing land uses and plans. Potential effects, if any, of changing land uses were qualitatively assessed. For the purposes of assessing land use impacts, it was assumed that no projects would be built outside the INL Site boundaries. , DOE determined there would be no effects on the public and private land use that surround the site.

For the selected alternative (the preferred alternative), DOE determined the proposed activities would be consistent with existing DOE plans for continued operations, environmental restoration and waste management, and would be similar to uses in existing developed areas on the site.

Ultimate shutdown and decontamination and decommissioning (life cycle) impacts for the projects were qualitatively assessed if they occurred beyond the 10- year time frame analyzed in the 1995 EIS. The 1995 EIS does not specifically indicate the time frame used for the analysis of land use impacts, however, land use impacts were assumed to occur for the duration of the activity. For some activities, the loss of acres of open space was considered to be an irretrievable and irreversible commitment of resources (e.g. radioactive waste disposal).

Two notable land management proclamations have occurred since the 1995 EIS was developed. Neither changes the overall land use but are included for completeness. In 1999, the Secretary of Energy set aside a portion of the INL Site as a Sagebrush Steppe Reserve in order to preserve that unique ecosystem. This is a change in land management policies and practices but does not change the overall land use. The Sagebrush Steppe Reserve is still maintained as part of the withdrawn land used as a buffer zone around active facilities.

On November 9, 2000, President Clinton signed a Presidential Proclamation that expanded the boundaries of the Craters of the Moon National Monument. The expansion adds 661,000 acres to the existing 54,000-acre monument.

Changes in the Environmental Discipline

1. Methodology-No change

2. Assumptions-No change

3. Analytical Methods-NA

4. Data Adequacy- N/A

5. Accident Scenarios-N/A

6. Accident Probabilities-N/A

7. Cumulative Impacts

   The 1995 EIS predicted that INL Site activities would disturb approximately 537 acres. The total acreage currently disturbed is approximately 511 acres.

8. Changes in Regulatory Requirements

   Changes have not occurred in the requirements. However, for clarity, it must be pointed out that federal legal policy provides that NEPA reviews are not conducted for CERCLA actions but the impacts of those actions are considered during the CERCLA process. Since completion of the 1995 EIS, several actions managed through the CERCLA process were not specifically discussed in the 1995 EIS. Those projects include the INEEL CERCLA Disposal Facility (ICDF) and the Staging, Storage, Stabilization, and Treatment Facility (SSSTF). The impacts on land use from those actions are discussed in this section.

9. Other NEPA Analysis for INL Site Operations

The 1995 EIS projected 537 acres of undisturbed land would be disturbed by activities implemented as part of the preferred alternative. Projects that disturbed additional undisturbed lands (i.e., not included in the 1995 EIS) and evaluated in other NEPA and CERCLA documents were also reviewed. Table 6.3.1-1 shows the project and approximate undisturbed acres disturbed to date.

Table 6.3.1-1

Project	Actual Acres
INTEC Percolation Ponds	20
ICDF	40
SSSTF	20
Expanded Landfill	10
CFA Medical and Fire Station	7
Gravel Pits Total	172
Silt/Clay Sources	50
TRA Sewage Lagoons	18
New Landfill at TAN	67
Approximately 25 new wells	12
Runway for Unmanned Aerial Vehicles	10
Various Ordnance Remediation Sites	5
Soil Remediation at ARA	60
Vadose Zone Research Park	10
Big Lost River Trenching Project	5
New FAA building/facility near Gate 1	5
Total	511

Any project requiring a NEPA document that disturbs additional undisturbed lands will need to have additional review of the cumulative impacts.

DOE has also completed two land management related NEPA documents affecting land use concerns. Those two documents are the Environmental Assessment (EA) for New Silt/Clay Source Development and Use at the INEEL, Wildland Fire Management EA, and the Sagebrush Steppe Ecosystem Reserve EA. Those two documents analyze general land management strategies and not project specific activities. There has not been any planned disturbance of undisturbed lands associated with those activities.

References:

1. INEEL Comprehensive Facility & Land Use Plan, electronic version

2. Remedial Design/Remedial Action Work Plan for Operable Units 6-05 and 10-04, Phase II (Draft Final), DOE/NE-ID-1112

3. Final Management Plan for the INEEL Sagebrush Steppe Ecosystem Reserve (EA ID-074-02-067), May 2004

4. Environmental Assessment and Plan for New Silt/Clay Source Development and Use at the Idaho National Engineering and Environmental Laboratory, DOE/EA-1083, May 1997

5. Idaho National Engineering and Environmental Laboratory Wildland Fire Management Environmental Assessment, DOE/EA-1372, April 2003

6. Email dated February 18, 2005, Personal Communication with Brenda Pace, BEA Ecological Services.

6.3.2. Socioeconomics

Summary

The 1995 EIS Alternative B projected minimal socioeconomic impacts beyond 1995 since employment levels would be nearly the same as they were in 1995 (8,620 in 1995 and 8,059 Alternative B projected for the year 2004). Actual employment numbers for 2004 were 7,360.

The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline. Additional analysis for this discipline is not required.

Scope of 1995 Analysis

The 1995 EIS, sections 4.3 and 5.3, provided an analysis of the socioeconomic impact to the surrounding counties of the INL Site primarily from any increases in INL Site employment. Based on Alternative B, any increases in employment would be offset by a declining workforce because of shrinking federal budgets experienced at the time in other DOE programs.

Changes in the Environmental Discipline

1. Methodology

Socioeconomic impacts in the 1995 EIS basically relied on compilation of statistical data from the government and internal sources. This socioeconomic data/information including potential declining outyear budgets and employment reductions were used to establish a basis and then this basis was adjusted by the potential needs and requirements (increased employment) outlined in the1995 EIS.

2. Assumptions

The relevant assumption was that any additional employment planned in the1995 EIS would offset declining employment in other program areas at the INL Site i.e., no major overall employment impacts were expected, thus no material socioeconomic impacts to the region were projected.

3. Analytical Methods

Statistical forecasting provided by government and internal sources. Qualitative estimating based on information relevant at the time.

4. Data Adequacy

Data/ information provided in the1995 EIS covered the major areas of concern, regarding socioeconomics.

5. Accident scenarios - None N/A

6. Accident probabilities - None N/A

7. Cumulative Impacts

The 1995 EIS projected minimal/immaterial changes in the area of socioeconomics. Any additional employment (impacts) would be offset by other INL Site programs that were declining due to shrinking budgets.

8. Changes in Regulatory Requirements - None

9. Other NEPA Analysis for INL Site operations -None

In the 1995 EIS the following selected data was derived from table F-1-7 from page F-1-16.

Table 6.3.2-1 Total Employment

	1994	1995	2004 (Projected)	2004 Actuals
Total direct Employment from the INL Site	10,729	8,620	8,059	7,360

As expected in 1995, employment levels decreased nearly 20 % from 1994 to 1995 due to federal budget reductions. The year 2004 estimate of 7,246 was based on out-year projections. Alternative B (Table F-1-1, page F-1-10) estimated that 813 jobs would result from this alternative. Using this data, the projected direct employment was estimated to be 8,059.

7,246 No action
813 Alternative B
8,059 Projected 2004 employment level.

DOE's Employment Reports show the total INL Site employment in 2004 at 7,360. A comparative analysis between the 4 sets of employment numbers (table 6.3.2-1) to the current socioeconomic conditions and the continued growth seen in the region of influence and lack of any known direct adverse socioeconomic impacts, supports the 1995 EIS conclusions that minimal socioeconomic impacts have resulted from implementation of the Alternative B decision.

References:

1. INEEL Impacts 2000
2. DOE-ID internal Employment Report (December 2004)

6.3.3. Cultural Resources

Summary

Impacts to cultural resources resulting from actions analyzed in the 1995 EIS have been greater than expected because of the adverse effects of D&D activities on historic architectural buildings and structures at the INL Site. The 1995 EIS anticipated sixty-six (66) buildings and structures would be modified, decommissioned, or demolished under the preferred alternative, Alternative B (Ten-Year Plan). Since 1995, one hundred fifty-six (156) buildings and structures have been demolished, ninety (90) more than originally projected. Impacts associated with increased D&D activities were not accurately anticipated or addressed. In addition, the 1995 EIS did not anticipate or address the effects of wildfires on prehistoric and historic archaeological sites. Impacts related to wildfires are addressed in the Idaho HLW & FD EIS and are addressed in more detail in the INEEL Wildland Fire Management Environmental Assessment, DOE/EA-1372, April 2003.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INL Site, or decisions deferred in the ROD, will require additional analysis for this discipline. Further analysis of impacts related to D&D activities on historic buildings and structures and the overall cumulative impacts caused by these actions may be necessary.

Scope of the 1995 Analysis:

The cultural resources of the INL Site are described in Section 4.4 of the Affected Environment Chapter of the 1995 EIS. Section 4.4 is divided into descriptions of prehistoric and historic cultural resources on the INL Site. The impacts to cultural resources of the INL Site from implementing spent nuclear fuel management and environmental restoration and waste management alternatives are analyzed in Section 5.4 of the Environmental Consequences Chapter of the EIS.

Changes in the Environmental Discipline:

1. Methodology.

No change. The methodology for identifying, evaluating, and mitigating impacts to cultural resources as established through the National Historic Preservation Act (NHPA) has been streamlined. This process is outlined in the "INEEL Cultural Resource Management Plan" (CRMP; DOE/ID-10997, 2004) and memorialized through a July 2004 Programmatic Agreement between DOE-ID, the Idaho State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation. Other primary laws that establish methodology include the Historic Sites Act, the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), and the American Indian Religious Freedom Act (AIRFA). These laws and their implementing regulations are still in effect and remain unchanged, with the exception of 36 CFR Part 800, Protection of Historic Properties (new final rule effective January 11, 2001), which implement the NHPA. Any change to the

scope of the 1995 EIS would require additional analysis to determine direct and indirect effects to cultural resources on the INL Site. A cultural resources review process and exemption to this process are outlined in the INEEL CRMP. Cultural resource reviews are routinely completed for non-exempted actions that may affect cultural resources on the INL Site.

2. Assumptions.

Any archaeological surveys that were performed more than ten years ago will be re-evaluated by the contractor's Cultural Resources Management Office for adequacy. In addition, the entire PBF and ARA areas (WAG-5) are sensitive areas to the Shoshone-Bannock Tribes because of unanticipated discoveries of early Native American remains that were discovered since the preparation of the 1995 EIS. There is a strong likelihood that any ground disturbing activities in these areas could produce inadvertent discoveries of human remains. Inadvertent discoveries are subject to INL Site stop-work authority and have the potential to trigger requirements under NAGPRA. The National Park Service has informally requested that DOE-ID nominate the entire INL Site as a Historic District or Historic Landscape for inclusion in the National Register of Historic Places. If that were to happen, the decision would need to be reviewed for any impacts to the 1995 EIS.

3 Analytical Methods. No change.

4. Data Adequacy.

A.) In September 1997, The Arrowrock Group Inc. of Boise, ID prepared "The INEEL - A Historic Context and Assessment Narrative and Inventory." The document was revised in July 1998 and again in November 2003. This document provides an assessment of 516 buildings on the INL Site. According to the document, 217 of the 516 buildings surveyed are potentially eligible for inclusion in the National Register of Historic Places. This document has a direct bearing on the data in Table 5.4-1 on page 5.4-3 of Vol. 2. For instance, the buildings listed under Decontamination and Decommissioning Projects (TRA-654, TRA-603, CPP-601, CPP-603, CPP-640 and CPP-633) are either individually eligible for the National Register or are contributing properties to the National Register. CPP-633 was demolished and, as mitigation, a Historic American Engineering Record (HAER) report completed. Mitigation for demolition of CPP-601, portions of CPP-603, CPP-627 and CPP-640 is outlined in a 1998 Memorandum of Agreement between DOE-ID and the Idaho SHPO.

B.) The 1992 Working Agreement between DOE-ID and the Shoshone-Bannock Tribes (page 4.4.2 of Vol. 2) was replaced in 1998, 2000, and again in 2002 with an Agreement -in-Principle between DOE-ID and the Shoshone-Bannock Tribes.

C.) The INEEL Cultural Resource Management Plan (CRMP) was completed and accepted by the Idaho SHPO and the ACHP in August 2004, DOE/ID-10997. The plan addresses cultural resources in a broader sense of the term to include Native American cultural values and perspectives. The Programmatic Agreement Concerning Management of Cultural Resources on the INL Site between DOE-ID, the Idaho SHPO and the ACHP, which is Appendix G of the CRMP, was signed in July 2004

D.) DOE-ID mitigated the adverse effects to these cultural resources through NHPA and related requirements and by completing stipulations included in several Memoranda of Agreement with the Idaho SHPO, including the completion of Historic American Engineering Record (HAER) reports for the TAN and PBF facilities. These reports document historic buildings and structures through large-format black and white interior and exterior photographs and written narratives of the history of the buildings. Other mitigation measures included gathering historic engineering and architectural drawings and photographs and taking new photographs to be used in future HAER reports and interpretive programs.

5. Accident Scenarios. N/A

6. Accident Probabilities. N/A.

7. Cumulative Impacts.

In 2002, DOE decided to engage in the Environmental Management (EM) Footprint Reduction project by deactivating and decommissioning (D&D) EM- owned buildings that no longer held a mission for the INL Site. This project is referred to as the Idaho Cleanup Project (ICP). Both direct and indirect impacts to INL Site cultural resources are greater than originally anticipated due to increased D&D activities to INL Site historic architectural properties. The cumulative impacts of demolition of historic buildings and structures across the INL Site, including those at the Test Area North (TAN) and Power Burst Facility (PBF) areas, has had an adverse impact on the INL Site cultural landscape. The 1995 EIS anticipated sixty-six (66) buildings and structures would be modified, decommissioned, or demolished under the preferred alternative, Alternative B (Ten-Year Plan). Since 1995, one hundred fifty-six (156) buildings and structures have been demolished, ninety (90) more than projected in the 1995 EIS.

8. Changes in Regulatory Requirements

The 1992 amendments to the National Historic Preservation Act (NHPA) were promulgated in May 1999, 36 CFR Part 800, Protection of Historic Properties. The new regulations removed much of the responsibility of the ACHP in the NHPA Section 106 process and placed more responsibility and involvement with the SHPO. Historic Preservation laws and their implementing regulations are still in effect and remain unchanged, with the exception of 36 CFR Part 800, Protection of Historic Properties (new final rule effective January 11, 2001), which implement the NHPA. It also gave Native American Tribes more of a role in the overall Section 106 process.

9. Other NEPA Analysis for INL Site operations.

See Cultural Resources sections (4.4 and 5.4) of the Idaho High-Level Waste and Facilities Disposition EIS, December 1999.

References:

1. Arrowrock Group, "The Idaho National Environmental and Engineering Laboratory A Historical Context and Assessment Narrative and Inventory", INEEL/EXT-97-01021, rev. 1, November 17, 2003

2. "Idaho National Engineering and Environmental Laboratory Cultural Resource Management Plan", DOE/ID-10997, Rev. 0, August 2004

3. Programmatic Agreement between the Department of Energy, Idaho Operations Office, the Idaho State Historic Preservation Office and the Advisory Council on Historic Preservation Concerning Management of Cultural Resources on the Idaho National Engineering and Environmental Laboratory, July 2004.

4. Agreement-in-Principle between the Shoshone-Bannock Tribes and the United States Department of Energy, December 10, 2002

6.3.4. Aesthetic and Scenic Resources

Summary

A qualitative analysis was performed to determine if there were any changes affecting aesthetic and scenic resources. Changes in the land status around the INL Site, and construction and demolition activities since 1995 were reviewed to determine changes to the visual quality of the INL Site. There has been a change to the built-up environment of the INL Site since 1995, mainly due to the demolition activities related to the Idaho Cleanup Project. For a summary of the impacts resulting from the demolition of buildings and structures related to the Idaho Cleanup Project, refer to section 6.3.3, Cultural Resources. By comparison, there were twenty-three (23) buildings constructed on the INL Site since 1995. There are no air quality or visibility issues that are changing the character of the landscape.

The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline. Additional analysis for this discipline is not required.

Scope of 1995 Analysis

Section 4.5 of Volume 2 Part A of the 1995 EIS describes the visual character of the INL Site in 1995 and the surrounding scenic areas including the Craters of the Moon National Monument and the Black Canyon Wilderness Study Area. Section 5.5 of Volume 2 Part A of the 1995 EIS describes the effects of the alternatives on the visual character of the INL Site and those surrounding scenic areas. Also discussed was the fact that the Middle Butte area located in the southern portion of the INL Site is seen by the Shoshone-Bannock Tribes to be an important Native American resource. Impacts to visual quality due to air pollution are covered under Air Resources. The 1995 EIS analysis used the extent of the modification to an area to determine significant visual resource degradation due to structures. The definition of the degree of acceptable modification considers the nature, density, and extent of sensitive visual resources.

The assumption used in the 1995 EIS when evaluating this resource area was that the construction of new facilities and modification of existing infrastructure and decontamination and decommissioning projects that occur within an established area boundary would have low visual impact.

Changes in the Environmental Discipline

1. Methodology-No changes

2. Assumptions-No changes

3. Analytical Methods-N/A

4. Data Adequacy- N/A

5. Accident Scenarios-N/A

6. Accident Probabilities-N/A

7. Cumulative Impacts-N/A

8. Changes in Regulatory Requirements-N/A

9. Other NEPA Analysis for INL Site Operations- Additional NEPA analyses for aesthetic and scenic concerns have been completed in the Advanced Mixed Waste Treatment Project EIS; Treatment and Management of Sodium-Bonded Spent Nuclear Fuel EIS; the Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, including the Role of the Fast Flux Test Facility; and the Idaho High-Level Waste and Facilities Disposition EIS.

A qualitative analysis was performed to determine if there were any changes affecting aesthetic and scenic resources. Changes in the land status around the INL Site, and construction and demolition activities since 1995 were reviewed to determine changes to the visual quality of the INL Site.

References:

President of the United States Proclamation 7373 of November 9, 2000, Boundary Enlargement of the Craters of the Moon National Monument, 65 FR 69221

6.3.5. Geology

Summary of Impacts

There are no major environmental impacts related to the 1995 EIS Geology characterization. Subsequent revisions, finalizations and challenges to volcanic and seismic hazards characterization documents and their conclusions indicate that the initial assessments of these hazards in the 1995 EIS are robust and bounding analyses.

The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline. Additional analysis for this discipline is not required.

Scope of the 1995 Analysis

The 1995 EIS geology analysis is contained in sections 4.6 and 5.6 and was based on three issues: seismic hazards, volcanic hazards, and gravel use. The primary document for the seismic hazard analysis was based on the draft Woodward-Clyde Federal Services 1993 probabilistic seismic hazard assessment (PSHA). The volcanic hazards were analyzed by the Volcanic Hazards Working Group (VWG, 1990). The details of the 1995 EIS seismic and volcanic hazards characterization are discussed or referenced in Appendix F-2 of the 1995 EIS. Geologic (seismic and volcanic in this case) hazards and gravel use were not significant criteria in the alternative selection process and Record of Decision.

The 1995 EIS acknowledged that additional site-specific analysis would be needed to ensure that structures modified or built as a result of decisions based on the 1995 EIS would be designed according to DOE and industry consensus standards.

Changes in the Environmental Discipline

1. Methodology

The 1995 EIS concluded that the two issues most related to INL Site geology; geologic hazards and gravel use impacts were not a discriminating factor in the analysis of alternatives or the Record of Decision. The geologic hazards assessments used to support site characterization are cited and referenced in Appendix F-2 of the 1995 EIS. A final version of the draft INEEL PSHA used in the 1995 EIS has been completed. High hazard facilities (such as the Advanced Test Reactor) are designed to survive a seismic event with a 10,000-year return period. Soil response curves (which incorporate site specific soil amplification effects) have been prepared for certain areas of the INTEC and TRA.

The methodology used in producing the PSHA and volcanic hazards assessment is prescribed in the DOE standards and included extensive peer review of intermediate and final products. This work has been reviewed by the Defense Nuclear Facility Safety Board, the Nuclear Regulatory Commission, and the State of Idaho as well as highly regarded experts in the seismological community.

2. Assumptions

Assumptions regarding the key parameters in the PSHA analysis (source, path, and site characteristics) have undergone extensive review and seem to be robust. The INL Site recently applied for and obtained a Nuclear Regulatory Commission license for the Three Mile Island Unit 2 Independent Spent Fuel Storage Installation (TMI ISFSI). In the course of obtaining this license, assumptions regarding site effects (soil amplification) and local path effects (attenuation of seismic waves by alternating layers of basalts and sedimentary interbeds) were further reviewed and validated. Source magnitude, location, frequency, and flow geometry assumptions underlying INL Site Volcanic hazards analyses have undergone similar reviews.

3. Analytical methods

The PSHA methodology as used at the INL Site involved the probabilistic characterization of seismic source location, magnitude, and frequency (return period). This characterization is formulated using seismic records, paleoseismological field data, and the statistical representation of source location and magnitude, site, and path effects. Three main types of seismic sources were accounted for including; a Basin and Range type earthquake (Borah Peak), a volcanic eruption, and a randomly occurring (in space and time) Snake River Plain earthquake. Volcanic hazards were also analyzed in a probabilistic framework.

4. Data adequacy

The geologic data and analyses presented in the 1995 EIS are adequate for site characterization and impacts analysis purposes supporting the ROD. Subsequent design work will require site-specific analyses for soil response effects and soil structure interaction. Soil amplification effects can be severe and should be taken into account when the cost of construction is evaluated for any new construction projects.

5. Accident Scenarios

Accident analyses using seismic and volcanic events as initiators are listed in Table F-5-5 in the 1995 EIS. All seismic initiators have the same beyond design basis (10E-6) probability.

6. Accident Probability

Seismic and volcanic initiating event probabilities are listed in Table F-5-5 in the 1995 EIS. The final INEEL PSHA (Woodward-Clyde Federal Services, 1996) indicates that these events are still beyond design basis.

7. Cumulative Impacts

There are no cumulative impacts from seismic and volcanic hazards.

