RECLAMATION

Managing Water in the West

Draft Environmental Assessment Third Powerplant Generating Units Overhaul Activities

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Grand Coulee Power Office
Grand Coulee, Washington

September 2009

U. S. Department of the Interior

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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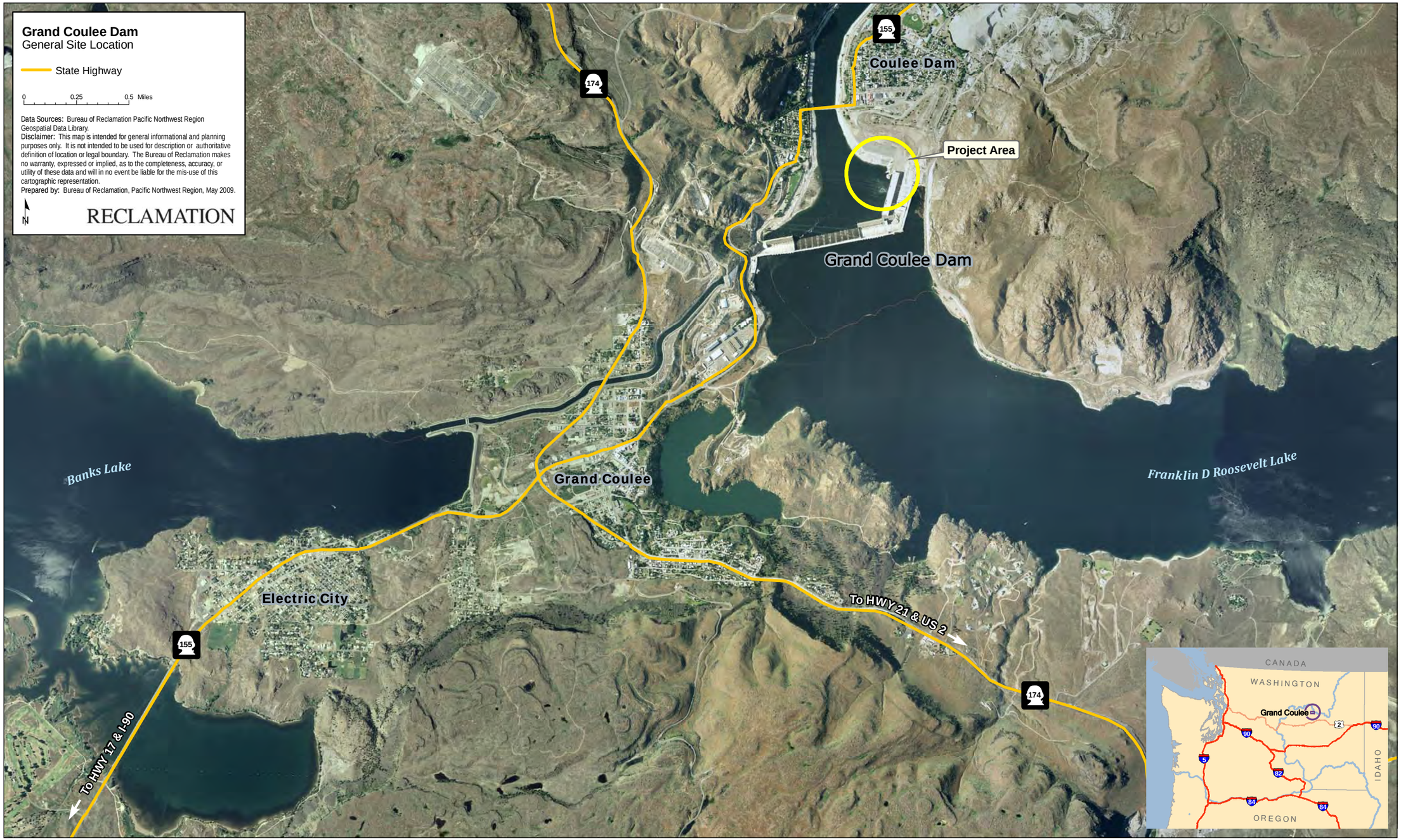

Frontispiece – Location map

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Acronyms and Abbreviations

7-DADMax	7-day average of the daily maximum temperatures
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BPA	Bonneville Power Administration
CCT	Colville Confederated Tribes (formally known as Confederated Tribes of the Colville Reservation)
CFR	Code of Federal Regulations
Corps	US Army Corps of Engineers
CWA	Clean Water Act
Ecology	State of Washington Department of Ecology
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
GCPO	Grand Coulee Power Office
HAER	Historic American Engineering Record
IMPLAN	IMpact Analysis for PLANning
ITA	Indian Trust Assets
kV	kilovolt
MOA	Memorandum of Agreement
MVA	megavolt amperes
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NRHP	National Register of Historic Places
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
PEL	Permissible Exposure Level
Reclamation	Bureau of Reclamation
SHPO	State Historic Preservation Office
SR	state route
TCPs	traditional cultural properties
TDG	total dissolved gas
THPO	Tribal Historic Preservation Office
TMDLs	total maximum daily loads
TPP	Third Powerplant
TPP Overhaul	Third Powerplant Generating Units Overhaul
Visitor Center	Grand Coulee Dam Visitor Center
WSDOT	Washington State Department of Transportation

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Chapter 1 PURPOSE AND NEED

1.1 Background

The Columbia Basin Project began with fund allocation for Grand Coulee Dam pursuant to the National Industrial Recovery Act of June 16, 1933. Grand Coulee Dam is on the mainstem of the Columbia River about 90 miles west of Spokane, Washington. Construction of the original dam started in 1933 and was completed in 1942. The dam is 550 feet high, 5,673 feet long, and impounds the river to a water surface approximately 350 feet above the old riverbed.

The original dam was modified in the late 1960s with the addition of the Third Powerplant (TPP). The TPP was created by adding a 1,170-foot-long, 201-foot-high forebay dam along the right abutment at a 64-degree angle to the axis of Grand Coulee Dam. The turbines (Units G-19 through G-24) that comprise the TPP were put in service in the mid-1970s.

The Federal Columbia River Power System (FCRPS) is comprised of 31 dams on the Columbia and lower Snake rivers that are owned and operated by the Bureau of Reclamation (Reclamation) and US Army Corps of Engineers (Corps) and the transmission system constructed and operated by Bonneville Power Administration (BPA) used to market and deliver electric power. The hydroelectric dams in the Columbia Basin have a maximum capacity of 22,500 megawatts and provide about 30 percent of the electricity used in the Pacific Northwest. Grand Coulee Dam is one of the 14 large-scale multipurpose facilities in the FCRPS. Grand Coulee's TPP has an approximate maximum output of 4,200 megawatts or roughly 18 percent of the FCRPS maximum output.

1.2 Purpose and Need for the Action

Reclamation is proposing to overhaul the TPP Generating Units at Grand Coulee Dam. The six generating units that comprise the TPP are starting to have problems stemming from age-related wear on the principle components. The age-related wear is causing an increase in outages and reduced reliability. Wear related issues include:

- Excessive wear on the operating ring bushing causing shear pins to break and wicket gate stems to twist.
- Wicket gate seals are worn and allow excessive amounts of water to leak into the Powerplant turbine pits. Packing box leakage has become excessive causing drainage systems to work beyond original design parameters.

- Because of the worn wicket gate seals, an excessive amount of water is being discharged to the TPP sumps. In the event of a spill, non-Polychlorinated biphenyl (PCB) containing oil may be discharged to the sumps. The capacity of each sump's oil/water separator may be insufficient to process this excessive amount of water and oil. Potential exists for oil to be released into the Columbia River in the event of a spill within the TPP. Substantial increase in oil/water separator capacity would be needed to minimize the potential for such a release and would greatly increase operation and maintenance (O&M) costs.

The Third Powerplant Generating Units Overhaul (TPP Overhaul) is needed to ensure continued operation and to reliably provide electrical power. The loss of revenue from interrupted public power generation would be substantial. If the generating units are not repaired, O&M would increase and production and reliability would decrease. If this decrease in production and reliability occurs, Reclamation may not be able to meet contractual obligations for power generation.

1.3 Location and General Description of Affected Area

Grand Coulee Dam is located on the mainstem of the Columbia River approximately 90 miles west of Spokane in central Washington. The TPP is on the downstream face of the forebay dam. Both the TPP and the forebay dam are on Federal land located within the boundaries of the Colville Reservation.

1.4 Authority

At its inception by Presidential Executive Order dated April 9, 1872, the former Colville Indian Reservation was in a different location and covered several million acres. Another Presidential Executive Order issued on July 2, 1872, moved the Colville Indian Reservation to its present location on the west side of the Columbia River and diminished its size to less than three million acres. On July 1, 1892, the north half of the Colville Indian Reservation was ceded to the United States by an Act of Congress. The 1892 cession of the north half reduced the reservation to 1.4 million acres, the acreage that is located within its boundaries today.

The Columbia Basin Project began with fund allocation for Grand Coulee Dam pursuant to the Nation Industrial Recovery Act of June 16, 1933. The project was specifically authorized for construction by the Rivers and Harbors Act approved August 30, 1935. The Columbia Basin Project Act of March 10, 1943 (57 Stat. 14) reauthorized the project, bringing it under the provisions of the Reclamation Project Act of 1939.

Construction of the TPP was authorized by Public Law 89-448 (80 Stat. 200) dated June 14, 1966, as amended by Public Law 89-561 (80 Stat. 714) dated September 7, 1966.

1.5 Scoping and Issues

A public scoping period was held from February 27, 2009 to March 27, 2009. A news release was provided to local area media announcing Reclamation's intent to prepare an Environmental Assessment and requesting public comment during the 30-day scoping period. Letters were sent to the Confederated Tribes of the Colville Reservation (also known as the Colville Confederated Tribes or CCT) and the Spokane Tribe of Indians to inform them of the proposed alternatives and to solicit comments or concerns they may have on the alternatives. Additionally, similar letters were sent to Federal and State agencies, and to local city and county officials (Appendix A). No responses to the news release or the scoping letter were received during the comment period.

1.6 Other Related Actions and Activities

Separate National Environmental Policy Act (NEPA) documents are being prepared for the following:

Replacing the 500-Kilovolt (kV) Cables with Overhead Lines

The condition of high voltage cables between the TPP and the 500-kV Spreading Yard constitute an unacceptable risk for unplanned loss of generation, requiring they be replaced. The nine, single-phase, oil-filled cables for G-19, G-20, and G-21 have been operated near or above their continuous current rating for 30 years. There are signs of deterioration such as bulges along the cables. They share a common underground tunnel so that the failure of one cable has the potential to take all three generators out of service for at least one year. The underground cables would be taken out of service and replaced with overhead lines.

Modifying the Fixed-Wheel Gate Chamber to Accommodate Media Blasting and Painting

The TPP fixed-wheel gate chamber modification would make it possible to media blast and paint TPP fixed-wheel gate components and be in compliance with Life Safety and Electrical Codes. At present, the lighting is not explosion-proof, ventilation is inadequate, separation from dam galleries is inadequate, and wiring is inadequate.

Rehabilitating All Powerplant Cranes

There are six cranes which would be in continual use during the TPP Overhaul. These consist of three powerhouse bridge cranes, one 2,000-ton powerhouse gantry crane, and one draft tube gantry crane. It is imperative that they all be in excellent working order prior to the overhaul work for use by contractors and the Grand Coulee Power Office (GCPO).

Work on the Draft Tube Platform

The TPP Overhaul would provide an opportunity to inspect and, if necessary, to repair the draft tubes. The condition of the concrete, interfaces between concrete and steel, cathodic protection systems, and surface coatings would be assessed. Any repairs would be accomplished during outages for turbine and generator overhauls.

TPP Exciter Replacement

The excitation equipment for all six generators in the TPP would be replaced with more robust and faster-acting equipment. Design of the present exciters was state-of-the-art when first supplied in the late 1970s, but the components have become obsolete.

TPP Governor Replacement

The governor equipment for all six generators in the TPP would be replaced with more robust and faster acting equipment. As with the excitation equipment, the design of the present governors was state-of-the-art when supplied in the 1970s, but the components have become obsolete.

TPP 236-Megavolt Amperes (MVA) Transformer Replacement

Six single-phase 236-MVA transformers comprising generator step-up transformer banks K19A and K20A at the TPP would be replaced. These banks of transformers have been in continuous service since 1975. Dissolved flammable gasses are being monitored closely because of increasing levels of hydrogen, methane, ethane, and acetylene. Access to the transformer area is restricted for safety reasons.

Two TPP Elevators Rehabilitation

There are two freight and personnel elevators which would be in continual use during the TPP Overhaul. One elevator is in the Turbine Erection Bay at the southern end of the TPP and the other in the Generator Erection Bay at the northern end of the TPP. It is imperative that they both be in excellent working order prior to the overhaul work and available for use by the Contractor and GCPO.

Chapter 2 ALTERNATIVES

2.1 Introduction

This chapter presents the following alternatives being considered for the TPP Overhaul. Figure 2-1 shows the location of the alternatives in relation to the existing TPP.

