APPENDIX F
PRELIMINARY FLOODPLAIN/WETLAND ASSESSMENT

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F.1 Introduction

The U.S. Department of Energy (DOE) has prepared this *Environmental Impact Statement for the Proposed Consolidation of Nuclear Operations Related to Production of Radioisotope Power Systems* (*Consolidation EIS*) to assess the range of reasonable alternatives regarding DOE's proposal to consolidate radioisotope power systems (RPS) nuclear production operations at a single, highly secure site within its complex. Specifically, the *Consolidation EIS* evaluates the environmental impacts of two action alternatives (Consolidation and Consolidation with Bridge Alternatives) and a No Action Alternative. DOE's Proposed Action is to consolidate all RPS nuclear production operations at a single, highly secure site within its complex. These operations include plutonium-238 production, purification, pelletization, and encapsulation, and RPS assembly and testing.

Under the Consolidation and Consolidation with Bridge Alternatives, DOE would consolidate all RPS nuclear production operations within a secure area at the Materials and Fuels Complex (MFC) within the Idaho National Laboratory (INL). Both alternatives would require new construction. Construction would consist of two new facilities, an addition to an existing facility, several miscellaneous new equipment pads and enclosures for support utilities, and miscellaneous site work for drainage, connection to electrical and mechanical utilities, and paving from new buildings to existing site roads. In addition, construction of a new road is required to connect these proposed new facilities to the Advanced Test Reactor (ATR) within the Reactor Technology Complex (RTC) at INL to provide appropriate security measures for the transfer of unirradiated and irradiated targets, while eliminating transportation over any public road.

Three possible transportation routes for this new road are being evaluated in this EIS (T-3, T-24, and East Power Line Road routes). The northernmost route, while more direct, would require that a new bridge be constructed across the Big Lost River. A new bridge would impact the floodplain and associated wetlands of the Big Lost River.

This Preliminary Floodplain/Wetland Assessment has been prepared in accordance with 10 *Code of Federal Regulations* (CFR) 1022, "Compliance with Floodplain/Wetlands Environmental Review Requirements," (68 FR 51429, August 27, 2003) for the purpose of fulfilling DOE's responsibilities under Executive Order 11988, "Floodplain Management," and Executive Order 11990, "Protection of Wetlands." Executive Order 11988 encourages measures to preserve and enhance the natural and beneficial functions of floodplains. It also requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative. Executive Order 11990 requires Federal agencies to minimize the destruction or degradation of wetlands, and to avoid undertaking new construction located in wetlands unless they find there is no practicable alternative to such construction.

Definition of "Floodplain" Under 10 CFR 1022.4

A floodplain is defined as the lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands. It includes the *base floodplain* and the *critical action floodplain*. The *base floodplain* means the 100-year floodplain, that is, a floodplain with a 1.0 percent chance of flooding in any given year. The *critical action floodplain* means, at a minimum, the 500-year floodplain, that is, a floodplain with a 0.2 percent chance of flooding in any given year.

> **Definition of "Wetland" Under 10 CFR 1022.4**
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> Wetland means an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas.

When maintained in a natural state, floodplains provide valuable services by moderating the extent of flooding, thereby (1) reducing the risk of downstream flood loss; (2) minimizing the impacts of floods on human safety, health, and welfare; and (3) providing support to wetlands, fish, and wildlife. Wetlands serve a variety of functions within the ecosystem including, but not limited to, helping to maintain and improve water quality by removing and transforming pollutants, providing for erosion control and flood protection by storing water during periods of high runoff or high flows in adjacent streams, and providing fish and wildlife habitat while enhancing overall biological productivity. Wetlands also offer cultural, aesthetic, economic, and scientific value.

DOE, in accordance with 10 CFR 1022, seeks to identify, evaluate, and as appropriate, implement alternative actions that may avoid or mitigate adverse floodplain or wetlands impacts, and provide early and adequate opportunities for public review of plans or proposals for floodplain and wetland actions. This Preliminary Floodplain/Wetland Assessment serves to inform the public of proposed activities that have the potential to affect the floodplain and wetlands, and to present alternative actions that may avoid or mitigate adverse floodplain or wetland actions. Upon publication and distribution of this Draft *Consolidation EIS*, DOE will consider comments on this Preliminary Floodplain/Wetland Assessment during the ensuing 60-day public comment period.