8. Changes in Regulatory Requirements

The NRC concurred with DOE–ID's recommendation to design the TMI – ISFSI according DOE risk based criteria as opposed to NRC maximum credible earthquake criteria. This has broad implication for the rational determination of seismic risk in DOE Safety Analysis Reports (SARs), which are based on NRC type characterization requirements. DOE 5480.28 (Natural Phenomena Hazard Mitigation (NPHM)) that was in effect at the time of 1995 EIS has been replaced by 420.1A (Facility Safety). The standards supporting DOE NPH characterization standards have been revised, updated, and finalized. All 1995 EIS and subsequent seismic and volcanic hazards characterization work has been performed consistent with these standards.

9. Other NEPA Analysis for INL Site Operations

The 1995 EIS accurately described the impacts of gravel use with respect to the alternatives. A subsequent environmental assessment was prepared to analyze the impacts of excavation and use of silt and clay at the INL Site.

There are no major geologic risks and impacts identified in the 1995 EIS. Subsequent revisions, finalizations and challenges to volcanic and seismic hazards characterization documents and their conclusions indicate that the initial assessments of these hazards in the 1995 EIS are bounding and adequate.

Extensive external review has shown that assumptions regarding the key parameters in the PSHA analysis which forms the basis of the INL Site A & E standards (source, path, and site) characteristics are robust. INL Site Volcanic hazards analyses have undergone similar reviews.

The 1995 EIS acknowledged that additional site- specific analysis would be needed to ensure that structures modified or built would be designed according to DOE and INL Site architectural and engineering (A&E) standards. Design work for facilities located on significant soil thicknesses will require site-specific analyses for soil amplification and soil structure interaction. Soil amplification effects can be severe and should be taken into account when the cost of construction is evaluated during a site selection process.

References:

1. Woodward-Clyde Federal Services, "Site-Specific Probabilistic Seismic Hazard Analysis for the Idaho National Engineering Laboratory – Final Report", INEL-95/0536, dated May 1996

2. Volcanic Hazards Working Group, "Assessment of Potential Volcanic Hazards for New Production Reactor Site at the Idaho National Engineering Laboratory", NPR91-029-DHC, dated 10/31/90

6.3.6. Air Resources

Summary

The maximum emissions from radiological sources are bounded by the analysis in the 1995 EIS. For air pollutants, the maximum emission scenario for cumulative emissions from baseline and preferred alternative sources remains bounding for most pollutants, as there are fewer sources operating today. All criteria air pollutants are bounded. Four toxic air pollutants are not bounded within the 1995 EIS, one is below the State of Idaho Toxic Screening Levels (considered bounded within the regulatory framework) and the remaining three chemical emissions have been bounded through permitting/categorical exemption processes (considered bounded within the regulatory framework). The increases in emissions of these chemicals are not considered a significant change and are not major impacts as the emissions have been accounted for in other regulatory framework documents (air permitting/CERCLA and or categorical exemption processes).

The existing analysis does not show any adverse impacts from air emissions at 50 km. It is not anticipated that there will be any adverse impacts from air emissions at 200 km. However, due to stakeholder concerns, analysis in the Idaho HLW & FD EIS has been completed out to 200 km for some sectors. The methodology has changed such that regional impacts can be considered using new models. Limited use of new models (CALPUFF in a screening mode) in the HLW & FD EIS and the CPP-606 Prevention of Significant Deterioration permit provide some mitigative influence on the changes in the discipline.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INL Site, or actions deferred in the ROD, may require additional analysis for this discipline. Additional analysis is recommended to address stakeholder concerns regarding air quality beyond 50 km.

Scope of 1995 Analysis

The 1995 EIS analyzed two scenarios - baseline and cumulative air quality impacts to (1) the National Ambient Air Quality Standards (NAAQS), (2) Prevention of Significant Deterioration (PSD) increments, (3) visibility impairment, and (4) radiological dose. Section 4.7 of the 1995 EIS describes the baseline air emissions that were analyzed and section 5.7 of the 1995 EIS describes the bounding air emissions from the selection of each of the alternatives.

The baseline case analyzed actual and potential emissions from existing INL Site facilities and those foreseeable facilities anticipated to be operational before June 1, 1995. The foreseeable facilities included: compacting and sizing operations at WERF, Fuel Cycle Facility (FCF) at ANL-W (now MFC), and operation of the portable water treatment unit at PBF. Baseline radiological impacts are based on 1991 emission estimates, with the exception of the NWCF, which are based on 1993 emissions and scaled up to reflect maximum operations. Baseline air pollutant impacts are based on 1991 air emissions data for the criteria air pollutants and on 1989 emissions data for the toxic air pollutants.

The cumulative scenario included the baseline case plus emissions from (1) construction and operation of new facilities, (2) demolition activities associated with the decontamination and

decommissioning of existing facilities, (3) environmental restoration activities, and (4) mobile sources, such as vehicular traffic and heavy equipment operation within the INL Site.

Changes in the Environmental Discipline

1. Methodology

Non-Radiological Emissions
The reporting methodology has changed since the 2002 Supplement Analysis. The Annual Air Emissions Inventory is no longer required to be compiled by the contractor. The data presented in the 2005 SA was taken from the 2002-2004 Title V Fee Registration for the criteria pollutants, 2002-2004 data from the Air Track database, the 2002 Consolidated Emission Reporting Rule Inventory.

Radiological Emissions
The methodology for the reporting of the radionuclide emissions has also changed since the 2002 SA. Historically, the effective dose equivalent (EDE) calculated for the radionuclide emission reports has always been between 0.1 and 0.01 mrem. Less than 5% of the radionuclide release sources at the INL Site cause the dose to exceed 0.01 mrem. The 2005 SA lists only the continuously monitored sources with emissions that contribute to the dose as per the 2003 NESHAPS Radiological Emissions Report.

2. Assumptions

Thirty-five toxic air pollutants were reviewed for the 2005 SA. From the 1995 EIS, Table 4-7.3, 26 toxic air pollutants were identified because they were emitted from existing INL Site facilities in quantities exceeding the screening level established by the State of Idaho. Eight additional chemicals were added from the 1995 EIS, Table 5-7.3, Maximum Toxic Emissions by Alternative, Alternative B. One chemical was added in the 2002 SA from the CERCLA activity that was analyzed for toxic air pollutants.

3. Analytical methods

For non-radiological emissions, the environmental impacts discussed above (PSD, NAAQS, visibility) were determined using air dispersion models, Industrial Source Complex Model (ISC-2) and Visibility Screening (VISCREEN) models. While both were accepted regulatory models they are limited to impacts within 50 km of the source(s). Regulatory agencies typically will accept - ISC-3 and VISCREEN modeling for impacts within 50 km and CALPUFF for beyond 50 km. CALPUFF is a multipurpose model that considers impacts out several hundred kilometers, including regional haze (visibility with sulfur dioxide) and deposition analyses. CALPUFF was used for the HLW & FD EIS and the CPP-606 boilers air permit. This model was executed in screening mode with meteorological data recommended by the National Park Service. Radiological dose calculations used GENII. GENII is still an acceptable model for dose calculations.

4. Data Adequacy

The 1995 EIS analysis for radionuclide emissions was based on 1991-93 emission data. The analysis for air pollutant emissions was based on 1991 emission data for the criteria air pollutants and on 1989 data for the toxic air pollutants.

The 2003 National Emissions Standards for Hazardous Air Pollutants (NESHAPs) Radiological Emissions Report contains data that has been reviewed, verified, and certified by the Idaho Operations Office Manager. The data for the analysis completed for the toxics and criteria air pollutants were also from reports that have been through extensive review, verification, and certification.

4.1 Background

Tables 5-7.2 and 5-7.3 in the 1995 EIS show the effect of implementing the proposed alternative. The document does not state that these impacts are increases over the baseline impacts. A review shows that the baseline data was not included in the alternative B emissions estimates.

The information presented in this section was developed from the 1995 EIS and the Air Resources Technical Resource Document. The analysis of the air emissions must be added to the baseline to obtain the bounding analysis (Table 6.3.6-1and Table 6.3.6-2a). The Health and Safety discussion addresses the cumulative impacts.

The baseline data found in table 4-7.2 in the 1995 EIS gives impacts that were based on 1989 (Toxic Air Pollutants) data and 1991 (Air Pollutants) data.

4.2 Analysis of Air Pollutant Emissions

4.2.1 Criteria Air Pollutants

A comparison of the actual emissions as reported in the Title V Fee Registration and the AirTrack database, with the estimated criteria air pollutant emissions in the 1995 EIS, shows that the criteria air pollutant emissions are bounded (Table6.3.6-1.c).

4.2.2 Toxic Air Pollutants

As shown in Table 6.3.6-2.c, the 1995 EIS is not bounded for four chemicals – benzene, beryllium, chlorine and naphthalene. The review of these toxic emissions in comparison with the State of Idaho Toxic Emission Screening Levels indicates that naphthalene is below the toxic standards.

Based on the discussion below, the four pollutants that are emitted at higher rates now than were analyzed in the 1995 EIS do not result in any significant environmental impact. The air analysis was adequate for decisions in the ROD.

In regulatory terms, the INL Site is in compliance with the toxic emission regulations. Toxic emission analyses are evaluated on a source-by-source basis not on a cumulative basis under the air regulations. The INL Site has not been required to apply for any IDAPA Toxic Permit to Construct Air Permits.

4.2.2.1 Fuel Combustion Chemicals (Benzene, Beryllium, Naphthalene)

Naphthalene emissions estimates increased from 16 to 309 kg/yr from what was analyzed in the 1995 EIS. This higher level is still significantly below the Idaho Toxic Screening Emission levels or deminimus level that would require an analysis and permit if it was all from new sources.

Benzene and beryllium are both emissions from combustion of fossil fuels that would be released most significantly from site boilers. Benzene emission estimates increased from 720 to 919 kg/yr. Beryllium emission estimates increased from 0.18 to 0.49 kg/yr.

Even though fuel usage has been reduced from the 1995 EIS estimate, the values for the toxic chemicals within the scientific literature has improved over the last 10 years. Material Safety Data Sheet data has improved over the last 10 years adding small percentages of toxics to the formula lists providing additional information on product constituents. In addition, the EPA Air Pollutant Emission Factors (AP-42) emission estimates have changed or been revised since the last analysis.

As a part of the Idaho HLW & FD EIS, a review was done on the emissions from the burning of fossil fuels. This resulted in revised emission estimates. From review of the toxic screening levels, both benzene and beryllium are above the IDAPA Toxic Screening Levels. As all major sources of fuel combustion at the INL Site are boilers and/or generators, these sources are captured under air permits or restrictions on operations due to categorical exemptions from permitting. These emissions have been considered through these processes and are bounded through issuance of air permits or the supporting documentation for categorical exemptions from air permitting. Since regulatory requirements are met, there are no significant impacts. It should be noted that continued changes in EPA regulations and guidance concerning toxic emission factors may cause other toxic emissions to appear unbounded in comparison to the 1995 EIS, although the impact to the environment is minimal (can be shown through modeling/emission calculations for permitting purposes).

4.2.2.2 Chlorine

Chlorine was not modeled for the CPP-606 Boiler Permit or for the 1995 EIS. The chlorine emissions are mostly from the Vapor Vacuum Extraction soil contamination cleanup activity at the RWMC. These emissions were modeled in 2003 and the results indicate that the impacts are less than 1% of the Idaho acceptable ambient concentration of 150 mg/m3.

4.2.2.2.1 Additional Information on VVE Units

Recent analytical work in determining actual emissions from INL Site operations has been completed the Vapor Vacuum Extraction (VVE) units at RWMC. Emissions are less than the original VVE estimates in the 2002 SA because the emissions were conservatively estimated in the 2001 VVE EDF (reference #5). The values presented in the 2005 SA are based on VVE feed measurements and actual hours of operations, which provide a more accurate value of emissions. It should be noted that these emissions are actuals for 2004, so if more units operated and/or operation time was increased on existing units, emissions would increase.

4.2.3 Analysis of Radionuclide Emissions

A comparison of the actual emissions as reported in the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) 2003 annual report with the estimated emissions in the 1995 EIS shows that the radiological emissions are bounded. For CY 2003, airborne radionuclide emissions from the INL Site operations were calculated to result in a maximum individual dose to a member of the public of 3.5 E^{-2} mrem (3.5 E^{-7} Sievert). The highest dose estimated for the maximally exposed individual in the 1995 EIS is associated with Alternative D. This dose (0.79 mrem per year), when added to the baseline dose of 0.05 mrem per year, results in a total maximum estimated dose to a member of the public of 0.84 mrem. This is well above the actual dose received by a member of the public showing that the 1995 EIS does provide a bounding analysis for radioactive air emissions sources.

5. Accident Scenarios

No Change.

6. Accident Probabilities

No Change.

7. Cumulative Impacts

The air analyses support the Aesthetic and Scenic Resources and Health and Safety disciplines.

8. Changes in Regulatory Requirements

There have been few, if any changes in regulatory requirements with the exception of visibility. Prior visibility analyses were based on impacts within close proximity of a source. Regulatory agencies consider visibility on a regional scale. The continued use of CALPUFF in a screening mode with limited meteorological data will likely meet with resistance from the Park Service and regulatory agencies in future NEPA actions and air permitting.

Toxic air pollutant emissions have increased because of toxic constituent emission data and Material Safety Data Sheet data has improved over the last 10 years. In addition, the EPA Air Pollutant Emission Factors (AP-42) emission estimates have changed/been revised since the last analysis. Through various permitting programs, either permit applications or documentation of an exemption from air permitting, the air releases to the environment are documented. If the

emissions reach a certain level, the emissions have to be modeled to understand how the emissions affect the affected public and environment. It should be noted that continued changes in EPA regulations and guidance concerning toxic emission factors may cause other toxic emissions to appear unbounded in comparison to the 1995 EIS, until an analysis can be completed to determine significance. As the emissions are evaluated on a source-by-source basis, any emissions would be evaluated and mitigated through the permitting process.

9. Other NEPA Analysis for INL Site Operations

The Idaho HLW & FD EIS provides some coverage for this environmental discipline for the broader regional impact. The Idaho HLW & FD EIS tiered off the 1995 EIS with the intent of reducing the amount of new analyses. However, new analyses were conducted with CALPUFF for one HLW processing option all in a screening mode.

The following tables compare the data from the 1995 EIS with the 2004 data in order to compare the values in order to analyze if the emissions are bounded. The Tables 6.3.6-1a through 6.3.6-1c contain information on criteria pollutant emissions (CO, NOx, Sox, PM and VOC), Tables 6.3.6-2a through 6.3.6-2d are toxic air pollutants, Table 6.3.6-3 contains a comparison of radionuclides and Table 6.3.6-4 introduces toxics from a CERCLA project that is considered within this analysis.

Table 6.3.6-1a – Criteria Pollutant Emissions Listed in 1995 EIS

Chemical	1995 EIS Alternative B Estimate Table 5-7.2	1995 EIS Actuals +Projected Increases Table 4-7.2	1995 EIS Permitted Maximums Table 4-7.2	Amount to Compare - Emission Data from 1995 EIS
	kgs/year	kgs/year	kgs/year	kgs/year
Carbon Monoxide (CO)	102,800	301,300	2,200,000	2,302,800
Nitrogen Oxides (NOx)	1,908,704	744,400	3,000,000	4,908,704
Sulfur Dioxide (SO2)	95,133	202,100	1,700,000	1,795,133
PM (0-100)	75,067	302,400	900,000	975,067
Volatile Organic Compounds (VOC)	14,239	None Listed	None Listed	14,239
Lead compounds	208	11	68	276

Table 6.3.6-1b - Criteria Pollutant Emissions 2001-2004

Chemical	2003 Air Track Data	2004 Air Track Data	2001 Fee Registration	2002 Fee Registration	2003 Fee Registration	Amount to Compare - Maximum Emission Values from 2001-2004
	kgs/year	kgs/year	kgs/year	kgs/year	kgs/year	kgs/year
Carbon Monoxide (CO)	18,600	25,000				25,000
Nitrogen Oxides (NOx)	75,000	99,000	91,000	105,000	72,000	105,000
Sulfur Dioxide (SO2)	51,000	25,000	59,000	54,000	50,000	59,000
PM (0-100)	4,200	4,900	4,300	4,800	4,300	4,900
Volatile Organic Compounds (VOC)	2,700	2,400	6,400	3,800	2,300	6,400
Lead compounds	1.3	1.7				1.7

Table 6.3.6-1c - Bounding Analysis for this Supplemental Analysis

Chemical	Amount to Compare - Emission Data from 1995 EIS	Amount to Compare - Maximum Emission Values from 2001-2004	Are the Emissions Bounded?
	kgs/year	kgs/year	
Carbon Monoxide (CO)	2,302,800	25,000	YES
Nitrogen Oxides (NOx)	4,908,704	105,000	YES
Sulfur Dioxide (SO2)	1,795,133	59,000	YES
PM (0-100)	975,067	4,900	YES
Volatile Organic Compounds (VOC)	14,239	6,400	YES
Lead compounds	276	1.7	YES

Table 6.3.6-2a - 1995 EIS Toxic Emission Data

Chemical	1995 EIS Alternative B Estimate Table 5-7.3 1995 EIS	1995 EIS Actuals + Projected Increases Table 8-1.3.2 2002 NEPA SA	1995 EIS Permitted Maximums Table 4-7.2 1995 EIS	Amount to Compare - Emission Data from 1995 EIS
	kgs/year	kgs/year	kgs/year	kgs/year
Acetaldehyde		31	180	180
Ammonia	1.6	1600	6500	6501.6
Arsenic compounds (inorganic including arsine)	0.49	4.2	24	24.49
Asbestos	0.44			0.44
Benzene (including benzene from gasoline)	190	370	530	720
Beryllium compounds	0.18			0.18
1,3-butadiene		220	390	390
Cadmium compounds	1.3			1.3
Carbon tetrachloride	240	28	28	268
Chloroform	9.6	1.95	1.9	11.5
Chromium compounds - trivalent	6.9	3.1	38	41.1
Chromium compounds - hexavalent		0.4	26	26.4
Cyclopentane		350	350	350
Dichloromethane	2000	620	1100	3100
Formaldehyde	2000	960	3300	5300
Hydrazine		8.3	8.3	8.3
Hydrochloric acid	16000	1500	1500	17500
Hydrofluoric acid	1100			1100
Mercury compounds	440	200	200	640
Naphthalene		16	16	16
Nickel Compounds	43	270	1000	1043
Nitric Acid	190	1500	97,000	97,190
Perchloroethylene	12			12
Phosphorus		56	210	210
Polychlorinated biphenyl	3			3
Propionaldehyde		62	110	110
Styrene		4.7	4.7	4.7
Sulfuric Acid	65			65
Tetrachloroethylene		980	980	980
Toluene		580	580	580
Trichloroethylene	55	4.68	4.5	59.68
Trichlorotrifluoromethane	4			4
Trimethylbenzene		87	87	87

Table6.3.6-2b - 2002-2004 INL Toxic Emission Data

Chemical	2002 Air Track Data kgs/year	2003 Air Track Data kgs/year	2004 Air Track Data kgs/year	VVE Data for 2004 kgs/year	Amount to Compare - Maximum Emission Valucs from 2002-2004 kgs/year
Acetaldehyde	0.07	38	29.82		38
Arsenic compounds (inorganic including arsine)	0.007	0.6	0.65		0.65
Benzene (including benzene from gasoline)	0.09	1133	918.63		918.63
Beryllium compounds	0.005	0.45	0.49		0.49
1,3-butadiene	0.004	0.05	0		0.05
Cadmium compounds	0.007	0.45	0.49		0.49
Carbon tetrachloride		1.90E-05	0	1.06	1.06
Chlorine				1415	1415
Chloroform		1.50E-05	0		1.50E-05
Chromium compounds	0.007	0.45	0.49	0.303	0.49
Formaldehyde	0.513	152	131.69		131.69
Hydrochloric acid				15468	15468
Hydrofluoric acid					0
Mercury compounds	0.015	0.91	0.49		0.91
Naphthalcnc	0.134	191	309		309
Nickel Compounds	0.007	0.45	0.6		0.6
Nitric Acid					
Perchloroethylene				0.082	0.082
Styrene		1.70E-05	0		1.70E-05
Toluene	0.118	417	339.76		339.76

Table 6.3.6-2c - Toxic Emissions Bounding Analysis

Chemical	Amount to Compare - Emission Data from 1995 EIS	Amount to Compare - Maximum Emission Values from 2002-2004	Are the Emissions Bounded?
	kgs/year	kgs/year	
Acetaldehyde	180	38	YES
Ammonia	6501.6	-	YES
Arsenic compounds (inorganic including arsine)	24.49	0.65	YES
Asbestos	0.44	-	YES
Benzene (including benzene from gasoline)	720	919	NO
Beryllium compounds	0.18	0.49	NO
1,3-butadiene	390	0.05	YES
Cadmium compounds	1.3	0.49	YES
Carbon tetrachloride	268	1.06	YES
Chloroform	11.5	1.50E-05	YES
Chlorine	-	1415	NO
Chromium compounds	44.9/32.9	0.303	YES
Cyclopentane	350	-	YES
Dichloromethane	3100	-	YES
Formaldehyde	5300	131.69	YES
Hydrazine	8.3	-	YES
Hydrochloric acid	17500	15468	YES
Hydrofluoric acid	1100	0	YES
Mercury compounds	640	0.91	YES
Naphthalene	16	309	NO
Nickel Compounds	1043	0.6	YES
Nitric Acid	97190	-	YES
Perchloroethylene	12	0.082	YES
Phosphorus	210	-	YES
Polychlorinated biphenyl	3	-	YES
Propionaldehyde	110	-	YES
Styrene	4.7	1.70E-05	YES
Sulfuric Acid	65	-	YES
Tetrachloroethylene	980	-	YES
Toluene	580	339.76	YES
Trichloroethylene	59.68	-	YES
Trichlorotrifluoromethane	4	-	YES
Trimethylbenzene	87	-	YES

Table 6.3.6-2d – Possible Unbounded Toxic Emissions

Chemical	IDAPA Toxic Standards IDAPA 58.01.01.585 and 586	Conversion	Amount to Compare - Maximum Emission Values from 2002-2004	Emissions Less than IDAPA Toxic Standards?	How are the emissions covered?
	lbs/hr	kgs/year	kgs/year	Yes/No	
Benzene (including benzene from gasoline)	8.00E-04	3.18	918.63	YES	Air Permits and Categorical Exemption Documentation
Beryllium	2.80E-05	0.11	0.49	YES	Air Permit - CPP-606 Boilers
Chlorine	0.2	794.69	1415	YES	CERCLA
Naphthalene	3.33	13231.65	309	NO	

Table 6.3.6-3 Radiological Air Emissions Sources (curies)

2003 NESHAPS Radiological Emissions Report Continuously Monitored Sources						
	1995 EIS ESTIMATE	ANL-785-018	ANL-764-001	CPP-708-001	CPP-659-033	GEM Project
Radionuclide						
Am-241	2.10E-02					2.00E-10
Ar-41		1.41E+00				
Co-60	7.30E-02			1.40E-07		
Cs-134	3.8E-01					
Cs-137 Ba-137				1.51E-04		
H-3	4.10E+03	2.02E-01	3.69E+00	2.21E+01		
I-129	1.90E-01			4.75E-03		
Kr-85	2.10E+04	8.99E-01	5.33E+02			
Plutonium Isotopes	5.80E-02					
Pu-238				1.10E-06		
Pu-239		5.18E-08				
Sb-125/Te-25m	2.90E-02			2.56E-07		
Strontium-90/Y-90	4.20E-01	8.59E-07	5.41E-07	3.66E-05	1.00E-05	
Uranium Isotopes	3.10E-03					
Xe-131m	1.8E+02					
Total 1995 EIS (Curies)	**2.53E+04**	**TOTALS 2003 NESHAPS Report (Curies) 5.5E+2 TOTALS 2003 NESHAPS Report Dose (mrem) 3.5E-2**				

Note: Table 6.3.6-3 above represents emission rates in Ci/yr. These estimates are entered into the EPA CAP88 dispersion model, along with the rest of the INL Site's radiological emissions, and a dose estimated to the nearest Maximum Exposed Individual (MEI). The dose is determined annually and reported to both the state and federal regulators.