- Alternative A – No Action
- Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)
- Alternative C – TPP Overhaul with Expansion of TPP for Storage
- Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

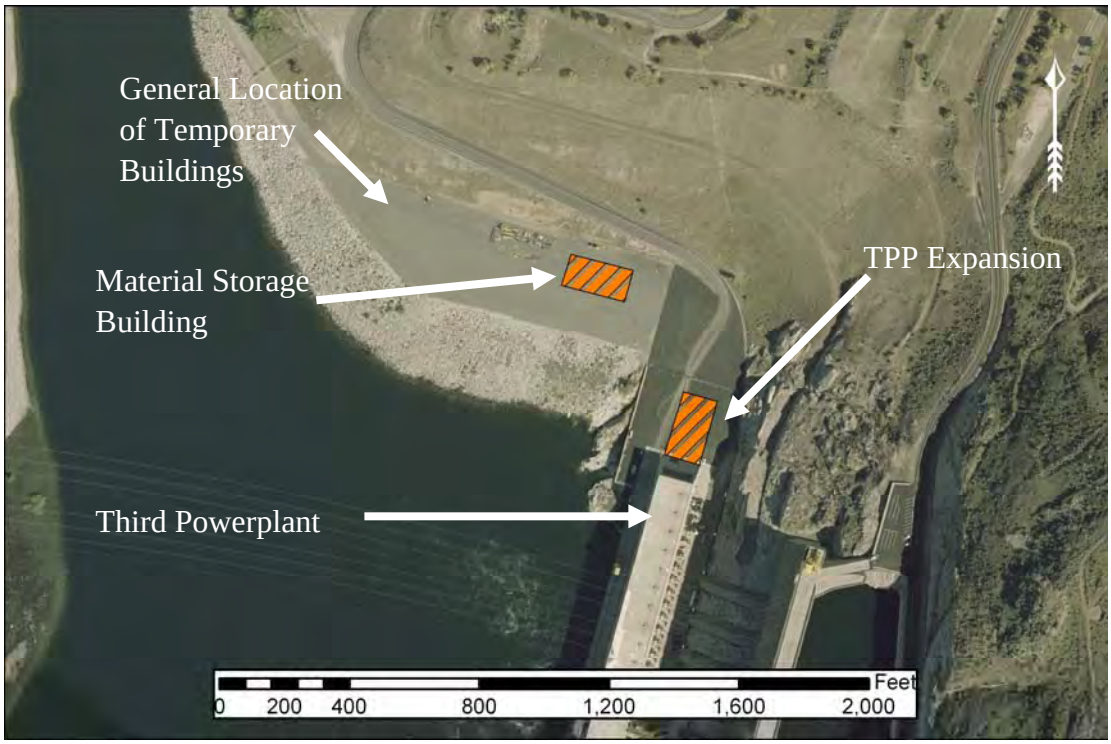

Figure 2-1. Aerial view of the proposed material storage building location and TPP expansion

2.2 Alternative A – No Action

Under the No Action alternative, Reclamation would continue operating the TPP generating units with no system improvements and would not construct a material storage building or expand the TPP. Power would continue to be generated by the six units with an increase in maintenance costs and production outages. Repair costs and time needed to obtain replacement parts would continue to increase based on the aging technology and the scarcity of the replacement parts. Wear issues would remain and become worse over time. The six units would continue to deteriorate increasing the risk and likelihood of failure of key generator components and ultimately rendering the units inoperable. They would be replaced one by one as failure occurred. View of the TPP and north service yard are shown in Figures 2-2 and 2-3.

Figure 2-2. View of TPP and north service yard from the northeast

Figure 2-3. View of TPP and north service yard from the west bank of the Columbia River

2.3 Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

Under Alternative B, Reclamation would overhaul the TPP generating units. The overhaul would include work on the generator, turbine, shaft, and the auxiliary equipment. The main portion of the overhaul work would be completed within the confines of the TPP. Generator units G-19, G-20, and G-21 may be up-rated in overall unit capacity with new generator and turbine components. Generator units G-22, G-23, and G-24 have begun to show age-related component wear resulting in reduced reliability and increasing repair outages. The overhaul program would include inspecting and refurbishing or replacing components. Refurbishment and repairs on the six units may include, depending on need, but are not limited to replacement or repair of:

- Wicket gate bushings and seals
- Head cover
- All mechanical controls and components
- Mechanical seals
- Deteriorated electrical wiring
- All cooling water piping
- All bearing circulation pumps, piping, and filtering system
- All condensing air piping and valves

Other repairs may need to be performed on the generating units, but due to lack of access to the units, all items in need of repair cannot be fully anticipated. The objective is to repair and restore these machines to ensure reliable operation for an additional 30 years.

There are logistical challenges because the overhauls require lay-down space for all turbine and generator parts as they are removed. More space is required during the overhaul than for initial construction when parts were delivered as needed. Several large and heavy items require special consideration for storage before being installed and during maintenance. It is expected that these large parts would occupy most of the TPP floor space except for access aisles needed to move smaller components. In order to make room to refurbish the existing parts, a new material storage building would be erected adjacent to the TPP (Figure 2-1) and the spare parts currently stored in the repair areas of the TPP would be relocated to the new building. Figures 2-4 and 2-5 are visual simulations of the proposed material storage building and temporary contractor buildings.

The proposed material storage building would be built to provide the needed space in a location convenient for movement of materials to and from the TPP. Preliminary plans for this building are not to exceed 30,000 square feet floor area with 30-foot walls, a commercial grade overhead coiling door (similar to those on the TPP), insulated walls and ceiling, heating and cooling, forced ventilation, power, compressed air, and life safety system with fire suppression. The new storage building would be detached from the TPP, in a previously disturbed area northwest of the TPP, and would likely include an overhead crane to assist in the movement and staging of the larger components. An option to the crane is to use a large forklift to move large components within the proposed material storage building. The construction of the material storage building would be completed during the contractor mobilization phase of the TPP Overhaul and would be a permanent structure.

A temporary building would be erected by the contractor for sandblasting and painting of repaired items. The building is estimated to be 130 feet by 65 feet. The building would be constructed in a previously disturbed area northwest of the TPP, just to the west of the proposed materials storage building. The contractor would be given the option of building another temporary structure to serve as a fabrication building which would be located to the west of the proposed material storage building and also be the same size as the other temporary building. Upon completion of the project, estimated to be ten years in duration, the temporary buildings would be removed from the site. Throughout the course of the TPP Overhaul, the contractor would have temporary trailers onsite to serve as offices, restrooms, lunchrooms, etc. The contractors would also be given areas that would be used for staging around the TPP and the industrial area, once the requirement is determined. These trailers and staging areas would be removed once the construction is complete.

During the estimated 10 years of construction for the project, the contractor would have the option to work on the project 24 hours per day, 7 days a week.

Figure 2-4. Visual simulation of Alternative B from the northwest (this visual simulation is not to scale)

Figure 2-5. Visual simulation of Alternative B from the west bank of the Columbia River (this visual simulation is not to scale)

2.4 Alternative C – TPP Overhaul with Expansion of TPP for Storage

Under Alternative C, the TPP Overhaul would be the same as described in Alternative B. The six generating units would have the same refurbishment and repairs performed on them to return them to good working order. A temporary work building would be constructed, with the option for an additional temporary fabrication building. However, instead of constructing a new material storage building, the north side of the TPP would be expanded by approximately 30,000 square feet to provide the needed work space. The proposed expansion location is shown in Figure 2-1 and a visual simulation of the expansion and temporary contractor buildings are given in Figures 2-6 and 2-7.

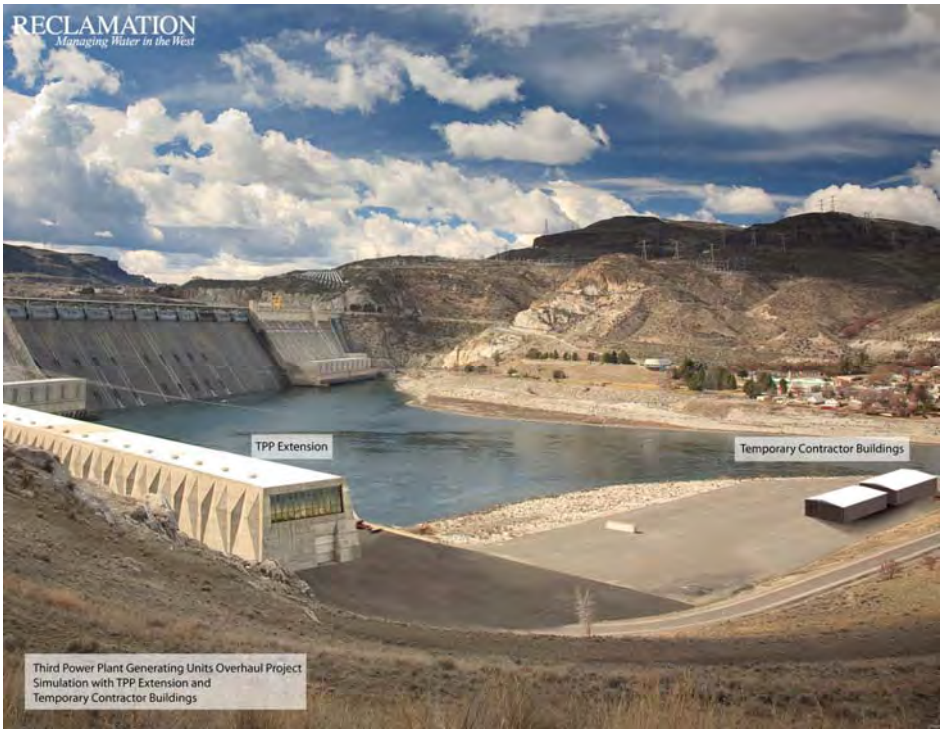

Figure 2-6. Visual simulation of Alternative C from the northeast (this visual simulation is not to scale)

Figure 2-7. Visual simulation of Alternative C from the west bank of the Columbia River (this visual simulation is not to scale)

2.5 Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

Under Alternative D, the TPP Overhaul would be the same as described in Alternative B. The six generating units would have the same refurbishment and repairs performed on them to return them to good working order. The temporary work building would be constructed, with the option for an additional temporary fabrication building. Along with the new material storage building, the north side of the TPP would also be expanded by approximately 30,000 square feet to provide additional work space. The proposed expansion is shown in Figure 2-1 and a visual simulation of Alternative D is shown in Figures 2-8 and 2-9.

Figure 2-8. Visual simulation of Alternative D from the northeast (this visual simulation is not to scale)

Figure 2-9. Visual simulation of Alternative D from the west bank of the Columbia River (this visual simulation is not to scale)

Chapter 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes existing physical, biological, natural, and cultural resources that could be affected and identifies any potential impacts, beneficial or adverse, to those resources if any one of the alternatives were implemented.

The No Action Alternative (Alternative A) describes conditions if the TPP Overhaul is not done and provides the basis to compare the action alternatives (Alternatives B, C, and D).

The resources analyzed include water quality, hazardous or toxic wastes, transportation, socioeconomics, environmental justice, cultural resources, Indian trust assets (ITAs), and Indian sacred sites.

Vegetation was not evaluated due to the previously disturbed nature of the project site. No potential impacts to wildlife or Endangered Species Act (ESA)-listed species are anticipated for the same reason. Hydropower generation was not evaluated because under Standing Operating Procedures five units are designed to run simultaneously with one unit down for maintenance, therefore, operation of the TPP would not change. No in-water work or work in wetland areas would occur so these resources were also not evaluated.

3.1 Water Quality

3.1.1 Affected Environment

Water quality of Franklin D. Roosevelt Lake (also known as Lake Roosevelt) and the Columbia River are managed by the State of Washington under the framework of the Clean Water Act (CWA). Washington has established water quality standards for specific physical and chemical parameters in order to provide suitable conditions to support designated and potential uses. Some of these uses include agriculture water supply, domestic water supply, stock water supply, industrial water supply, commercial navigation, boating, wildlife habitat, harvesting, and aesthetics (Ecology 2006). The designated uses of Lake Roosevelt and the Columbia River above the reservoir include core summer salmonid habitat and extraordinary primary contact recreation, as well as nine additional standard uses listed above. The uses designated for the segment of the Columbia River below Grand Coulee Dam in addition to the nine standard uses, are spawning/rearing and primary contact recreation.

Section 303(d) of the CWA requires states and tribes to identify water bodies that do not meet water quality standards. States and tribes must publish a list of these impaired waters every two years. The most recent approved 303(d) list for the State of Washington is the 2008 Integrated Report approved by U.S. Environmental Protection Agency (EPA) on January 29, 2009 (Ecology 2009a). For lakes, rivers, and streams identified on this list, states and tribes must develop water quality improvement plans known as total maximum daily loads

(TMDLs). These TMDLs establish the amount of a pollutant a water body can carry and still meet water quality standards. Elevated water temperature is the primary water quality problem identified in the Columbia River segments near Grand Coulee Dam. Low dissolved oxygen and PCBs were also identified as water quality concerns in Category 2 of the integrated report. Category 2 waters are waters where there is some evidence of a water quality problem, but not enough to require production of a water quality improvement project. This category type is synonymous with a threatened category.

In 2004, the State of Washington Department of Ecology (Ecology) with the EPA and in cooperation with the Spokane Tribe of Indians developed the total dissolved gas (TDG) TMDLs for the Mid-Columbia River and Lake Roosevelt, which included the areas above and below Grand Coulee Dam (Ecology 2004).