If DOE finds that no practicable alternative to locating or conducting the action in the floodplain or wetland is available, DOE would, before taking action, design or modify its action in order to minimize potential harm to or within the floodplain or wetland, consistent with the policies set forth in Executive Orders 11988 and 11990. For actions that would be located in a floodplain, DOE must prepare a statement of findings. This statement of findings would include (1) a description of the Proposed Action; (2) an explanation indicating why the action is proposed to be located in the floodplain; (3) a list of alternatives considered; (4) a statement indicating whether the action conforms to applicable floodplain protection standards; and (5) a brief description of steps to be taken to minimize potential harm to or within the floodplain (10 CFR 1022.14). The statement of findings will be published in the Final EIS distributed to the public. The Final EIS will include all comments received from the public during the 60-day public comment period, as well as DOE's responses to those comments.

F.2 Proposed New Road

The proposed new road at INL would be constructed between the proposed new Plutonium-238 Facility at the MFC and ATR at the RTC, (see **Figure F–1)**. The road would be paved with asphalt over a compacted granular base. Width of the asphalt pavement would be approximately 6.7 meters (22 feet) with 2.7-meter (9-foot) granular shoulders on either side. The width of the construction corridor would be 18 meters (60 feet). Due to security requirements, the new road would be a government road, with access restricted to INL contractor material transfers and other official DOE projects only. The entire length of this restricted access road would be on DOE property. Each end would have swing-type closure gates, which would be padlocked shut when not in use. Additionally, warning signs would be posted on either side of each gate advising that the use of this road is for official DOE business only (INL 2005).