Table 6.3.6-4 Revised Vapor Vacuum Extraction (VVE) Unit Emissions Data

Pollutant	1995 EIS Emissions Estimate (kg/year)	2004 Revised Emissions Estimate (kg/year)
Carbon Tetrachloride	230	1.06
Chloroform	7.6	0.303
Perchloroethylene	8.8	0.082
Trichloroethylene	40	0.297
1,1,1-trichloroethane		0.118
HCl		15468
Cl_2		1415

References:

1. 2003 INEEL National Emission Standards for Hazardous Air Pollutants- Radionuclides, Annual Report, June 2003, DOE/ID-10342 (03)

2. Technical Resource Document for Air Resources Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs, DOE/ID-10497, March 1995

3. E-mail note from Steven Zohner, WERF, NWCF, and Coal-Fired Plant emissions from 1999 Air Emissions Inventory

4. Air Emissions Inventory for the Idaho National Engineering and Environmental Laboratory – 1999 Emission Report, DOE/ID-10788, May 2000

5. Operable Unit 7-08 Air Dispersion Modeling and Health Effects from Thermal and Catalytic Oxidation Unit Emissions at the Radioactive Waste Management Complex, EDF-1901, June 25, 2001

6. Routine Organic Air Emissions at the Radioactive Waste Management Complex Waste Storage Facilities Fiscal Year 1996 Report INEL/96-0377, January 1997, K. J. Galloway, J. G. Jolley

7. E-mail note from Kevin O'Neill, VVE Data for 2004

8. Title V Fee Registration for Criteria Pollutants for 2002, 2003, and 2004

9. Air Emissions Excel Spreadsheet of Data from the Air Track Database System for Toxic and Criteria Pollutant Analysis, S. Woolf, 2005

10. BBWI Air Emission Spreadsheets on Benzene, Beryllium, and Toluene Analysis, H. Orr, 2005

6.3.7. Water Resources

6.3.7 a Water Resources - Groundwater

Summary

The 1995 EIS addressed existing ground water plumes from the TRA, INTEC, TAN, and RWMC. It also provided estimates of doses from the ongoing low-level waste disposal activities at the RWMC. The 1995 EIS showed a dose of 0.60 mrem/yr attributable to the LLW disposal facility through the year 2060. It also stated that results of the preliminary risk assessment for buried wastes indicate that contaminants would not reach the INL Site's site boundary exceeding Federal primary drinking water standards through 2005. Additional analysis completed since the 1995 EIS confirms that these statements are still valid through 2005 and the reasonably foreseeable future as discussed in the Idaho HLW & FD EIS. The projected ground water dose from all buried waste at the RWMC is 0.07 mrem/yr through 2120.

The 1995 EIS stated that additional work was required in order to understand impacts from INL Site operations. Since that time, additional analysis has been completed that addresses some of the unknowns but additional work is still required. RWMC Composite Analyses (Case et al., 2000 and McCarthy et al., 2000) have been completed since the 1995 EIS was published along with updates to the RWMC Performance Assessment (Holden et al., 2002 and Zitnik et al., 2002). These have addressed one of the major ground water analysis needs: further definition on the balance of the buried waste at the RWMC. The WAG 3 RI/FS (DOE-ID, 1997) has also been completed since the 1995 EIS and provides another major piece of the ground water analysis such as impacts from spills at the INTEC. The INEEL CERCLA Disposal Facility has been completed and shown to have insignificant impacts on groundwater quality (DOE-ID, 2002a and DOE-ID, 2003b) with respect to impacts identified in the 1995 EIS. (It should be noted during the discussion of ground water impacts, that there is a great deal of uncertainty in ground water modeling and impacts. Most models calculate results conservatively because they cannot duplicate actual transport mechanisms through the vadose zone. These transport processes are highly complex especially in an environment like the INL Site where fractured basalt, rift zones, geothermal activity, and sedimentary interbeds all play a part in fate and transport of contaminants. Analysis done to date has consistently used conservative assumptions.)

Decontamination and decommissioning (D & D) decisions on ultimate disposition of radiologically contaminated facilities have the potential to add significant source term that may increase the long-term dose (if decisions are made to leave source terms in place on a facility specific basis which could result in a site-wide increase in long term dose) reflected in the Composite Analysis. From a site-wide cumulative impacts standpoint, the D & D impacts on the long-term dose are uncertain because of decisions yet to be made. D & D decisions must take into account cumulative impacts on ground water dose estimates. The additional analysis needed is a site-wide Composite Analysis in accordance with the FFA/CO risk assessment and WAG 10 RI/FS. This information will be used to address some of these uncertainties. However, given the robust and conservative nature of assumptions in previous analyses and subsequent mitigation, it is likely that the doses computed at the INL Site boundary remain bounding regardless of future D & D decisions.

While additional work is required for D&D decisions, the conclusions of the 1995 EIS (see page 5.8-4 in the 1995 EIS) are adequate to support the ROD. Given the nature of previous analyses and water quality monitoring results, it seems likely that the conclusions in the 1995 EIS can be assumed to be bounding out to at least 2035 based on the analyses and conclusions in the Idaho HLW & FD EIS and other INL Site data and analyses. Some uncertainty in this assertion was introduced in the WAG 3 RI/FS which estimated that I-129 could reach the INL Site southern boundary in the 1992-2035 time frame at the mcl concentration but as discussed in the Idaho HLW & FD EIS, subsequent mitigation and monitoring trends suggest that the I-129 plume may not reach the INL Site southern boundary in concentrations above the mcl. In general, monitoring data shows decreasing contaminants across the INL Site with the exception of inorganic salts (from agricultural sources in the Mud Lake area) and carbon tetrachloride, which is being addressed through CERCLA remediation actions (DOE-ID, 2001).

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD.

Scope of the 1995 Analysis

The water resources section of the 1995 EIS addressed both possible flood hazards and impacts from INL Site operations. These two topics are addressed separately in this Supplement Analysis document.

Section 4.8 of the 1995 EIS addresses the water resources of existing activities on the INL Site, and section 5.8 addresses the estimated impacts from proposed actions. The 1995 EIS analysis was based on two primary pieces of information. The first is the 1994 RWMC Performance Assessment (Maheras, et al., 1994). The second is the monitoring data that was available in 1994. The analysis included monitoring data tabulation and modeling to assess water resources with respect to potential impacts of the activities delineated in the 1995 EIS. The geology and water resources methodologies and assumptions are detailed in Appendix F-2 in Volume 2 of the 1995 EIS. Preliminary predictions of ground water impacts from other areas and activities (INTEC, TAN, TRA, and RWMC) were presented with detailed analyses deferred to future characterization activities.

The analyses summarized in the 1995 EIS showed hazardous constituents at TAN, TRA, INTEC, and in the subsurface at RWMC. The potential radioactive plume projected to emanate from the RWMC was projected to result in a maximum exposure rate to the public of 0.60 mrem/yr by the year 2060. This information was based on the Performance Assessment (Maheras et al., 1994) for the active LLW disposal facility (Pits 17 – 20, disposal vaults) at the RWMC. The buried ER wastes were addressed and the statement was made that federal drinking water standards would not be exceeded through 2005. Also addressed were the iodine-129 (I-129), tritium (H-3), and Strontium-90 (Strontium-90) plumes from TRA and INTEC, and the trichloroethylene plume from TAN.

The 1995 EIS acknowledged that additional analysis was needed in order to fully understand the impacts to a maximally exposed member of the public. Reference was made to the ongoing Remedial Investigation and Feasibility Study for WAG 3 (DOE-ID, 1997). No credit was given

for any activities at the Pit 9 project or the Test Area North (TAN) pump and treat and enhanced bioremediation/natural attenuation remediation project.

Water use and discharge data is analyzed in the INL Site Services section (6.3.12).

Changes in the Environmental Discipline

1. Methodology

The 1995 EIS concluded that possible ground water impacts were not by themselves a discriminating factor in the weighting of alternatives.

Since the 1995 EIS was published a great deal of analysis and remediation has been completed at the INL Site. The remediation includes removal of volatile organics from the vadose zone at RWMC and the removal of contaminated ground water from the TAN injection well through pump and treat and other processes. Other changes include the use of bioremediation in cleaning up the TAN TCE plume, which has been so successful that the CERCLA ROD was amended to select bioremediation for the most contaminated portion of the plume.

Other more recent analyses include the 2000 update to the RWMC Performance Assessment (Case at al., 2000), development of the RWMC Composite Analysis (McCarthy et al., 2000), the WAG 3 (INTEC) Remedial Investigation and Feasibility Study (DOE-ID, 1997), the Idaho HLW & FD EIS and the ongoing analysis for the Waste Area Group 7 (RWMC) Remedial Investigation and Feasibility Study (WAG 7 RI/FS). The Idaho HLW & FD EIS ground water characterization and impacts analyses rely heavily on the data and modeling results contained in the 1997 WAG-3 Remedial Investigation and Feasibility Study for the INTEC (DOE-ID, 1997). The 2000 RWMC Composite Analysis (CA) provides significantly more detail regarding the ground water impacts of INL Site activities. Additionally, a site wide hydrology model for the WAG 10 R/FS is being developed.

The 2000 Performance Assessment (PA) addresses the potential maximum environmental impacts to a member of the public from the active LLW disposal facility. The CA addresses the potential maximum environmental impacts to a member of the public from all sources of radiological contamination in the subsurface at the INL Site, including the active disposal facility.

The most recent site-wide Environmental Monitoring report (SM Stoller, 2004) is consistent with the assertion in the 1995 EIS that INL Site water quality would continue to be acceptable or improve at the site boundary for the reasonably foreseeable future.

2. Assumptions

The primary assumptions from the1995 EIS are similar to those that are currently used in the RWMC 2000 Performance Assessment. The agricultural scenarios and intruder scenarios for receptors are essentially the same. Key assumptions for the INTEC/TRA models included; meteorological data for vadose zone transport rate analyses, distribution coefficient (kd) values, a transport time of three years through the vadose zone to the aquifer, and that there would be no

intentional surface or subsurface discharges exceeding DOE standards. The TAN TCE model used in the 1995 EIS assumed an infinite source of TCE and identified TCE as a major potential contaminant of concern. Subsequent analyses indicate that in-situ bioremediation is significantly attenuating the distal TAN TCE plume (DOE-ID, 2001). The robust and defensible documentation of this attenuation has led to the generation and acceptance of alternative remediation strategies for the TAN TCE plume. Other assumptions are delineated in Appendix F-2 in Volume 2 of the 1995 EIS.

Some significant changes in assumptions for RWMC ground water modeling since 1994 include: the adjustment of the distribution coefficient (Kd) for uranium from 1000 mL/g to 6 mL/g, the inclusion of source terms from the entire Subsurface Disposal Area, and the development of a more sophisticated release model for buried waste.

A key assumption in the 1995 EIS regarding the recession of contaminant plumes on the INL Site seems to have been verified by data and models contained in the CA. However, the WAG 3 RI/FS indicates that the I-129 plume could reach the INL Site southern boundary at or above the 1 pCi/l MCL. Subsequent data and analysis in the Idaho HLW & FD EIS concluded that mitigation subsequent to the WAG 3 RI/FS has likely resulted in a significant decrease in the possibility of the I-129 plume migrating off of the INL Site in concentrations above the mcl. It is also important to note that aquifer risks were characterized with respect to impacts at the site boundary in the 1995 EIS.

3. Analytical Methods

The 1995 EIS used MODFLOW and its MT3D fate and transport module for INTEC/TRA 2-d saturated zone contaminant transport characterization. The GFLUX 1-d unsaturated zone contaminant transport code was used to numerically introduce contaminants into the saturated zone. This modeling process has been replaced by the use of the TETRAD multi-phase flow and transport simulator. The MODFLOW/PORFLOW or GWSCREEN approach is arguably limited by the 1-d assumptions required for vadose zone transport but has reasonably fast computation times. TETRAD has the capability to fully capture 3-d geohydrologic and source term effects on coupled saturated and unsaturated zone fate and transport. Lengthy computation times limit the range of sensitivity analyses that can be done and assumptions have to be made regarding the geohydrologic structure in 3 dimensions. Nonetheless, the improvements in discretization and transport sytematics provided by TETRAD have resulted in more sophisticated modeling approaches and better results in terms of history matching validation efforts.

The TAN and RWMC models (FLASH/FLAME and PORFLOW respectively) were used in the 1995 EIS and have subsequently been replaced by the TETRAD simulator.

4. Data Adequacy

Since the 1995 EIS, new monitoring data is available for further refining fate and transport history matching. RWMC data gathered since the 1995 EIS analyses will be crucial in assessing 1995 EIS assumptions. Additional data on point source releases of water to the vadose zone at the INTEC is now available and summarized in the 1997 WAG-3 RI/FS. However, since the WAG-3 INTEC RI/FS changes in key model parameters driving rapid vertical transport (as

discussed in the Idaho HLW & FD EIS) including infiltration (artificial sources of infiltration have been identified and minimized and the Big Lost River has not flowed past INTEC for five years from May 12, 2000 to May 30, 2005) and radioactive decay suggest that 1995 EIS estimates for INL Site boundary concentrations are still bounding. Two INTEC wells show Strontium-90 slightly increasing since the 1995 EIS but still well below MCLs and there is significant uncertainty in the trends as indicated by the small correlation coefficients (SM Stoller, 2004). Recent ground water monitoring data (SM Stoller, 2004) shows that the area of Strontium-90 is approximately the same as it was in 1991. New data demonstrating the effectiveness of in-situ bioremediation in the distal TAN TCE plume is now available (SM Stoller, 2004).

The source term data that was used in the1995 EIS is the same source term data that was used in the 94 Performance Assessment (Maheras et al., 1994). That data came directly from the RWMIS database maintained by the Waste Management organization. Since then, a number of efforts have been made to more accurately characterize some of the remote-handled waste received from TRA and from NRF. This has resulted in another revision to the database. As a result of these changes, the data quality has been upgraded since the1995 EIS. The CIDRA and WILD databases are examples of additional data that is now available for refining source term estimates.

The monitoring results comparing data from the 1995 EIS and maximum monitoring results from 1995 - 1999 are shown in Table 7.3.7.a-1. The table shows decreased contaminant levels for most contaminants across the INL Site. This trend is further validated in the most recent INL Site water quality data (SM Stoller, 2004). The contaminants that show increases are for inorganic salts around the Mud Lake area (not attributable to INL Site actions) and for carbon tetrachloride. The receding or stable plume observation cited in the 1995 EIS is justified given the data set for H-3 and Strontium-90 but problematic for other radionuclides due to sporadic sampling. The CA model calibration ignored the impacts of sporadic and isolated contaminant detections on model parameters. This assumption is reasonable in light of the model's main objective which is to capture the large-scale behavior of contaminants that are consistently detected.

5. Accident Scenarios

One scenario was analyzed in the 1995 EIS in which a HLW tank was postulated to simultaneously release 1,300,000 curies of Strontium-90 in 300,000 gallons of water at the surface. Assuming only meteorological input, the maximum modeled aquifer concentration of 2 pCi/l (MCL=8 pCi/l) occurred in the model 300 years after the release.

The intruder and inadvertent intruder scenarios that were described in the1995 EIS are essentially the same as are currently used in the 2000 PA. The CA uses a different set of exposure scenarios than the PA (in accordance with the DOE guidance on CA development).

6. Accident Probability

While the PA and CA analyses are not inclusive of all activities across the INL Site, they are reasonable approximations until the comprehensive WAG-10 analysis can be completed. These

analyses assume that the intrusion into the facility takes place and analyzes the impact of the intrusion.

7. Cumulative Impacts

The PA (Case et al., 2000) and the CA McCarthy et al., 2000) evaluate doses in a number of different scenarios and in comparison to a number of different criteria. These documents are available in the source documents for the 2005 Supplement Analysis. The all-pathways doses shown below are representative of the maximum calculated dose assuming that no remediation occurs.

Additional analysis may be required to address all of the buried radiological source terms across the site. This analysis will likely be accomplished in the FFA/CO cumulative impacts risk assessment and WAG 10 RI/FS.

The Ancillary Basis for Risk Analysis (ABRA) (Holden et.al. 2002) and the Preliminary Evaluation of Remedial Alternatives (PERA) (Zitnik et.al. 2002) were intended to provide the technical basis for the WAG 7 RI/FS. While not accepted as official regulatory documents, these two documents provide the basis for understanding risk at the RWMC from all CERCLA activities. The ABRA shows that remedial action is needed to meet the CERCLA cleanup objectives for WAG 7. Different cleanup scenarios in the PERA provide varying levels of residual risk dependent upon the remedial action chosen. These documents are being updated to reflect additional data regarding source term information, additional considerations for contaminant mobility and retardation coefficients, and to better understand the costs and risks with the Pit 4 exhumation.

In the near term, the 2000 PA shows a dose to a maximally exposed member of the public from the all-pathways dose of 0.0022 mrem/yr through 2120. This compares to the 1995 EIS which shows a dose of 0.60 mrem/yr through 2060. These time frames and scenarios, previous discussions in this section, and the Idaho HLW & FD EIS data and analysis show that the 1995 SNF EIS projections (out to 2035) are still bounding.

8. Changes in Regulatory Requirements

The primary regulations governing, the Safe Drinking Water Act and the Clean Water Act, have not significantly changed in the previous five years. The designation of the Snake River Plain Aquifer as a sole source aquifer in 1991 did not appreciably change regulatory requirements for INL Site actions. These regulatory requirements have not changed in the previous five years.

The 1994 PA was written to the requirements of DOE O 5820.2A. The 2000 PA was written to DOE O 435.1which replaced DOE O 5820.2A but imposes similar requirements for a PA analysis. The CA is relatively new and the guidelines for it are found in DOE O 435.1. Additionally, the creation of the WAG-10 (site-wide) aquifer characterization unit creates opportunities and issues with respect to the integration and coordination of ground water characterization and remediation strategies.

9. Other NEPA Analysis for INL Site Operations

The Idaho HLW & FD EIS was issued in October 2002 which incorporates WAG 3 RI/FS ground water data and modeling results and presents analyses of the impacts of subsequent mitigation and monitoring and sampling data on lower contaminant fate and transport estimates.

