Exhibit B

Project Operations Plan and Energy Production

Exhibit B

Statement of Project Operation and Resource Utilization

FERC Project No. P-13318

October 2015

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Prepared for:

EDF Renewable Development, Inc.

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Statement of Project Operation and Resource Utilization

October 2015 FERC Project No. P-13318

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Environmental Resources Management
1001 SW 5th Avenue, Suite 1010
Portland, OR 97204

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ACRONYMS AND ABBREVIATIONS

AMSL.............. above mean sea level

DLA .... Draft License Application

EDF .... EDF Renewable Energy

FAA .... Federal Aviation Administration

FERC............... Federal Energy Regulatory Commission

FLA .... Final License Application

gWh .... gigawatt hour

MW .... megawatt

NRCS.............. Natural Resources Conservation Service

PAD .... Pre-Application Document

ROW .... right-of-way

WRP................ Wetland Reserve Program

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1. PROJECT ALTERNATIVES CONSIDERED DURING PRE-APPLICATION PROCESS

The applicant originally considered the possibility a 1,144 MW project with a lower reservoir in NRCS-managed lands just south of Grizzly Butte. This initial project was described in the December 2008 preliminary permit application. During the pre-application study process the applicant downsized the project to 1,000 MW and moved the lower reservoir to the north of NRCS managed lands, but south of Grizzly Butte. The 1,000 MW design was well studied and considered the only real alternative design for the primary project features considered by the applicant. The 1,000 MW alternative (DLA Project) was described in detail in the 2011 Draft License Application (DLA) for the proposed Project and is summarized below.

The Project was re-designed in late 2014 with a smaller capacity, based on needs of the local energy grid and an increased ability to address environmental concerns with the smaller Project. This 393.3-MW Project requires smaller reservoirs, the locations of which were revised to further reduce potential environmental impacts. Figure B.1 shows the Project siting in the DLA, compared to the currently proposed Project (FLA Project). Additionally, the transmission alignment was modified from the route selected during the transmission line corridor alternatives analysis after the DLA was filed to further reduce environmental and visual impacts of the Project.

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FIGURE B.1 SITING OF THE PROJECT IN THE DLA AND CURRENT PROPOSAL

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1.1. Alternative Project Design Proposed in DLA

1.1.1. *Alternative Upper Reservoir and Dam*

1.1.1.1. Upper Reservoir

The Applicant originally proposed an upper reservoir on the western edge of Swan Lake Rim. The area would have been accessible from the proposed access road from the lower reservoir. A 14,773-foot-long, 20-footwide perimeter road would have been constructed around the upper reservoir. The reservoir would have had a gross storage capacity of 11,852 acre-feet and a surface area of 215 acres at the spillway crest elevation of 5,495 feet above mean sea level (AMSL). The usable storage of the upper reservoir would have been 10,622 acre-feet at the maximum operating pool elevation of 5,491 AMSL. The minimum water surface elevation would be 5,430 feet AMSL, with a usable storage volume of 966 acre feet. The elevation change in the upper reservoir during normal operations was anticipated to be 61 feet. The bottom and side slopes of the reservoir were proposed to be composed of an asphalt concrete facing with a geomembrane liner.

TABLE B.1: RESERVOIR VOLUME VERSUS ELEVATION FOR THE UPPER AND LOWER RESERVOIRS

Upper Reservoir[1]			Lower Reservoir	
Water Elevation (ft)	Gross Water Volume (ac-ft)	Available Water Volume (ac-ft)[3]	Water Elevation (ft)	Gross Water Volume (ac-ft)
5,499	12,716	12,446	4,286	12,773
5495(2)	11,852	11,852	4280(2)	11,583
5491(3)	10,892	10,892	4275(3)	10,622
5,490	10,789	10,789	4,270	9,726
5,480	8,774	8,774	4,260	8,009
5,470	6,936	6,936	4,250	6,422
5,460	5,273	5,273	4,240	4,954
5,450	3,768	3,768	4,230	3,614
5,440	2,411	2,411	4,220	2,409
5430(4)	1,202	966	4,210	1,349
5,420	375	111	4205(4)	966
5,410	37	30	4,200	509