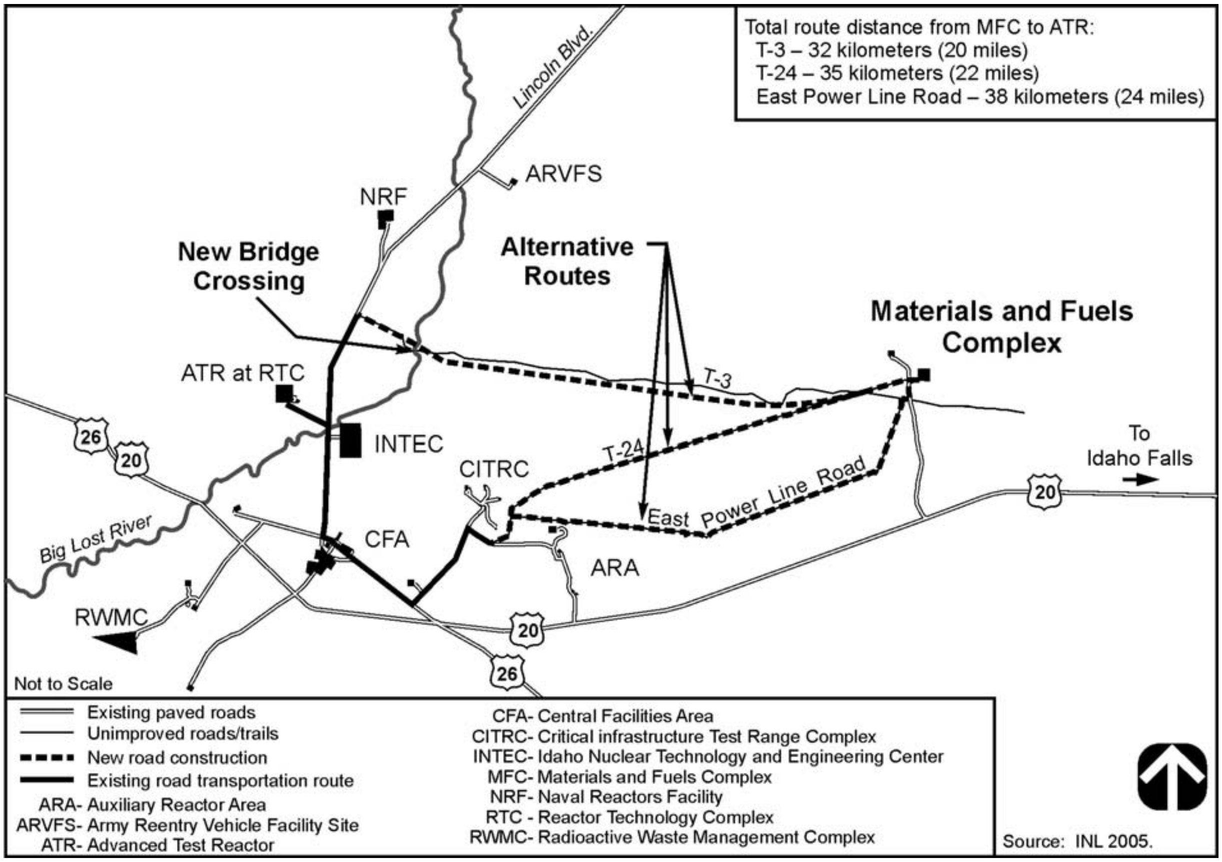

Figure F–1 New Road Alternative Routes

F.3 Nature and Extent of the Flood Hazard, Floodplain, and Associated Wetlands

During dry years, there is little or no surface water flow on the INL. Otherwise, the Big Lost River flows southeast from Mackay Dam, located 72 kilometers (45 miles) upstream of the INL, past Arco and onto the Snake River Plain. On INL, near the southwestern boundary, a diversion dam prevents the flooding of downstream areas during periods of heavy runoff by diverting water to a series of natural depressions or spreading areas (see **Figure F–2**). During periods of high flow or low irrigation demand, the Big Lost River continues northeastward past the diversion dam, passes within about 60 meters (200 feet) of the Idaho Nuclear Technology and Engineering Center (INTEC), and ends in a series of playas where the water infiltrates the ground (DOE 2002b). The INL diversion dam constructed in 1958 and enlarged in 1984 was designed to secure INL from the 300-year flood (estimated peak flow of slightly above 142 cubic meters [5,000 cubic feet] per second) of the Big Lost River (DOE 2002a, INL 2005).

Flooding on the Big Lost River has been evaluated for the potential impact on INL facilities and included examination of the flooding potential due to the failure of Mackay Dam from a probable maximum flood (see Figure F–2). The maximum flood evaluated was assumed to be caused by a probable maximum flood resulting in the overtopping and rapid failure of Mackay Dam, and included the effects of systematic (non-instantaneous) failure of the diversion dam. This flood would result in a peak surface water elevation at INTEC of 1,499 meters (4,917 feet), with a peak flow of 1,892 cubic meters (66,830 cubic feet) per second in the Big Lost River measured near INTEC. The average elevation at INTEC is 1,499 meters (4,917 feet). At this peak water surface elevation, portions of INTEC would be flooded, especially at the north end. However, the RTC (formerly the Test Reactor Area) would not be flooded.