Applicable Water Quality Standards

The water quality criteria (narrative and numeric) that protect the designated and potential uses for Lake Roosevelt and the Columbia River downstream of Grand Coulee Dam are discussed below.

Chapter 173-201A of the Washington Administrative Code (Ecology 2006) contains the water quality standards for the State of Washington. Water temperature is measured by the 7-day average of the daily maximum temperatures (7-DADMax). Table 3-1 lists the temperature criteria for each of the aquatic life use categories designated for the Columbia River and Lake Roosevelt.

Table 3-1. Columbia River aquatic life temperature criteria

Aquatic Life Temperature Criteria in Fresh Water Category	Highest 7-DADMax
Core Summer Salmonid Habitat	16°C (60.8°F)
Salmonid Spawning, Rearing, and Migration	17.5°C (63.5°F)

The TDG, measured in percent saturation, does not apply when the river flow exceeds the seven-day, 10-year frequency flood and may be adjusted to accommodate fish passage. All other times TDG must not exceed an average of 110 percent.

Both the CCT and the Spokane Tribe have developed water quality standards that are similar to the Washington State water quality standards and are applicable to portions of the affected area. Both Tribes' standards for TDG and dissolved oxygen are set at 110 percent of saturation and 9.5 mg/l respectively (Spokane Tribe 2003; Colville Tribe 2009). The CCT have established temperature criteria of 16 °C for the Columbia River and Lake Roosevelt (Colville Tribe 2009), while the Spokane temperature criteria is set at a 7-DADMax of 18.5 °C. The most stringent standards for temperature are the Washington State standard for the Lake Roosevelt portion, and the CCT standard for the Columbia River below Grand Coulee Dam; both of these standards are set at 16 °C 7-DADMax.

Lake Roosevelt

Water quality conditions in Lake Roosevelt currently do not support the designated and potential uses. Elevated TDG, elevated water temperature, and low levels of dissolved oxygen have been determined as the factors affecting the designated and potential uses (Ecology 2009a). As part of an on-going reservoir monitoring program for operating projects, Reclamation collects water quality data every 3 years from Lake Roosevelt. These samples are analyzed for chemical, physical, biological, and trace metal parameters. In addition, Reclamation has installed fixed monitoring locations (Hydromet Stations) at the international boundary and the forebay of the reservoir. At these locations, surface water temperature is collected at midnight every day and TDG information is collected every 15 minutes throughout the year.

TDG levels can be increased above the water quality criteria by releasing water over spillways of dams. There are other ways that TDG may also be elevated. These include passing water through turbines, low-level ports, fishways, or locks; and natural processes such as low barometric pressure, high water temperatures, or high levels of aquatic plant activity and growth. However, the vast majority of elevated TDG levels found in the Columbia River are caused by spills from dams. In some cases, dams located upriver may pass elevated TDG down river because there is not enough time or water turbulence to dissipate the elevated gasses. This is the case with Lake Roosevelt. The Hydromet monitoring station at the international border shows TDG exceeding State and Tribal water quality standards entering the reservoir. As this water passes through Lake Roosevelt there is some change in TDG recorded at the forebay Hydromet station.

Table 3-2. Monthly average TDG percentage at the United States-Canada border and the Lake Roosevelt forebay from January 1999 to April 2009

Month	International Boundary	Lake Roosevelt Forebay
January	102.59	99.14
February	101.88	99.96
March	103.57	102.31
April	108.84	106.41
May	117.28	110.28
June	120.76	113.64
July	114.47	113.90
August	109.98	108.74
September	104.95	103.90
October	102.52	100.14
November	102.17	98.75
December	104.00	96.97

Water temperature measured at the forebay Hydromet station indicates that water temperatures often exceed water quality criteria. Generally, the surface waters of the reservoir reach 16 °C by mid to late July and remain above 16°C until the end of October. However, this is typical for lakes and reservoirs. Several reports and studies indicate that the upper portion of Lake Roosevelt does not stratify while the lower segment of the reservoir near the dam weakly stratifies. As with TDG issues in Lake Roosevelt, a majority of the temperature issues are the result of upstream effects being passed through the reservoir due to the very low retention time in the reservoir. Retention times have been estimated to be between 20 and 60 days depending on the time of the year and if the reservoir is being drawn down for flood control (BPA 1996).

Columbia River Downstream of Grand Coulee Dam

Water quality conditions in the Columbia River below Grand Coulee Dam, also known as Rufus Woods Lake, do not support the designated and potential uses. Elevated water temperature has been determined as the factor affecting the designated and potential uses (Ecology 2009a). This is in addition to the TDG TMDL. Reclamation has installed a fixed monitoring location 6 miles downstream of Grand Coulee dam. At this location, surface water temperature is collected at midnight every day and TDG information is collected every 15 minutes throughout the year.

The Hydromet monitoring station at the Lake Roosevelt forebay shows TDG exceeding State and Tribal water quality standards. Monthly average TDG values from the Hydromet station over the past 10 years indicate that TDG exceeds water quality criteria in May, June, and July. At the Hydromet station downstream of Grand Coulee Dam, TDG values over the same period, on average are approximately 1 percent less TDG. Monthly average TDG levels exceed State water quality standards in June and July. Both of these indicate that some degassing occurs between the forebay and the monitoring station.

Table 3-3. Monthly average TDG percentages at the Lake Roosevelt forebay and from the Columbia River 6 miles downstream from Grand Coulee Dam from January 1999 to April 2009

Month	Lake Roosevelt Forebay	Columbia River
January	99.14	97.93
February	99.96	99.65
March	102.31	101.92
April	106.41	104.67
May	110.28	108.24
June	113.64	111.28
July	113.90	112.05
August	108.74	108.44
September	103.90	103.23
October	100.14	99.01
November	98.75	97.22
December	96.97	97.42

Water temperature measured at the Rufus Woods Lake Hydromet station indicates that water temperatures often exceed the most stringent of the established water quality criteria. Generally, the surface waters of this segment reach 16 °C by late July and remain above 16°C until the beginning of October. The difference in the onset of temperature exceedances between Lake Roosevelt and Rufus Woods Lake is likely the discharge of colder, denser water from the lower levels of Lake Roosevelt.

3.1.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

Water quality impact analysis is based on available water quality data and State or Tribal water quality standards. Water quality standards were described previously.

Alternative A - No Action

Reclamation would continue operating the TPP generating units with the current maintenance and production schedules. Water quality conditions are not expected to change as a result of the no action alternative until the failure of key generator components renders multiple units inoperable. At that time, the likelihood of spill events occurring at Grand Coulee would increase. TDG generation can occur during spill events at Grand Coulee Dam, but simply pass through existing TDG when discharge is routed through the powerplants. Currently, the Corps and Reclamation jointly operate Grand Coulee Dam and Chief Joseph Dam for TDG minimization (ACOE 2009). As the units fail, the ability to jointly operate the two systems would also fail resulting in increased spill at Grand Coulee and increased TDG generation in Rufus Woods Lake and potentially the Columbia River below Chief Joseph Dam.

The environmental consequence of the no action alternative on temperature conditions within Lake Roosevelt and the reach of the Columbia River below Grand Coulee Dam also are not expected to change significantly over the short term. As the generation units fail there is the potential for some water temperature changes to occur in both Lake Roosevelt and in the Columbia River below the dam, due to shifting proportions of withdrawal from the shallower TPP outlet works to the deeper Right and Left Powerplants' outlet works. The temperature changes would be seasonal in nature and occur only when the reservoir was stratified. During the stratification period of the reservoir, colder water would be withdrawn at the Right and Left Powerplants than would have been withdrawn at the TPP. As a result, the river below the reservoir would be slightly colder during the summer months. This scenario has been examined several times in the past and it is estimated that a 2.22°C temperature difference could be seen in the river below the dam without the operation of the TPP (Vermeyen 2000). Water quality conditions in Lake Roosevelt would also change as the TPP becomes inoperable. As a result of colder water withdrawal from the Right and Left Powerplants, the lake would become isothermal earlier in the year than would have occurred with the operation of the TPP. However, the increase in the onset of isothermal conditions may be imperceptible due to the already weak thermal stratification which develops in Lake Roosevelt under existing conditions. Water from the surface may cause additional higher temperature water days downstream of the dam if the reservoir is strongly stratified.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

No water quality impacts from construction activities are anticipated as a result of the Reclamation plan to overhaul the TPP generating units sequentially and build a separate material storage building. A National Pollution Discharge Elimination System Permit for stormwater discharge, issued by Ecology, will be required for the construction activities associated with the material storage building. This permit and the water quality certification from the State will prescribe best management practices to reduce or eliminate stormwater runoff from the construction zone and parking lots in the construction zone.

No water quality impacts from operation activities are anticipated during the overhaul of the TPP generating units. Current O&M schedules attempt to have at least 5 TPP units in production during the months of December through August. More than one unit is typically removed from production in the fall months to perform needed maintenance. Joint operations with the Corps and Chief Joseph Dam can continue uninterrupted minimizing spill events at Grand Coulee Dam and consequently minimizing TDG generation below the dam. Due to power demand, current operations have not allowed for selective operations at Grand Coulee for temperature modification in the Columbia River downstream from the dam. This would not change during the overhaul and up-rating of the individual TPP units. As a result, the effect on water temperature by operations throughout the overhaul period would be similar to the effect on water quality conditions of the existing conditions in both the reservoir and in the river below the dam.

Alternative C – TPP Overhaul with Expansion of TPP for Storage

No water quality impacts from construction activities are anticipated as a result of the Reclamation plan to overhaul the TPP generating units sequentially and expand the TPP for storage. Water quality effects from operational changes during the TPP Overhaul and expansion would be similar to Alternative B.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

No water quality impacts are anticipated as a result of the Reclamation plan to overhaul the TPP generating units sequentially, build a separate material storage building, and expand the TPP for storage. Water quality effects would be similar to Alternatives B and C.

3.1.3 Mitigation

None identified for any of the alternatives.

3.1.4 Cumulative Impacts

Alternative A - No Action

Reservoir and power management practices in the Columbia River upstream from Grand Coulee Dam, such as bypass spill, introduce TDG into the Columbia River. This elevated gas is transported in the river and through the reservoirs. In the No Action Alternative, this gas is ultimately transported past Grand Coulee Dam into the Rufus Woods Reservoir and the Columbia River. Some gas generation occurs during spill events at Grand Coulee Dam. In some cases, spill over the drum gates can strip TDG, which results in decreases in TDG below the dam.

Alternatives B, C, and D

The TPP would continue to operate in a similar fashion as the No Action Alternative A. TDG would continue to be transported through the reservoir and into the Columbia River below the Grand Coulee Dam. The Alternatives would not increase the current TDG load generated by spill events at the dam. In high water years, spill is sometimes required to meet flood control requirements. If one of the TPP units is out of service and another unit has a problem which forces it out of service there may be a need to increase spill. This may increase TDG, especially if this occurs while the reservoir is below elevation 1265.

3.2 Hazardous or Toxic Wastes

3.2.1 Affected Environment

The GCPO is identified as a Medium Quantity Generator of Hazardous/Dangerous Wastes according to Ecology Dangerous Waste Regulations. These wastes are generated as part of the facility's O&M activities and include waste paints, solvents, used oils, lead, and asbestos (Ecology 2009b). The lead and asbestos are accumulated as part of O&M activities associated with generation units.

As identified through sampling and on-going efforts to dispose of PCB electrical equipment, the TPP is generally considered to have a non-PCB operational status. Regardless of this consideration, the TPP continues to manage for disposal, oil-filled capacitors as PCB items. Other oil-filled electrical equipment for which sampling cannot be performed or the manufacture date is not discoverable are also managed for disposal as PCBs items.

The TPP has six generation units, identified as G-19 through G-24. All of these units were previously equipped with asbestos-containing brake pads. The brake pads were removed from units G-20 thru G-24 and all accessible areas were abated of brake dust. Generation unit G-19 remains equipped with the original brake pads. Other areas are accessible only after the units are dismantled and are presumed to contain no asbestos contaminated dust. Lead contamination is also evidenced in the dust, since many of the metal components were originally coated with lead based paint. Because of these facts, all TPP units are managed with the presumption that they contain asbestos and lead dust.

The EPA has recently expressed concerns regarding the potential for PCBs to be included in paints or caulks manufactured prior to 1979. As a result of these concerns, all painted surfaces scheduled for paint removal as part of any O&M activity would be sampled for both PCBs and lead.

Colville Tribal Law and Order Code, Chapter 4-13 Solid Waste regulates solid and hazardous waste storage and disposal on CCT lands. According to Grand Coulee Solid and Hazardous Waste program management, no solid or hazardous wastes are authorized for disposal on Tribal lands.

It has been found through inspection and air monitoring that the asbestos and lead dust is trapped in an oily film that covers virtually all internal surfaces of the units. Personal air monitoring results have not revealed any airborne concentrations of asbestos within an order of magnitude of the Occupational Safety and Health Administration (OSHA) Permissible Exposure Level (PEL) (>0.1 fiber per cubic centimeter of air as an eight (8) hour time-weighted average). Personal air sampling for airborne concentrations of lead contaminated dust also revealed concentrations well below the PEL for lead (0.050 milligrams per cubic meter (mg/m^3). Health hazards associated with these contaminated dusts are perceived to be minimal (Andrews 2009a).