[1] A portion of the reservoir cannot be drained by the intake due to the topography at bottom of reservoir
[2] Maximum water surface elevation at spillway crest
[3] Maximum operating pool water surface elevation
[4] Minimum operating pool water surface elevation

1.1.1.2. Upper Dams

The upper reservoir would have been contained by two dams on the east and west sides of the reservoir. The crest for each dam was planned to be at 5,499 feet AMSL, with a maximum dam height of 111 feet. The east dam was planned to be 6,560 feet long and the west dam will be 5,990 feet long. The east and west dams would have had a similar cross-section with 30-foot-wide crown widths and 1.5 horizontal (H) to 1 vertical (V) slopes. Approximately 3,500 feet of the eastern dam would have had a 20-foot bench on the landside face.

The dams would have been designed and constructed in full compliance with Uniform Building Code Seismic Zone 3 minimum requirements. Crest elevation of 5,499 feet AMSL would have provided 8 feet of freeboard above the maximum normal water surface elevation. The upper dams were proposed as rockfill dams with asphalt concrete face, which were to be constructed by compacting a higher grade rock to create the dam core. Asphalt would have been applied on the upstream face of the dam.

1.1.1.3. Upper Spillway

An emergency overflow spillway would have been constructed at the north end of the east dam. The spillway crest was proposed at elevation 5,495 feet AMSL. The 750-foot-wide, 85-foot-long spillway would have discharged into an existing drainage channel. The spillway would have consisted of a concrete weir structure and chute with concrete baffle blocks and a riprap armored apron.

1.1.1.4. Upper Reservoir Inlet/Outlet of Headrace

The headrace inlet/outlet structure would have been located at the western end of the upper reservoir. The inlet/outlet structure consisted of a circular concrete bell mouth intake structure to control the flow of water into the 26-foot-diameter drop shaft that leads to the headrace tunnel. The invert of the upper reservoir intake/outlet structure was proposed at elevation 5,408 feet AMSL.

1.1.1.5. Upper Reservoir Low-Level Outlet

A 3-foot-diameter low-level outlet was proposed in the upper reservoir as an emergency outlet in the event that water cannot be pumped into the lower reservoir. A low-level outlet was located near the middle of the east dam and consists of a concrete-encased steel pipe with a slide gate outlet. The upper reservoir would have drained through the Project conveyance system into the lower reservoir for dewatering. However, the low level outlet was proposed in the event that the upstream conveyance still holds water, but the upper reservoir still needs to be dewatered.

1.1.2. *Alternative Lower Reservoir and Dam*

1.1.2.1. Lower Reservoir

The lower reservoir site was located northwest of Swan Lake, on Grizzly Butte and southwest of the Swan Lake Rim, approximately 1.25 miles west of the upper reservoir. A private road owned by Jesperson Edgewood, Inc. (JEI) was proposed as the primary access road to the lower reservoir, with Swan Lake Road serving as a secondary access road. A 14,406-foot-long, 20-foot-wide perimeter road would have been constructed around the lower reservoir. The proposed lower reservoir had a gross storage capacity of 11,583 acre-feet and a surface area of 193 acres at the spillway crest elevation of 4,280 feet AMSL. The maximum operating pool elevation was 4,275 feet AMSL, with a storage capacity of 10,622 acre-feet. The minimum surface water elevation would have been 4,205 feet AMSL, with a storage volume of 966 acre-feet. Similar to the proposed upper reservoir, the side slopes and bottom of the lower reservoir would have been composed of an asphalt concrete facing with a geomembrane liner.

