

SUPPLEMENT ANALYSIS

FOR THE

**Idaho High-Level Waste and Facilities Disposition Final Environmental
Impact Statement**

Integrated Waste Treatment Unit (IWTU)

Product Storage Building (PSB)-II

October 2022

United States Department of Energy
Idaho Operations Office

Introduction

The Department of Energy (DOE) has prepared this supplement analysis (SA) to evaluate the Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement (EIS) (DOE/EIS-0287, Final EIS) (DOE 2002) in light of changes that could have bearing on the potential environmental impacts previously analyzed. The Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations direct agencies to prepare a supplement to either a draft or final EIS when a major Federal action remains to occur and either the “agency makes substantial changes to the proposed action that are relevant to environmental concerns” or there are “significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.” (40 CFR 1502.9(d)(1)(i)–(ii)). DOE’s NEPA regulations state that when it “is unclear whether or not an EIS supplement is required, DOE shall prepare a Supplement Analysis.” (10 CFR 1021.314(c)). This SA provides sufficient information for DOE to determine whether (1) to supplement an existing EIS, (2) to prepare a new EIS, or (3) no further NEPA documentation is required. (10 CFR 1021.314(c)(2)(i)–(iii)).

Proposed Change

This SA was prepared to support the analysis of the need for a supplement to the Final EIS in consideration of the proposed action of constructing and operating a second Product Storage Building (PSB-II) at the Idaho National Laboratory (INL) Site- Idaho Nuclear Technology and Engineering Center (INTEC) for the Integrated Waste Treatment Unit (IWTU) facility. It will also include modification of the existing Product Storage Building (PSB-I) to allow the transfer of product storage vaults into a connecting breezeway between PSB-I and PSB-II.

Background

In October 2002, DOE issued the Final EIS, which provided an analysis of the potential environmental consequences of alternatives/options for the management and disposition of sodium-bearing waste (SBW), calcine, and HLW facilities at INTEC. INTEC is located at the Idaho National Laboratory (INL) Site in southeastern Idaho. The Final EIS analyzed six alternatives for waste processing and the final disposition of INTEC HLW management facilities. DOE considered the information in the Final EIS, a related Supplement Analysis (DOE 2005a), and comments received on the Federal Register Notice (70 FR 44598; August 3, 2005) that announced DOE’s preferred treatment technology for SBW when making the decisions in a December 2005 record of decision (ROD) (DOE 2005b). In this ROD, DOE adopted a phased decision-making strategy to issue a series of amended RODs that will address future waste processing and closure of HLW facilities. With regard to SBW treatment, the 2005 ROD states, “DOE has decided to treat SBW using the steam reforming technology.”

As part of the facilities described in the Final EIS, the IWTU is located at the INTEC on the INL. The IWTU mission is to treat the approximately 900,000 gallons of liquid radioactive waste that remain from past INTEC operations, package the solid product in canisters, and store these

canisters in concrete vaults on site in the interim while awaiting final disposal. Because of the relatively high sodium content, this waste is referred to as SBW. The radioactive waste that will be processed in the IWTU facility is the remaining liquid SBW that will be generated during tank closure activities. The remaining liquid SBW is stored in three, 300,000-gal tanks at INTEC including supernate,¹ tank heels² and wash rinsates. These tanks and the approximate volume of SBW they contain are WM-187 (266,500 gal); WM-188 (281,800 gal); and WM-189 (281,700 gal).

The treatment process uses fluidized-bed steam reforming technology to treat the waste, destroying nitrates and organic materials, producing a granular solid product (primarily sodium carbonate and sodium aluminate) that is suitable for packaging in waste containers and future disposal. The IWTU SBW treatment process involves (1) oxidizing and converting any organics contained in the SBW liquid to carbon dioxide and water vapor; (2) converting the majority of nitric acid and nitrates directly to nitrogen gas; (3) converting inorganic chemicals to a dry, solid carbonate or aluminate product retaining the radionuclides and hazardous constituents; (4) packaging the solid product into canisters; and (5) surveying, and storing the filled canisters in concrete vaults for interim storage on-site.