The impacts of the now completed INEEL CERCLA Disposal Facility have been analyzed and found to be insignificant with respect to the impacts described in the 1995 EIS (Holden, et al., 2002 and Zitnik, et al., 2002)

References:

1. Case et al., 2000, Technical Revision of the Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment for Calendar Year 2000, INEEL/EXT-2000-01089, September 2000

2. McCarthy et al., 2000, Radioactive Waste Management Complex Low-Level Waste Radiological Composite Analysis, INEEL/EXT-97-01113, September 2000

4. DOE-ID, 1997, Comprehensive RI/FS for the Idaho Chemical Processing plan OU 3-13 at the INEEL – RI/BRA Report (Final), DOE/ID-10534, Nov. 1997

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9. DOE-ID, 2003a, Performance Assessment for the INEEL CERCLA Disposal Facility Landfill, DOE-ID-10978, August

10. DOE-ID, 2003b, Composite Analysis for the CRECLA Disposal facility Landfill, DOE/ID-10979

11. Maheras, et al., 1994, Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment, EGG-WM-8773, April.

Table 6.3.7.a-1 Summary of highest detected contaminant concentrations in ground water within the INL Site 1995 – 2000 Although this table has not been formally updated, these trends are consistent with recent (through 2003) water quality data (SM Stoller, 2004)

Parameter	Highest detected recent concentration through 2000	Recent boundary concentration through 2000	Highest detected recent concentration through 1995[g]	Recent boundary concentration through 1995[g]	Current maximum contaminant level[g]	Derived concentration guide[g]
Radionuclides in picocuries per liter						
Americium-241	< detection limit (1998)[a]	< detection limit	0.91 (1990)	< detection limit	15	30
Cesium-137	< detection limit (1998)[a]	< detection limit	2,050 (1992)	< detection limit	200	3,000
Cobalt-60	< detection limit (1998)[a]	< detection limit	890 (1987)	< detection limit	100	10,000
Iodine-129	3.82 (1990)[b]	0.00083	3.6 (1987)	0.00083	1	500
Plutonium-238	< detection limit (1998)[a]	< detection limit	1.28 (1990)	< detection limit	15	40
Plutonium-239/240	< detection limit (1998)[a]	< detection limit	1.08 (1990)	< detection limit	15	30
Strontium-90	76 (1995)[c]	< detection limit	640 (1992)	< detection limit	8	1,000
Tritium	25,100 (1995)[c]	310	48,000 (1988)	Background	20,000	2,000,000
Nonradioactive metals in milligrams per liter						
Cadmium	0.002 (1998)[a]	Background	0.0073 (1992)	Background	0.005	Not applicable
Chromium	0.168 (1998)[a]	Background	0.21 (1988)	Background	0.1	Not applicable
Lead	0.02 (1998)[a]	Background	0.009 (1987)	Background	0.015	Not applicable
Mercury	0.0006 (1995)[c]	Background	0.0004 (1987)	Background	0.002	Not applicable
Inorganic salts in milligrams per liter[l]						
Chloride	267 (1997)[d]	Background	200 (1991)	--	250	Not applicable
Nitrate	11 (1995)[c]	Background	5.4 (1988)	Background	10	Not applicable
Sulfate	270 (1995)[e]	Background	140 (1985)	Background	250	Not applicable
Organic compounds in milligrams per liter						
Carbon tetrachloride	0.0072 (2000)[f]	Background	0.0066 (1993)	< detection limit	0.005	Not applicable
Chloroform	0.0012 (2000)[f]	Background	0.951 (1988)	< detection limit	0.1	Not applicable
1,1-dichloroethylene	0.0011 (1996)[f]	Background	0.009 (1989)	< detection limit	0.007	Not applicable
Cis-1,2-dichloroethylene	0.05 (1996)[f]	Background	3.9 (1992)	< detection limit	0.07	Not applicable
Trans-1,2-dichloroethylene	0.02 (1996)[f]	Background	2.6 (1988)	< detection limit	0.1	Not applicable
Tetrachloroethylene	0.046 (1996)[f]	Background	0.051 (1992)	< detection limit	0.005	Not applicable
1,1,1-trichloroethylene	0.0076 (1996)[f]	Background	0.012 (1989)	< detection limit	0.2	Not applicable
Trichloroethylene	0.99 (1996)[f]	Background	4.6 (1992)	< detection limit	0.005	Not applicable

Parameter	Highest detected recent concentration through 2000	Recent boundary concentration through 2000	Highest detected recent concentration through 1995[g]	Recent boundary concentration through 1995[g]	Current maximum contaminant level[g]	Derived concentration guide[g]
Vinyl Chloride	<0.0002[f]	Background	0.027 (1989)	< detection limit	0.002	Not applicable

Note 1: The inorganic salts were detected in wells at the northern portion of the INL Site. This is indicative of agricultural fertilizers used by farmers in the Mud Lake area.

a Bartholomay, Tucker, and others (2000) DOE/ID-22167
b Mann and Beasley (1994) DOE/ID-22115
c Bartholomay, Tucker, et.al. (1997) DOE/ID-22137
d Bartholomay, Knobel, et.al. (2000) DOE/ID-22165
e Bartholomay, Knobel, and Tucker (1997) DOE/ID-22143
f USGS database – www.water.usgs.gov/nwis/, this data is for wells extending into the aquifer
g 1995 EIS, Table 4.8-1

6.3.7 b Water Resources – Surface Water

Summary

Flood hazard characterization in the 1995 EIS was limited to the Mackay dam failure scenario, which is considered to be a bounding accident. Impacts were not rigorously analyzed but structural failures were assumed to be insignificant due to the shallow depth and low flow velocity at the INL Site approximately 45 miles downstream of Mackay reservoir. Because the effects of the Mackay dam failure scenario were assumed to be small, the effects of the 100 and 500-year floods were considered to be insignificant in the 1995 EIS. However, the conservative nature of this flood hazard characterization could result in the inappropriate allocation of resources for risk reduction activities and thus increase the net risk at the INL Site.

Idaho Operations Office Senior Management acceptance and endorsement of the latest (BOR, 2005) Big Lost River flood hazard characterization study will be required to improve the accuracy and defensibility of 100 and 500 year flood plain delineations as required for certain permits (such as RCRA). Senior Management acceptance and endorsement of this study will ensure that the flood risk as described in regulatory submittals will be assessed consistent with flood hazard analysis prescribed in DOE standards. DOE-ID will use the latest study to provide more accurate Flood Plain documentation per 10 CFR 1022, DOE natural phenomena hazards characterization requirements and other regulatory prescriptions. The review determined that the flood plain analysis in 1995 was bounding and adequate for supporting DOE decisions nnounced in the ROD.

Scope of the 1995 Analysis

The water resources section of the 1995 EIS addressed both possible flood hazards and impacts from INL Site operations. These two topics are addressed separately in the 2005 Supplement Analysis.

Section 4.8 of the 1995 EIS addresses the water resources of existing activities on the INL Site, and section 5.8 addresses the estimated impacts from proposed actions. Flood hazard characterization in the 1995 EIS was limited to the Mackay dam failure scenario, which is considered to be a bounding accident. Structural failures were assumed to be insignificant due to the shallow depth and low flow velocity and the low probability of the initiating event. Subsequent flood hazard studies and their implications are discussed in the Idaho HLW & FD EIS.

1. Methodology

Flood Hazard characterization methodology is described in detail in Appendix F-2 in Volume 2 of the 1995 EIS. The primary source for the 1995 EIS flood hazard analysis was the Koslow and Van Haaften (1986) Mackay dam failure analysis. This report relied on the DAMBRK one-dimensional (1-d) flood routing model (developed by the National Weather Service) to simulate 4 scenarios; seismic dam failure, hydraulic (piping) failure of the dam with a 100 year flood,

hydraulic failure with a 500 year flood, and overtopping failure with a probable maximum flood. DAMBRK was validated with data from actual dam failures including the 1976 Teton Dam failure.

This report also included an analysis of local basin snowmelt effects with a combined rain and snowmelt water availability of 2.74 inches per day. This analysis concludes that there is no threat to INL Site facilities from local runoff resulting from the simultaneous occurrence of heavy rains and melting snow. Local basin snowmelt flooding is identified in the 1995 EIS as a problem that can be alleviated through adequate hydrologic design, construction and maintenance. Subsequent analyses for the RWMC provided design parameters for the 100-year precipitation event occurring for 24 hours (Zukauskas, 1992). The 1992 study concluded that minor modifications would result in adequate control of surface water flooding at the RWMC from these events. These modifications have been completed.

Current sub-surface water quality analyses at the RWMC could represent the integrated results of surface water flooding and infiltration. These analyses (the 2000 Composite Analysis and 2000 Performance Assessment for example) and models tend to show limited risks (depending on receptor location) resulting in part from past (prior to facility surface water drainage improvements) RWMC surface water flooding. Similar analyses at TRA and INTEC are complicated by process and other water releases that amplify natural sources of infiltration water. As discussed in the HLW EIS, sources of artificial surface water infiltration are being identified and eliminated. Flow in the Big Lost River that might impact INTEC perched aquifers is controlled by irrigation demands upstream of the INL Site and INL Site Diversion Dam operations (and has not flowed past INTEC for five years), not natural processes.

2. Assumptions

The most heavily weighted assumption underlying the data analyzed in the 1995 EIS is that all the hypothetical risks from flooding would come from structural failure. The total risk from other flood hazard related contaminant migration modes cannot be formulated until the probabilities and magnitudes of the initiator events (floods) are rigorously determined consistent with DOE standards. There are no significant technical barriers to characterizing the INL Site flood hazard risk per DOE standards and in fact a report has been finalized that characterizes the Big Lost River flood hazard for the INL Site (BOR, 2005). Detailed surface water analysis technical assumptions are provided in Appendix F-2 of the 1995 EIS. The Koslow and Van Haaften (1986) study did include sensitivity analyses for the parameters related to dam failure time and breach bottom width, which are responsible for most of the uncertainty in forecasting dam break floods. Variations in Manning's n (a surface roughness estimate assumed to range from 0.030 – 0.060) and flow losses (due to infiltration and net flow away from the main channel assumed to be 40%) result in small changes in peak flood arrival time and flood elevation (0.4 foot increase in flood elevation for a 20% decrease in assumed infiltration rate for example).

The Big Lost River has to make an almost 90 degree left turn at the INL Site Diversion dam in order to continue on to the central part of the INL Site. Without making the left turn, the Big Lost River flows almost straight into the INL Site spreading areas. Modeling the change in Big Lost River flood momentum at the INL Site Diversion Dam is problematic but it was

conservatively estimated that flow into the INL Site spreading areas was only a function of elevation. It is likely that a flow model that fully captures flow momentum would have shown more water entering the spreading areas and reducing the flow onto the INL Site.

Although the actual stability and probability of failure of the Mackay dam under the different scenarios is unknown, it was assumed in this conservative calculation that the probability of failure under each of these conditions is 1.

3. Analytical methods

The 1986 Koslow and Van Haaften study used in the 1995 EIS relied on 1-d hydraulic models of dam failure assigned a probability of 1, subject to loads with varying probabilities. Although the DAMBRK code used by Koslow and Van Haaften (1986) is 1-d, it is more dynamic than most 1-d codes. DOE standards (as well as the rigorous computation of risk) require that explicit probabilistic formulation of flood hazard frequencies (including the propagation of uncertainty) be computed for each potential flood hazard mode (river flooding dam failure, surface run-off, etc.). Thus, the 1986 Mackay Dam failure analysis provides extremely conservative frequency estimates for flooding events because the probability of dam failure under all scenarios is assumed to be 1.

Subsequent flow frequency estimates (such as the USGS WRI 96-4163 report) obtain 100 and 500-year flow estimates by assigning a probability of 1 for various events with extremely small real probabilities. The U.S. Bureau of Reclamation (BOR) completed a fully probabilistic flood hazard analysis of the Big Lost River consistent with DOE standards (Ostenaa, et al., 1999). Multiple INL Site reviews of this study are documented in the Idaho HLW & FD EIS project files. The defensibility of this study is also demonstrated by publication in the peer-reviewed literature of four articles resulting from this work. Summaries of the USGS and BOR work are presented in the HLW & FD EIS. Additional work by the USGS (Hortness and Rousseau, 2003) and the BOR (U. S. BOR, 2005) to evaluate flow frequency estimates has been completed. The 100-year flow estimates for these reports (BOR=3,072 cfs, USGS = 3,740 cfs) is not significantly different.

4. Data adequacy

The flood hazard data in the 1995 EIS is bounding and adequate for supporting the ROD. The DAMBRK 1-d code establishes flood flow levels in the context of deterministic dam failure modes, 1-d flow, and low-resolution topographic contour data. Given these limitations, this analysis establishes conservative bounds appropriate for the 1995 EIS but less appropriate for site-wide programmatic decisions dependent on flood hazard estimates. Programmatic options for flood hazard mitigation should be analyzed. The first element in such an analysis is the determination of the combined mean flood hazard in a probabilistic context per DOE standards as determined for the Big Lost River flood hazard component in BOR 2005.The BOR INL Site flood hazard characterizations (Ostenaa, 1999 & BOR, 2005) meet all NRC and DOE QA/QC requirements and is the only study consistent with the DOE flood hazard characterization standards. In addition to extensive INL Site and external peer review, the BOR analyses incorporates Big Lost River stream gauge data, paleohydrologic data, extensive radiocarbon

dating, 2-d hydraulic modeling to develop flow estimates constrained by high resolution geologic and radiocarbon data, statistical analyses incorporating Bayesian updating and maximum likelihood functions, and extensive sensitivity analyses. All of these elements are consistent with or required by DOE standards. The BOR studies also avoid the effects of system regulation, which complicate traditional flow frequency analyses by extending the hydrologic record into pre-historic times. The depth, frequency, and quality of independent review of the BOR reports is documented in the Idaho HLW & FD EIS project files.

The BOR report also uses new geomorphologic data to establish that the "outburst flood" was in fact either much less in magnitude than previously thought and/or occurred at a much earlier time (over 100,000 years ago).

USGS WRI 96-4163 (Kjelstrom and Berenbrock, 1996) attempts to mitigate the effects of reservoir regulation of the Big Lost River by using an ad hoc technique based on conservative assumptions. In particular the assumption that all 22 upper subbasins empty instantaneously at the Arco gauging station and that no flood water is lost from Arco to the INL Site diversion dam is not supported by factual observations and lack quantitative assessments regarding the impacts of these assumptions on the uncertainty in flow frequency estimates. While reviewed internal to the USGS, WRI 96-4163 has no documented external review associated with it. This, as well as other limitations, has led the USGS to propose and complete additional work (Hortness and Rousseau, 2003) to refine their previous flow frequency estimates. The Ostenaa (1999) 100-year flow is 2,917 CFS while the USGS (Kjelstrom and Berenbrock, 1996) 100-year flow is 7,260 CFS. The BOR 20,000 year flow is 5,012 CFS. The present capacity (based on a geotechnical analysis using tensiometer and standard penetration test data) of the INL Site diversion dam is 6,000 CFS (factor of safety = 1.91). The INL Site diversion dam is not certified as a flood control structure and is therefore numerically "erased" for FEMA type flood plain modeling.

Recent BOR (BOR, 2005) and USGS (Hortness and Rouseau, 2003) estimates for the 100-year flow (BOR=3,072 cfs, USGS = 3,740 cfs) have converged and are not statistically distinct.

Two-dimensional (2-d) flow models are required to understand flood impacts on the INL Site. Previous 1-d models conserve flow between cross sections or rely on infiltration only to account for flow losses. The topography and irrigation diversion system of the Big Lost River suggest that 2-d flow models would show that there are significant flow losses in the reach from the Mackay Dam to the Big Lost River sinks. Scenarios and codes for 2-d modeling have to be carefully chosen and include; flows for return periods determined in a combined probability context (per DOE standards), robust sensitivity analyses reflecting the uncertainty of the data and parameters, sufficient memory for large scale high resolution model development, realistic viscosity terms, and initial and final conditions consistent with site geomorphology.

5. Accident Scenarios

No significant accident analysis scenarios in the 1995 EIS were related to flooding. Potential ground water impacts of flooding at the INTEC are addressed in the Idaho HLW & FD EIS.

6. Accident Probability

DOE requirements for flooding analysis are based on flood return frequencies. Thus the probabilities for these floods have not changed.

7. Cumulative Impacts

There were no cumulative impacts identified with surface water identified in the 1995 EIS. The potential cumulative impacts of INL Site management of Big Lost River flow in the INL Site should be systematically analyzed and managed. The cumulative effects of surface water flow (natural and artificial) could be reflected in water quality and modeling results from INL Site facilities. Flood hazard mitigation, RWMC subsurface contaminant migration and INTEC perched aquifer impacts on the Snake River Plain aquifer could be optimized by systematically alternating the diversion of Big Lost River flows at the Diversion Dam to the INL Site spreading areas with periods when flows are allowed to continue downstream. The primary risk to the Snake River Plain aquifer identified in the WAG 3 RI/FS was due to effects of Big Lost River infiltration on INTEC perched aquifers. While closing the Diversion Dam head gates would mitigate this risk, recent studies have shown that this action would increase water mobility and infiltration at the RWMC.

The mitigating factors with respect to these risks include: high impact floods are likely to have extremely low probabilities; the INL Site is an internal drainage system; and the nature of flooding and peak flood arrival times is likely to have no impact on RCRA facilities (Guymon to Kelly, 1/18/01, EDF 1747) or allow for hours or days of time to prepare for a flood peak arrival.

8. Changes in Regulatory Requirements

There has been no change since 1995 in any of the statutes, but the RCRA regulations have continued to become more specific regarding flooding information in permit applications.

Recent RCRA Permit Applications have included USGS preliminary estimates of the 100-year flood plain and the State of Idaho has asked for certification that RCRA activities are or are not in the 100-year flood plain. In response to this request, the site prepared an engineering design file and analysis (EDF-1747) showing that the Koslow and Van Haaften (1986) 100 year flow and failure of the Mackay dam and resulting flow (24,870 cubic feet per second) and elevation at the INTEC (4,916 feet) did not washout critical RCRA related structures. This response to the State (Guymon to Kelly, 1/18/01, CNN 017515) also notes that studies are ongoing to more rigorously delineate the INL Site 100-year flood (see BOR, 2005).

Several environmental characterization activities required to meet regulatory requirements (such CERCLA) require the delineation of the 100-year flood plain per Federal Emergency Management Agency (FEMA) approved methodology. Several points should be made with respect to the FEMA type 100-year flood at the INL Site. First, there is no recognized procedure for determining a 100-year flood in a regulated system (see Hydrology Subcommittee, Bulletin 17-B). The Big Lost River is regulated for irrigation purposes. Second, the DOE standards are clear that USGS/FEMA type 100-year flood analyses are to be treated as screening analyses indicating the need for more thorough characterization. Third, 100 and 500-year floods have to

be determined in the context of DOE standards which require the delineation of flood hazards with a combined probability of 10E-5 (100,000 year return period) for high hazard facilities such as the Advanced Test Reactor. The most recent NE-ID flood hazard study (BOR, 2005) meets these requirements in the most defensible manner given the complications associated with the contradiction between FEMA requirements and the fact that regulation of the Big Lost River precludes the application of FEMA methodology for determining the 100-year flood.

This last point is critical and suggests the difficulties with establishing unreasonably conservative 100-year flood estimates and the advantages of using the geologic record to establish low frequency flow bounds. Recently, DOE re-issued 10 CFR 1022 (DOE requirements for meeting the Executive Order on Flood Plain mitigation) to allow the use of DOE characterization requirements for determining the 100 and 500-year flood plains.

An additional and most important consideration in performing and assessing flood hazard characterization methods involves the rational allocation of resources. Rigorous risk assessments cannot be performed in the absence of defensible hazard probabilities. The use of conservative or indefensible hazard probabilities could shift scarce resources away from real risk reduction and into the mitigation of less rigorously determined risks. Thus, increasing the net risk to the environment, workers, and public.

The recent water supply issues and water law invocations that have threatened eastern Idaho water rights are not expected to impact the INL Site due to the fact that it is a Federal Water Right, dating back to 1949, the withdrawal volumes are much less than what the water right allows.

9. Other NEPA analysis for INL Site Operations

The WAG 3 RI/FS has been completed for the INTEC. The Idaho HLW & FD EIS incorporates WAG 3 RI/FS surface water/ground water interaction modeling results (by reference). Impacts of Big Lost River flow and flooding on the INTEC perched aquifers and Snake River Plain aquifer have been identified in the WAG 3 RI/FS as a potential concern. The WAG 10 RI/FS will also provide data and analyses pertaining to site wide water issues.

References:

1. Koslow, K. N. and Van Haaften, D. H., "Flood Routing Analysis for a Failure of Mackay Dam", EGG-EP-7184, dated June 1986.

2. Zukauskas et.al, 1992, "Conceptual Design for Surface Water Drainage Control Upgrades for the RWMC Watershed and the Transuranic Storage Area, EEF-ESQ-9994, EG&G Idaho, Inc., August

3. Kjelstrom and Berenbrock, USGS, "Estimated 100-Year Peak Flows and Flow Volumes in the Bid Lost River and Birch Creek at the Idaho National Engineering Laboratory, Idaho", WRI 96-4163, dated 1996

4. Ostenaa, D. A., "Phase 2 Paleohydrologic and Geomorphic Studies for the Assessment of Flood Risk for the Idaho National Engineering and Environmental Laboratory, Idaho", Report 99-7, dated 9/16/99

5. Letter, R. H. Guymon to K. B. Kelly, "Response to Department of Environmental Quality Request for Additional Floodplain Information for the Idaho National Engineering and Environmental Laboratory", CCN 017515, dated 1/18/01

6. Hydrology Subcommittee, "Guidelines for Determining Flood Flow Frequency", Bulletin #17B, PB86-157278, dated 3/82

7. Hortness and Rousseau, 2003, Estimating the Magnitude of the 100-Year Peak Flow in the Big Lost River at the INEEL, Idaho, USGS, WRI-02-4299

8. BOR, 2005, Big Lost River Flood Hazard Study, Idaho National Laboratory, Idaho, U. S. Bureau of Reclamation

6.3.8. Ecology

Summary

The actions and alternatives analyzed in the 1995 EIS that have been implemented have had little or no impact on ecological resources. Also, if effective re-vegetation and non-native invasive plant species control techniques are implemented, the actions and alternatives analyzed in the EIS would have minimal impact on site ecology. Presently, the INL Site is revegetating disturbed areas and implementing noxious weed control. DOE continues to evaluate the effectiveness of those actions. The impacts of emergency actions related to fire, fire suppression, and additional threat of permanent habitat conversion caused by non-native invasive plant species are the main sources of ecological impacts on the INL Site. No additional analysis with regard to planned DOE actions identified in the 1995 EIS is required.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INL Site, or decisions deferred in the ROD and not yet implemented, will require additional analysis for this discipline.

There have been no impacts resulting from planned DOE actions that were not accurately anticipated and analyzed in the 1995 EIS or subsequent NEPA documentation. Traffic, noise and emissions from generators, night-lights and artificial water sources, have not exceeded that analyzed in the EIS. The potential for re-suspension of radionuclides caused by wildfires was evaluated in the Wildland Fire EA. DOE actions analyzed in the 1995 EIS and implemented by DOE have not contributed to the extent or intensity of wildfires. Based on environmental monitoring results, there is no evidence that INL Site related contamination is having an adverse impact on populations of plants and/or animals.

Scope of 1995 Analysis

The ecological resources of the INL Site are described in Section 4.9 of the Affected Environment Chapter of the 1995 EIS. Section 4.9 is divided into descriptions of INL Site flora, fauna, threatened, endangered and sensitive species, wetlands and radioecology. The impacts of implementing spent nuclear fuel management and environmental restoration and waste management alternatives on the ecology of the INL Site are analyzed in Section 5.9 of the Environmental Consequences chapter of the 1995 EIS.

Changes in the Environmental Discipline

1. Methodology

Because DOE expected existing major facility areas, such as RWMC, to be most affected by the alternatives analyzed, the "biotic resources" in those areas were emphasized in the 1995 EIS in Sec. 4.9 description. Because some species are mobile, such as pronghorn, biotic resources for the entire INL Site were briefly described. The 1995 EIS Sec. 5.9 analysis is qualitative, and focuses on potentially affected areas such as sites and facilities to be used, constructed, or remediated and surrounding habitat where effluents, emissions, light, or noise may be present.