1.1.2.2. Lower Main Dam and Saddle Dam

The lower reservoir was to be impounded by both a main dam and a saddle dam. The main dam was proposed at 5,245 feet long. The crest of the main dam was proposed at 4,286 feet AMSL, making the dam approximately 100 feet high. The crest elevation of 4,286 feet would have provided 11 feet of freeboard above the maximum normal water surface elevation. Similar to the upper dams, the main dam was proposed as a rockfill dam with an asphaltic concrete face with a crown width of 30 feet and 1.5 H to 1 V slopes. The main dam would have a 20-foot bench on the landside face. The main dam would have been designed and constructed in full compliance with Uniform Building Code Seismic Zone 3 minimum requirements with balanced construction and no import of materials anticipated. In addition to the main dam, a 358-foot-long rockfill saddle dam was to be constructed on the northwest end of the lower reservoir. The saddle dam would have been approximately 360 feet long and 9 feet high, with a crest elevation of 4,288 feet AMSL. The saddle dam was designed with 2 feet more freeboard than the main dam to accommodate potential wave runoff since the prevailing wind direction is assumed to be generally from the west/southwest.

1.1.2.3. Lower Reservoir and Spillway

An emergency overflow spillway was proposed near the main dam for emergency purposes only, since the reservoir was designed to accommodate the capacity of the entire dewatered Project.

1.1.2.4. Lower Reservoir Inlet/Outlet of Tailrace

A tailrace tunnel inlet/outlet structure was proposed at the southeastern end of the lower reservoir. The inlet/outlet structure consisted of a concrete-lined approach channel, trash racks, and two vertically controlled slide gates to control the flow of water into the 26-foot-diameter, concrete- lined tailrace tunnel. The invert of the inlet/outlet structure was at elevation 4,186 feet AMSL.

1.1.2.5. Lower Reservoir Low-Level Outlet

A 3-foot-diameter low-level outlet was proposed in the lower reservoir as an emergency outlet in the event that water cannot be pumped into the upper reservoir. The low-level outlet was located near the middle of the saddle dam and consisted of a concrete-encased steel pipe with a slide gate outlet. The outlet was planned as an emergency drawdown feature in the event of a pending dam failure. The discharge would have drained into the adjacent wetland reserve.

1.1.3. *Large Diameter Hydraulic Conveyance*

Groundwater was proposed to be used for the initial fill and maintenance of the pumped storage system. Water would have been pumped from the lower reservoir to the upper reservoir on a daily basis. At the initiation of each daily cycle, approximately 10,000 acre-feet of water would have been pumped from the lower reservoir to the upper reservoir. Later in the cycle, this process would be reversed, with the same amount of water being discharged back into the lower reservoir to generate power.

1.1.3.1. Drop Shaft

The vertical drop shaft was designed as a 26-foot-diameter, 1,292-foot-long concrete-lined tunnel that extended from the inlet/outlet structure in the upper reservoir and connected to the headrace tunnel at approximately 4,100 feet AMSL. The shaft was to be excavated using drill and blast methods supported with rockbolts and shotcrete.

1.1.3.2. Headrace Tunnel

The 1,630-foot-long headrace tunnel was proposed to connect the shaft to the powerhouse via the headrace manifold and penstocks, which would have bifurcated flows to the four individual turbines within the powerhouse. The headrace tunnel was proposed at 24 feet in diameter, partially concrete-lined, and partially steel-lined in concrete encasement. The headrace tunnel would have extended for 1,630 feet at a slope of 8 percent until it reaches the 231-foot-long manifold. The four branches of the manifold were proposed to be steel-lined with concrete encasement. The manifold bifurcated to four 11.5-foot-diameter, 711-foot-long penstocks, which reduced to 7.5-foot-diameter penstocks for 285 feet before connecting to a 250-MW reversible pump-turbine unit.

1.1.3.3. Tailrace Tunnel

The 26-foot-diameter tailrace tunnel was proposed to connect the powerhouse to the lower reservoir. Like the headrace tunnel, it was partially concrete-lined and partially steel-lined in concrete encasement. Four 12.5-foot-diameter, 988-foot-long draft tubes would have extended from the pump-turbine units to reach the 228-foot-long tailrace manifold. From there, water would have entered the 26-foot diameter tailrace tunnel and continued 4,203 feet to the outlet.