A Product Storage Building (PSB-I) was included in the Final EIS as part of the Vitrified High-Level Waste (HLW) interim Storage at the IWTU. The PSB-I is used to store vaults containing solid waste product, which is collected in remote-handled (RH) canisters. Sixteen (16) RH canisters are stored in a single large concrete vault. PSB-I has room for 37 vaults (INL 2020a).

Since substantial completion of construction, the IWTU has been subject to numerous modifications, corrective measures, and improvements as the facility has transitioned from construction start-up and commissioning to pre-radiological operations. These modifications and improvements have been the direct result of lessons learned during attempts to achieve sustained simulant operations and ensure the facility is fully capable of performing its intended mission of treating the approximately 900,000 gal of sodium bearing liquid radioactive waste currently stored at the INTEC Tank Farm, in a safe and efficient manner. Plant start-up and commissioning used the Inspection, Tests, Analysis, and Acceptance Criteria (ITAAC) program to define the test objectives and acceptance criteria for construction start-up and commissioning testing. All the ITAACs other than those that are specific to the System Performance Testing have been completed in prior tests. Engineering Path Forward (EPF) documents serve the same function as the ITAAC program for prior tests: it defines the test objectives and data requirements for tests going forward.

During the pre-radiological operations period, IWTU operations, engineering, and testing personnel have documented system and equipment performance issues and recommendations

¹ Supernate is considered to be any waste that can be removed from the tanks up until loss of suction occurs on the permanently installed tank jets.

² Tank heels are considered to be any residual waste that remains in the bottom of the tank following loss of suction that requires the installation of temporary equipment to remove.

for corrective measures or improvements in Test Reports and Engineering Paths Forward (EPFs). TI-102 – Parts 4 & 5 testing (INL 2018) has determined that 78 vaults are required to store the processed waste (supernate, tank heels and rinsate).

The primary reasons for additional onsite storage include the facilities revised strategy to use blended waste feedstock for system performance testing during initial radiological operations, accounting for planned and unplanned shutdowns requiring system flushes with simulant throughout the treatment campaign, variability in planned waste treatment feed rates, and additional volumes of liquid that are needed to achieve full Resource Conservation and Recovery Act closure (i.e., tank heels and rinsates), which were not considered for the sizing of PSB-I. A second PSB (PSB-II) is proposed to provide additional onsite storage capacity. PSB-II will be located north of the existing PSB (INL 2020b). Modifications to the site fence, roads, and utilities will be required to support PSB-II construction. Vaults will be transferred from the IWTU vault loading station into the existing PSB-I, as described in the Final EIS, directly to PSB-II, or through the existing PSB-I into PSB-II.

The addition of 19,875 ft² via the construction of the PSB-II will provide a total storage capacity of 84 vaults, 48 in PSB-II, and 36 in the existing PSB-I (one space in existing PSB is lost to provide access to PSB-II). 84 vaults will hold 1,344 canisters. Per PLN-2019 (INL 2020a), 1,235 canisters (78 vaults) are needed to treat the SBW, including heels and rinsate, and tank solids. PSB-II will have extra storage capacity to account for variability in the treatment process/rates, decontamination cycles, and startup/shutdown activities.