All workers receive annual lead awareness training and asbestos training/certification commensurate with their assigned duties. The Grand Coulee Powerplant Safety Office has established work planning steps to ensure that O&M activities are performed to ensure worker health and safety. Work supervisors are instructed to adhere to the Reclamation Safety and Health Standard Section 4 to ensure that all known and foreseeable hazards are identified and mitigated prior to beginning work. Past O&M work activities have been preceded by a thorough cleaning of accessible surfaces (Andrews 2009b).

3.2.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

The purpose of this discussion is to determine if implementation a proposed alternative would significantly impact the TPP and surrounding environment. This is a qualitative analysis which identifies the current affected environment and perceived variables subsequent to the implementation of the proposed action. The indicator variable used in this analysis is the potential for the generation, transportation, and disposal of additional hazardous wastes as part of the overhaul of the TPP and the potential impact to human health and the environment resulting from the management of these wastes.

Alternative A - No Action

Reclamation would continue operating the TPP generating units. Current maintenance and production schedules would be adjusted as necessary to meet operational parameters and contractual obligations for power generation. Hazardous materials and waste would continue to be managed as they are at this present time. Used oils, lead and asbestos contaminated dusts, and potential PCB and lead-based paints would continue to be analyzed for content and removed and disposed of as determined by the O&M schedule.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

As previously discussed, GCPO is regulated as a Medium Quantity Generator of hazardous/dangerous waste according to Ecology regulation. The internal parts of generating units within the TPP are coated with a thin film of oil which has encased dust particles potentially containing lead, asbestos, and PCBs. Potential exists for the exposure of GCPO employees and contractor employees working in the TPP and proposed material storage building during the dismantling and refurbishing of the generating units. Potential routes of exposure are inhalation and ingestion of contaminated dusts.

It is anticipated that regulated hazardous wastes would be generated as part of the proposed action in quantities greater than during general O&M activities. Dismantling and cleaning of generator unit components would generate additional quantities of used oils, solvents, and

detergent-based wastes which may contain lead, asbestos, and PCB contaminated dust. Refurbishing of metal parts may require the removal of paint and the repainting of those parts utilizing non-lead based paints. These activities would lead to the generation of sandblast media containing lead based paint chips, waste paints, PCBs, and solvents. An elevated amount of waste generation may increase potential workers exposure through inhalation, ingestion, and dermal absorption.

As a result of increased waste generation, it is anticipated that there would be a small increase in the transportation of solid and hazardous wastes for recycling or disposal. As per the Federal Resource Conservation and Recovery Act and State of Washington Dangerous Waste Regulations, hazardous and dangerous waste management is tightly regulated and requires strict controls for its generation, transportation, and disposal or recycling. This process is commonly referred to as cradle-to-grave management and requires, among other things, contingency and emergency response planning throughout all phases of the management process. Also, no appreciable impact is anticipated relative to available hazardous/dangerous waste disposal capacity resulting from the proposed action.

Contracted work performed at the TPP follows criteria provided in the contract specifications which ensure worker health and safety and the proper treatment, temporary storage, and disposal of hazardous/dangerous wastes. Contract specifications require either a Negative Initial Exposure Assessment or the implementation of appropriate engineering controls for any contracted work area where the potential exists for airborne concentrations of lead or asbestos. OSHA PELs for worker exposure to hazardous substances are not to be exceeded.

It is established in Reclamation Manual Policy (ENV P01) and Directives and Standards (ENV 02-02) that Reclamation must ensure that hazardous/dangerous wastes generated on Reclamation property through its own or contracted activities are properly treated, stored, and disposed of in accordance with applicable environmental rules, regulations and standards, and that hazardous/dangerous wastes are recycled whenever possible.

As discussed above, established worker safety standards and contract specifications adequately address the potential worker exposure to generated hazardous/dangerous wastes. Also, waste management standard operation procedures, contract specifications, and Federal State, and local environmental regulations ensure that a minimal potential exists for the release of hazardous/dangerous wastes to the environment. It is anticipated that the proposed action represents a minimally elevated potential for impact to human health or the environment.

Alternative C – TPP Overhaul with Expansion of TPP for Storage

Potential exists that sandblast media may also contain PCBs. As previously stated, paint wastes would be sampled and analyzed for lead and PCB content. As discussed in Alternative

B above, minimal additional hazardous waste impacts are anticipated as a result of the Reclamation plan to overhaul the TPP generating units. Likewise, the expansion of the TPP for material storage is also anticipated to result in minimal hazardous waste environmental impacts.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

Environmental consequences would be the same as Alternatives B and C.

3.2.3 Mitigation

Alternative A - No Action

No mitigation is required.

Alternatives B, C, and D

Established worker safety standards and contract specifications adequately address the potential worker exposure to generated hazardous/dangerous wastes. Waste management standard operation procedures, contract specifications, and Federal, State, and local environmental regulations ensure that a minimal potential exists for the release of hazardous/dangerous wastes to the environment. It is anticipated that the proposed action represents a minimally elevated potential for impact to human health or the environment. Apparent or alleged impacts to human health or the environment are currently being adequately addressed through administrative and engineering controls. The slightly elevated potential for impact to human health or the environment does not require additional controls or mitigation.

3.2.4 Cumulative Impacts

The GCPO has numerous O&M activities throughout the facility which generate similar types of wastes anticipated to be generated as part of the TPP Overhaul project. These projects include the following:

- Replacement of the 500-kV cables with overhead lines
- Modification of fixed-wheel gate chambers to accommodate blasting and painting
- Rehabilitation of powerplant cranes
- TPP exciter and governor replacement
- Transformer replacements
- Elevator rehabilitations

It is anticipated that all these activities would likely generate hazardous wastes including used oils, paint wastes and solvents, asbestos and lead contaminated dusts, and sandblast material containing lead-based paint chips.

Because of the onsite generation of hazardous wastes from these (and other) O&M activities, the GCPO has an established hazardous/dangerous waste program that ensures appropriate and effective waste management from cradle to grave. This program is subject to regularly scheduled audits by GCPO and independent Reclamation personnel, and to environmental inspection by Federal and State regulatory authorities. Such inspection and review of the GCPO waste management program ensures minimal potential adverse impact to human health and the environment.

3.3 Transportation

This section addresses how traffic caused by the proposed alternatives would affect roadways in the vicinity of Grand Coulee Dam and the TPP. Transportation of hazardous or toxic wastes is addressed in Section 3.2.

3.3.1 Affected Environment

Grand Coulee Dam is located on the Columbia River north of the City of Grand Coulee and south of the Town of Coulee Dam in Grant and Okanogan counties in north-central Washington State, approximately 90 miles west of Spokane and 230 miles east of Seattle. Access to and from the Grand Coulee Dam area is provided by Interstate Highway 90, US Highway 2, and state routes (SR) 17, 21,174, 283/28, and 155 as shown in Figure 3-1. Access to Grand Coulee Dam and the TPP is provided by Reclamation roads via SR 155. Traffic volume data for SR 155 are shown in Table 3-4.

Table 3-4. Average daily two-way traffic - State Route 155, Coulee Dam

State Route	Milepost	Location	2004	2005	2006	2007
155	25.73	After Junction SR 174	5,500	5,000	5,300	5,100
155	28.04	Entering City Of Coulee Dam	5,300*	5,300	5,200	5,300

* based on actual count
Source: WSDOT 2007

The main road of concern is SR 155, a paved rural, two lane, minor arterial road. It is the main north-south route through the area around Grand Coulee Dam. From its intersection with SR 174 in west Grand Coulee, the highway heads northeast, through town, past Grand Coulee Dam and the Grand Coulee Dam Visitor Center (Visitor Center). The road continues through west Coulee Dam, crossing the Columbia River about 1/2 mile downstream of the dam via the Columbia River Bridge at Grand Coulee Dam to east Coulee Dam thence through Nespelem to its terminus in Omak.

The Columbia River Bridge at Grand Coulee Dam is the original bridge constructed in the 1930s during the building of Grand Coulee Dam. This bridge is also known as Grand Coulee Bridge, Washington State Department of Transportation (WSDOT) Bridge Number 155/101, and WSDOT Historic Bridge Number WA-102. Vehicles crossing the bridge are limited to 20,000 pounds per axle on 3 or 4 axle single units; also know as tri-axles. Six or more axle combination units are also limited to 20,000 pounds per axle. The bridge has a restricted height of 14 feet 3 inches. Traffic becomes congested on the east and west approaches to the bridge when large trucks are crossing. The bridge provides access to the TPP via Roosevelt Way in east Coulee Dam.

Access to the Reclamation road across Grand Coulee Dam is located off SR 155 between the City of Grand Coulee and the Town of Coulee Dam. However, security restrictions prohibit public access to the road atop the dam.

The Grand Coulee Dam, Visitor Center, and tours are popular tourist attractions. An average of about 300,000 people in approximately 67,000 vehicles annually visited the dam during the 2004 to 2007 period. Peak visitation occurs in July each year. The average daily July peak was 3,600 visitors and 800 vehicles during the 2004 to 2007 period. The Visitor Center is open daily (except New Year's Day, Thanksgiving, and Christmas) from 9:00 a.m. to 5:00 p.m., with extended hours between Memorial Day and September 30. A laser light show is presented nightly starting the Saturday of Memorial Day Weekend through September 30. The 36-minute show, shown on the face of the dam and the TPP, is viewable from many locations in the downstream area and attracts large numbers of viewers each night.

Presently, approximately 400 people are employed at Grand Coulee Dam, associated facilities, offices, and the TPP. Seasonal peak traffic loads are handled adequately during three shift changes without causing congestion. Traffic patterns associated with the current operation of Grand Coulee Dam and TPP are considered to be the local norm.

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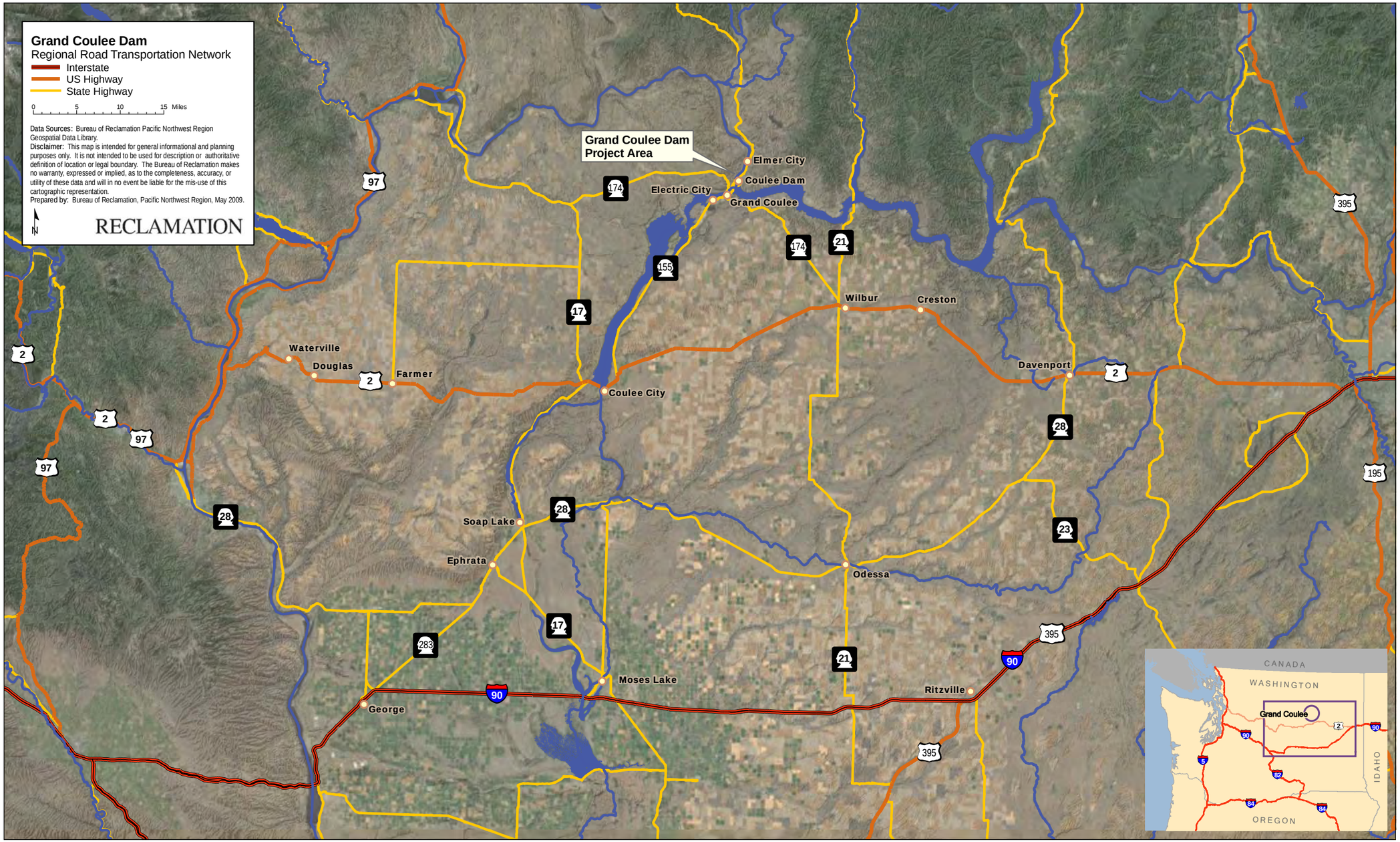

Figure 3-1. Map showing transportation routes to Grand Coulee Dam

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3.3.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

Potential adverse transportation impacts could be associated with implementation of the No Action and Action Alternatives. A qualitative assessment of traffic impacts was performed, based on the construction procedures and equipment that would be used, review of existing conditions, and traffic levels on key roadways. Transportation impacts would be considered significant if construction or operation of the alternative caused substantial increases in traffic or disruption of existing vehicular traffic.