1.1.4. *Alternative Powerhouse*

The proposed powerhouse cavern was proposed at approximately 375 feet long by 80 feet wide by 135 feet tall and will contained four 250-MW reversible pump-turbine units with a total installed capacity of 1,000 MW in generating mode. The powerhouse was located approximately 900 feet underground between the headrace and tailrace tunnels. The powerhouse contained four pump-generator turbine assemblies, all associated electrical and mechanical support equipment, personnel sanitary facilities, changing and meeting rooms, and a control room. The powerhouse was envisioned with four floor levels, including an operations floor, generator floor, turbine floor, and turbine sump floor. A 24-foot-diameter, 916-foot-long vertical access shaft was connected the powerhouse to the surface directly above the powerhouse on the existing mid-slope bench between the upper and lower reservoirs. The shaft would have provided a conduit for power delivery to the open air terminal, as well as a permanent emergency exit route from the powerhouse cavern, and ventilation during underground construction.

1.1.5. *Alternative Access Tunnel*

A 30-foot-diameter, 3,536-foot-long main access tunnel would have extended underground to the powerhouse. The entry to the access tunnel was proposed to be on the hillside near the lower reservoir, then branch underground to provide access to two levels of the powerhouse and the transformer chamber. Each access tunnel branch would have served as Project access during both construction and long-term Project operations.

1.1.6. *Alternative Open Air Terminal*

A 500-kV open air terminal was proposed to be constructed on a natural bench above the powerhouse approximately midway between the upper and lower reservoirs at an elevation of roughly 4,800 feet AMSL. The proposed terminal, also referred to as a substation in previous documents, was approximately 270 feet by 230 feet and would have housed the switchgear, breakers, terminal bus, and include a control building.

1.2. Transmission Line Alternative Analysis

Five transmission line route alternatives were considered during the pre-application phase of the FERC licensing process for the Project. These five route alternatives were reviewed and ranked based on their resource impacts and ability to meet Project needs. All five routes included a 500-kV transmission line from the proposed pumped storage project to a new open air terminal adjacent to the existing COTP line near Malin, Oregon (Appendix B-1), which was the size of transmission line needed for the Project design at that time. The purpose of the analysis was to seek feedback from landowners and resource agencies on transmission route alternatives prior to beginning federal scoping.

In accordance with FERC guidelines, Swan Lake Hydro LLC filed a Notice of Intent and Pre-application Document (PAD) with the FERC on June 8, 2010. The PAD included a description of a single 345-kV transmission route extending 23 miles from the Project to the Captain Jack Substation. This route incorporated a combination of public and private lands, including upland portions of land protected under the Natural Resource Conservation Service's (NRCS) Wetland Reserve Program (WRP) immediately west of the Swan Lake escarpment (see Figure B.2). At Applicant and state-sponsored public and agency meetings in August and October of 2010, the NRCS requested that the Applicant look at the possibility of alternative transmission routes; routes that would require fewer or no modifications to their existing easement in Swan Lake Valley. The public also expressed support for the development of alternative transmission line routes at the public meetings in August and October of 2010.-