Proposed Product Storage Building – II

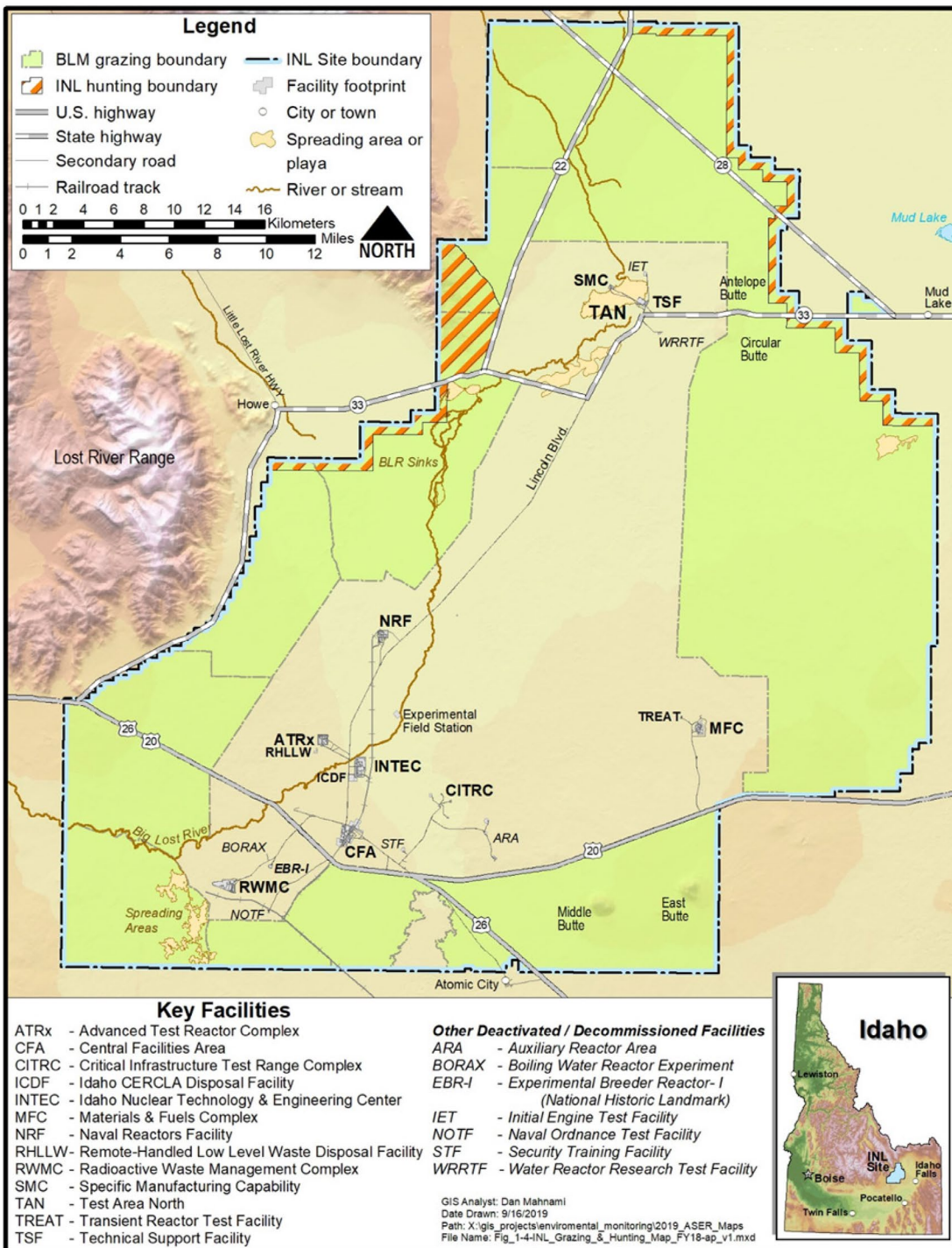
PSB-II will be constructed of structural steel and reinforced concrete to house an additional 48 product storage vaults in a 6 × 8 array. The structure will be classified as Occupancy Group H-4 per the International Building Code. The building will be located north of the existing PSB (PSB-I) and will include a breezeway connecting it from to the north end of PSB-I. PSB-I will be modified to allow the transfer of product storage vaults into the breezeway connecting PSB-II. The building will be compatible with the existing air pallet system used to move vaults, and the breezeway will have a walled area attached to accommodate potential future facility modifications. No additional modifications beyond those described in this SA are currently planned. If additional modifications are identified, DOE will determine the need for additional NEPA analysis at that time. The building will include all utility upgrades necessary to support the additional storage (i.e., power, water, cathodic protection). This will necessitate an electrical expansion to the north facility. The existing power grid will be extended to supply power to equipment within this new building.