For actions analyzed in the 1995 EIS, nothing has occurred which indicates the methodology used is inadequate or inaccurate. There have been no impacts or conditions resulting from actions analyzed in the 1995 EIS that exceeded the expected impacts. The methodology used is adequate and accurate

2. Assumptions

Assumptions were not stated but it was expected that locations analyzed in the 1995 EIS, such as landfill expansion, would take place adjacent to the existing landfill and that what became the AMWTP would be constructed on undisturbed land outside of existing major facilities.

The general assumption regarding the location of facilities and other actions evaluated in the 1995 EIS appear appropriate and reasonable.

3. Analytical Methods

The method of analysis was based primarily on acres disturbed by each alternative. Other impacts identified were those occurring from vehicular traffic, the noise and emissions of generators, night-lights, artificial water sources, re-suspension of radionuclides and remediation of contaminated areas. Methods used to determine impacts to ecological resources are appropriate and reasonable.

4. Data Adequacy

The data concerning the occurrence and distribution of flora and fauna, threatened, endangered and sensitive species and existence of wetlands was adequate. There was limited information on

the deposition or accumulation of radionuclides and contaminants such as mercury in soils. Long-term monitoring data indicated no impacts to wildlife at the individual or population level. Some changes in species populations and distribution have occurred since 1995.

Sage Grouse populations continue to fluctuate with a declining trend throughout Western U.S. and on the INL Site. There has also been extensive reduction of the sagebrush steppe vegetation type in Eastern Idaho and on the INL Site due to wildland fires, development, and encroachment of invasive plant species. Wolves belonging to an experimental, non-essential population continue to expand their range and undocumented sightings on the INL Site have occurred. Though major changes have occurred as a result of fire and loss of Sage Grouse habitat, none of the change resulted from, or was affected by, the alternatives analyzed in the 1995 EIS. Because of these changes, the 1995 EIS is now inaccurate with regard to certain aspects of the data, but is not inadequate for identification of impacts within the scope of its analysis

5. Accident Scenarios

No change. The impacts of accidents to the ecology of the INL Site and region were not analyzed in the 1995 EIS. It can be assumed, however, that a large, high consequence accident would have an impact on the flora and fauna within the accident zone.

6. Accident Probabilities: No change.

7. Cumulative Impacts

Cumulative impacts on Ecological Resources are analyzed in the 1995 EIS in Section 5.15.6. This Section states that the types of cumulative impacts on ecological resources would be the same for all alternatives. That is, impacts would result primarily from land disturbance, which would cause lost productivity, reduced biodiversity, displacement from disturbed habitat, and habitat fragmentation.

DOE planned actions and alternatives analyzed in the 1995 EIS that have been implemented have had little or no impact on aspects of the ecological environment considered in the 1995 EIS. As such, the actions analyzed in the 1995 EIS have minimal incremental impacts of a cumulative nature which have contributed to loss of productivity, reduced biodiversity, or habitat fragmentation. The primary ecological impact from all DOE activities on the INL Site is the result of not having an effective re-vegetation and invasive plant species management program. The 1995 EIS did not anticipate or consider the effects of wildfire and fire suppression. Since 1995, wildfire and the effects of response actions on the INL Site, such as constructing fire breaks, has had a much greater effect on habitat and ecological potential than planned DOE actions. Fire is natural and habitat recovery from fire through transitional stages is normal where the environment has not been altered. The presence of invasive plant species presents a risk of permanent conversion of vegetation and habitat type from sagebrush steppe to cheatgrass. The lack of successful re-vegetation of native species at locations where DOE activities on the INL Site disturb soil is becoming a more serious problem and needs to be addressed before those impacts become significant.

8. Changes in Regulatory Requirements

There have been no changes in regulations pertaining to ecological resources that would affect the environmental baseline or analysis of impacts. However, two separate activities have been taking place with respect to listing species under the Endangered Species Act (ESA) that could affect the INL Site. In December of 2003, several environmental groups submitted a petition to the US Fish and Wildlife Service (the Service) to list the Greater Sage Grouse. In January 2005, the Service determined the Greater Sage Grouse does not warrant listing under the ESA. Immediately thereafter, the Institute for Wildlife Protection issued a notice of intent to sue the Service for violating the ESA. In addition, a petition to list the Pygmy Rabbit under the ESA has also been submitted to the Service. The Service has agreed to decide by May 16, 2005, if threats to the North American pygmy rabbit warrant a yearlong review that could lead to protection under the Endangered Species Act. The agreement came in a settlement of a U.S. District Court lawsuit by environmental groups that contended the Service had refused to consider their petition for protection of the rabbit. If Sage Grouse or Pygmy Rabbit were listed, it would affect land management and use on the INL Site. It is not expected that ongoing operations within fenced facility boundaries would be affected.

9. Other NEPA Analyses for INL Site Operations

DOE prepared two environmental assessments that affect ecological resources outside facility fences. They are the Environmental Assessment and Plan for New Silt/Clay Source Development and Use at the Idaho National Engineering and Environmental Laboratory, DOE/EA-1083 and the Idaho National Engineering and Environmental Laboratory Wildland Fire Management Environmental Assessment, DOE/EA-1372. The silt/clay source development EA analyzed impacts for borrow sources available on the INL Site. The Wildland Fire EA analyzed the effects of different strategies for pre-fire activities, fire suppression activities, and post fire activities. Both documents stress restoration activities to reduce long-term impacts to ecological resources on the INL Site. Other activities outside facility fences have been evaluated by the CERCLA process and DOE's internal NEPA process (categorically excluded activities). Restoration requirements have been included in the requirements for those activities including re-vegetation and invasive plant species control.

References:

1. Environmental Assessment and Plan for New Silt/Clay Source Development and Use at the Idaho National Engineering and Environmental Laboratory, DOE/EA-1083

2. Idaho National Engineering and Environmental Laboratory Wildland Fire Management Environmental Assessment, DOE/EA-1372

3. Idaho National Engineering and Environmental Laboratory Site Environmental Report Calendar Year 2003 dated September 2004

4. Federal Register, Vol. 70, No. 8, January 12, 2005, Endangered and Threatened Wildlife and Plants; 12 month finding for Petitions to List the Greater Sage Grouse as Threatened or Endangered

6.3.9. Noise

Summary

Noise impacts to the public are bounded by the 1995 EIS because all factors contributing to noise levels have decreased. Noise impacts to site workers are considered to be mitigated by OSHA standards, which require the use of hearing protection for noise above 85 dBA. Noise impacts to wildlife have been previously studied and determined to have no deleterious effect on wildlife productivity.

Scope of the 1995 Analysis

Section 4.10 of Volume 2 Part A of the 1995 EIS described the INL Site-related noise of public significance occurring during 1995. That section also provided noise levels from other source not related to INL Site activities to help the public put noise levels into perspective. Section 5.10 of Volume 2 Part A of the 1995 EIS analyzed the effects of INL Site-related noise of public significance stemming from buses, trucks, private vehicles, helicopters, freight trains, air cargo and business travel, industrial operations, and construction activities for all of the alternatives. The methodology used in the 1995 EIS was to describe how far facilities were from public receptors; thus justifying that the only impact to the general public was from transportation noise. Transportation of the operations workforce stationed at the site to and from the site and waste and spent fuel shipments were considered to be the largest contributors to noise impacts to the public. Noise impacts to workers were considered to be mitigated by OSHA requirements. The operations workforce stationed at the site (i.e. transportation impacts) was assumed to be lower than the baseline for all years for all alternatives. Therefore, there would not be an increase of noise impacts over the baseline from the operations workforce traveling to and from the site. Waste and spent fuel shipments were determined to be infrequent and indistinguishable from any other public transportation noises. Noise impacts from railroad and aircraft traffic were determined to be negligible. No environmental impact due to noise was expected from any of the alternatives.

Changes in the Environmental Discipline

1. Methodology – No change
2. Assumptions – No change
3. Analytical Methods – N/A
4. Data Adequacy – N/A
5. Accident Scenarios – N/A
6. Accident Probabilities – N/A
7. Cumulative Impacts – N/A
8. Changes in Regulatory Requirements – N/A
9. Other NEPA Analysis for INL Site Operations – N/A

Analysis

A qualitative analysis was completed by comparing the numbers and types of sources of transportation noises identified in the 1995 EIS to current sources. A re-evaluation of noise impacts to the public is not warranted based on the following and shown in the chart below:

- The number of INL Site employees has remained at or below the number estimated in the 1995 EIS.
- The number of INL Site bus routes to and from the site has decreased in number since 1995.
- Commercial vehicle and other vehicle mileage, as measured traveling to and from the site, has decreased since 1995.
- There is a four-day workweek for site workers instead of a five-day workweek which reduces transportation noise.
- Shipments of transuranic waste, low-level waste, and spent nuclear fuel have been lower than predicted in the1995 EIS.
- The INL Site no longer has helicopters, eliminating noise impacts.

Table 6.3.9-1 Noise Factors

Noise Factors	1995 EIS	2004
Site Employees	5,000	4,852
DOE Bus Routes	300	64
Other DOE Vehicles	9,183,1000 miles traveled	6,153,406 miles traveled
Commercial Vehicles	905,900 miles traveled	268,850 miles traveled

The primary noise impact to the public from the INL Site operations is from transportation activities. There have been a number of decreases in transportation activities since 1995. As such, the 1995 EIS provides a bounding analysis for the environmental impacts of noise to the public.

The primary noise impact to INL Site workers is operational activities. Noise limits for the workplace are established to protect workers in accordance with OSHA standards. Site workers are required by OSHA to wear ear protection devices when exposed to noise levels above 85 dBA on an eight-hour time-weighted average. Therefore, noise impacts to workers are considered to be mitigated by OSHA standards.

Previous studies of the effects of noise on wildlife indicate that even very high intermittent noise levels at the INL Site (over 100 dBA) would have no deleterious effect on wildlife productivity (Leonard 1993).

References

1. INEEL Headcount by Organization Report for Calendar Year 2004, November 2004

2. Leonard, P.R., 1993, "Air Resources," in Irving, J.S., Environmental Resource Document for the Idaho National Engineering Laboratory, Volume 1, EGG-WMO-10279, EG&G Idaho, Inc., Idaho Falls, Idaho, July

3. CFR (Code of Federal Regulations), 1992, 29 CFR 1910.95, "Occupational Noise, Exposure," Office of the Federal Register, Washington, D.C

4. 2005 Supplemental Analysis, Traffic and Transportation Analysis, Section 6.3.10

6.3.10. Traffic and Transportation

Summary

Existing analysis is adequate because the total number of shipments to the INL Site is over 8 times less than was analyzed in the 1995 EIS. The number of shipments expected in the upcoming years will be well within the 1995 EIS estimates.

Total radioactive shipments estimated in the 1995 EIS (10 years) 17,145
Total actual radioactive shipments FY 1996-2004 (9 years) 2,087

Total vehicle miles traveled in 2004 of 9,062,129 are also lower than the estimated annual mileage of 16,157,200.

Analysis

Transportation analysis of all four alternatives was performed in sections 4.11 and 5.11 in the 1995 EIS. Each of the alternatives provided analysis of associated shipments for that alternative.

The selection of a specific alternative or a change in the time frame for the alternative would have little or no affect on specific characteristics (external dose rate, route of travel, etc.) of individual shipments since these items are controlled by federal regulations.

Transportation impacts can be radiological (involving exposure to or release of radioactive material) or non-radiological (physical impacts resulting in injuries or fatalities). Non-radiological impacts are independent of the cargo and depend primarily on routing, accident rates for selected routes, and number of shipments. Radiological impacts can be accident impacts or non-accident impacts. Non-accident impacts are primarily a function of the external dose rate from the shipping container, routing (which includes distances and population densities), and the number of shipments. Accident impacts depend on the physical/chemical/radiological characteristics of the cargo, routing, number of shipments, accident severity, release fractions, atmospheric dispersion, population densities and other pathway factors.

Changes in the Environmental Discipline

Alternative B of the 1995 EIS provides estimated number of shipments for a number of options (potential shipping destinations) that have not been utilized to date. This is not to say they will not be utilized in the future, but rather that to date there have been no actual shipments on which to base a comparison. For those options and categories that have been utilized, a comparison is made to the option B estimates to determine that actual shipments (a shipment consists of all material on one shipping paper, bill of lading, or manifest) are within the estimates. The estimated number of shipments for Alternative B was obtained from the 1995 EIS tables 5.11-4 and 5.11-5, and compared to the actual number of shipments from the past year. The 1995 EIS tables show estimates for making both 100% of the shipments by truck and for making 100% of the shipments by rail. The actual shipments shown are 100% by truck.

The 1995 EIS provides estimated annual vehicle miles traveled by DOE vehicles. A comparison is made to the estimates from table 4.11-2 of the 1995 EIS, to the actual miles traveled by DOE vehicles in 2004 as obtained from BEA's Fleet Management's Transportation Information Management System (TIMS), to determine that actual miles traveled are within the estimates. The 2004 miles represent all miles for DOE vehicles regardless of the facility, project, or operation they were supporting.

Table 4.11-2 of the 1995 EIS also provides the miles driven per year, related to SNF, ER, HLW, and WM, by commercial vehicles as 905,900 miles total. As means of comparison, based on DOE Enterprise Transportation Analysis System (ETAS), in the year 2004 there were 2,174 commercial vehicles that delivered and or picked up material in connection with all INL Site operations. This mileage represents all mileage for all BBWI programs, projects, and facilities at the INL Site, not just those within the scope of the EIS. This includes express carriers (such as Federal Express, Air Borne Express, and UPS) for hire carriers (such as TRISM, Yellow Freight, and Consolidated Freight, City Express), vendors (such as Gas House, Bangs Office Supply, and Bowen Petroleum) and house hold movers and air-ride vans (such as United Van Lines and Wheaton Van Lines). Most of these commercial vehicles are involved in delivering materials where the INL Site would be only one of numerous customers to whom deliveries are made on any given day/trip. Accordingly, related to the INL Site, miles driven per vehicle would be the distance from their dispatch points in the surrounding communities to the INL Site and return to their dispatch point. The dispatch points for virtually all the commercial vehicles are located in Idaho Falls (55 miles from the Central Facilities Area) or Pocatello (60 miles from the Central Facilities Area). The INL Site related commercial vehicle miles traveled last year can be approximated by multiplying the number of commercial vehicles that delivered to and or picked up material from the INL Site by the average round trip miles from dispatch point to the INL Site delivery point, and return, or:

(2174 commercial vehicles) X (120 miles) = 268,880 commercial vehicle miles

Table 6.3.10-1 Vehicle miles traveled for traffic related to the INL Site

Type of vehicle	Miles traveled per year Estimated from EIS	Actual in 2004
DOE Busses	6,068,200	2,639,873
Other DOE vehicles	9,183,100	Light vehicles 5,827,080 Trucks 326,326 Total 6,153,406
Commercial vehicles	905,900	268,850

The comparison shows that the miles traveled per year by DOE vehicles and commercial vehicles in relation to the INL Site are well within the original estimates used for the EIS.

The 1995 EIS considers only radioactive shipments connected to SNF, ER, and WM projects, for the transportation analysis. To provide comparison, the number of radioactive shipments from all projects and facilities over a nine-year time period was obtained from the DOE Enterprise Transportation Analysis System (ETAS) and is provided for comparison EIS. Table 6.3.10-2 below compares the estimated number of radioactive shipments from the EIS specific to SNF, ER, and WM and compares that number to the actual number of radioactive shipments from all programs, projects, and facilities per year (per ETAS) times 1.1.

Table 6.3.10-2 Total Radioactive Shipments

EIS Estimate for specific operations from table 5.11-4, 5,381 shipments (a ten year estimate) plus (+) Table 5.11-5, 7,058 shipments (a 40 year estimate adjusted to a ten year estimate, 7,058 divided by 4) 7,058 divided by 4 = 1,764 (5.11-5 10 year total) + 15,381 (5.11-4 10 year total) = 17,145. Radioactive shipments from the 1995 EIS tables 5.11-4 & 5.11-5 (10 year time frame) = 17,145
Actual radioactive shipments for all programs projects and facilities for the following years. 1996 = 299 1997 = 331 1998 = 278 1999 = 167 2000 = 180 2001 = 102 2002 = 29 2003 = 280 2004 = 421 ------ actual 9 year total 2,087 Total shipments for the nine year time frame = 2,087 Times 1.1 to make it comparable to the EIS 10 year time frame = 2,295

This figure includes TRU waste shipments to WIPP, mixed waste shipment from Sandia, mixed waste shipment from Paducah, mixed waste shipments to Treatment/Storage/Disposal (TSDs), long haul shipments, and miscellaneous shipments to Massachusetts, Pennsylvania, New Jersey, Maryland, Tennessee, South Carolina, Louisiana, Oklahoma, Texas, Colorado, California, and Washington (shipments include samples, sources, instrumentation, empty packagings, etc.)

The comparison shows that the total number of radioactive shipments, over a nine-year period, for all programs, projects, and facilities is well within the original estimates used for the EIS.

References:

1. DOE-AL Enterprise Transportation Analysis System

2. Transportation Management System (TIMS)

6.3.11. Health and Safety

Summary

The INL Site conditions, data, and methodology used in the 1995 EIS remain valid with the exception of the four air pollutants discussed later in this section. The type and scope of work

performed at the INL Site has not changed significantly from 1995 to 2005. However, as part of the Idaho Closure Project and the ongoing Environmental Management mission, the Department has completed several and initiated additional projects at the INL Site to reduce or better manage the sites radioactive material inventory and therefore reduce the potential environmental exposure. These projects include the removal of 3100 cubic meters of transuranic waste from the Radioactive Waste Management Complex to the Waste Isolation Pilot Project, removal of the Three Mile Island Fuel from the Storage Pool at the Test Area North Facility and the subsequent draining of the TMI Fuel Pool, Draining of the Fuel Storage Pool at the Power Burst Reactor and the Materials Test Reactor, D&D activities at the INTEC Facility, removal of contaminated topsoil from the Auxiliary Reactor Area, and the initiation of waste retrieval operations at the RWMC PIT 4 Accelerated Retrieval Project.

Ground water impacts from the INL Site have been reduced as a result of clean-up activities at the various INL Site facilities. However, these impacts have not been fully incorporated into an INL Site composite analysis. The 2003 RWMC Composite Analysis continues to show impacts from that facility are still bounded by the 1995 EIS.

The Department, through its contractors, continues to maintain a high level of attention on worker health and safety in the sites ongoing operations. The major safety indicators, radiation exposure and work accident rates, have shown an overall downward trend during 1995 to 2004. The Department mandated a comprehensive Integrated Safety Management System for all nuclear operations. The emphasis on safety has grown with the codification of the requirements for Radiation Safety, Quality Assurance, and Nuclear Safety into the United States Code of Federal Regulations. The Department's safety and health requirements will be increased with the inclusion of the Occupational Safety and Health requirements into the code of federal regulations. The final rule, 10 CFR 851, is expected to be issued in fiscal year 2006.

As noted above, emissions of hazardous air pollutants were greater than estimated for four pollutants; the resulting maximum concentrations for those pollutants were below any regulatory threshold requiring additional controls. As a result, the analysis concluded there are no adverse health impacts to the public from these pollutants.

The analysis in the 1995 EIS was adequate for DOE decisions announced on projects and activities within the scope of the 1995 EIS. Future DOE decisions on major federal actions on the INL Site, or decisions deferred in the 1995 EIS, will require additional analysis for the specific disciplines.

Scope of 1995 Analysis

The 1995 Health and Safety analysis was completed for the proposed alternatives involving radioactive and non-radioactive hazards at the INL Site. This analysis is found in the 1995 EIS in sections 4.12 and 5.12. The analysis was conducted using consensus standards on health effects for exposure to ionizing radiation including International Council on Radiation Protection (ICRP) and National Council on Radiation Protection (NCRP) guidance.

Worker Risk Analysis - Radiological Hazards

The methodology used to calculate latent health effects to members of the public and the INL Site workforce is consistent with the National Council on Radiation Protection and Measurements guidance as well as other Federal Agencies. Personnel Dosimetry Data on monitored individuals at the INL Site indicate a general decline in individual and collective radiation exposures. The regulations contained in 10 CFR 835 "Occupational Radiation Protection," require operations involving radioactive materials to be conducted while maintaining radiation exposure As-Low-As-Reasonably-Achievable (ALARA). This requirement and operational philosophy results in a general decline in occupational exposure, however, as work scope changes it is natural to expect radiation exposures to vary with the complexity of the work. The worker exposures include direct radiation and internal radiation exposures due to work activities at the INL Site. Table 6.3.11-1 illustrates overall trends in radiation exposures.

Table 6.3.11-1 INL Site Personnel Exposure Trends[a]

Year	Number of People Monitored	Number of People with Measurable Dose	Total Effective Dose Equivalent (TEDE) (person-rem)	Average TEDE (mrem)
1991	7,402	1,273	177.1	139
1992	6,967	1,223	104.7	86
1993	7,322	1,424	252.9	178
1994	6,006	1,659	236.7	143
1995	5,984	1,501	284	189
1996	5,753	1,299	164.1	126
1997	6,424	1,141	115.3	101
1998	5,075	743	64.9	87
1999	8,885	729	48.3	66
2000	10,161	1440	64.8	45
2001	8834	1088	106.6	97.9
2002	6768	1089	76.0	69.8
2003	3639	986	64.0	56.1
2004	3363	1154	87.6	76.8

a INL Site Radiological Dosimetry Program

The table illustrates a significant reduction in (TEDE) since 1995 in occupational radiation exposure. This is explained by an increased awareness in the planning of radiological work, monetary incentives to reduce occupational exposures, and the adoption of the integrated safety management program. Increase in TEDE for 2001 to 2003 are reflected by the increase in radioactive waste shipments from the state and the Idaho Completion Project's acceleration of clean-up activities at the INL Site. It should also be noted that no DOE or INL Site Administrative Control Limits were exceeded during this period.

Other NEPA Analysis for INL Site Operations – The Secretary of the Department of Energy directed several changes to Safety and Health Programs, including the Integrated Safety

Management Program and a revision to DOE Order 5400.5 to implement the Secretary's moratorium on the release of materials with residual contamination.