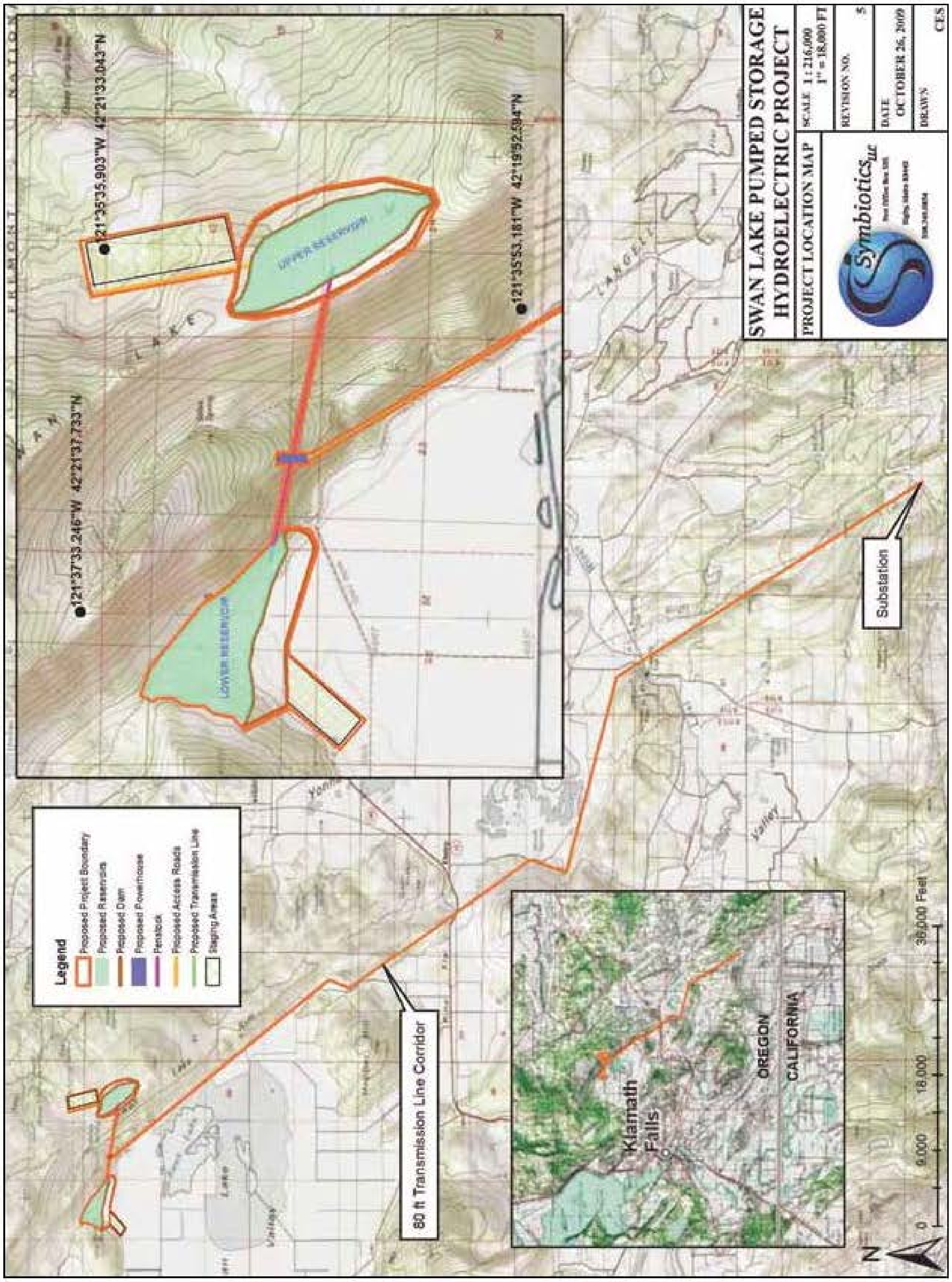

Figure A.5: Proposed project location and transmission route as presented in the Pre-Application Document filed for the Swan Lake North Pumped Storage Hydroelectric Project in June 2010.

FIGURE B.2: PROPOSED PROJECT LOCATION AND TRANSMISSION ROUTE AS PRESENTED IN THE PRE-APPLICATION DOCUMENT FILED FOR THE SWAN LAKE NORTH PUMPED STORAGE HYDROELECTRIC PROJECT IN JUNE 2010

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As a result of these requests, the Applicant included a transmission line corridor alternatives analysis as one of the pre-application studies proposed in 2011. The Applicant committed to identifying at least two additional transmission line routes as result of additional planning, public meetings, and studies. To begin this process, the Applicant completed a preliminary routing study in early spring of 2011. The goal of this preliminary effort was two-fold. First, to identify possible transmission line alternatives to the route in the PAD based on existing environmental, ROW, and engineering information, as well as public and agency comments related to the PAD. Secondly, to provide preliminary route alignments to the public, resource agencies, and other stakeholders who had the potential to be impacted by these routes, prior to completing ground studies in the summer of 2011. This effort resulted in the identification of six preliminary transmission routes, including the route presented in the PAD (Appendix B-1).

These six preliminary transmission routes for a new 500-kV transmission line corridor from the Project to the Captain Jack Substation were presented to the public in May 2011. Large scale maps were mailed directly to landowners and reviewed as part of a public presentation in Klamath Falls on May 30, 2011. The Applicant received written and verbal comments on the preliminary routes, including numerous negative comments about routes or portions of routes that would impact residences and/or agricultural properties in Poe Valley and along Swan Lake Road. All comments received prior to September 15, 2011, were used in cooperation with the results of other environmental, cultural, and engineering studies to refine the six preliminary routes into five revised alternatives (Section 1.2.1).