Alternative A - No Action

Under to No Action Alternative, the need for maintenance would increase resulting in greater repair costs and longer production outages. Repair costs and time needed to obtain replacement parts would continue to increase based on the aging technology and scarcity of replacement parts. The timing and duration of future maintenance periods would depend on the nature of the problems to be resolved. Maintenance would be performed by existing Reclamation employees and by contractor, if necessary.

Maintenance

Any potential onsite contractor workforce would likely range from 20 to 30 workers. This increase in workers would result in an additional 20 to 30 vehicle trips to and from the TPP, an increase of about 0.4 percent (four tenths of one percent) to 0.6 percent (six tenths of one percent) in the average daily two-way traffic on SR 155 between the entrance to the Town of Coulee Dam (mile marker 28.04) and the junction of SR 155 and SR 174 (mile marker 25.73). No adverse workforce related traffic impacts have occurred from similar numbers of additional workers and associated increases in vehicle trips in the past and none would be expected for this alternative.

Routine deliveries of maintenance related materials and equipment would use existing roadways and be unlikely to cause adverse traffic impacts.

No significant adverse maintenance related transportation impacts would be expected.

Operation

Under the No Action Alternative, there would be no changes in traffic from the current condition.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

The majority of the overhaul work would be completed within the confines of the TPP by contractor workforces. A permanent material storage building and two temporary buildings would be erected adjacent to the TPP (see Figures 2-1, 2-4, and 2-5). Upon completion of the approximately 10-year overhaul, the contractor would remove the temporary buildings from the site.

Construction

Primary access to construction areas would be via public roads and existing access roads. No new access roads would need to be built or upgraded for the overhaul.

Potential onsite contractor workforce would likely average 40 workers. This increase in workers would result in an average of 40 additional vehicle trips to and from the TPP, an increase of about 0.8 percent (eight tenths of one percent) in the average daily two-way traffic on SR 155 between the entrance to the Town of Coulee Dam (mile marker 28.04) and the junction of SR 155 and SR 174 (mile marker 25.73). No adverse workforce related traffic impacts have occurred from similar numbers of additional workers and associated increases in vehicle trips in the past and none would be expected for this alternative.

Routine deliveries of construction related materials and equipment and removal of the temporary buildings would use existing roadways and be unlikely to cause adverse traffic impacts. The materials and equipment would be brought to the construction site and staged at onsite staging locations. From the staging locations, travel to and from work areas would be limited to onsite Reclamation roads.

Slow moving vehicles delivering oversized replacement parts could cause temporary traffic congestion on area roadways. Such deliveries are expected to be intermittent and infrequent. Compliance with applicable Federal and State requirements for transport of oversized loads would be required and would significantly reduce or eliminate adverse impacts. Vehicles transporting oversize and overweight materials for the overhaul that are unable to cross the restricted Columbia River Bridge would require alternate delivery access to the TPP. Access via the Reclamation road across Grand Coulee Dam would be arranged and approved in advance by Reclamation as necessary.

With the exception of truck traffic for transportation of construction materials and equipment, all construction activities would be conducted onsite. Construction related traffic would not prevent movement of emergency vehicles. The effect of the local traffic on roads from the additional personal vehicles and trucks during the proposed construction activities would be barely noticeable. Construction generated traffic would be negligible compared with existing traffic levels in the area. No significant adverse transportation impacts would be expected.

Operation

There would be no permanent increase in traffic with the TPP's return to service and the continued operation of TPP after the overhaul activities conclude would cause no new impact. Operations would not cause any changes in traffic.

Alternative C – TPP Overhaul with Expansion of TPP for Storage

The TPP Overhaul would be the same as described in Alternative B. However, instead of constructing a stand alone material storage building, the north side of the TPP would be expanded to provide additional work space. The temporary work buildings would be constructed and removed as in Alternative B. The proposed expansion is shown in Figures 2-1, 2-6, and 2-7.

Construction

Impacts would be the same as for Alternative B. No significant adverse transportation impacts would be expected.

Operation

Impacts would be the same as for Alternative B. Operations would not cause any changes in traffic.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

The TPP Overhaul would be the same as described in Alternative B. A permanent material storage building would be erected adjacent to the TPP. In addition the north side of the TPP would be expanded to provide additional work space. The temporary work buildings would be constructed and removed as in Alternative B. The proposed expansion is shown in Figures 2-1, 2-8, and 2-9.

Construction

Impacts would be the same as for Alternative B. No significant adverse transportation impacts would be expected.

Operation

Impacts would be the same as for Alternative B. Operations would not cause any changes in traffic.

3.3.3 Mitigation

Alternative A - No Action

No mitigation is required.

Alternatives B, C, and D

Compliance with contract specifications and Federal and State requirements for transport of oversize loads would ensure there are no significant adverse transportation impacts. No mitigation would be needed for the construction or operation of any of these alternatives.

3.3.4 Cumulative Impacts

Alternative A - No Action

No cumulative impacts would be associated with this alternative.

Alternatives B, C, and D

Construction

Construction generated traffic associated with any of these alternatives of less than one percent would be negligible when compared with existing traffic levels in the area. Some of the items identified in Section 1.6 Other Related Actions and Activities could be concurrent with any of these alternatives. Assuming a total onsite construction workforce of 100 workers and a total of an additional 100 vehicle trips, construction traffic would equate to about 2 percent of the existing traffic levels in the area. The 2 percent increase in construction related traffic would be less than significant. Thus no cumulative impacts would be associated with construction of any of these alternatives.

Operation

There would be no change in traffic from the current condition. No cumulative impacts would be associated with operation of the overhauled TPP.

3.4 Socioeconomics

This section presents estimates of the regional economic impacts resulting from changes in construction expenditures for each action alternative. The regional economic impact analysis includes not only the initial or direct impact on the primary affected industries, but also the secondary impacts resulting from those industries providing inputs to the directly affected industries as well. This analysis also includes the changes in economic activity stemming

form household spending of income earned by those employed in the sectors of the economy impacted either directly or indirectly. These secondary impacts are often referred to as "multiplier effects." 2007 data are the most current available for the modeling package used to assess the regional economic effects.

3.4.1 Affected Environment

This section describes the social and economic conditions in the Grand Coulee Dam and TPP area. The key parameters include the study area's population, industry output, employment, and labor income. The study area encompasses Washington's Douglas, Grant, Ferry, Lincoln, and Okanogan Counties.

Population

The Bureau of Census estimated a 2000 population of 164,309 for the entire five-county study area. The population estimate for the impact area increased to 176,450 in 2007. All study area counties experienced increases in population during the 2000 to 2007 period.

The common measures of economic impacts include industry output, employment, and labor income. These parameters are summarized in Table 3-5 below.

Table 3-5. 2007 Industry output, employment, and labor income for the five-county study area

Industry	Industry Output (millions)	Percent of Total	Employment Jobs (millions)	Percent of Total	Labor Income (millions)	Percent of Total
Ag, Forestry, Fish & Hunting	$1,987.5	22.0	19,435.0	22.0	$356.3	12.4
Mining	$199.7	2.2	4,410.4	5.0	$120.1	4.2
Utilities	$19.4	0.2	36.9	0.0	$4.0	0.1
Construction	$662.7	7.3	4,222.8	4.8	$175.6	6.1
Manufacturing	$4,106.4	45.5	25,541.4	28.9	$963.1	33.6
Wholesale Trade	$18.8	0.2	124.2	0.1	$4.6	0.2
Transportation & Warehousing	$386.5	4.3	6,964.4	7.9	$192.8	6.7
Retail Trade	$117.5	1.3	2,209.0	2.5	$39.9	1.4
Information	$314.6	3.5	5,377.6	6.1	$103.0	3.6
Finance & Insurance	$183.9	2.0	3,353.4	3.8	$117.1	4.1
Real Estate & Rental	$247.1	2.7	1,386.5	1.6	$104.3	3.6
Professional- Scientific & Tech Svcs	$774.6	8.6	15,418.2	17.4	$684.0	23.9
Totals	$9,018.6	100.0	88,479.8	100.0	$2,864.6	100.0

Source: IMPLAN 2007

Industry Output

Industry output or sales represent the value of production of goods and services produced by businesses within a sector of the economy. The manufacturing sectors produce the highest level of output in the study area (45.5 percent of total industry output). The agricultural

production sectors rank second in level of output (22.0 percent of total industry output). Ranking third is the Professional Scientific and Technical Services sector (8.6 percent of total industry output).

Employment

Employment measures the number of jobs related to the sector of the economy. In the study area, activities related to manufacturing generate the largest number of jobs (28.9 percent of total regional employment). Agricultural sector ranks second in terms of overall number of jobs in the study area (22.0 percent of total regional employment).

Labor Income

Labor income is the sum of Employee Compensation and Proprietor Income. The manufacturing sectors generate the largest portion of labor income in the region (33.6 percent of total regional labor income). The sectors related to providing professional related services rank second (23.9 percent of total regional labor income). Ranking third are the sectors related to agricultural production (12.4 percent of total labor income).

3.4.2 Environmental Consequences

Construction activities associated with the action alternatives would result in positive economic output at the regional level.

Impact Indicator/Methods for Evaluating Impacts

The modeling package used to assess the regional economic effects stemming from construction expenditures for each action alternative is IMpact Analysis for PLANning (IMPLAN). IMPLAN is an economic input-output modeling system that estimates the effects of economic changes in an economic region. The common measures of regional economic impacts include regional output, employment, and income.

Input-output models measure commodity flows from producers to intermediate and final consumers. Purchases for final use (final demand) drive the model. Industries produce goods and services for final demand and purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the region (imports and value added) stop the cycle.

These indirect and induced effects (the effects of household spending) can be mathematically derived using a set of multipliers. The multipliers describe the change of output for each and every regional industry caused by a one dollar change in final demand for any given industry.

IMPLAN data files are compiled from a variety of sources, for the study area, including the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor, and the U.S. Census Bureau. This analysis uses 2007 IMPLAN data, the most current data available, for Washington's Douglas, Grant, Ferry, Lincoln, and Okanogan Counties which comprise the study area.

Construction expenditures expected to be made inside the study region were considered in the regional impact analysis. Construction expenditures made outside the five-county area were considered "leakages" and would have no impact on the local economy.

The study assumed the contractor workforce would move temporarily to the region and spend some of their wages inside the area during the construction period. This analysis also assumed the vast majority of the construction expenditures would be funded from sources outside study area. Money from outside the region spent on goods and services within the region would contribute to regional economic impacts, while money originating from within the study region is much less likely to generate regional economic impacts. Spending from sources within the region represents a redistribution of income and output rather than an increase in economic activity.

For the purpose of the study, construction expenditures within the region were used to measure the total overall regional impacts. The total impacts would be spread over the approximate 10-year construction period and would vary year by year proportionate to actual expenditures.

Alternative A - No Action

Construction

No construction is anticipated for this alternative; therefore, no regional impacts related to construction would be generated.

As noted in Chapter 2, Reclamation would continue operating the TPP generating units without any system improvements. Power would continue to be generated by the six units with an increase in maintenance costs and production outages. Repair costs and time needed to obtain replacement parts would continue to increase based on the aging technology and the scarcity of the replacement parts. Wear issues would remain and become worse over time. The six units would continue to deteriorate, increasing the risk and likelihood of failure of key generator components and ultimately rendering the units inoperable. Since the timing and duration of future maintenance periods would depend on the nature of the problems to be resolved, maintenance costs are not available.

Failure of TPP components would cause power production outages resulting in lost power revenue as described in the following examples:

Lost revenue is dependent on time of year and availability of other TPP generators. An average one week forced outrage costs about $250,000 if only the affected generator is out of service and up to nearly $800,000 if a second generator is also out of service. High value month costs (July) would be approximately 4.3 times higher (Reclamation 2009a). A conservative estimate of lost power sales revenue for one year of outage of three TPP units is over $139 million. If the value of the availability of generating capacity on short notice is considered, the loss is estimated to be $177 million (Reclamation 2009b).

Regional economic impacts of lost power revenue would accrue to the region served by the FCRPS not just the five-county study area. Since the timing and duration of power production outages caused by failure of TPP components are unknown, regional economic impacts associated with changes in power revenue were not calculated.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

Construction

The majority of the overhaul work would be completed by contractor workforces. A permanent material storage building and two temporary buildings would be erected adjacent to the TPP. The contractor would remove the temporary buildings from the site at the end of the approximately 10-year construction (overhaul) period. The estimated economic impacts are for the five-county study area, the region, for the entire 10-year construction period, i.e., the impact would occur throughout the entire five-county region, not just at the TPP. These regional impacts would not occur each year; they would vary year by year proportionate to annual expenditures. The majority of the output, employment, and income impacts are due to the expenditures of the wages earned by the workforce involved in construction activities. Regional economic impacts related to construction expenditures are presented in Table 3-6.