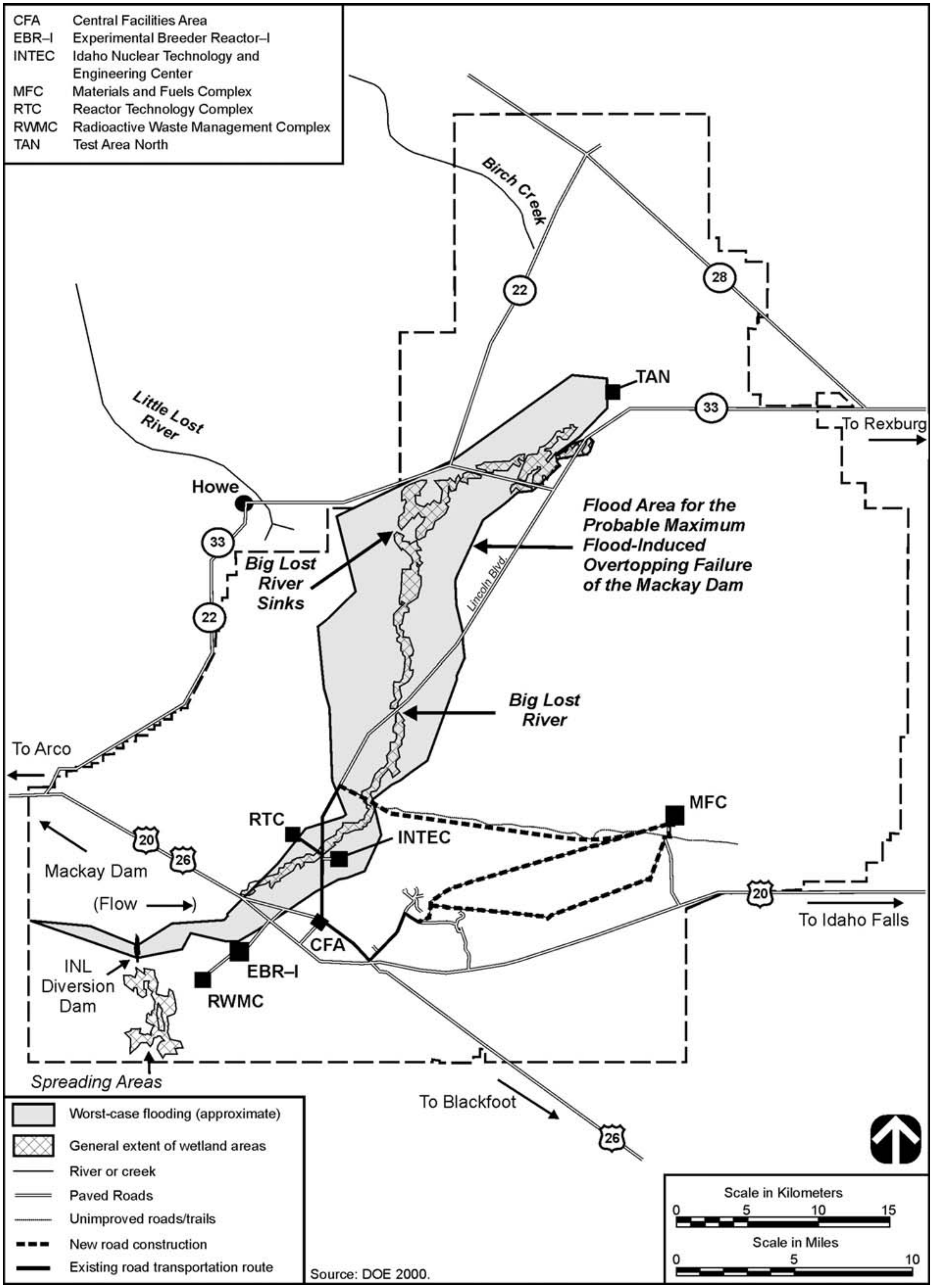

Figure F–2 Surface Water Features, Wetlands, and Flood Hazard Areas at Idaho National Laboratory

Because the ground surface at INL and INTEC is relatively flat, floodwaters outside the banks of the Big Lost River would spread over a large area and pond in the lower lying areas. Although predicted flood velocities would be relatively slow with shallow water depths, some facilities could be impacted. There is no record of any historical flooding at INTEC from the Big Lost River, although evidence of flooding in geologic time exists (DOE 2002b).

Nevertheless, other than natural topography, the primary choke points for probable maximum flood flows are the diversion dam on the INL and the culverts under Lincoln Boulevard near INTEC that allow the Big Lost River to flow beneath Lincoln Boulevard between INTEC and the RTC. The probable maximum flood would quickly overtop the diversion dam. The Lincoln Boulevard culverts are capable of passing about 42 cubic meters (1,500 cubic feet) per second (DOE 2002b).

Probable Maximum Flood

The probable maximum flood is the hypothetical flood considered to be the most severe reasonably possible flood, based on the comprehensive hydrometeorological application of maximum precipitation and other hydrological factors favorable for maximum flood runoff (e.g., sequential storms and snowmelts). It is usually several times larger than the maximum recorded flood.