Considerations in the revision of the six preliminary routes into the five revised alternatives included but were not limited to the following:

1. Utilize existing ROWs, natural divisions, and agricultural boundaries where feasible.
2. Limit the length of the line and avoid geographic constraints limiting line constructability. Minimizing the route length generally decreases its impacts on the environment. However, some longer routes and sections of routes were chosen to avoid impacts as well.
3. Avoid populated areas, agricultural production, or other conflicting land uses where possible.
4. Avoid major environmental features, including Swan Lake, Alkali Lake, and other areas containing important wildlife habitat.
5. Avoid known historic and culturally significant resources areas.

Additional consideration was given to comments received in response to FERC filings and/or public meetings. These comments included but were not limited to:

1. Avoid or minimize conflicts with agriculture including center pivot irrigation features and other agricultural facilities

2. Avoid or minimize impacts to groundwater resources and wildlife
3. Avoid or minimize impacts on federal lands
4. Avoid private lands
5. Minimize direct and indirect impacts to private property values
6. Utilize existing ROWs where feasible
7. Avoid or minimize impacts to residences
8. Avoid airports

1.2.1. *Revised Transmission Line Alternatives*

Five revised transmission route alternatives for a new 500-kV transmission line corridor from the Project to a new open air terminal located along the COTP line were made available to the public in October of 2011 (Table B.2; Appendix B-1). Letters to affected property owners and other stakeholders on our mailing list in Oregon and California were mailed a packet of information on October 11, 2011.

Included in the packet were five maps illustrating the five revised transmission line route alternatives identified by the Applicant (Figure B.3). In addition to the maps delineating the five alternatives, the packet included one of the following:

For property owners whose property(s) would be impacted by one of the proposed transmission line alternatives, their packet included the following: (1) maps delineating the path of any alternatives that cross the property, including the location of the proposed ROW, locations of transmission poles, and property boundaries provided by Klamath County; (2) photographs illustrating what the proposed transmission poles would look like; (3) request for comments on the revised transmission alternatives by November 15, 2011; and (4) instructions on how to file comments with the FERC.

For property owners who had requested to be on the Swan Lake Project mailing list but whose property(s) were not within the proposed ROW, their packet included the following: (1) maps delineating the five proposed transmission line route alternatives; (2) photographs illustrating what the proposed transmission poles would look like; (3) request for comments on the revised transmission alternatives by November 15, 2011; and (4) instructions on how to file comments with the FERC.

A second public meeting to discuss the revised transmission line alternatives was held at the Klamath County Fairgrounds on November 7, 2011, from 6 p.m. to 8:30 p.m. All comments made at the public meeting or received in writing prior to November 16, 2011, were reviewed for the purposes of selecting a transmission alternative (see Appendix E-19) for review in the DLA, and subsequently leading to the FLA.

FIGURE B.3. TRANSMISSION ALTERNATIVES CONSIDERED AND THE SELECTED TRANSMISSION ROUTE

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1.2.1.1. Route 1

The route leaves the open air terminal and heads west-southwest for 1.35 miles along the spoil bank. The route then heads directly west for 0.66 mile before turning south and running parallel to White Line Road for 0.68 mile and crossing it diagonally. The route again crosses White Line Road and heads west along the south side of White Line Road for 0.97 mile. The route turns south and runs along the east side of Swan Lake Road for 0.74 mile before crossing over diagonally to the west side of the road and continuing south, running along the road for 2.02 miles. It then crosses over Swan Lake Road and heads east for 1.01 miles through farmland before heading south for 1.23 miles alongside an irrigation canal. The route crosses another 2.01 miles of farmland to the east and follows an irrigation canal south for 0.47 mile. It then heads south-southeast, following the base of a forested hill for 1.48 miles before heading directly south for 0.22 mile to meet Swan Lake Road. The route then runs south-southeast along the east side of Swan Lake Road for 0.47 mile. The route then breaks away from the road and heads southwest for 0.50 mile, crossing Highway 140 just northeast of the intersection of Swan Lake Road and Highway 140 at the northwest tip of Horton Rim.