PSB-II will be operated in the same manner as PSB-I. Vaults with 16 filled product storage canisters will be removed from the vault loading area, moved with the existing air pallet system, and placed in the desired array location within the product storage building (either PSB-I or PSB-II). Emplaced vaults will be monitored periodically in accordance with the facilities environmental permit and radiological monitoring program until final disposal.

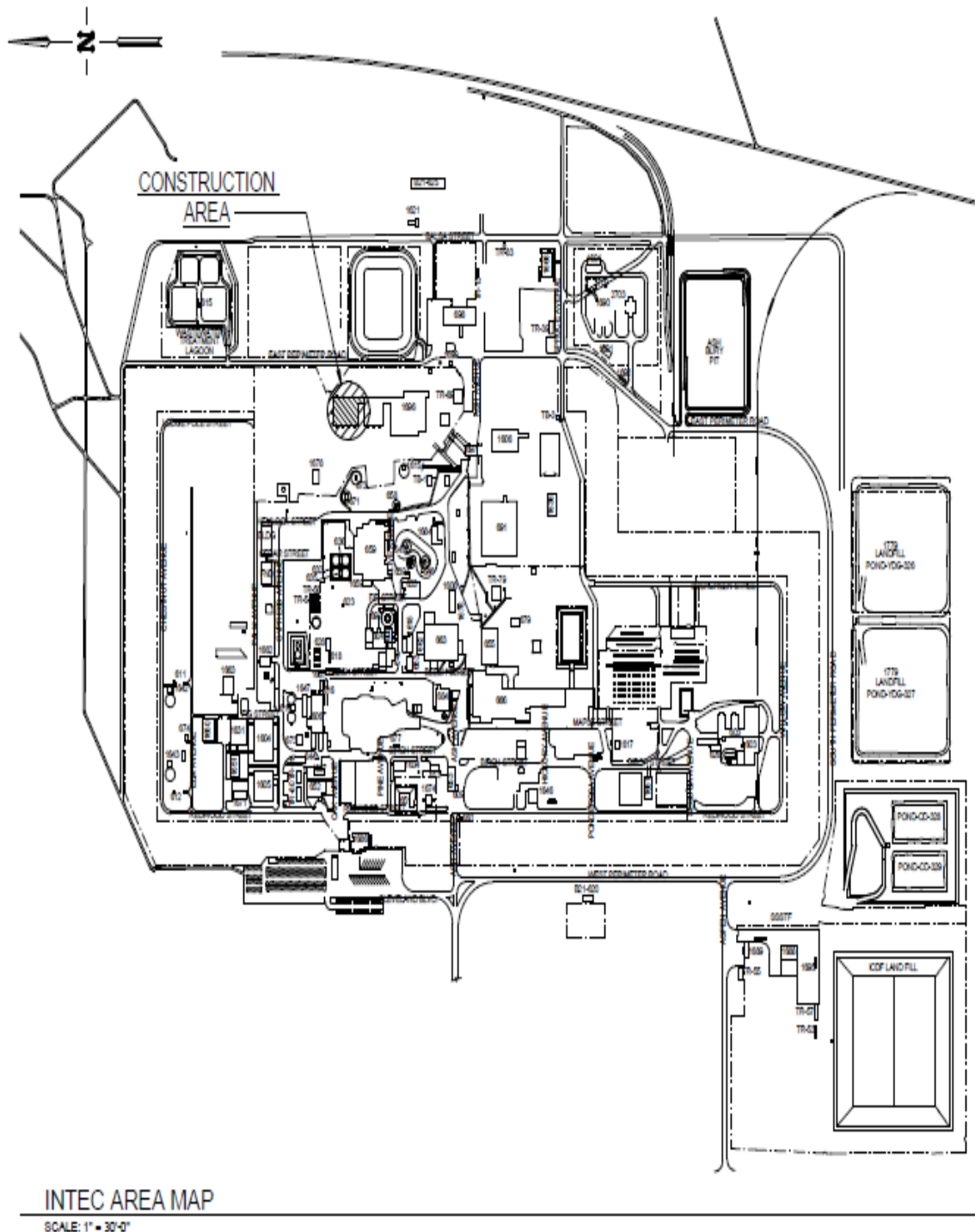
PSB-I is ~14,800 ft², while the proposed PSB-II would be ~19,875 ft². The proposed PSB-II was planned using the design and requirements described in the Final EIS (Appendix C.6, C.6.2.27) for PSB-I. The expanded facility will include ~1200 ft² empty space for a proposed hot shop (future capability). PSB-I and PSB-II shall provide a combined space for storage and maneuverability of 84 product storage vaults using air pallets that will allow retrieval of any vault stored in PSB-I or PSB-II. The floor system will be designed to allow air pallets to operate with minimum effort and maintenance.