A preliminary map of the 100-year floodplain for the Big Lost River prepared by the U.S. Geological Survey (USGS) in 1998 indicated INTEC may be subject to flooding from a 100-year flood. The USGS 100-year flow estimate is approximately 206 cubic meters (7,260 cubic feet) per second at the Arco gauging station 19 kilometers (12 miles) upstream of the INL diversion dam. This estimate and the preliminary 100-year floodplain map is based on 60 years of stream gauge data and conservative assumptions. It was assumed that the INL diversion dam did not exist and that some 30 cubic meters (1,040 cubic feet) per second would be captured by the diversion channel and flow to the spreading areas southwest of the diversion dam. The analysis then assumed the remaining 176 cubic meters (6,220 cubic feet) per second of flow would run down the Big Lost River channel on the INL. A U.S. Army Corps of Engineers analysis and an INL geotechnical analysis both concluded that the INL diversion dam could withstand flows up to 170 cubic meters (6,000 cubic feet) per second. Culverts running through the diversion dam could convey a maximum of an additional 25 cubic meters (900 cubic feet) per second, but their condition and capacity as a function of water elevation is unknown. A subsequent DOE-commissioned flood hazard study published in 1999 by the U.S. Bureau of Reclamation is based on analyses with inputs from stream gauge data and two-dimensional flow modeling constrained by geomorphic evidence. Floodplain maps were produced using a flow estimate of 93 cubic meters (3,270 cubic feet) per second for the 100-year flow and 116 cubic meters (4,086 cubic feet) per second for the 500-year Big Lost River flow. These associated floodplain maps were generated assuming one-dimensional flow, no infiltration or flow loss along the Big Lost River flow path, and no diversion dam. Under these conservative assumptions, small areas of the northern portion of INTEC could flood at the estimated 100 and 500 year flows (DOE 2002b). Additional work is currently being performed by DOE at the INL to further refine the floodplain boundaries of the Big Lost River as a basis to support future flood hazard assessments. The results of this effort, if available, will be included in the Final EIS.

National Wetland Inventory maps prepared by the U.S. Fish and Wildlife Service (USFWS) have been completed for most of INL. These maps indicate that the primary wetland areas are associated with the Big Lost River (see Figure F–2). Wetlands associated with the Big Lost River are classified as riverine/intermittent, indicating a defined stream channel with flowing water during only part of the year. However, wetland vegetation that exists along the Big Lost River is in poor condition because of recent years of only intermittent flows (DOE 2002a).

F.4 Floodplain/Wetland Impacts from the Proposed New Road Construction

Of the three alternative routes initially considered by DOE, construction of the new road as described in Section F.2 along the existing T-3 route would provide the most direct route between the MFC and the ATR in the RTC. However, this route would require construction of a new bridge across the Big Lost River to carry the new roadway (see **Figure F–3**) and has been dismissed from further evaluation (see Chapter 2, Section 2.2.4.3 of this EIS). Associated activities would specifically include placement of a construction laydown pad (typically consisting of rock) beneath the proposed bridge span and construction of cofferdams to support placement of the bridge piers. These activities would be facilitated by the fact that the river is normally dry. Figure F–3 depicts the area of potential impact on the 100- and 500-year floodplains of the Big Lost River, as defined by the U.S. Bureau of Reclamation (see Section F.3), and associated riverine wetlands.