Tribal Employment Rights Ordinance

Tribal Employment Rights Ordinance (TERO) ordinances extend Indian preference hiring to all construction projects “on or near” an Indian Reservation. A TERO program monitors and enforces employment and contracting rights of Indians and ensures their rights are protected and exerted. Portions of the work associated with the TPP Overhaul would be located on or near the CCT Reservation. The CCT have enacted a TERO (Colville Tribal Law and Order Code, Title 10 Employment and Contracting Chapter 10-1 Tribal Employment Rights [CCT 2009]) and other ordinances that may be applicable to this work. Tribal ordinances would be included among the laws, codes, and regulations covered by the “Permits and Responsibilities” clause of the Reclamation contract for the work. Reclamation’s contractor would be directed to contact the CCT Tribal Employment Rights Office for information about these requirements. However, Reclamation’s Contracting Officer is not a party to enforcing Indian preference requirements; it is a matter solely between the tribe and the contractor.

Table 3-6. Construction related regional economic impacts by alternative

	Output (Sales) (millions)	Employment (jobs)	Labor Income (millions)
Alternative A - No Action	—	—	—
Alternative B - TPP Overhaul and Separate Material Storage Building (Preferred Alternative)	$18.2	170	$6.6
Alternative C - TPP Overhaul with Expansion of TPP for Storage	$18.2	169	$6.6
Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building	$19.0	178	$6.9

Source: IMPLAN 2007

Alternative C – TPP Overhaul with Expansion of TPP for Storage

Construction

The TPP Overhaul would be the same as described in Alternative B. However, instead of constructing a stand alone material storage building, the north side of the TPP would be expanded to provide additional work space. The two temporary work buildings would be constructed and removed as in Alternative B. This construction activity would also take approximately 10 years. The regional impacts stemming from construction are summarized in Table 3-6.

Tribal Employment Rights Ordinance

TERO information would be the same as Alternative B.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

Construction

The TPP Overhaul would be the same as described in Alternative B. A permanent material storage building and two temporary buildings would be erected adjacent to the TPP. The temporary work buildings would be removed as in Alternative B. In addition, the north side of the TPP would be expanded to provide additional work space. This construction activity would take approximately 10 years. The regional impacts stemming from construction are summarized in Table 3-6.

Tribal Employment Rights Ordinance

TERO information would be the same as Alternative B.

3.4.3 Mitigation

None identified for any of the alternatives.

3.4.4 Cumulative Impacts

Alternative A - No Action

No cumulative impacts would be associated with this alternative.

Alternatives B, C, and D

Implementation of any of these alternatives would contribute a total of two-tenths of one percent increase in the five county study area's regional output (sales), employment, and income which would be spread over the 10-year construction period. Some of the items identified in Section 1.6 Other Related Actions and Activities could be concurrent with these alternatives and would contribute to regional economic impacts also.

3.5 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," dated February 11, 1994, requires agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities as well as the equity of the distribution of the benefits and risks. Environmental Justice addresses the fair treatment of people of all races and incomes with respect to actions affecting the environment. Fair treatment implies that no group should bear a disproportionate share of negative impacts.

3.5.1 Affected Environment

The area around Grand Coulee Dam and its reservoir, Lake Roosevelt, is located in Douglas, Ferry, Grant, Lincoln, and Okanogan counties. These counties were selected as the local study area. Table 3-7 provides the numbers and percentages of population for seven racial categories (White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, and Two or More Races), the total minority population, and the Hispanic or Latino population, a minority ethnic group, for each county, the combined five-county study area, and the State of Washington (U.S. Census Bureau).

The American Indian population of the local study area is about three times greater than the State of Washington due largely to the presence of the CCT Reservation within the study area and the nearby Spokane Tribe of Indians Reservation. While the Total Racial Minority Population of the five-county study area, 28.5 percent, is similar to the State's percentage of 21.1, the Hispanic or Latino population of the study area is about three times greater than the State, 21.3 percent and 7.5 percent, respectively.

Table 3-7. Race and ethnicity

	Study Area													
	Douglas County		Ferry County		Grant County		Lincoln County		Okanogan County		Total		State of Washington	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	32,603	—	7,260	—	74,698	—	10,184	—	39,564	—	164,309	—	5,894,121	—
Population of one race	31,794	97.5	7,009	96.5	72,451	97.0	10,020	98.4	38,440	97.2	159,714	97.2	5,680,602	96.4
White	27,599	84.7	5,480	75.5	57,174	76.5	9,740	95.6	29,799	75.3	129,792	79.0	4,821,823	81.8
Black or African American	101	0.3	15	0.2	742	1.0	23	0.2	109	0.3	990	0.6	190,267	3.2
American Indian and Alaska Native	355	1.1	1,327	18.3	863	1.2	166	1.6	4,537	11.5	7,248	4.4	93,301	1.6
Asian	178	0.5	21	0.3	652	0.9	25	0.2	176	0.4	1,052	0.6	322,335	5.5
Native Hawaiian and Other Pacific Islander	31	0.1	4	0.1	53	0.1	7	0.1	28	0.1	123	0.1	23,953	0.4
Some other race	3,530	10.8	162	2.2	12,967	17.4	59	0.6	3,791	9.6	20,509	12.5	228,923	3.9
Population of two or more races	809	2.5	251	3.5	2,247	3.0	164	1.6	1,124	2.8	4,595	2.8	213,519	3.6
Total Minority Population	7,424	22.8	1,821	25.1	25,815	34.6	552	5.4	11,202	28.3	46,814	28.5	1,241,631	21.1
Non-white, Not Hispanic or Latino	991	3.0	1616	22.3	3,339	4.5	361	3.5	5,514	13.9	11,821	7.2	800,122	13.6
Hispanic or Latino	6,433	19.7	205	2.8	22,476	30.1	191	1.9	5,688	14.4	34,993	21.3	441,509	7.5

Low-income populations are identified by several socioeconomic characteristics. As categorized by the 2000 Census, specific characteristics include income (median family and per capita), percentage of the population below poverty (families and individuals), unemployment rates, and substandard housing. Table 3-8 provides income, poverty, unemployment, and housing information for each county and the State (U.S. Census Bureau).

Table 3-8. Income, poverty, unemployment, and housing

	Study Area					State of Washington
	Douglas County	Ferry County	Grant County	Lincoln County	Okanogan County	
Income						
Median family income	$43,777	$35,691	$38,938	$41,269	$35,012	$53,760
Per capita income	$17,148	$15,019	$15,037	$17,888	$14,900	$22,973
Percent below poverty level						
Families	11.2	13.3	13.1	8.4	16.0	7.3
Individuals	14.4	19.0	17.4	12.0	21.3	10.6
Percent unemployed	9.0	18.8	11.7	6.2	12.0	6.2
Percent of Housing						
1.01 or more occupants per room	7.8	6.6	12.5	1.9	7.0	5.1
Lacking complete plumbing facilities	1.8	11.1	1.3	3.9	8.0	1.0

Median family income and per capita income for the five counties are less than the State. Compared to the State of Washington, the study area has greater percentages of families and individuals below the poverty level.

Other measures of low-income, such as unemployment and substandard housing also characterize demographic data in relation to environmental justice. In 2000, unemployment in four of the five counties was greater than the State's 6.2 percent unemployment rate. Lincoln County's unemployment rate was 6.2 percent.

Substandard housing units are overcrowded and lack complete plumbing facilities. The percentage of occupied housing units with 1.01 or more occupants per room in the four of the five study area counties was greater than the 5.1 percent for the State; Lincoln County's 1.9 percent was less than the State percentage. The percentage of housing units lacking complete plumbing facilities in the study area was greater than the State percentage.

3.5.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

Environmental justice analysis evaluates the effects of potential adverse environmental impacts on natural resources (and associated human health impacts) and socioeconomic impacts to identify and describe disproportionate adverse effects to minority and/or low-income populations.

Alternatives A, B, C, and D

No adverse natural resource or socioeconomic impacts adversely affecting minority and low-income populations have been identified for any of the alternatives, therefore there are no environmental justice impacts.

3.5.3 Mitigation

None identified for any of the alternatives.

3.5.4 Cumulative Impacts

This project would not result in any cumulative impacts when evaluated in conjunction with other projects being done at Grand Coulee Dam.

3.6 Cultural Resources

3.6.1 Affected Environment

Human beings have lived in eastern Washington since at least 11,000 years ago, and recent finds elsewhere in the West indicate that the history of human occupation in the region may be even greater (Gilbert et al. 2008). This comes as no surprise to the local tribes, especially the Nespelem, Sanpoil, and Moses-Columbia, whose oral histories link them to events at the beginning of time (Ray 1933).

During this long history, human beings have left behind traces of their activities in the form of archeological sites and standing structures, and they have assigned meaning to notable natural features. These traces, structures, and notable features are commonly called “cultural resources.” In the project area, cultural resources specifically include pre-contact archeological resources, post-contact archeological resources, properties of traditional religious and cultural importance to Indian tribes, and standing structures.

Pre-Contact Archeological Resources

Pre-contact archeological resources are those archeological sites, features, artifacts, and other traces of human behavior that pre-date European contact with aboriginal Native American populations. For the purposes of this project, archeological resources that pre-date 1800 A.D. would be considered Pre-Contact.

Professional archeologists have been conducting investigations in and around Grand Coulee Dam since the late 1930s and early 1940s, when Reclamation started gearing up for construction of the dam. Another intensive round of archeological investigations accompanied the construction of the TPP in the 1960s and 1970s, which required deeper than usual drawdowns of the level of Lake Roosevelt that exposed hundreds of archeological sites. Sporadic work continued through the 1980s (Galm 1994). The pace of work increased in the 1990s with the creation of the FCRPS cultural resources program, which continues to the present day.

Two archeological surveys have been conducted within a 1/2 mile of the TPP (Cook 2001; Roulette et al. 2001). No archeological resources were identified within a 1/2 mile of the dam.

One of the reasons that archeological resources have not been recorded in the project area relates to the extensive disturbance that happened during the construction of the original Grand Coulee Dam from 1933 to 1942, and the renewed construction activities from 1967 to 1974 associated with the TPP. Comparison of topographic maps developed in 1934 at the start of the construction project for Grand Coulee Dam (Reclamation Drawing No. 222-D-307 [Reclamation 1934]) with current conditions show that the northern end of the TPP was built on part of a broad terrace with a west-northwest aspect that sloped gently down to the river with about a 7 percent (4°) slope.

Construction dramatically altered the original landscape, as shown in Reclamation construction plans (Reclamation Drawing No. 1222-142-1748 & 1749). The elevation of the landform in the vicinity of the TPP was about 1170 feet above sea level in 1934. At present, the TPP and the parking area to the northwest of the TPP rest on a surface with an elevation of about 1013 feet above sea level, indicating that almost 160 feet of sediment and rock were removed prior to the construction of the TPP. The amount removed to create the current flat surface decreases as one moves west toward the edge of the original terrace. At the west end of the parking area, only about 90 feet of material was removed. The area of extensive disturbance related to construction of the TPP extends well to the north, going beyond the paved powerplant service road. Photographs taken during construction further demonstrate the extensive disturbance of this area (Reclamation Photograph No. 1222-142-1885).

Post-Contact Archeological Resources

Within the project area, the earliest direct contact between Native Americans and European and Euro-American explorers came in 1810 A.D., when David Thompson and company floated down the Columbia River past the present-day site of Grand Coulee Dam (Williams and Newell 1980). Indirect effects of European and Euro-American exploration and trade in the west preceded direct contact by at least 100 years, but for the sake of convention, 1800 A.D. would be the end of the Pre-Contact Period.

Just as dam-related construction has compromised the integrity of any pre-contact cultural resources that might have been in the project area, the history of repeated construction has also served to eliminate archeological traces of previous phases of construction at Grand Coulee. Photographs taken in the 1960s just before TPP construction began, show that the Right Powerhouse 230-kV switchyard occupied the area now taken by the TPP (Reclamation Photograph No. 1222-142-189). Any remnant features in this area were wiped out by the construction of the TPP. Reclamation also removed the houses that had been built in "Mason City" (i.e., that portion of the Town of Coulee Dam east of the Columbia River) between the TPP and the steel truss bridge over the Columbia River. The only remnants of these houses are a few traces of the abandoned streets where the houses used to sit. Much of this area was also cut away during the excavations for the TPP.

Properties of traditional religious and cultural importance to Indian tribes

The proposed project lies within the traditional territory of the Nespelem Tribe, one of the twelve Federally-recognized tribes that have become incorporated into the CCT. The aboriginal territories of the closely-related Sanpoil Tribe lie just to the east, while traditional territory of the Moses-Columbia Tribe is to the south.

A number of studies have identified properties of traditional religious and cultural importance to Indian tribes in the vicinity of the Grand Coulee Dam (Ray 1933, 1936; Bouchard & Kennedy 1984; Anglin 1995; George 2008).