The following figures indicate the location of the proposed PSB-II within the INTEC facility area as well as relative to the existing Product Storage Building.

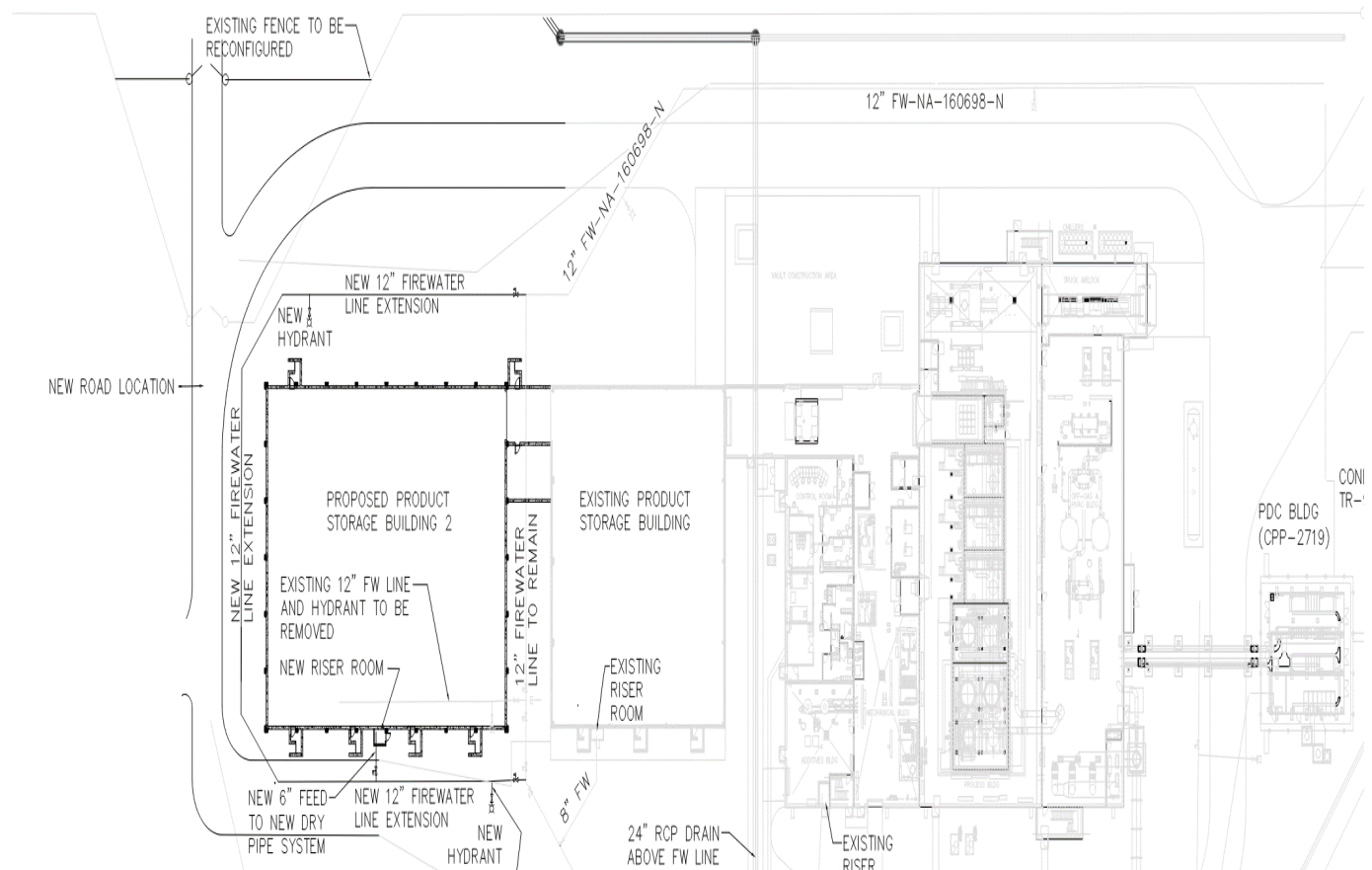
INL Site and Facilities



INTEC Area Map ((INL 2020b))



PSB-II Location Within INTEC (INL 2020b)



Resources Analyzed

Because the proposed change is limited to the construction and operation of PSB-II, adjacent to the existing facility to provide the additional necessary storage space identified during preliminary testing, with no new or additional processing, impacts would be mostly limited to the construction phase of the PSB-II. The Final EIS assessed environmental consequences for 14 areas of impact for waste processing alternatives, including the steam-reforming option. There are minimal operational impacts anticipated and any contributions to cumulative impacts would be negligible.

The following resource areas are not analyzed in detail in this SA because it is clear that they will not be significantly affected by the changes to the proposed action or new circumstances or information:

- **Land Use:** Construction would take place wholly within INTEC and conform with current and planned uses of INTEC. Construction does not affect land use of the surrounding region.

- *Aesthetic and Scenic Resources:* Construction would take place in an industrial, highly developed area and would not affect the local visual characteristics. Construction of the PSB-II could produce fugitive dust (if not mitigated) that could affect visibility temporarily in localized areas; however, it would not be visible from lands adjacent to the INL or beyond. Dust generation would be mitigated by the application of water, use of soil additives, and possibly administrative controls, such as halting construction during high-wind conditions.
- *Geology and Soils:* Construction activities would include excavating and grading of soil in a highly developed area. There are no unique geological resources that would be affected.
- *Air Resources:* Construction emissions would result primarily from the disturbance of land, which generates fugitive dust, and from the combustion of fossil fuels in construction equipment. Dust generation would be mitigated by the application of water, use of soil additives, and possibly administrative controls, such as halting construction during high-wind conditions.