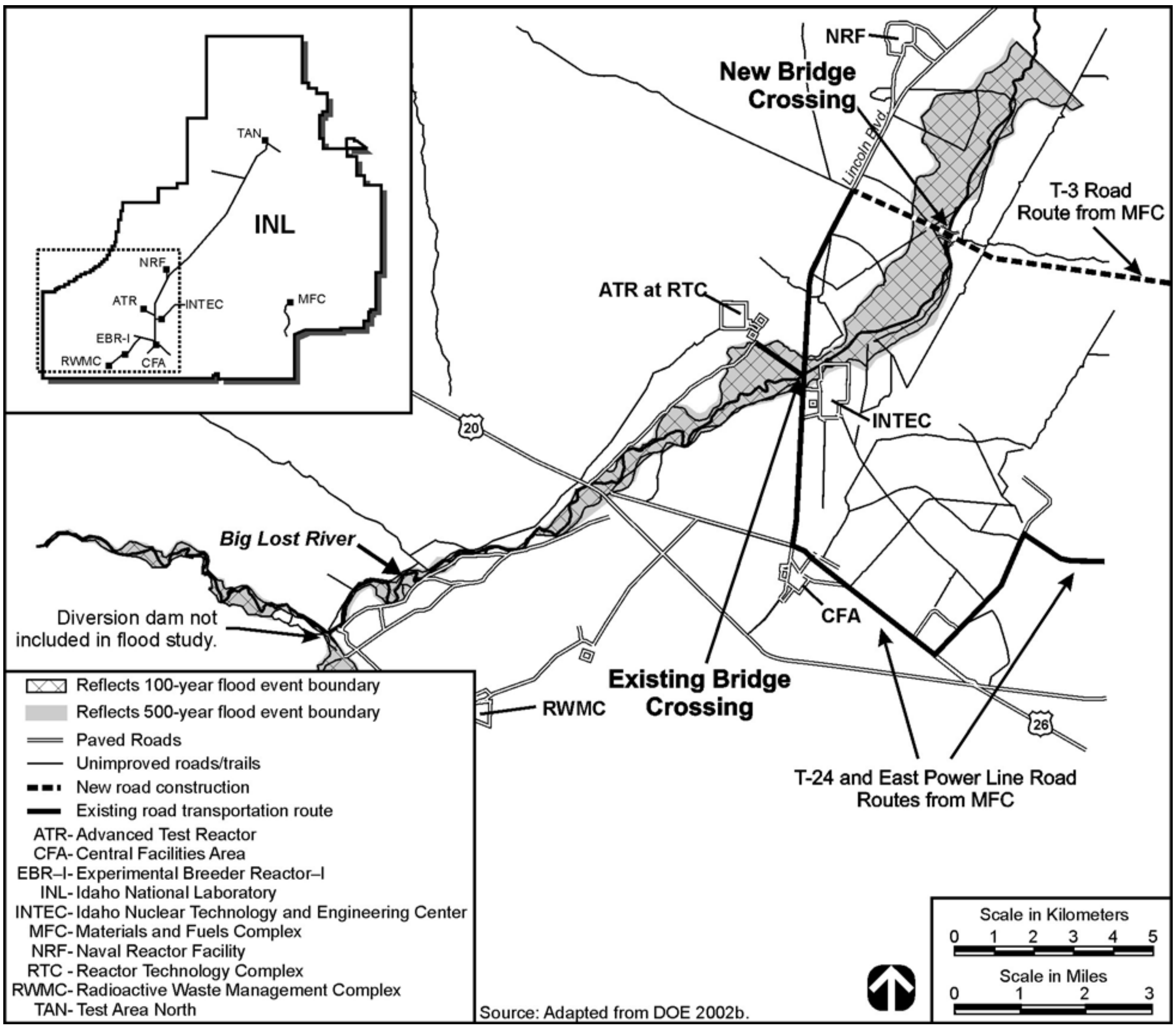

Figure F–3 Alternate Road Routings and Impact on the Floodplains of the Big Lost River

In the short term, the floodplain and floodway (channel) of the Big Lost River and associated riverine wetlands would be directly impacted by clearing, grading, and embankment excavation work during road and bridge construction. As discussed in Section F.3, mapped wetlands along the Big Lost River are classified as riverine/intermittent. Site-wide vegetation mapping indicates that most vegetation along the segment of the new road traversing the Big Lost River is sagebrush steppe habitat. In general, wetland and other vegetation would be preserved in the area of the bridge/road crossing to the extent possible, and adjacent areas would be restored and enhanced after construction is complete. Potential impacts of this proposed new road construction on ecological and cultural resources, as well as on other resource areas, are further described in Chapter 4 of this *Consolidation EIS*.