Worker Risk Analysis – Non-Radiological Hazards

The common non-radiological hazards encountered at the INL Site include work with chemical agents, Heat/Cold Stress, industrial hygiene considerations, and ergonomic considerations. Implementation of worker safety programs such as the Department's Integrated Safety Management program and the Voluntary Protection Program have improved the INL Site's safety posture. It is the conclusion of this review that the 1995 EIS continues to provide an appropriate bounding analysis of the non-radiological hazards at the INL Site.

1) Air Emissions

There are four pollutants that exceeded the baseline established in the 1995 EIS. The health effects of these pollutants show that they are well below established emissions standards. The existing analysis does not show any adverse impacts from air emissions at 50 km. Because the most significant emissions sources analyzed in the 1995 EIS are no longer in operation, cumulative impacts overall and associated air pathway risks are less than anticipated in the 1995 EIS. In addition, given the anticipated air pollution control methods required, the Pu-238 Consolidation Project is not anticipated to add significantly to air impacts. Some impacts to air resources would occur if a potential explosives test range were constructed and operated on the INL Site. Air impacts would potentially include particulates and unburned explosives.

2) Injury/Illness Rate for 1996 – 2005

There were 1,375 reportable Injury/Illnesses from 1996 – 2003, during which a total of 93,141,076 hours were worked. Total injury/illness case rates varied from 1.22 to 4.2. By comparison, the 1995 EIS reported 1,337 reportable events from 1987 – 1991, during which a total of 79,654,000 hours were worked. The 1995 EIS reported total injury/illness case rates from 1.8 to 4.9. Comparing these two five-year periods show comparable case rates. However, the INL Site experienced two fatalities in 1996 and 1998. The 1996 fatality occurred when a worker fell from an elevated platform at the Radioactive Waste Management Complex. The 1998 fatality resulted from an unplanned discharge of a CO_2 fire suppression system at the Test Reactor Facility. A direct result of the two fatalities was the total revamp of the work control system to improve the integration of safety into all INL Site program activities. The 1995 EIS estimated an average injury/illness rate of 273 and an average fatality rate of 0.29 over the years from 1995 - 2005. Therefore, the 1995 EIS continues to bound the injury/illness rate for activities at the INL Site. The INL Site fatality rate exceeded the 1995 EIS estimate from 1996 - 2000. The fatalities in 1996 and 1998 resulted in a significant change in the INL Site work control system and environment, safety, health and quality assurance (ESH&Q) programs. The changes to the work control system and ESH&Q programs were mitigative actions taken in response to the fatalities. A review of table 6.3.11-2 reflects

the seriousness of the INL Site fatalities and the results of the INL Site to improve worker safety in the years 1999-2004. Table 6.3.11-2 illustrates the continued emphasis on worker safety and the effect of the systematic changes in work control, hazard identification and work performance at the INL Site.

Table 6.3.11-2 Injury/Illness Case Rates for the INL Site[a]

Year	Total Work hours	Total Recordable Cases		Lost Workday Cases		Fatalities
		Number	Rate[b]	Number	Rate[b]	
1996	12,711,062	197	3.1	80	1.3	1
1997	12,078,235	228	3.8	97	1.6	0
1998	11,530,387	244	4.2	94	1.6	1
1999	11,959,675	236	3.9	83	1.4	0
2000	12,806,353	187	2.9	76	1.2	0
2001	11,313,667	130	2.3	69	1.2	0
2002	10,317,959	89	1.72	45	0.9	0
2003	10,423,738	64	1.22	28	0.5	0

a) Data obtained from the DOE Computerized Accident/Incident Reporting System

b) Case rates are determined by multiplying 200,000 hours (100 workers working for a year) by the number of cases divided by the number of work hours.

3) INL Site Fire Loss History

During the period 1994 – 2004, the INL Site has experienced approximately 40 wildland fires. The INL Site successfully contained the wildland fires without damage to significant INL Site structures. The 2000 wildland fire destroyed several utility poles. In addition, the Secretary of Energy commended the INL Site for successfully containing a wildland fire in 2000. The fire safety posture for the INL Site is enhanced by cooperative agreements for support with the counties surrounding the INL Site as well as other federal agencies such as the Department of Interior. The 1995 EIS reported $88,000 in fire related damages in the five year period analyzed. The 1995 EIS continues to provide a bounding analysis for INL Site fire losses.

Public Risk Analysis - Radiological Hazards

1) Air Emissions

The public risk from ongoing operations is the risk associated with air emissions and associated inhalation and ingestion pathways. Table 6.3.11-3 shows the dose to a maximally exposed individual as estimated by an independent environmental monitoring organization and shows that the dose to the public is well below the doses that were estimated in the 1995 EIS.

Table 6.3.11-3 Radioactive Dose to the Public

Year [l]	Dose to Maximally Exposed Individual (mrem)	1995 EIS Estimated Dose to Maximally Exposed Individual (mrem)[e]	Maximum Potential Population Dose (person-rem)	1995 EIS Estimated Maximum Potential Population Dose (person-rem)[f]
1995[a]	0.018	0.63	0.08	2.9
1996[b]	0.03	0.63	0.2	2.9
1997[c]	0.03	0.63	0.2	2.9
1998[d]	0.007	0.63	0.08	2.9
1999[g]	0.002	0.63	0.02	2.9
2000[h]	0.057	0.63	0.53	2.9
2001i	0.035	0.63	0.59	2.9
2002[j]	0.055	0.63	0.93	2.9
2003[k]	0.074	0.63	0.085	2.9

a. Site Environmental Report for Calendar Year 1995, DOE/ID-12082 (95) (ESRF-014)
b. Site Environmental Report for Calendar Year 1996, DOE/ID-12082 (96) (ESRF-018)
c. Site Environmental Report for Calendar Year 1997, DOE/ID-12082 (97) (ESRF-030)
d. Site Environmental Report for Calendar Year 1998, DOE/ID-12082 (98) (ESRF-034)
e. 1995 EIS, Table 5.12-1, Alternative B – 10-year dose of 6.3 mrem divided by 10 to give an average yearly dose of 0.63 mrem.
f. 1995 EIS, Table 5.12-2, Alternative B – 10-year dose of 29 mrem divided by 10 to give an average yearly dose of 2.9 mrem.
g. Site Environmental Report for Calendar Year 1999, DOE/ID-12082 (99)(ISSN 1089-5469
h. Site Environmental Report for Calendar Year 2000, DOE/ID-12082 (00)(ESER-48)
i. Site Environmental Report for Calendar Year 2001, DOE/ID-12082
j. Site Environmental Report for Calendar Year 2002, DOE/ID-12082
k. Site Environmental Report for Calendar Year 2003, DOE/ID-12082
l. The site environmental report for Calendar Year 2004 has been compiled but not released.

The 1995 EIS made an assumption regarding public exposure that hunters are not expected to eat game animals that feed on INL Site rangeland. Over the last several years, the Idaho Department of Fish and Game has held controlled hunts on the INL Site. Reference (d) from Table 6.3.11-43 provides a maximum potential dose to a hunter consuming game from the INL Site as 0.03 mrem. If this value is added to the dose for a maximum exposed individual for any of the years, the result is still well below the estimated maximum dose given in the 1995 EIS.

2) Groundwater Impacts

The 2000 RWMC Performance Assessment (PA) and subsequent annual updates provided impacts to a maximally exposed member of the public from the low-level waste disposal facility located at the RWMC. The 2000 RWMC Composite Analysis shows the impacts to that same individual from all sources of buried radioactive wastes at the RWMC. The 1995 EIS used information from the 1994 RWMC PA. The ongoing projects to remove buried waste at the RWMC Pit 9 and Pit 4 areas as well as the 3100 cubic meter project and ongoing waste shipment from the Transuranic Retrieval Storage Enclosure, has resulted in a marginal decrease in the radioactive material at the facility. The decrease in source term has not been fully analyzed, however, intuitively the removal of radioactive waste from the disposal site should have the overall effect to reduce the impacts to the environment from the RWMC facility.

At Test Area North, Test Reactor Area, and Power Burst Facility, fuel storage pools have been drained and decontaminated resulting in a decrease in the potential for impact.

The 1995 EIS provides a bounding assessment of the groundwater impacts from the INL Site.

Public Risk Analysis – Non-Radiological Hazards

The health and safety impacts from Criteria Air Pollutants Table 6.3.6-1a-b and Toxic Air Pollutants for most of the pollutants are within the bounds established by the 1995 EIS.

References:

1. INL Radiological Dosimetry Program

2. Air Emissions Inventory for the Idaho National Engineering and Environmental Laboratory – 1999 Emission Report, DOE/ID-10788, May 2000

3. DOE Computerized Accident/Incident Reporting System

4. Site Environmental Report for Calendar Year 1995, DOE/ID-12082 (95) (ESRF-014)

5. Site Environmental Report for Calendar Year 1996, DOE/ID-12082 (96) (ESRF-018)

6. Site Environmental Report for Calendar Year 1997, DOE/ID-12082 (97) (ESRF-030)

7. Site Environmental Report for Calendar Year 1998, DOE/ID-12082 (98) (ESRF-034)

8. Technical Revision of the Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment for Calendar Year 2000, INEEL/EXT-2000-01089, September 2000

9. Radioactive Waste Management Complex Low-Level Waste Radiological Composite Analysis, INEEL/EXT-97-01113, September 2000

10. Operable Unit 7-08 Air Dispersion Modeling and Health Effects from Thermal and Catalytic Oxidation Unit Emissions at the Radioactive Waste Management Complex, EDF-1901, June 25, 2001

11. Annual Performance Assessment and Composite Analysis Review for the RWMC Low-Level Waste Disposal Facility – FY 2003, ICP/EXT-04-00280 Revision 0

6.3.12. INL Site Services

Summary

During 2001 through 2004, in every category, the usage rate for the INL Site and Idaho Falls facilities resources has decreased since 1995. The INL Site service capabilities in Security, Fire Department, and Emergency have improved since 1995 due to newer technology equipment purchases and additional personnel within the Fire Department.

The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline. Additional analysis for this discipline is not required.

Scope of the 1995 Analysis

The 1995 EIS addressed INL Site Services in the areas of water consumption, electricity consumption, fuel consumption, wastewater disposal, and security and emergency protection. These are discussed in the 1995 EIS in sections 4-13 for the baseline services and section 5-13 for the alternatives analysis. The Most Recent Data column shown in the table below is an annual usage average of 2001 through 2004. The 1995 EIS Annual Usage column reflects the baseline utilities plus the anticipated additions from implementing Alternative B. Changes in these services are reflected in Table 6.3.12-1.

Table 6.3.12-1 Usage of Resources

1995 EIS Annual Usage	Most Recent Data (Average of FY 2001 through 2004)	Change in Usage
Water usage – INL Site: 1.78 billion gallons I.F. Facilities: 79 million gallons	**Annual Water Usage -** INL Site: 1.11 billion gallons, (Average of 2003 and 2004) I.F. Facilities: 55 million gallons	Decreased water usage. Decreased water usage.
Electricity usage - INEEL site: 303,521 megawatt hrs I.F. Facilities: 31,500	**Annual Electricity usage -** INL Site: 159,767 megawatt hrs I.F. Facilities: 26,637	Decreased electricity usage. Decreased electricity usage.

1995 EIS Annual Usage	Most Recent Data (Average of FY 2001 through 2004)	Change in Usage
megawatt hrs	megawatt hrs	
Fuel consumption - Heating Oil usage - 4.25M gal; Diesel Fuel usage - 1.8M gal; Propane use - 863,000 gal; Gasoline usage - 557,000 gal; Jet Fuel usage - 73,100 gal; Kerosene usage - 33,800 gal; Coal usage - 9000 tons (Natural gas and LNG/CNG was not addressed in the 1995 EIS)	**Annual Fuel usage** Heating Oil use - 2.4 M gal Diesel Fuel use – 541,456 gal Propane usage - 152,434 gal Gasoline usage - 389,661 gal Jet Fuel usage - 0 gal Kerosene usage - 0 gal Coal usage - 0 tons LNG/CNG bldg usage- 3.0 Mbtu LNG/CNG Vehicle- 18.2MBtu Natural Gas usage – (I.F. facilities) - 18,002 Mcf	Heating Oil - Decrease Diesel Fuel - Decrease Propane - Decrease Gasoline - Decrease Jet Fuel - Decrease Kerosene - Decrease Coal – Decrease LNG/CNG – Data provided Natural Gas - Data provided
Wastewater treatment and discharge systems. Average annual wastewater disposal - INL Site: - 144 million gallons * I.F. facilities: 79 million gallons	**Annual Wastewater disposal** (Average of FY-2001 through 2004) INL Site: 715 million gallons I.F. facilities: 44 million gallons	 Idaho Site - Decrease I.F. facilities - Decrease

* The data used in the 1995 EIS for the wastewater disposed, (144 million gallons) appears to be in error. Wastewater disposed in 1996 was 1.18 billion gallons.

1995 EIS Annual Usage	Most Recent Data	Change in Usage
Fire Department - The INL Site contractors operate and staff three fire stations on the site. Each station has a minimum of one engine company capable of supporting any fire emergency in their assigned area. The services also include site ambulance, emergency medical technician, and hazardous material response services. Mutual aid agreements exist with fire fighting entities such as the BLM and cities of Idaho Falls, Blackfoot, and Arco.	**Fire Department – 2004** The Fire Department serves the INL Site through three fire stations located at CFA, MFC (formerly ANL-W), and TAN. The main fire station at CFA houses two engine companies and all response support apparatus and equipment. The MFC and TAN fire stations each house a single engine company. Each engine company is outfitted with a structural engine, ambulance, and wildland firefighting unit available for immediate response. Services provided by the INL Site Fire Department include emergency medical services, structural fire suppression, hazardous material mitigation, technical rescue, wildland firefighting, proprietary supervising station operation, and associated support functions for the entire site and the surrounding communities as identified in memorandums of understanding and reciprocal agreements.	Noteworthy changes include an increase of 12 firefighting personnel. While immediate response capability does not change, the total number of firefighters potentially available for call back during major or extended emergencies has increased. Upgrade of the INL Site Proprietary Supervising Station (IPSS) is expected to be complete by the end of FY 2005. Completion of this project will increase reliability and efficiency of alarm receiving for the site. The new IPSS will be located at Fire Station 1 at CFA.
Emergency Preparedness - Each INL Site contractor administers and staffs its own emergency preparedness program under supervision of DOE. The DOE emergency preparedness system includes mutual aid agreements with all regional county and major city fire departments, police, and medical facilities.	The Emergency Preparedness programs for DOE-ID and the Contractors provides for prompt emergency notification to DOE, State, Tribal, and local authorities. National emergency response agencies can be notified for assistance as necessary. Mutual aid agreements with regional county and major city fire departments, police, and medical facilities remain	National emergency response agencies and assets can provide additional assistance.

1995 EIS Annual Usage	Most Recent Data	Change in Usage
	essentially unchanged from 1995.	
Security - DOE has oversight responsibility for safeguards and security at the INL Site. The security program is divided into three categories: security operations, personnel security, and safeguards	The Security Program for DOE-ID and the Contractors is divided into several sub organizations including: personnel security and badging, material control and accountability, protective forces, investigations, security engineering and vulnerability assessments, security systems, operations security, and computer security. DOE has mandated more stringent protection of Strategic Nuclear Material; therefore several security upgrades are planned in addition to increases in protective forces. There are memorandums of agreements with city, county, and state law enforcement support.	Since CY-2000, two armored vehicles have been added to the Security capability and several hand held explosive detection devices have been purchased for use as needed. Also, Strategic Nuclear Material inventories have been reduced across the site.

References:

1. Coombs, R. to Harker, W. S., E-mail, "EIS Supplemental. Analysis – Department of Energy and Idaho National Laboratory (INL) Security", dated 2/18/2005

2. Couchman, T. to Harker, W. S., E-mail, "EIS Supplemental Data - Fire Dept.", dated 2/21/2001

3. Ljungberg, C. to Harker, W. S., E-mail, " EIS Supplement Analysis - The INL Emergency Management System, dated 2/14/05

5. 2004 Wastewater Land Application Site Performance Reports for the Idaho National Engineering and Environmental laboratory, ICP/EXT-04-00648, dated February 2005

6. Erickson, P. A. to Harker, W. S., E-mail, "RTC Water Use and Waste Effluent Information", dated 3/31/05 (Wastewater data for 2001 through 2004).

7. Fossum, E. L. to Harker, W. S., E-mail, "Utility Data", dated April 1, 2005

6.3.13. Facility Accidents

Summary

The existing analysis is technically adequate since there have been no significant changes to the operating conditions and their respective accident scenarios or to material inventories since 1995.

The 1995 EIS showed bounding accident impacts for both radiological and hazardous accidents to be at Materials and Fuel Complex (MFC) (Formerly the ANL-W site). The Idaho HLW & FD EIS identified a radiological bounding accident of a seismically induced failure of degraded bin sets and a hazardous accident of a spill of 15,000 pounds per minute of liquid ammonia. The impacts of the HLW & FD EIS accidents are significantly greater than those found in the 1995 EIS, and therefore become the bounding accidents for INL Site operations. Additional analysis for this discipline is not required.

Scope of 1995 Analysis

The Facility Accident analysis presented in the 1995 EIS, analyzed a series of events from various INL Site facilities for a number of different initiating events considering internal initiators, external initiators, and natural phenomena. These initiating events were categorized in three frequency categories, abnormal (greater than 10^{-3} events per year), design basis ($10^{-3} - 10^{-6}$), and beyond design basis ($10^{-6} - 10^{-7}$). A summary of the historical record of accidents at the INL Site was provided as well as comparisons in accident fatality rates between various industries, the DOE complex, and the INL Site. The accidents were screened to pick the bounding accidents in each of the three frequency categories. The bounding accidents for the INL Site with respect to impacts to the public were located at MFC for both radiological and hazardous chemical accidents. Bounding accidents are those that are associated with the highest consequence without regard to frequency category. The primary sections in the 1995 EIS that addressed potential facility accidents are section 5.14 and Appendix F-5.

Changes in the Environmental Discipline

1. Methodology

The 2002 SA identified a number of nuclear safety analysis reports that had been upgraded to meet current requirements. While additional analysis had been performed on virtually every nuclear facility at the INL Site, the additional analysis had not identified greater impacts for bounding accidents for a specific waste type or facility. The exception to that statement was for HLW facilities. The Idaho HLW & FD EIS analyzed a completely different set of operations alternatives which resulted in postulated accidents not previously considered. This new analysis resulted in new bounding accidents for the INL Site from the new proposed HLW operations. In the five years since the 2002 SA analysis was performed, no new nuclear safety analyses have been performed, so the results of the 2002 SA have not changed, and therefore there are no new significant impacts to be reported.

The bounding accidents for the INL Site in the 1995 EIS were at MFC for both radiological and hazardous impacts (due primarily to the proximity of the MFC site to the INL Site boundary). Both the spent nuclear fuel and the source of chlorine at MFC were reconfigured in the past ten years to greatly reduce the hazard associated with these activities.

2. Assumptions

The assumptions that were used in the 1995 EIS were conservative for the various parameters. Each safety analysis document uses slightly different assumptions for the analysis based on the specific accidents being analyzed. For a generic set of assumptions that are applicable to all potential facility accidents on the INL Site, the ones that were identified in the1995 EIS are still acceptable. The assumptions for the HLW & FD EIS were consistent with those found in the 1995 EIS.

3. Analytical methods

The primary computer codes used in the1995 EIS for the accident analysis were Radiological Safety Analysis Computer Program (RSAC-5), Origen 2.1, Microshield 3.13, and EPIcode™. These are still respected codes in the accident analysis community. Though upgrades in some of the codes have taken place, a number of the safety analysis documents across the site still use some of these codes to determine impacts to receptors. Performing additional accident analysis using updated codes would not provide significantly different results.

4. Data Adequacy

The primary areas of assessment with data adequacy are with source term and meteorological data. The facility accident analysis that was completed with the1995 EIS used bounding source terms for specific facilities. No facilities on the site are known to have modified their safety basis documents to allow for greater source terms than what was previously analyzed. The meteorological data is used to determine what the 50% and 95% meteorological conditions are that are used to transmit the dose from a release site to a receptor. The meteorological data is based on long-term weather patterns in southeast Idaho and has not been significantly affected by the weather in the previous ten years.

5. Accident Scenarios

Table 6.3.13-1 below shows a summary of the bounding potential facility accidents that were taken from the primary safety analysis documents for INL Site facilities and from other NEPA analysis that have been completed. The primary change is that the Idaho HLW & FD EIS provides the bounding accident for the site from a radiological and hazardous impacts perspective.

The 1995 EIS showed bounding accident impacts from a Hot Fuel Examination Facility fuel handling accident of 5.0 rem to the maximally exposed offsite individual (MEI) and an MFC chlorine release with a MEI exposure of 35% of the Emergency Response Planning Guidelines (ERPG)-3 guidelines. This compares to the Idaho HLW & FD EIS bounding accidents of a seismically induced failure of degraded bin sets up to 9500 years into the future resulting in 83

rem to the MEI and a spill of 15,000 pounds per minute of liquid ammonia which would result in greater than ERPG-2 concentrations at 3600 meters. These new impacts (Idaho HLW & FD EIS) now present the bounding impacts for INL Site operations.

8. Changes in Regulatory Requirements

Since 1995, the primary change in the regulatory area is the incorporation of 10 CFR 830 Subpart B (Nuclear Safety Rule). This codifies the nuclear safety rules providing Price Anderson Amendment enforcement actions for noncompliance with nuclear safety requirements. The other major change is the development of the Authorization Agreements. The Authorization Agreements are between the DOE and the operating contractor. These documents identify all safety bases and regulatory requirements in a single document for each individual nuclear category 1 and category 2 facility. These provide the authorization to operate specific facilities and provide the boundaries of all operational parameters under which operations are authorized.

9. Other NEPA Analysis for INL Site Operations

The 2002 SA listed additional NEPA analysis for potential facility accident concerns that had been completed since 1995, including the Advanced Mixed Waste Treatment Project EIS; Treatment and Management of Sodium-Bonded Spend Nuclear Fuel EIS; the Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States including the Role of the Fast Flux Test Facility; and the High-Level Waste and Facilities Disposition EIS. No new accident analyses have been done since 2000.