Based on these studies, no properties of traditional religious or cultural importance to tribes have been identified in the area to be directly affected by ground disturbance. Properties of traditional religious or cultural importance to the CCT have been documented near Grand Coulee (Bouchard & Kennedy 1984; George 2008), and others may be present in the general area. As described by Ray (1933), members of the Sanpoil and Nespelem tribes often moved from their winter villages along the Columbia and Sanpoil rivers in the spring to exploit early-maturing root crops south of the Columbia, especially bitter root (*Lewisia rediviva*) and small camas (*Camassia quamash*). Bitter root tends to grow in rocky soils and soils of this type are present in the hills above the Grand Coulee Dam. There may be some amount of on-going traditional use, although most of the gathering appears to have happened in areas further to the south.

Another traditional use that may have occurred in the vicinity of the project area, and may still be occurring, is the creation of stacked rock features (often called "cairns") to mark places where young adults sought spiritual power or where people marked locations where they prayed (Ray 1933). These structures are often found on rocky promontories that provide a wide view of the surrounding countryside. Although no such promontories are within the area to be affected by ground disturbance, a number of promontories are present in the project viewshed. No cairns are currently known on the nearby promontories, but few cultural resources surveys have been conducted in these areas.

Standing Structures

The Grand Coulee Dam, including the Main Dam that was completed in 1942 and the Forebay Dam and TPP, which were completed in 1974, are considered to be historic properties. Reclamation entered into a Memorandum of Agreement (MOA) with the Washington State Historic Preservation Office (SHPO) in 2006 to resolve the adverse effects of some modifications to structures in the Grand Coulee Dam complex. As a part of this MOA (Agreement No. 1425-06-MA-1G-7047), Reclamation determined that

> "the dam, power plants, pumping plants, industrial area, and associated facilities … are eligible to the National Register of Historic Places. The Complex includes facilities associated with construction of the Third Power Plant and Forebay Dam, which Reclamation has determined are contributing elements although they are not yet 50 years old".

The SHPO concurred with this determination. Because this MOA dealt primarily with modifications in the Industrial Area, it did not include the Colville Tribal Historic Preservation Office (THPO) as a party. The position of the THPO with regard to the eligibility of the Grand Coulee Dam is currently unknown.

Reclamation is preparing Historic American Engineering Record (HAER) documentation for the Grand Coulee Dam complex, which should be completed by the close of 2009. The agency would then begin preparing a National Register nomination for submission to the Keeper of the National Register of Historic Places (NRHP). The Keeper is defined by 36 Code of Federal Regulations (CFR) 60.3(f) as "the individual who has been delegated the authority by NPS to list properties and determine their eligibility for the National Register." Although Federal agencies may nominate properties for inclusion in the National Register, it is ultimately the Keeper who makes the decision about whether or not the property should be formally listed on the register. Until that time, the boundaries of the Grand Coulee Dam "complex" or historic district would remain unclear. At this point in time, the district would probably only contain those structures that are on Reclamation lands and under Reclamation management.

The Federal regulations specified at 36 CFR 60.4 provide the criteria by which a cultural resource may be judged eligible for inclusion in the NRHP:

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

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

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

(d) that have yielded, or may be likely to yield, information important in prehistory or history.

The TPP meets three of the National Register criteria. It is significant under Criterion A because of the role that it played in the development of hydroelectric power in the Pacific Northwest and in America's Cold War struggle for technological dominance over the Soviet Union. It has Criterion B significance because of its association with the life of Henry "Scoop" Jackson, a long-serving Washington senator who used his success with projects like the TPP to help launch presidential candidacies in 1972 and 1976. It has Criterion C significance because it is an important example of the work of a master architect, Marcel Breuer, who designed the TPP and the contemporaneous Visitor Center. The TPP displays Breuer's work in the style commonly called "Brutalism" through its use of concrete, repeated decorative elements, and cantilevered structures like the Observation Deck on the structure's west face (Hartmans 2009).

A second historic property near the project area is the steel truss bridge that links the west side of the Town of Coulee Dam with its eastern half. The bridge was constructed in 1935, and was placed under the management of the WSDOT. The Columbia River Bridge (i.e., Grand Coulee Bridge) was listed on the NRHP on July 16, 1982.

Finally, portions of the Town of Coulee Dam may also be eligible for inclusion in the NRHP, especially as a district, but no work has been done in this regard. At this point in time, only the Columbia School, which was built by Reclamation in 1934 to provide for the education of students in the Government Camp (i.e., west side of the Town of Coulee Dam), has been found to be eligible for inclusion in the National Register. This structure is 0.6 miles northwest of the TPP and lies outside of the project viewshed.

3.6.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

In this Environmental Assessment, Reclamation has relied on the regulations that implement the National Historic Preservation Act (NHPA) (36 CFR 60 and 36 CFR 800) to help determine if identified cultural resources should be considered significant, and then to determine if the effects of the project would be significant and negative. In short, if an effect of this project is considered adverse under 36 CFR 800.5, then the project would be found to result in significant negative impacts under NEPA unless they could be resolved through an enforceable agreement like a MOA as described in 36 CFR 800.6(c).

Alternative A - No Action

This alternative would result in significant negative effects to the TPP as a historic property. Section 2.(d) of Executive Order 11593 directs Federal agencies to

> "initiate measures and procedures to provide for the *maintenance*, through preservation, rehabilitation, or restoration, of federally owned and registered sites at professional standards prescribed by the Secretary of the Interior" [emphasis added].

Under the regulations that implement the NHPA specified at 36 CFR 800.5(a)(s)(vi), it is an "adverse effect" if an agency neglects to maintain a historic property and thereby allows it to deteriorate. For the purposes of this Environmental Assessment, such an adverse effect would also be considered a significant negative effect.

Given the value of the TPP and its generation capacity, it is extremely doubtful that Reclamation would neglect to maintain the TPP. In the unlikely event that the No Action Alternative where chosen, Reclamation would find it progressively more difficult and expensive to maintain the TPP as a functional powerplant, and this would also cut at the heart of the TPP's integrity as a historic property. Unless this adverse effect was mitigated through a MOA or other enforceable agreement, it would have to be considered a significant negative impact.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

The potential effects of this project are two-fold. First, construction of the new structures or extension of the TPP could result in direct effects to cultural resources through ground disturbance. Archeological sites or standing structures, if any are present, could be affected by the work itself. The construction could also result in indirect effects, primarily by changing the setting and feeling of nearby historic properties. The new or extended structures are likely to be visible over an area measuring about 680 acres and this visual intrusion may affect the integrity of nearby properties.

Analysis of information about archeological resources, traditional cultural properties (TCPs), and standing structures in the project vicinity shows that the integrity of the TPP as a historic property would be adversely affected by this proposed project (Hess 2008). Review of the construction history of the Grand Coulee Dam shows that there is no possibility for intact archeological resources in the footprint of the buildings or utility corridors.

No TCPs are known for the area of direct ground disturbance. The new structures would be visible from many of the promontories around Grand Coulee Dam, and if traditional religious practitioners are still using these areas, they would be able to see the buildings. Nevertheless, the buildings would stand in an area that has already been heavily modified, and the new structures would not significantly add to the visual disturbance already caused by the construction of the dam and related facilities. When viewed from Radio Tower Hill, which is about 2800 feet from the project area, the approximate 300-foot-long material storage building would only appear to be a small rectangular cube occupying a visual space of about 7/8 inch. When viewed from Crown Point, which is about 4600 feet away, the new structure would occupy a visual space of about ½ inch.[1] In other words, the new structures would just be a relatively small change in an otherwise unmodified scene.

Construction of the material storage building would result in adverse effects on the setting, feeling, and association of the TPP as a historic property (Hartmans 2009). The material storage building would be a distraction within the viewscape of the observer from across the river, from along the top of the dam, and other locations. Furthermore, the flat-sided material storage building would create a sharp contrast to the TPP's textured surface and the surrounding landscape.

Alternative C – TPP Overhaul with Expansion of TPP for Storage

Like Alternative B, this alternative is not likely to result in adverse effects on archeological resources or TCPs. However, Alternative C would result in much greater impacts on the TPP, and would result in adverse effects to this historic property (Hartmans 2009). These adverse effects include diminishment of the integrity of design, setting, materials, workmanship, feeling, and association. Most importantly, reproducing the same massing and dimensions of height and with the same surface pattern and textures would provide no differentiation between the old and new, thus creating a false sense of history. That is, an observer would not be able to tell what parts of the TPP were original to the 1970s structure, and what parts had been added as a result of this project. This would create the impression that the whole building was constructed at once, which is not historically accurate.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

Alternative D would combine the adverse effects of both Alternatives B and C.

[1]These image sizes were generated using the formula image size = *object size x viewing distance/object distance*. The viewing distance is considered to be a plane one (1) foot from the viewer's face.

3.6.3 Mitigation

Alternative A - No Action

If Alternative A is adopted, the appropriate mitigation for the adverse effects to historic properties would be to enter into a MOA with the Washington SHPO and Colville THPO. This MOA would likely require extensive documentation of the TPP, as well as steps to educate the public.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

Two steps would be needed to mitigate the negative impacts of this alternative. First, Reclamation would enter into a MOA with the Advisory Council on Historic Preservation (ACHP) and Colville THPO to resolve the adverse effects of the project on the TPP, as the TPP is located within the exterior boundaries of the Colville Reservation. In order to resolve the adverse effects of building a stand-alone material storage building (Alternative B), the MOA should incorporate these provisions (Hartmans 2009):

- Concrete Walls: The tilt-up concrete walls should not be a consistent smooth, flat, light color that reflects the sunlight. Concrete can be mixed using a variety of aggregates; the aggregates being of various colors and sizes. The concrete mix can be blended to create numerous colors. The concrete should be "mottled" to create a variegated effect. The contractor for the material storage building should provide samples or "mock-ups" of the concrete panels so that a variety of appearances can be studied for comparison.
- Roof: A light colored roofing material would have the same reflective aspect as smooth concrete walls. The low-pitched, built-up roofing would be a variegated color so that the reflective quality is diminished. A gravel ballast would also provide a variegated surface.
- Landscaping: The arid, rocky terrain of the Columbia Plateau does not sustain vegetation unless water is consistently provided. It is apparent, however, that across the river at the Visitor Center (completed in 1978) and around the Reclamation Administrative complex that conifers and shrubs were planted, have been maintained, and have flourished. A similar assortment of trees and shrubs would be planted at the edge of the embankment and the flat gravel area where the material storage building would be located. They should be planted in groupings as across the river to provide camouflage and greenery at the building site. These trees would soften the landscape when viewing the TPP.

No additional mitigation would be needed for the implementation of Alternative B provided that the structures were built as required by the contract and Reclamation observed the “post-review discoveries” provisions of 36 CFR 800.13 and the “inadvertent discoveries provisions”

of 43 CFR 10, which implements the Native American Graves Protection and Repatriation Act (NAGPRA). As per 43 CFR 10, Reclamation would include in all contracts with contractors working on this project explicit directions about the steps that they should take in the unlikely event that human remains, burials, or funerary objects, or other NAGPRA cultural items are found during construction. In brief, the contractors would be instructed to stop work immediately in the vicinity of the find, take steps to protect the find, and then contact the GCPO Archeologist and appropriate law enforcement agencies. No work would resume until the NAGPRA consultation process has been completed.

Alternative C – TPP Overhaul with Expansion of TPP for Storage

Like Alternative B, a MOA would be required to mitigate the negative effects of Alternative C. Because of the greater level of effects, a more stringent MOA would be needed to mitigate the effects. The MOA would incorporate these provisions, which would be refined in consultation with the ACHP and the Colville THPO:

- Concrete Walls: Because the "V" or wedge shapes visible on the exterior of the TPP are integral to the structure's load-bearing capacity, it is likely that any extension would need to include these basic forms. Unfortunately, this may create a "false sense of history." That is, an observer could look at the TPP and think that the extension was a part of the original plant. To help minimize this effect, the extension would not receive all of the extensive detailing found in the original plant, especially the fine horizontal lines visible on the exterior and interior.

- Terrazzo Floors: As on the exterior of the TPP, the construction of an extension with visible characteristics that exactly matched the characteristics of the original plant would create a false sense of history. To minimize this problem, the terrazzo flooring in the extension should be a slightly different but compatible color with the original terrazzo flooring.

- Interpretation: These changes to the TPP, if completed, offer an excellent opportunity to explain the historic significance of the TPP as both an engineering and architectural achievement. A display and/or brochures about the project would be made available in the Visitor Center on the opposite side of the river, and this brochure should explain the reasons for the project and the changes made to the original structure. The brochure should explain how the TPP fits into architectural history in the United States, especially the development of Brutalism and the way that the structure makes purposeful use of light and its surroundings. Photographs of the original structure should be included in the brochure to help the public understand the extent of the changes. Some of this same information should be included in a permanent display or interpretive sign that would be placed along the TPP tour route. Finally, information about the changes to the TPP should be included in the verbal narrative that is provided by Reclamation tour guides while taking the public through the TPP.

- Documentation: Limited HAER documentation for the TPP has already been compiled that shows the existing condition of the TPP, and Reclamation has contracted for additional HAER documentation for the Grand Coulee Dam Complex. Completion of this documentation is anticipated by the close of calendar year 2009. This extensive photographic and narrative description of the existing conditions of the TPP would help mitigate the effects of the project.

- Nomination: Reclamation has already committed to nominating the Grand Coulee Dam Complex to the NRHP under a previous MOA with the Washington SHPO. Preparation of this nomination is currently under contract. In the MOA for this project, Reclamation would commit to nominating the TPP as an eligible property, rather than just as a contributing element to a historic district, because of its exceptional significance.