Although the arid climate reduces the potential for water erosion from precipitation events, construction-related land disturbance would also expose soils and sediments to possible erosion. Storm-water runoff, if present, from areas exposed during construction could convey soil and sediments and other pollutants (e.g., construction waste materials) to surface waters or infiltrate the subsurface and impact the underlying groundwater. Appropriate soil erosion and sediment control measures (e.g., sediment fences, stacked hay bales, mulching disturbed areas, etc.) and spill prevention practices would be employed during construction to minimize suspended sediment and material transport and potential water quality impacts. Scheduling construction activities during the dryer months and when river flow is unlikely to be present would further reduce the potential for water quality impacts.

A bridge design has not been completed for the T-3 Road crossing. However, bridge abutments at either end of the bridge span, associated retaining walls, and piers supporting the bridge span would have a relatively small footprint on the river channel and floodplain and would be designed to have a minor impact on hydraulic flow and floodwaters over the long term. Design and construction of the crossing would ensure that the change in runoff from pre- to post-development conditions would be small.

The proposed T-3 route would traverse the floodplain before linking up with Lincoln Boulevard to the west of the river (see Figure F–3) would include structures (e.g., culverts) to allow inflow and outflow of water into the floodplain. This would ensure that there would be minimal impact on floodwater elevations (no rise), with no impact on downstream facilities.

The T-24 Road route is located south of the T-3 Road. Approximately 16 kilometers (10 miles) would need to be paved from the MFC until the road reaches the Critical Infrastructure Test Range Complex (CITRC) (formerly the Power Burst Facility) and connects to approximately 19 kilometers (12 miles) of INL existing internal roads leading to the RTC (INL 2005). Although less direct than following the T-3 Road, this route would use an existing bridge across the Big Lost River, with no impacts on the floodplain of the Big Lost River or associated wetlands.

The East Power Line Road route is located south of both the T-3 Road and the T-24 Road. An advantage is that this road is currently maintained to a higher level than the T-3 and T-24 routes because of ongoing activities related to power line maintenance. As with the T-24 Road, approximately 19 kilometers (12 miles) would need to be paved from the MFC before the new road connects to existing INL paved roads at CITRC (INL 2005). Also, this route would use an existing bridge across the Big Lost River, with no impacts on the floodplain of the Big Lost River or associated wetlands.

F.5 Conclusion

The proposed construction of the new road along the existing T-3 Road and associated bridge crossing would have short-term impacts on the floodplain, floodway, and associated wetlands of the Big Lost River. Following their completion, the new bridge crossing and road traversing the Big Lost River floodplain would have only a minor impact on hydraulic flow and floodwaters. Overall, floodplain values of infiltration and conveyance would be minimally affected due to the fact that the majority of the floodplain will not have any significant floodplain altering development. No long-term adverse impacts would be expected from the proposed construction.

The T-24 and East Power Line Road routes as described in Section F.4 would have no impacts on the floodplain, floodway, and associated wetlands of the Big Lost River because they do not require any new bridge crossing. These alternative roads also are shorter and require less road construction.

Additional studies of all three routes including ecological and cultural resource surveys and regulatory consultations will be completed with the results presented in the Final EIS. In total, these studies would define the acreage of vegetation types that could be impacted, establish the occurrence and legal status of animal species residing in the corridor, identify the presence and significance of any potentially affected cultural resources, help to define permitting requirements, and would facilitate construction planning and post-construction mitigation for impacted areas. These additional studies will ultimately support a decision on selecting a final road routing to be published in the ROD.

F.6 References

DOE (U.S. Department of Energy), 2000, *Final Environmental Impact Statement for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel*, DOE/EIS-0306, Office of Nuclear Energy, Science and Technology, Washington, DC, July.

DOE (U.S. Department of Energy), 2002a, *Final Environmental Impact Statement for the Proposed Relocation of Technical Area 18 Capabilities and Materials at the Los Alamos National Laboratory*, DOE/EIS-0319, National Nuclear Security Administration, Washington, DC, August.

DOE (U.S. Department of Energy), 2002b, *Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement*, DOE/EIS-0287, Idaho Operations Office, Idaho Falls, Idaho, September.

INL (Idaho National Laboratory), 2005, *Consolidation EIS* Information document, Data call materials, Idaho Falls, Idaho.