References:

1. Idaho High Level Waste and Facilities Disposition Environmental Impact Statement DOE/EIS-0287, September 2002

Table 6.3.13-1 Potential for Off-Site Radiological Consequences

This table does not represent all of the events that have been analyzed but does represent the bounding events for INL Site operations. Blocks that are blank represent areas where information was not available. In many cases, additional analysis results were presented in the source documents but are not shown here. For the purposes of being able to compare analysis results, the following information is provided. Different terms are used in the source documents for the same receptor locations and in a number of cases the input assumptions may cause the results to not be comparable to other analyses. This is provided to allow the reader to have a basic understanding of the primary bounding accidents across the INL Site.

Accident	Frequency	TEDE at 100 m (rem)	Maximally Exposed Offsite Individual		Population to 50 miles		Noninvolved Worker		Meets Evaluation Guidelines
			Dose (rem)	Latent Cancer Fatality Probability	Dose (person-rem)	Latent Cancer Fatalities	Dose (rem)	Latent Cancer Fatality Probability	
Environmental Restoration									
No accidents were identified that would result in offsite consequences									
High Level Waste (bounding accidents from the HLW & FD FEIS)[a]									
Seismic failure of a degraded bin set	Unlikely	Note 1	83	0.042	5.3×10^{5}	270	5.7×10^{6}	1.0	Yes
Calcine retrieval onsite transport equipment failure	Unlikely	Note 1	0.04	2.0×10^{-5}	470	0.23	2.7×10^{3}	1.4×10^{-3}	Yes
Flood induced failure of a bin set	Extremely Unlikely	Note 1	0.88	4.4×10^{-4}	5.7×10^{4}	29	59	0.059	Yes
External event results in a bin set release	Beyond Design Basis	Note 1	14	7.0×10^{-3}	1.2×10^{5}	61	930	0.94	Yes
External event results in a release from the borosilicate vitrification facility	Beyond Design Basis	Note 1	17	8.5×10^{-3}	1.5×10^{5}	76	1.2×10^{3}	1.0	Yes
Infrastructure									
MFC, ZPPR, Materials Storage Building, uranium burning event			0.4				1.0		Yes

Accident	Frequency	TEDE at 100 m (rem)	Maximally Exposed Offsite Individual		Population to 50 miles		Noninvolved Worker		Meets Evaluation Guidelines
			Dose (rem)	Latent Cancer Fatality Probability	Dose (person-rem)	Latent Cancer Fatalities	Dose (rem)	Latent Cancer Fatality Probability	
Spent Nuclear Fuel									
Earthquake[d]	1.0×10^{-3}		(g)						Yes
Inadvertent Criticality – TAN[d]	Extremely Unlikely	47	0.78						Yes
TMI-2 6-pack Module Drop[d]	9.1×10^{-3}	0.016 rad/hr at 75 meters	Insigni-ficant		insigni-ficant		0.016 rad/hr at 75 meters		Yes
Exposure to high radiation fields[d]	7.6×10^{-7}		(g)						Yes
Mixed Waste Fire[d]	1.8×10^{-7}		(g)						Yes
Release of gaseous fission products[d]	5.6×10^{-3}		(g)						Yes
Underground Fuel Storage Facility – Fuel drop into dry well		1.6×10^{-4}	1.4×10^{-6}						Yes
Florinel Dissolution & Fuel Storage Facility - criticality		13.1							Yes
Irradiated Fuel Storage Facility – criticality		0.4	9.0×10^{-4}						Yes
Unirradiated Fuel Storage Facility – criticality		160	1.4×10^{-3}						Yes
Reactor Technology Complex									
ATR Direct Damage Loss of Coolant Accident with 100% core melt[b]	Beyond Design Basis		0.60	3.0×10^{-4}	5.17×10^{4}	25.9	7.61	3.0×10^{-3}	Yes
ATR Direct Damage Loss of Coolant Accident with 100% core melt[e]	Beyond Design Basis		11[f]						Yes
Waste Management									
Fire in TRU waste in the TSA-RE[c]	Unlikely	2.1×10^{-2}	3.5			0.005			Yes
Incinerator Explosion	Unlikely	1.4×10^{-3}	0.24			1.8			Yes
Design Basis Seismic Event[c]	Unlikely	2.6	4.8×10^{-2}			0.98			Yes

Accident	Frequency	TEDE at 100 m (rem)	Maximally Exposed Offsite Individual		Population to 50 miles		Noninvolved Worker		Meets Evaluation Guidelines
			Dose (rem)	Latent Cancer Fatality Probability	Dose (person-rem)	Latent Cancer Fatalities	Dose (rem)	Latent Cancer Fatality Probability	
Type II module fire[c]	Extremely Unlikely	1.3×10^{-2}	2.2			0.05			Yes
Propane-fueled fires[c]	Extremely Unlikely	2.6	2.2			1.14			Yes

Note 1 - This information was not provided in the source document

a. Idaho High Level Waste and Facilities Disposition Environmental Impact Statement (HLW & FD FEIS) – The accidents shown in this table are a representative sample of the accidents in this document. The accidents selected for inclusion here are the bounding accidents from the HLW & FD FEIS Table 5.2-39.
b. Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States including the Role of the Fast Flux Test Facility
c. Advanced Mixed Waste Treatment Project EIS
d. Test Area North Safety Analysis Report – INEL-94/0163 Addendum 1, Rev. ID:2 June 2000
e. Advanced Test Reactor Upgraded Final Safety Analysis Report
f. The dose from the ATR SAR and the NI PEIS are significantly different for the same accident. The difference is a result of a number of differences in the models used. The primary difference is that the ATR SAR modeled the accident using 95% meteorology and the NIPEIS used 50% meteorology.
g. DOE Evaluation Guidelines are not exceeded for this accident

The following terms are used in some analyses to describe frequency of postulated events

Anticipated	1.0×10^{0} - 1.0×10^{-2} years
Unlikely	1.0×10^{-2} - 1.0×10^{-4} years
Extremely Unlikely	1.0×10^{-4} - 1.0×10^{-6} years
Beyond Design Basis	$<1.0 \times 10^{-6}$ years

Table 6.3.13-2 Summary of Facility Accidents at the INL Site That Have the Potential for Off-Site Chemical Consequences

This table does not represent all of the events that have been analyzed but does represent the bounding events for INL Site operations. Blocks that are blank represent areas where information was not available. In many cases, additional analysis results were presented in the source documents but are not shown here. For the purposes of being able to compare analysis results, the following information is provided. Different terms are used in the source documents for the same receptor locations and in a number of cases the input assumptions may cause the results to not be comparable to other analyses. This is provided to allow the reader to have a basic understanding of the primary bounding accidents across the INL Site.

Accident	Frequency	Ammonia	Sulfuric Acid				Meets Evaluation Guidelines
Environmental Restoration							
No accidents were identified that would result in offsite consequences							
High Level Waste (bounding accidents from the HLW & FD EIS)[a]							
Ammonia tank spill of 150 pounds per minute of liquid ammonia	Unlikely	Less than ERPG-2 at 3,600 meters					Yes
Ammonia tank spill of 1500 pounds per minute of liquid ammonia	Extremely Unlikely	Greater than ERPG-2 at 3,600 meters					Yes
Ammonia tank spill of 15,000 pounds per minute of liquid ammonia	Beyond Design Basis	Greater than ERPG-2 at 3,600 meters					Yes
Infrastructure							
MFC, EBR-II, Power Plant Building, sulfuric acid leak from a 2,000 gal storage tank			ERPG-1 at 218 m	ERPG-2 at 65 m	ERPG-3 at tank		Yes

Accident	Frequency	Asbestos ERPG-2 (2.5E-02)	Beryllium ERPG-2 (2.5E-02)	Cadmium ERPG-2 (4.0E+00)	Lead ERPG-2 (2.5E-01)	Mercury ERPG-2 (1.00E-01)	Meets Evaluation Guidelines
Spent Nuclear Fuel							
No accidents were identified that would result in offsite consequences							
Reactor Technology Complex							
No accidents were identified that would result in offsite consequences							
Waste Management (AMWTP/RWMC)							
Fire in TRU waste in the TSA-RE[b]	Unlikely	1.3×10^{-2}	9.0×10^{-5}	8.9×10^{-6}	7.9×10^{-5}	2.6×10^{-6}	Yes
Incinerator Explosion[b]	Unlikely	0	0	8.9×10^{-6}	7.9×10^{-5}	2.6×10^{-6}	Yes
Design Basis Seismic Event[b]	Unlikely	3.5×10^{-4}	5.5×10^{-6}	9.6×10^{-5}	5.9×10^{-4}	3.3×10^{-6}	Yes
Type II module fire[b]	Extremely Unlikely	2.5×10^{-2}	7.4×10^{-5}	1.2×10^{-4}	3.3×10^{-3}	4.2×10^{-6}	Yes
Propane-fueled fires[b]	Extremely Unlikely	2.5×10^{-2}	7.4×10^{-5}	1.2×10^{-4}	3.3×10^{-3}	2.6×10^{-5}	Yes

a. Idaho High Level Waste and Facilities Disposition Environmental Impact Statement (HLW & FD FEIS) – The accidents shown in this table are a representative sample of the accidents in this document. The accidents selected for inclusion here are the bounding accidents from the HLW & FD FEIS.
b. Advanced Mixed Waste Treatment Project EIS

6.3.14. Adverse Environmental Impacts Which Cannot Be Avoided

The methodology used in the 1995 EIS was to review the cumulative impacts and the project specific impacts for potential adverse effects that could not be mitigated. This same methodology was used for the 2005 SA.

The 1995 EIS, section 5.16, identified five environmental disciplines (i.e. Cultural Resources, Aesthetic and Scenic Resources, Air Resources, Water Resources and Ecology) to have unavoidable adverse environmental impacts.

The 2005 SA analysis identified five environmental disciplines (i.e. Cultural Resources, Air Resources, Health and Safety, Facility Accidents and Waste Management) in which the 2005 SA analyzed values exceeded those used in the 1995 EIS. In each of the five disciplines the amount greater than the 1995 EIS value was found to be not significant. The construction and operation of facilities at the INL Site has and will continue to result in some adverse impacts to the environment. However, these existing and potential impacts do not result in a change in this section.

6.3.15. Relationship Between Short-term Use of the Environment and the Maintenance and Enhancement of Long-term Productivity

The methodology used in the 1995 EIS was to review an alternative and the project specific impacts for potential impacts that would occur over the life of the project. These potential impacts were then compared to the potential benefits that may result over the long-term from the project. This same methodology was used for the 2005 SA.

The 1995 EIS analyses, section 5.17, found that there would be no long-term loss of productivity from the actions planned except for the impacts to the ecology. Ecological impacts would result in the loss of productivity and biodiversity associated with the amount of land that would be disturbed and used. In addition, if effective re-vegetation and control of invasive plant species is not accomplished at the INL Site, there is the potential to impact long-term productivity on the INL Site.

However, at this time, activities that have occurred since the 1995 EIS and the analyses performed for the 2005 SA result in no change being required for the description of the relationship between short-term use of the environment and the maintenance and enhancement of long-term productivity. The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline.

6.3.16. Irreversible and Irretrievable Commitments of Resources

The methodology used in the 1995 EIS was to review an alternative and the project specific impacts for commitment of resources that could be considered to be irreversible or irretrievable. This same methodology was used for the 2005 SA.

The 1995 EIS analyses, section 5.18, found irreversible and irretrievable commitments would potentially include land, ground water, aggregate and energy resources. The analyses performed for the 2005 SA did not result in any changes to the irreversible and irretrievable commitment of resources described in the 1995 EIS. Therefore, the 1995 EIS still provides a bounding analysis for this discipline.

6.3.17. Mitigation

Summary

The mitigation measures are adequate for the scope of activities identified in the 1995 EIS and continue to be appropriate for existing activities. New proposed actions not included in the scope of the 1995 EIS will require additional review to determine if additional mitigation is required.

Analysis

Potential mitigation measures were discussed in Section 5.19 of Volume 2, Part A, and in Section C-3.3 of Volume 2, Part B of the 1995 EIS. That analysis was applied to the Cultural Resources, Aesthetic and Scenic Resources, Geology, Air Resources, Water Resources, Ecology, Traffic and Transportation, Health and Safety, INL Site Services, and Facility Accidents analyses. The discussion of mitigation measures in the 1995 EIS did not distinguish mitigation from standard practices and appeared to treat all activities that reduce any impact as mitigation. Mitigation measures were discussed in general terms and the document seemed to imply that mitigation activities would be addressed for each new activity as more was known about that activity (e.g., the Advanced Mixed Waste Treatment Facility).

Mitigation is a specific activity associated with an action that will lessen adverse impacts of that alternative. Mitigation can be accomplished by:

a) Avoiding the impact altogether by not taking a certain action or parts of an action.
b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
e) Compensating for the impact by replacing or providing substitute resources or environments.

Normal programmatic activities will continue and any impacts will be minimized to the extent possible using standard practices. However, without a clear distinction between standard practices and specific mitigation activities for a specific action, it is not clear what mitigation measures may have been required for a given activity. Therefore, the document did not stipulate any specific mitigation measures and relied on standard, routine practices to reduce or eliminate

the impacts of any alternative selected. No Mitigation Action Plan was prepared in conjunction with the 1995 EIS or Record of Decision (ROD). However, Section 6 of the ROD did include a discussion of the types of activities DOE will perform in conjunction with decision to carry out the ER and WM program on the INL Site. DOE continues to perform those actions as necessary to reduce or eliminate impacts from activities conducted on the INL Site. Those actions included finalizing a Cultural Resource Management Plan and obtaining a Programmatic Agreement signed by DOE, the State of Idaho Historic Preservation Officer and the Advisory Council for managing cultural resources, maintaining a Memorandum of Agreement with the Shoshone-Bannock Tribes, performing additional air and modeling, and continuing coordination with the Citizens Advisory Board.

6.3.18. Environmental Justice

Summary

Impacts are bounded by the 1995 EIS and no additional analysis is needed. Existing analysis is adequate because there continue to be no adverse environmental health or safety affects on low income or minority populations within the zone of impact.

Scope of 1995 Analysis

Section 5.20 of Volume 2 Part A of the 1995 EIS assessed Environmental Justice as it relates to waste management and environmental restoration activities. The 1995 EIS used 1990 U.S. Bureau of Census data (USBC 1992). At the time the 2002 Supplemental Analysis was written, the 2000 Census data had not yet been published and relied upon the 1990 USBC data in the analysis. The 2002 Supplemental Analysis recommended that updated census data should be examined during the 2005 Supplemental Analysis.

USBC classifications were used to define "minority." For purposes of the analysis in the 1995 EIS and 2002 Supplemental Analysis, minority populations were defined as those census tracts within the zone of impact for which the percent minority population exceeds the average of all census tracts within the zone of impact or where the percent minority population exceeds 50 percent for any given census tract. Low-income populations were defined as a group of people and/or community experiencing common conditions of exposure or impact, in which 25% or more of the population is characterized as living in poverty. The same definitions apply to the 2005 Supplemental Analysis, however, it should be noted that the poverty threshold has changed since 1990 and the current 2000 USBC poverty threshold was used for the 2005 Supplemental Analysis.

The primary assumption used in the 1995 EIS was to designate Argonne National Laboratory-West (ANL-W) as the epicenter for the region of impact. The zone of impact was an 80-kilometer (50-mile) radius circle with its epicenter at ANL-W. The same epicenter has been used in the 2005 Supplemental Analysis.

Changes in the Environmental Discipline

1. Methodology

The methods used to assess potential environmental justice impacts included comparing the new 2000 Census information within the zone of impact to the 1995 EIS and 2002 Supplemental Analysis to evaluate what, if any changes have occurred since then that would have an adverse human health or environmental effect on the minority and low income populations residing in a defined zone of impact. Each project was evaluated to determine whether or not the impacts of the action were analyzed and bounded by the 1995 EIS. Several projects that were included in the 1995 EIS analysis were not implemented and as such the impacts were less that the bounding analysis. New projects were analyzed to assess what impact they had on low income and minority populations.

2. Assumptions – No change

3. Analytical Methods – No change

4. Data Adequacy – The 1990 USBC data that was used in the 1995 EIS and 2002 Supplemental Analysis is no longer valid.

Total population, minority population and low-income population data were analyzed for an area encompassing an 80-kilometer (50-mile) radius defining a zone of potential impact. This area is the same as that used for analysis performed in the 1995 EIS with the center of the circle indexed to ANL-W, the center location of hypothetical or existing major activities. The total population of individuals residing in the zone of impact is presented in Table 6.3.18-1. The total population in the zone of impact has increased by 26%.

Each census tract was evaluated for each county that is within the zone of impact. In instances where a census tract was bifurcated by the radius boundary, the population for the bifurcated census tract was included only if greater than 50 percent of the census tract was within the zone boundary. A listing of the census tracts evaluated for this Analysis including the total population, minority population and low-income population for each census tract is shown in Table 6.3.18-1.

Minority populations were determined as those census tracts within the zone of impact for which the percent minority population exceeds the average of all census tracts within the zone of impact or where the percent minority population exceeds 50 percent of the spatial area for any given census tract. The minority population residing in the zone of impact is presented in Table 6.3.18-1. Since 1995, the number of minorities living within the zone of impact has increased from 7% to 10%.

The poverty threshold has changed with the updated 2000 Census data. The U.S. Bureau of Census characterizes persons in poverty as those whose income is less than a "statistical poverty threshold." The U.S. Census poverty threshold is a weighted average based on family size and the age of the persons in the family. The 2000 census poverty threshold for a family of four is an income of $17,603. The number of low-income individuals residing in the zone of impact that are living below the poverty threshold are presented in Table 6.3.18-1. Since 1995, the number

of low-income individuals living within the zone of impact has decreased from 14% to 13%, although the total population has increased by 26% from 172,366 in 1995 to 231,908 in 2000.

Table 6.3.18-1.

Summary Statistics	
Total Population in Zone of Impact – Per the 2000 Census	231,908
Total Minority Population in Zone of Impact – Per the 2000 Census	23,092 10% of Total
Low-income individuals residing in the Zone of Impact – Per the 2000 Census	30,585 13% of Total

5. Accident Scenarios – N/A

6. Accident Probabilities – N/A

7. Cumulative Impacts – N/A

8. Changes in Regulatory Requirements

Since 1995, the Environmental Justice Guidance from the Council on Environmental Quality has been finalized. The Guidance provides specific principles for agencies to consider when evaluating Environmental Justice. The draft Guidelines were followed for the 1995 EIS and 2002 Supplemental Analysis. There were no substantial changes to the final Guidelines that would present a deviation from the methodology used to conduct the 1995 EIS and the 2002 Supplemental Analysis.

9. Other NEPA Analysis for INL Site Operations - N/A

References

1. United States Census Bureau Census 2000 Population, Minority and Low Income Reports, http://www.census.gov.

2. Environmental Justice Guidance Under the National Environmental Policy Act, Council on Environmental Quality Executive Office of the President, December 10, 1997.

3. U.S. Department of Energy Environmental Justice Strategy, Executive Order 12898, April 1995.

6.3.19. Waste Management

Summary

The average yearly disposal rates for LLW and MLLW exceed the estimates in the 1995 EIS. At the time the 1995 EIS was written, the LLW disposal facility at the RWMC was projected to continue to receive waste until 2020. As a part of the accelerated cleanup initiative, the closure goal for the LLW disposal facility was accelerated to 2009. This resulted in increased disposal of backlogged waste streams. However, the total inventory allowed to be disposed at the LLW disposal facility has not changed and will not be exceeded prior to the disposal facility reaching capacity. The resulting ground water impact from the LLW disposal has not changed because the total amount of waste to be disposed at the LLW disposal facility has not changed. The RWMC Performance Assessment, which analyzes total impact to the ground water from LLW disposal operations, still shows that the performance objectives of the disposal facility and local, state, or federal ground water standards will be met.

Scope of the 1995 EIS

The 1995 EIS addressed the Waste Management program in two ways, one by the analysis of the various projects ongoing in the waste management program and the second by an analysis of all waste disposal activities along with projected waste inventories. The waste management projects are addressed in Volume 2 Part B Appendix C. This section of the 2005 SA will address the overall program impacts and waste disposal volumes.

Changes in the Environmental Discipline

The Waste Management program has not increased its scope since the 1995 EIS. A number of projects have been effective in reducing the amount of orphan wastes to be disposed, eliminating the mixed low-level waste backlog that previously existed, disposing of the majority of the stored low-level waste, shipping transuranic waste to WIPP, and the ongoing disposal of industrial and hazardous wastes. While a number of waste streams remain to be addressed, the volumes have been greatly reduced.

Waste Disposal Performance to Date

A review of the Waste Disposal Volumes in Table 6.3.19-1 shows that the 1995 EIS was conservative regarding waste disposal volumes. The average yearly disposal rates for LLW and MLLW exceed the estimates in the 1995 EIS. At the time the 1995 EIS was written, the LLW disposal facility at the RWMC was projected to continue to receive waste until 2020. As a part of the accelerated cleanup initiative, the closure goal for the LLW disposal facility was accelerated to 2009. This resulted in increased disposal of backlogged waste streams. The accelerated cleanup also generated greater volumes of both LLW and MLLW needing disposal than planned in the early years of the 1995 EIS analysis. However, the total inventory allowed to be disposed at the LLW disposal facility has not changed and will not be exceeded prior to the disposal facility reaching capacity. The resulting ground water impact from the LLW disposal has not changed because the total amount of waste to be disposed at the LLW disposal facility

has not changed. The RWMC Performance Assessment, which analyzes total impact to the ground water from LLW disposal operations, still shows that the performance objectives of the disposal facility and local, state, or federal ground water standards will be met.

Table 6.3.19-1 Waste Disposal Volumes

	Volumes of Disposed INL Site Wastes (m^3)												Average Yearly Disposal Rate	1995 EIS Projected Yearly Disposal Rates
Waste type (disposal location)	**CY-95**	**CY-96**	**CY-97**	**CY-98**	**CY-99**	**CY-00**	**CY-01**	**CY-02**	**CY-03**	**CY-04**	**Total**			
LLW/Treated MLLW (RWMC SDA)	1159	726	1341	4215	4210	4621	4207	4496	3933	6081	34989		3499	3942[a,b]
LLW/MLLW (Offsite)	3	20	21	37	50	1081	1176	918	1287	2888	7481		748	0[b]
Hazardous (Offsite)	33	934	254	146	896	828	614	231	174	266	4376		438	1201
Industrial (CFA Landfill)	56782	45175	53971	41053	50812	41410	37491	33544	37284	49430	446952		44695	58,298
TRU/ MTRU (WIPP)	0	0	0	0	26	178	831	2220	195	387	3837		384	2500[c]

a These numbers are after treatment disposal volumes. Treated MLLW no longer exhibits the hazardous characteristic and is considered to be LLW.

b The 1995 EIS projected all MLLW to be disposed at the INL Site. Because the MLLW Disposal Facility was not built, listed MLLW cannot be disposed at the INL Site. With the shutdown of the WERF incinerator, the INL Site has limited MLLW treatment capability.

c The 1995 EIS projected TRU shipments of untreated wastes from 1998 - 2002 at this rate. Treated waste volumes would begin shipment after 2005.