To cover the unlikely event that artifacts or human remains are found during construction, the contract language discussed above for the mitigation of effects from the implementation of Alternative B would also be implemented.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

All of the mitigation discussed above for Alternatives B and C would need to be implemented to mitigate the effects of Alternative D.

3.6.4 Cumulative Impacts

Alternative A - No Action

No cumulative effects would be associated with this alternative.

Alternative B – TPP Overhaul and Separate Material Storage Building (Preferred Alternative)

Of the other projects likely to be taking place in and around the TPP during the TPP Overhaul (see Section 1.6), the replacement of the 500-kV cables with overhead lines has the most potential to affect the integrity of the TPP as a historic structure. Although the project is still in the early planning stage, it would likely result in the placement of 12 additional overhead lines running across the Columbia River from the transformers on the back side of the TPP to the 500-kV Switchyard west of the river. These additional lines would represent a reversal of the decisions made in the 1970s by Reclamation to minimize the aesthetic effects of connecting the TPP to the switchyard by running the cables through tunnels in the dam. Increasing the number of overhead lines is likely to result in adverse effects on the TPP as a historic structure, as its exterior appearance is an important part of its historical significance

(Hartmans 2009). In concert with Alternatives B, C, or D of this project, placement of additional overhead lines may result in cumulative impacts. Nevertheless, these impacts could be resolved through a MOA developed in consultation with the ACHP, the Washington SHPO, and the Colville THPO.

Alternative C – TPP Overhaul with Expansion of TPP for Storage

As with Alternative B, this option has the potential to result in cumulative effects, especially when one considers the effects of placing 12 additional overhead lines across the Columbia River as a part of the 500-kV line project. The effects could be mitigated through a MOA developed in consultation with the ACHP, the Washington SHPO, and the Colville THPO.

Alternative D – TPP Overhaul with Expansion of TPP and Separate Material Storage Building

This alternative has the same potential for creating cumulative effects as Alternatives B and C. The effects could be mitigated through a MOA developed in consultation with the ACHP, the Washington Historic Preservation Officer, and the Colville Tribal Historic Preservation Officer.

3.7 Indian Trust Assets

3.7.1 Affected Environment

The Secretary of the Interior has defined ITAs as "lands, natural resources, money, or other assets held by the Federal government in trust or that are restricted against alienation for Indian tribes and individual Indians" [Interior Departmental Manual 303 DM 2, Secretarial Order No. 3215]. Reclamation usually takes this to mean that ITAs include water rights, lands, minerals, hunting and fishing rights, money, and claims (Reclamation 1994).

Following this definition, Reclamation has not identified any potential ITAs within the area to be directly affected by the proposed project. All of the proposed construction activities would take place within Federal lands withdrawn or acquired by the U.S. for project purposes, and they are not held in trust for the CCT or for individual Indians. Congress also expressly directed the Secretary of the Interior (54 Stat. 703) to not establish "rights of hunting, fishing, and boating to the Indians in the areas" withdrawn for project purposes. Therefore, no reserved hunting or fishing rights exist in the project area.

However, the CCT have ITAs related to water rights on the Columbia River which is directly adjacent to the project area. The CCT have water rights within the Colville Reservation, and they have asserted claims for analogous rights in the waters that border the Colville Reservation, including the Columbia River (Columbia River Initiative Agreement in Principle between the State of Washington and the CCT, January 4, 2005).

3.7.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

The purpose of this discussion is to determine if implementation of the proposed action would appreciably impact the current ITAs that may be in the project area. This is a qualitative analysis which identifies the affected environment and perceived variables subsequent to the implementation of the proposed action. The indicator variable used in this analysis is the potential for the project, during either construction or operation, to affect access to ITAs or to reduce their value.

Alternatives A, B, C, and D

Alternatives B, C, and D would not result in any significant negative effects on ITAs. The project would not involve actions on trust lands and it would not further reduce the ability of Indians to hunt, fish, and boat in the Colville Reservation. The project would not affect the amount of water available in the Columbia River below Grand Coulee Dam and would not affect any water rights that might be claimed by the CCT.

3.7.3 Mitigation

None identified for any of the alternatives.

3.7.4 Cumulative Impacts

Many of the other projects to be undertaken at the Grand Coulee Dam over the foreseeable future involve other kinds of large maintenance projects. None of these other projects are likely to result in significant negative impacts to ITAs. Therefore, this project would not result in cumulative effects.

3.8 Indian Sacred Sites

3.8.1 Affected Environment

Executive Order 13007, which was signed by President Clinton on May 24, 1996, defines "sacred site" as

> any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site [E.O. 13007, Section 1 (b) (iii)].

Members of the CCT often recognize that, in general, many aspects of the natural environment should be considered sacred, including water, land, air, and various plant and animal species. In their Cultural Resources Management Plan (CCT 2006), the CCT grouped

"sacred sites" with TCPs and properties of traditional religious and cultural importance to tribes, both of which are addressed in the Cultural Resources section above.

The project area has undergone extensive construction-related disturbance (see the Cultural Resources section above) and the physical integrity of any sacred sites in this area would have been severely compromised. Furthermore, as a part of its security procedures, Reclamation has been obligated to curtail access to lands within the project area.

At this point in time, the CCT have not specifically identified any sacred sites within the immediate vicinity of the proposed project area. A number of locations with traditional Indian place names and traditional cultural value are in the general area of Grand Coulee Dam, but none of these have been specifically identified as having established religious significance or ceremonial use and they are all well outside of the area of direct effects.

3.8.2 Environmental Consequences

Impact Indicator/Methods for Evaluating Impacts

The purpose of this discussion is to determine if implementation of the proposed action would appreciably impact Native American sacred sites that may be in the project area. This is a qualitative analysis which identifies the affected environment and perceived variables subsequent to the implementation of the proposed action. The indicator variable used in this analysis is the potential for the project, during either construction or operation, to affect access to sacred sites.

Alternatives A, B, C, and D

Implementation of any of the alternatives would not result in negative effects on sacred sites.

3.8.3 Mitigation

None identified for any of the alternatives.

3.8.4 Cumulative Impacts

This project would not result in any cumulative impacts when evaluated in conjunction with other projects being done at Grand Coulee Dam.

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Chapter 4 CONSULTATION AND COORDINATION

4.1 Agency Consultations

National Historic Preservation Act (NHPA)

The NHPA was enacted in 1966 and is used to protect historical properties. The Act required the Federal government to partner with states, local governments, and Indian tribes to indentify and protect eligible properties. All Federal actions must be analyzed to assess for possible effects on these properties. The process for implementing the NHPA is defined in Federal regulations (30 CFR 800) and includes consultation with the SHPO, THPO, and ACHP.

Reclamation initiated consultation under Section 106 of the NHPA with the Colville THPO and the Washington SHPO in April 2009, requesting their concurrence with an Area of Potential Effects (APE) that included both an area of direct physical effects created by ground disturbing activities, and a broader area of visual effects (i.e., that area over which the proposed structures might be visible). By May, both the THPO and the SHPO had concurred with the APE. Later that same month, Reclamation initiated consultation about the level of effort to be used to identify historic properties. The SHPO had no specific comments about the proposed level of effort, and the THPO responded with a letter dated May 28, 2009, which said, in part,

> "Based on the information available at this time, we determined that the draft chapter regarding traditional cultural properties (TCPs) contains adequate information to address this issue based on the scale and nature of the proposed undertaking. We feel the information provided satisfies the intent of our October 24, 2005 protocol for TCP background research guidance. We do not require further background information nor is a research permit required to obtain additional information related to the project area."

Reclamation responded to the THPO's other concerns about the extent of the area of visual effects by conducting additional field verification. The proposed structures would not be visible from the Sand Pile, so no expansion of the APE in this direction was warranted.

Reclamation would be submitting a report regarding the proposed effects of the project to the THPO and SHPO for review and comment. Provided that Reclamation chooses to move forward with Alternatives B, C, or D, Reclamation would continue consultation under the NHPA to develop a MOA to resolve the identified adverse effects.

4.2 Consultation and Coordination with Tribal Governments

A scoping letter was sent to the CCT and the Spokane Tribe of Indians to involve and address any questions or concerns related to the proposed actions. No indication was received from the tribes that any comments or concerns existed or that further consultation was warranted.

4.3 Public Involvement

As part of the NEPA process, Reclamation submitted a news release to local radio, television, and newspapers and a scoping letter was sent to 14 Federal and State agencies, Tribal Governments, and local city and county officials soliciting comments, concerns, and issues related to the Proposed Action. A list of the recipients and a copy of the scoping letter and news release are included in Appendix A. No responses to the scoping letter or the news release were received during the February 27, 2009 to March 27, 2009 comment period.

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Appendix A

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Distribution List for Scoping Letter and Draft EA for TPP Overhaul

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RECLAMATION
Managing Water in the West

U.S. Department of the Interior
Bureau of Reclamation

GRAND COULEE THIRD POWER PLANT OVERHAUL

ENVIRONMENTAL ASSESSMENT (EA)

Grand Coulee Dam

Scoping Letter

Reclamation is preparing an Environmental Assessment for the proposed Grand Coulee Third Power Plant Overhaul and is requesting public comment and agency input to help identify issues to be addressed in the EA. Information obtained during the scoping period (February 27-March 27, 2009) will help in developing the EA. A draft EA is scheduled to be available for public review by August of 2009. Comments on the draft will be accepted during this time. The final EA is scheduled for completion in November of 2009.

PURPOSE AND NEED

Reclamation is proposing to overhaul the Third Powerplant (TPP) turbines at Grand Coulee Dam. The six generating units that comprise the TPP have been in service since the mid 1970's and are starting to have problems stemming from age related wear on the principle components. The age related wear is causing in an increase in outages and reduced reliability. Wear related issues include:

- Excessive wear on the operating ring bushing causing shear pins to break and wicket gate stems to twist.
- Wicket gate seals are worn and allowing excessive amounts of water to leak through the packing box into the Powerplant.
- Oil and water separators can not handle the current amount of water and oil leaking from the units and the volume of liquids compromises the original design of the system. The increased run time of the oil and water separation units results in increased maintenance and costs.
- Excitation system has become worn making the generating units increasingly difficult to start after they have been shut down.
- Governor system electronic controls are unreliable due to age and out of date technology resulting in increased outages and failures.

Overhaul of the TTP is needed to ensure continued operation and reliably provide electrical power. The estimated loss of revenue from interrupted power generation is four million dollars per day. If the generating units are not repaired, operating and maintenance (O&M) will increase and production and reliability will decrease. If this decrease in production and reliability occurs, Reclamation may not be able to meet contractual obligations for power generation.

PROPOSED ALTERNATIVES

Reclamation is currently investigating the alternatives identified below.

- **No Action**
  Under the No Action alternative Reclamation would continue operating the Third Powerplant (TPP) generating units with no system improvements. Power would continue to be generated by the six units with an increase in maintenance costs and production outages. The six units would continue to deteriorate increasing the risk and likelihood of failure of key generator components and ultimately rendering the units inoperable.

- **Third Power Plant Overhaul and Separate Material Storage Building**
  Under this alternative, Reclamation would overhaul the TPP generating units. The overhaul would include work on the generator, turbine, shaft, and the auxiliary equipment. The main portion of the overhaul work would be completed within the confines of the TPP. The overhaul program would include inspecting and refurbishing or replacing components. A material storage building would be built to provide needed storage space in a location convenient for movement of materials to and from the TPP. Additionally, a temporary building would be erected by the contractor for sand blasting and painting of repaired items. The contractor would also have the option of constructing a temporary fabrication building. Both temporary buildings and the new materials storage building would be located to the northwest of the Third Power Plant.

- **Third Power Plant Overhaul with Expansion of Third Power Plant for Storage**
  Under this alternative, the overhaul of the TTP generating units would be the same as described above. The six generating units would have the same refurbishment and repairs performed on them to return them to good working order. The temporary work building would be constructed, with the option for the second temporary fabrication building. However, instead of constructing a new material storage building, the north side of the TPP would be expanded to provide the needed work space.

YOUR FEEDBACK REQUESTED

Please submit your comments using the enclosed comment form and return it to the contact listed below by March 27, 2009.

FOR MORE INFORMATION

For more information about the project, please contact:

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Released On: February 27, 2009

Reclamation Prepares EA on Proposed Grand Coulee Third Powerplant Overhaul

The Bureau of Reclamation is accepting public comments in preparation of an Environmental Assessment for the proposed Grand Coulee Third Powerplant overhaul aimed at replacing outdated components at the facility.

The six generating units that comprise the Third Powerplant have been in service since the mid 1970s and are starting to have problems stemming from age-related wear on the principle components which have resulted in increased power outages and reduced reliability. The proposed overhaul will ensure continued operation and allow Reclamation to provide a reliable source of hydroelectric power.

The three proposed alternatives in the Environmental Assessment include: No Action; Third Powerplant Overhaul and Separate Material Storage Building; and Third Powerplant Overhaul with Expansion of Third Powerplant for Storage.

A draft EA is scheduled to be available for public review by August of 2009. The public comment period is February 27-March 27, 2009. The final EA is scheduled for completion in November of 2009. Written comments can be sent to Jim Taylor, Natural Resource Specialist, Bureau of Reclamation, 1150 North Curtis Road, Suite 100, Boise ID 83706-1234

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