- *Water Resources:* Potential construction impacts evaluated for water resources include water use and impacts to surface water quality from stormwater runoff. Water use is discussed under *Utilities and Energy*. Best management practices would be utilized to minimize stormwater runoff and the potential pollution of surface waters. INTEC stormwater runoff is prevented from reaching the Big Lost River by drainage ditches and berms that divert runoff to a borrow pit and depressions scattered around the INTEC area. Water collects in these depressions and infiltrates the ground surface, providing recharge to the aquifer.
- *Traffic and Transportation:* Projected increases in employment associated with the construction of PSB-II are not anticipated to impact local main transportation routes.
- *Environmental Justice:* There would be no disproportionately high and adverse effects on minority populations or low-income populations. The proposed construction would generate temporary increases in employment and earnings in the region of interest. Construction is not expected to significantly affect land use, cultural resources, or ecological resources because no previously undisturbed onsite land would be required and no offsite lands are affected. Because construction impacts would not adversely impact the surrounding population, and no means were identified for minority or low-income populations to be disproportionately affected, no disproportionately high and adverse impacts would be expected for minority or low-income populations.
- *Waste and Materials:* Limited waste would be produced as a result of the construction of the PSB-II. There will be a section (~18 ft x 16 ft) of reinforced concrete removed from the northeast corner of the existing product storage building to allow construction of a breezeway to connect the existing storage building to the new one which allow the movement of vaults. This section of concrete was installed during the initial construction of the existing facility and has not been exposed to radiological contamination, therefore there is no risk of contamination with removal. In addition, incidental waste would be generated during typical construction activities. All wastes would be disposed of on-site (INL).