LLW, MLLE, and HAZ compiled from IWTS database
INDUST all CYs compiled from INWMIS database
TRU/MTRU all CYs compiled from WIPP database
EIS Projections from EDF-94-Waste-0104, "Waste Generation, Storage, and Treatment Volumes", March 1995 (AR-RF-1173)

RWMIS = Radioactive Waste Management System
WIPP = Summary of Shipments to the Waste Isolation Pilot Plant site
INWMIS = INEEL Nonradiological Waste Management Information System

6.4. Cumulative Impacts and Impacts From Connected or Similar Actions

Scope of 1995 Analysis

"Cumulative Impacts and Impacts from Connected or Similar Actions" relating to the INL Site and surrounding region are analyzed in Volume 2, Part A, Section 5.15 of the 1995 EIS. The Cumulative Impacts analyses address Land Use, Socioeconomics, Cultural Resources, Air Resources, Water Resources, Ecological Resources, Transportation, Health and Safety, and Waste Management.

Changes in the Environmental Discipline

1. Methodology

The methodology used to analyze cumulative impacts in the 1995 EIS was to summarize the impacts identified in the separate sections of the Environmental Consequences Chapter (Chapter 5). For example, the cumulative impacts analysis repeats the impacts identified in Chapter 5 for Air Resources and Health and Safety. The Health and Safety section of the Cumulative Impacts analysis combines the radiological and non-radiological effects from the atmospheric, ground water, and biotic pathways. Impacts to both workers and the public were identified. The analysis also compares the sources of radioactive airborne materials on the INL Site with other regional sources, such as phosphate processing operations in Pocatello. Transportation impacts from direct exposure (from the transport of radioactive materials) and traffic accidents were also analyzed.

The 1995 EIS cumulative impact analysis is based on a projection of radiological and chemical exposures resulting from the alternatives compared to the no action baseline. Each of the alternatives is composed of a set of actions that are the sources of the impacts and risks.

The assessment of whether the 1995 analysis remains adequate is based on a comparison with program reviews and analyses prepared for each of the disciplines analyzed for the 2005 Supplement Analysis. The adequacy assessment is also based on a comparison with the cumulative impacts analysis in the Idaho HLW & FD EIS. The cumulative impacts analysis in the Idaho HLW & FD EIS incorporates the "I Think" computer model to integrate impacts from various sources to identify potential synergistic or additive incremental effects under several "what if" alternative scenarios.

<u>Consideration of direct, indirect, interconnected and synergistic effects in the 2005 SA Cumulative Impacts review</u>

Air emissions may be inhaled over time by an individual or a population and have a cumulative impact on health. Air emissions may also result in the deposition of chemicals or radioactive contaminants in soil and water. Soil contaminants may be re-suspended by wind erosion, inhaled and re-distributed repeatedly. These contaminants may in-turn be picked up by vegetation and ingested by herbivores and concentrated up the food chain. Soil contaminants may also be picked up by water run-off or driven through the soil into the ground water. Humans and

animals may be affected by inhaling, ingesting or absorbing contaminants originating from emissions to the air pathway.

Leaks, spills and the disposal of chemical and radioactive contaminants from different locations can have a cumulative impact on water resources. Contaminants may converge from several sources to concentrate contaminates or be diluted and dispersed by the ground water depending on local and regional hydrology. Contaminated ground water may be withdrawn and used in many ways by individuals and populations. Use of contaminated ground water for drinking, cooking, bathing, irrigation and watering livestock can result in cumulative impacts to health.

Contaminated soil or ground water can affect land use and local economic conditions. As ground water emerges in springs and flows into rivers it may impact the ecology and cultural resource values.

Transportation of radioactive waste or material past an individual or population residing at a stationary location results in a certain exposure risk. Exposure to radioactivity and the corresponding health risks increase as the level of radioactivity or the number of shipments increase. The likelihood of traffic accidents increases with the number of shipments. Thus, transportation may contribute cumulatively to increasing risks to health and safety.

2. Assumptions

Assumptions used for the 1995 EIS cumulative impact analysis are not stated but the basis used for the analysis provides a clear means of comparison with current conditions.

3. Analytical Methods

The 1995 EIS cumulative impacts analysis was based on: a) on historical data; b) alternatives analyzed in the EIS; c) reasonably foreseeable actions; and d), actions that may be unrelated to federal actions or alternatives analyzed in the 1995 EIS but may contribute to cumulative environmental impacts.

The first part of the approach used in conducting the cumulative impacts review for the SA was to compare the actions selected for implementation in the 1995 EIS ROD with those actions that have actually been implemented or are still planned. Program reviews were used as the basis for this comparison. The second part was to compare the analysis of each discipline in the 1995 EIS with reviews of each discipline prepared for the 2005 SA. These were then compared to the cumulative impacts analyses in the Idaho HLW & FD EIS, which contains the most recent comprehensive cumulative impacts analysis of the INL Site.

4. Data Adequacy

In general, data used in the 1995 EIS is adequate and presents a reasonable picture of cumulative environmental impacts of the INL Site and surrounding region. In general, impacts were overestimated because some facilities have been closed, some operations have been discontinued, and some anticipated actions have not been implemented.

Areas where data used in the 1995 EIS may have been incomplete or out of scope and were not used to analyze cumulative impacts are ground water, flooding, reactor operations, and effects of wildland fires.

Since the 1995 EIS, DOE has made considerable progress in understanding the impacts to ground water from INL Site operations, including updated Composite Analyses and Performance Assessments. In addition, DOE is finalizing an extensive flood study of the Big Lost River. Impacts from wildland fires have been evaluated in the Idaho National Engineering and Environmental Laboratory Wildland Fire Management Environmental Assessment. While reactor operations were not specifically addressed in the 1995 EIS, impacts for those operations to resource areas such air and socioeconomics are included in the baseline impacts for INL Site Operations. Data is adequate for all other comparisons.

5. Accident Scenarios

Accident impacts are not included in the cumulative impacts section because any impacts from a single accident on a co-located facility are already included in the existing accident analysis.

6. Accident Probabilities

Not Applicable.

7. Cumulative and Synergistic effects

Since the 1995 EIS was issued, there have been no facilities constructed, operations initiated, or any unforeseen events occurred that would tend to contribute any incremental increase to cumulative impacts over those analyzed or projected in the 1995 EIS. Overall, the potential for cumulative environmental impacts has been reduced on the INL Site and in the surrounding area. Some of the INL Site's sources of air emissions have been shut down and some that were planned were not under construction as of October 2004 and are not likely to become operational. For example, WERF, EBR-II, and the New Waste Calcine Facility have been shut down or placed in standby, an incinerator is currently not planned as part of the AMWTP, and there are no current plans for thermal treatment associated with waste being retrieved from RWMC. These examples contributed incrementally to health impacts through the air pathway in the 1995 EIS cumulative impacts analysis. There are other examples such as fewer spent nuclear shipments to the INL Site than projected thus reducing transportation associated risk. No impacts have been identified that would synergistically work together or combine to result in greater impacts in extent or intensity than those analyzed in the 1995 EIS.

8. Changes in Regulatory Requirements

There have been no changes in regulatory requirements that would affect the cumulative impact analyses in the 1995 EIS. However, the implementation of those requirements, such as permitting under the Clean Air Act, may have the effect of reducing emissions through requiring more stringent control technology. New required air modeling, such as CALPUF, provides

additional data for more distant places but tends to corroborate existing data. DOE Order 435.1 requires the preparation of a "composite analysis" which is a comprehensive review of ground water contaminant sources at a site.

9. Other NEPA Analyses for INL Site Operations

Several EISs have been prepared that tier from the 1995 EIS. These are the Advanced Mixed Waste Treatment Project EIS, EIS for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel, Nuclear Infrastructure EIS, and Idaho High Level Waste and Facilities Disposition EIS. The Idaho HLW & FD EIS also integrates the analysis of CERCLA and RCRA actions to comprehensively analyze impacts on environmental restoration and waste management. Each of these EISs analyzes the impacts of the actions within their scope as they contribute incrementally to INL Site cumulative environmental impacts. An additional EIS is being developed on a proposal to consolidate Pu-238 operations at the INL Site. Potential impacts of that proposal will be addressed in that EIS including cumulative impacts. If implemented, impacts to some resource areas such as land use and air emissions will occur. DOE has not yet fully defined the extent of those impacts. A potential activity related to explosives testing may occur on the INL Site. The scope of the activities included in that activity are not yet defined but would likely include land disturbance and potential impacts to ecological and cultural resources as well as air resources.

Summary of Major Impacts

The 1995 EIS based its analysis on predictions, whereas the 2005 SA bases its comparison on a set of conditions, which for the most part are known. For example, a certain set of facilities have been built, or shut down, resulting in a known set of environmental impacts. In other cases, emissions and contaminants have been measured or are better known and can be compared with the 1995 EIS analysis. Following the outline of the 1995 EIS cumulative impacts analysis the findings are as follows:

Land Use: Impacts to land use are as similar to what was anticipated. The 1995 EIS projected about 537 acres of undisturbed land would be cleared or excavated for a range of proposed activities. About 525 acres of undisturbed land have been cleared. Even though approximately 356 additional acres of undisturbed land could potentially be disturbed in the future, all of the disturbances and potential disturbances not included in the 1995 EIS have had an environmental review either through the CERCLA process or NEPA process. An additional activity, the Pu-238 Consolidation Project, could impact additional undisturbed acres during the construction of buildings and a new road between the Materials and Fuels Complex and INTEC. An EIS being developed on that project will address those additional acres and evaluate cumulative impacts.

Socioeconomics: The employment level projected in the 1995 EIS for 2004 was 8,308, while the actual employment for 2004 was 7,360. While the number of employees is less than projected, negative impacts to the local economy from INL Site employment are still minimal and in line with the 1995 EIS analysis.

Cultural Resources: In 2002, DOE began the deactivation and decommissioning (D&D) of EM-owned buildings that no longer hold a mission for the INL Site. Both direct and indirect impacts to INL Site cultural resources are greater than originally anticipated due to increased D&D activities to INL Site historic architectural properties. The cumulative impacts of demolition of historic buildings and structures across the INL Site, including those at the Test Area North (TAN) and Power Burst Facility (PBF) areas, has an adverse effect on the INL Site cultural landscape. As part of the mitigation described in the Record of Decision for the 1995 EIS, DOE-ID mitigated the adverse effects to these cultural resources through completion of stipulations outlined in several Memoranda of Agreement with the Idaho State Historical Preservation Office (SHPO), including the completion of Historic American Engineering Record (HAER) reports for the TAN and PBF facilities. The INL Site now has a final Cultural Resource Management Plan and Programmatic Agreement signed by DOE, the Idaho SHPO, and the Advisory Council on Historic Preservation. The plan and agreement provide a site-wide perspective and strategy for managing INL Site cultural resources. Those two documents will continue to be implemented to reduce or eliminate impacts to cultural resources for INL Site activities that have the potential to impact cultural resources. The 1995 EIS did not anticipate or address the effects of wildland fires or the impacts of fire fighting such as the un-surveyed grading of emergency firebreaks. Impacts related to wildfires are addressed in the Idaho HLW & FD EIS and the Wildland Fire Management EA. Soil erosion resulting from the fires expose some cultural resource sites to weathering and erosion.

Air Resources: Primary INL Site emissions sources, WERF and NWCF, have been shut down, or placed in standby pending upcoming decisions on whether to install major new emission control systems. Transportation has been less than expected and some INL Site vehicles have been converted to natural gas so transportation related emissions have been less than expected. Air emissions are the most direct pathway to workers and the public and all INL Site air pollutants are emitted into a common airshed so the impacts to receptors within the airshed are cumulative. There are four pollutants that exceeded the baseline established in the 1995 EIS, however, the health effects of these pollutants show that they are well below established emissions standards. The existing analysis does not show any adverse impacts from air emissions at 50 km. Because the most significant emissions sources analyzed in the 1995 EIS are no longer in operation, cumulative impacts overall and associated air pathway risks are less than anticipated in the 1995 EIS. In addition, given the anticipated air pollution control methods required, the Pu-238 Consolidation Project is not anticipated to add significantly to air impacts. Some impact to air resources would occur if a potential explosives test range were constructed and operated on the INL Site. Air impacts would potentially include particulates and unburned explosives.

Water Resources: Since the 1995 EIS, DOE has performed additional ground water analyses including the 2000 update to the RWMC Performance Assessment (2000 PA), development of the RWMC Composite Analysis (CA), the WAG 3 (INTEC) Remedial Investigation and Feasibility Study, the HLW & FD EIS and the ongoing analysis for the Waste Area Group 7 (RWMC) Remedial Investigation and Feasibility Study (WAG 7 RI/FS). The 2000 RWMC Composite Analysis provides significantly more detail regarding the ground water impacts of INL Site activities. The Ancillary Basis for Risk Analysis of the Subsurface Disposal Area at RWMC provides the most up-to-date ground water analysis of impacts from RWMC buried

wastes. From a site-wide cumulative impacts standpoint, future D & D impacts on the long-term dose are uncertain because of decisions yet to be made. D & D decisions must take into account cumulative impacts on ground water dose estimates. However, given the robust and conservative nature of assumptions in previous analyses, it is likely that the doses computed at the INL Site boundary remain bounding regardless of future D & D decisions. Additional analysis is required to address all of the buried radiological source terms across the site as well as future D&D actions.

DOE is finalizing an extensive study of the flood hazard from the Big Lost River. When final, the new study will allow DOE to more precisely characterize activities in or near the Big Lost River floodplain. This situation is discussed further in the HLW & FD EIS.

Ecological Resources: Impacts to the ecology of the INL Site are primarily tied to acres of surface disturbance and an increase in the occurrence of invasive plant species. Since the 1995 EIS, fewer acres have been cleared of native vegetation or converted to facility use than expected. Consequently, impacts resulting from the loss of habitat due to facility construction have been less than expected. The greatest ecological concern is the presence of invasive plant species that present a risk of permanent conversion of vegetation and habitat type from sagebrush steppe to cheatgrass. The lack of successful re-vegetation of native species at locations where DOE activities on the INL Site disturb soil is becoming a more serious problem. The 1995 EIS did not anticipate or consider the effects of wildfire and fire suppression. Since 1995, wildfire and the effects of response actions on the INL Site, such as constructing fire breaks, has had a much greater effect on habitat and ecological potential than planned DOE actions. In addition, soils have been analyzed to detect radionuclides, heavy metals and chemical contaminants. The Idaho HLW & FD EIS states both radioactive and chemical contaminants in INL Site soil samples are lower than screening levels.

Transportation: To date, there have been fewer shipments of radioactive materials than forecast in the 1995 EIS, and the associated risks have thus far been correspondingly lower. In addition, yearly projections of miles traveled for buses, other DOE vehicles, and commercial vehicles has been less than projected in the 1995 EIS, thus actual risks and impacts from vehicle traffic are less than projected.

Health and Safety: The air and ground water pathways are the primary sources of potential health effects for workers and the public from past, ongoing and future INL Site operations. The most significant air emissions sources analyzed in the 1995 EIS have been shut down or placed in stand-by so the potential for health effects from INL Site sources has been significantly reduced. As shown in the ground water analysis, the preliminary results of ground water analysis show no adverse impacts to the public.

As noted in the Air Resources Section of the 2005 SA (6.3.6), emissions of hazardous air pollutants were greater than estimated for four pollutants; however, the resulting maximum concentrations for those pollutants were below any regulatory threshold requiring additional controls. As a result, the 2005 SA analysis concluded there are no adverse health impacts to the public from these pollutants.

Given the most current air and ground water analysis, there have been no actions implemented or conditions found to exist on the INL Site since the 1995 EIS was issued that would increase risks to health or safety from chemical or radioactive exposure. Since 1995, two industrial fatalities have occurred within the INL Site workforce (1996 and 1998), causing the fatality rate to increase slightly above that forecast in the 1995 EIS. Since then, the rates have been decreasing as indicated in the CAIRS database.

Waste Management: The 1995 EIS was conservative regarding waste disposal volumes. Since 1998, the average yearly disposal rates for LLW and MLLW exceed the estimates in the 1995 EIS. However, the total inventory allowed being disposed at the RWMC LLW disposal facility has not changed and will not be exceeded prior to the disposal facility reaching capacity. At the time the 1995 EIS was written, the RWMC LLW disposal facility was projected to continue to receive waste until 2020. As a part of the accelerated cleanup initiative, the closure goal for the RWMC LLW disposal facility was accelerated to 2009. This resulted in increased disposal of backlogged waste streams. Since the 1995 EIS, an additional 586,000 gallons of liquid managed as HLW at the INTEC Tank Farm has been converted to calcine and DOE has sent 3,837 cubic meters of TRU to WIPP for disposal. None of the yearly disposal rates for TRU have been above those projected in the 1995 EIS. In addition, even with accelerated cleanup and removal of buildings associated with that activity, industrial waste disposal has been less than projected in the 1995 EIS.

Environmental Restoration: Numerous CERCLA removal actions have occurred or are occurring on the INL Site that was not specifically evaluated in the 1995 EIS. Those specific activities as well as the balance of CERCLA activities such as soil remediation and tank removal, are addressed through the CERCLA process; however, the resource impacts were considered as part of the cumulative impacts for each resource discipline. Examples of those removal actions include deactivation and partial demolition of PBF reactor building, PER-620, and CPP-627, the Remote Analytical Facility Building and two removal actions initiated at the RWMC in the past two years. The first action grouted beryllium blocks in place, greatly reducing the corrosion rate of the beryllium. The second action has started retrieving targeted waste streams, primarily transuranic waste, from a ½-acre area of Pit 4 in the Subsurface Disposal Area. These two removal actions are directly reducing risk and the threat of risk to the Snake River Plain Aquifer. DOE has proposed a third removal action for removal of targeted waste from an additional ½-acre area of Pits 4 and 6. In addition, DOE continues to remove volatile organic compounds from the vadose zone with over 150,000 pounds of organics removed and destroyed via catalytic oxidizers.

The environmental restoration program has not generated any waste for treatment or disposal not covered under the 1995 EIS and has reduced radioactive risks from the INL Site. Remediation of organic contaminant plumes by bio and vapor extraction methods has been more successful than expected.

Infrastructure: Due to an aggressive clean up schedule, the number of buildings on the INL Site has decreased since 1995. Fewer buildings result in lower maintenance costs and resource use. Diesel fuel, water, electricity, and other fuel use on the INL Site has been less than identified in the 1995 EIS. The quantity of wastewater generated has also been less than

estimated in the 1995 EIS. The Coal Fired Steam Generating Facility has been shut down and replaced entirely with oil boilers, but may again operate to some extent if turned over to the Southeast Idaho Regional Development Alliance. Impacts from that activity will have to be assessed in a future NEPA document. The NWCF has been placed in standby and may not operate in the future which would eliminate the need for kerosene. There have been no facilities constructed, except small support structures, not identified and analyzed in the 1995 EIS. The Environmental Management Program will continue to reduce its activities on the INL Site thus reducing resource use. The reduced resource use may be offset by new projects such as the Pu-238 Consolidation Project and activities associated with the treatment of radioactive wastes at INTEC.

Conclusion: There has been a general net reduction in risk potential and contributing additive sources and therefore a reduction in cumulative environmental impact risks from INL Site operations since the 1995 EIS was issued. However, there has been an increase in worker safety and health risk related industrial accidents and potential exposures since 1995 due to the acceleration of cleanup efforts. The introduction of the INEEL Integrated Safety Management System and Voluntary Protection Program has provided some effective mitigation of this risk. The 1995 EIS adequately discloses and bounds operational cumulative impacts from all sources except for cumulative risk from flooding, however, that risk is being evaluated in a flood study that will soon be finalized. While long-term ground water cumulative impacts from all various sources on the INL Site have been extensively evaluated, a comprehensive site analysis still needs to be conducted. That analysis will likely be conducted as part of the WAG-10 RI/FS and should be completed within the next few years.

The analysis in the 1995 EIS is still adequate for DOE decisions announced in the ROD and existing operations. Future DOE decisions on major federal actions on the INL Site, or decisions deferred in the ROD, will require additional analysis.

7.0. CONCLUSIONS

The 2005 SA conclusions are as follows:

1. The 1995 EIS is still adequate for informing the DOE decision makers and the public of the environmental risks and impacts of actions taken within the scope of the 1995 EIS and for existing Environmental Restoration and Waste Management operations at the INL Site.

2. There are no new significant circumstances, information, or changes identified within the analysis of the 1995 EIS that would compel preparation of a new EIS or Supplemental EIS for current INL Site Environmental Restoration and Waste Management activities.

3. Future DOE decisions on major federal actions at the INL Site including those supporting the new laboratory mission or decisions on projects that were deferred or cancelled in the ROD will require further analysis through the NEPA process.

4. The 1995 EIS analysis may be used as a baseline for cumulative impacts. Future DOE decision makers should ensure that any data referenced from the 1995 EIS included in future NEPA analysis is still current and valid.

5. The 1995 EIS Volume 2 analysis for decisions does not end in 2005. The Ten-year plan was used as a planning horizon to identify reasonably foreseeable activities used for analysis to meet a continuing environmental restoration and waste management mission at the INL Site.

8.0. LIST OF PREPARERS

This list presents the individuals who contributed to the technical content of this Supplement Analysis. All of the individuals are employees of the U.S. Department of Energy, Idaho Operations Office except as noted. Some of the individuals listed below prepared specific sections in accordance with their technical qualifications. Other technical experts provided input to those sections through in-depth review and data verification. Still others provided overall technical or management reviews for their respective organizations.

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