The construction of the PSB-II is anticipated to have similar impacts as those described in the Final EIS, with the most important discussed below.

Socioeconomics/Employment: The design, site preparation, and construction of the PSB-II is anticipated to last for approximately 2.5 years, with on average 75 additional direct jobs created during this construction project. Therefore, temporary minor increases in employment and earnings in the region of interest are anticipated.

Cultural Resources: The proposed change was evaluated for potential effects to historic properties from the proposed modification and construction activities, and from potential visual effects to historic properties within the project area of potential effects (APE). There are eight historic architectural properties within the APE. All eight properties have previously been recommended for listing on the National Register of Historic Place (NRHP) as contributing to either a potential historic district or historic landscape but not as individually eligible for the NRHP (CPP-606, CPP-618, CPP-628, CPP-632, CPP-635, CPP-636, CPP-646, and CPP-647). Seven of the properties would contribute to a potential district with a period of significance from 1949 to 1970. When evaluated, this potential district was found to retain significance but lack the integrity necessary to convey that significance. Therefore, the district is not eligible for the NRHP and does not constitute a historic property. A second potential district, representing INTEC's second generation of buildings dating from 1971 to 1989, was also evaluated. However, the perspective necessary to fully and accurately evaluate that district is lacking, due to much of the period of significance not yet meeting the 50-year threshold required for evaluation to the NRHP. This undertaking will occur within the INTEC facility and therefore has been determined to be exempt from section 106 review for archaeological properties under the INL Cultural Resources Management Plan's Activity Exemption #9, Ground Disturbance within Fenced Facility Perimeters (DOE/ID 2016).

There are no historic buildings that would be affected by the PSB expansion. The area where the expansion would be sited is currently covered in asphalt but largely devoid of any structures. The project has erected three small Quonset huts within the last couple of years to warm/dry coal products prior to use in the facility. Therefore, the construction and operation of PSB-II would not change cultural resources impacts as analyzed in the Final EIS.

Ecological Resources: Construction of the PSB-II will occur adjacent to the PSB-I, within the perimeter security fence at INTEC, which is a heavily developed industrial area with most natural vegetation removed, its value as wildlife habitat is marginal. Construction-related disturbances of various types (such as earthmoving and noise) associated with the construction of PSB-II could result in displacement of individual animals. No state or federally listed species are known to occur in the area. Migratory birds may utilize critical equipment required for construction or other areas for nesting purposes. Frequent inspections of equipment and structures will be conducted to identify nesting activities to ensure uninterrupted operations and avoid potential Migratory Bird Treaty Act compliance issues. If a nest is observed, the facility environmental personnel or their Migratory Bird Treaty Act Technical Representative will be immediately contacted for direction on actions to be taken. A number of bat species use INL Site infrastructure as roosting habitat. Prior to removal of temporary or permanent infrastructure, such as Quonset huts, the INL Natural Resources group will perform a survey for

bats according to the INL Site Bat Protection Plan (DOE/ID 2018). Therefore, the construction and operation of PSB-II would not change ecological resources impacts as analyzed in the Final EIS.

Health & Safety: PSB-II construction and operation activities will not result in increased radiation exposure to workers. All hazard and accident sequences in the approved IWTU safety basis³ remain applicable for the proposed storage for PSB-II. PSB-II was determined to be a simple modification to the safety basis of the IWTU facility in accordance with Title 10 Code of Federal Regulations (CFR) Part 830, Subpart B. The material at risk analyzed in the current approved IWTU safety basis remains the same and consists of SBW product from the three tanks already analyzed in the IWTU safety basis. Specifically, the SBW product will originate from ~900,000 gallons of SBW stored at the INTEC tank farm in tanks WM-187, 188, and 189 and will be processed in the same manner as product stored in the current PSB-I. Rather than this entire SBW product inventory being stored in PSB-I alone, the inventory will be split between PSB-I and PSB-II. PSB-II will house the same vaults with loaded canisters as PSB-I. These vaults and canisters will be identical in design and are evaluated and analyzed in the current approved IWTU safety basis. Therefore, the construction and operation of PSB-II would not change health and safety impacts as analyzed in the Final EIS.

Utilities and Energy: Construction activities would result in power and water consumption and wastewater generation but would be negligible in comparison to the annual energy and water usage analyzed for INTEC in the EIS. Water usage would include potable water for workers and process water for dust control and other construction-related activities. Domestic and process water would be supplied from existing wells. The use of heavy equipment (e.g., bulldozers, earth movers, dump trucks, compactors) and portable generators during construction would result in the consumption of fossil (diesel) fuel. Following construction, the only water line into PSB-II will be for fire protection purposes. The electrical supply into PSB-II will be 1200 amps. The existing INTEC capacity would adequately support these needs. Therefore, the construction and operation of PSB-II would negligibly change utilities and energy use as analyzed in the Final EIS.

Facility Accidents: Construction and operation of PSB-II will not increase the likelihood of a facility accident for any of the classes of initiating events as analyzed in the Final EIS including:

- Fires
- Explosions during facility operations.
- Spills (of radiological or hazardous material) during facility operations
- Criticality (uncontrolled nuclear chain reaction during facility operations)
- Natural phenomena (for example; flood, lightning, seismic event, high wind) during facility operations
- External events (human-caused events that are external to a facility and may impact the safe operation and integrity of the facility) during facility operations

³ Safety basis means the documented safety analysis and hazard controls that provide reasonable assurance that a DOE nuclear facility can be operated safely in a manner that adequately protects workers, the public, and the environment. (10 CFR 830)

All hazard and accident sequences in the approved IWTU safety basis remain applicable for the proposed storage for PSB-II. PSB-II was determined to be a simple modification to the safety basis of the IWTU facility in accordance with 10 CFR 830, Subpart B. The material at risk analyzed in the current approved IWTU safety basis remains the same and consists of SBW product from the three tanks already analyzed in the IWTU safety basis. Specifically, the SBW product will originate from ~900,000 gallons of SBW stored at the INTEC tank farm in tanks WM-187, -188, & -189 and will be processed in the same manner as product stored in the current PSB-I. Rather than this entire SBW product inventory being stored in PSB-I alone, the inventory will be split between PSB-I and PSB-II. PSB-II will house the same vaults with loaded canisters as PSB-I. These vaults and canisters will be identical in design and are evaluated and analyzed in the current approved IWTU safety basis. Therefore, the construction and operation of PSB-II would not change the risk of facility accidents as analyzed in the Final EIS.

Determination

In accordance with the NEPA and CEQ's and DOE's implementing NEPA regulations, DOE prepared this supplement analysis to evaluate whether the Idaho Cleanup Project activities related to the expansion of the storage capacity of the product storage building area require supplementing the existing EIS or preparing a new EIS. DOE concludes that the decision to construct the PSB-II is not a substantial change relative to the proposal analyzed in the Final EIS, nor are there significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. Therefore, neither a new EIS nor a supplement to the Final EIS is required, consistent with 10 CFR 1021.314(c) and 40 CFR 1502.9(d)(4). No further NEPA documentation is required.

References

- 10 CFR 1021, 2012, "National Environmental Policy Act Implementing Procedures," *Code of Federal Regulations*, Office of the Federal Register, January 1, 2012.
- 10 CFR 830, 2020, "Nuclear Safety Management," *Code of Federal Regulations*, Office of the Federal Register, October 19, 2020.
- 40 CFR 1502, 2012, "Environmental Impact Statement," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2012.
- 70 FR 44598, 2005, "Notice of Preferred Sodium Bearing Waste Treatment Technology," *Federal Register*, August 3, 2005.
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INL, 2018, EPF-095, *Test Objectives for TI-102- Part 5 (Demonstration Run 3)*, Rev. 2, 11-27-2018.

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INL, 2020b, RPT-1840. *Conceptual Design Report, IWTU Product Storage Building II (PSB-II)*, Rev. 0, 8/25/20.