The next segment proceeds 2.62 miles south-southeast up the west side of Horton Rim to the TransCanada Pipeline. The line runs parallel to the TransCanada Pipeline for 1.23 miles before turning sharply to the southwest, crossing the pipeline, and continuing for 0.75 mile, dropping off Horton Rim and crossing both North Poe Valley Road and E Canal as it enters the west side of Poe Valley. The route heads due south across Poe Valley for 0.54 mile, then runs east for 0.24 miles. The line heads southeast for 0.87 mile, diagonally crossing the Lost River and wetlands on the northern side of the river bank. After crossing the river it continues southeast for 0.47 mile, then south for 0.35 mile, crossing South Poe Valley Road and F Canal. The route then heads southeast for 0.61 mile, crossing F Canal two more times, then heads east for 0.28 mile, crossing F Canal again. It then proceeds south for 0.43 mile and crosses the F Canal. The line heads southeast for 0.64 mile, crossing Webber Road and F Canal three times. The route proceeds directly east for 1.03 miles and crosses Schaupp Road; it parallels South Poe Valley Road 0.22 mile to the south. It then turns to the southeast and continues for 0.50 mile, heads due east for 1.33 miles, again paralleling South Poe Valley Road 0.50 mile to the north. The route makes a sharp turn and heads directly south for 0.52 mile. It then continues south-southwest for 0.77 mile, crosses Bedfield Cemetery Road, proceeds east for 0.29 mile, and crosses Harpold Road.

The route parallels Harpold Road for 0.45 mile, heading due south. The route then breaks away from Harpold Road and heads southeast for 2.14 miles onto the western face of Buck Butte. It continues east-southeast for 1.45 miles before heading 1 mile east-northeast across the southern side of Buck Butte, paralleling the existing high voltage transmission lines. When the route nears the Captain Jack Substation it turns south-southeast, continuing for 0.14 mile and crossing the existing 500-kV high voltage lines at a perpendicular angle. It continues south-southeast for 1.30 miles and crosses the access road to the Captain Jack Substation. The line then heads southeast for 2.67 miles along the escarpment on the northeast side of Tule Valley, paralleling the existing high voltage transmission lines located just over 0.25 mile away. The route heads south-southeast for 1.14 miles and continues south for 1.63 miles, passing the Loveness Landing Strip and crossing the Ruby Pipeline. The line continues south for 1.03 miles, crossing the access road to the Malin Substation and leaving Tule Valley. After leaving Tule Valley, the route then turns slightly and heads south-southeast for 1.46 miles, crossing County Road 114. From there the route extends southeast for the final 0.31 mile to the proposed open air terminal.

1.2.1.2. Route 2

The route leaves the switchyard and heads west-southwest for 1.35 miles along the spoil bank. The route then heads directly west for 0.66 mile before heading south for 0.68 mile, paralleling White Line Road and crossing it diagonally. The route again crosses White Line Road and heads west along the south side of White Line Road for 0.97 mile. From there the route heads south on the east side of Swan Lake Road for 0.74 mile before crossing over diagonally to the west side of the road and continuing south, paralleling the road for 2.02 miles. It then crosses over Swan Lake Road and heads east for 1.01 miles through farmland before heading south for 1.23 miles along an irrigation canal. The route crosses another 2.01 miles of farmland to the east and then turns to the south and follows an irrigation canal for 0.47 mile. The route leaves the farmland and heads south-southeast, paralleling the base of a forested hill for 1.48 miles before heading directly south for 0.22 mile to meet Swan Lake Road. The route proceeds southsoutheast for 0.47 mile along the east side of Swan Lake Road. It then breaks away from the road and heads southwest for 0.50 mile, crossing Highway 140 just northeast of the intersection of Swan Lake Road and Highway 140 and extending to the northwest tip of Horton Rim.

The route proceeds 2.62 miles south-southeast up the west side of Horton Rim. The line turns southeast and parallels the TransCanada Pipeline for 1.23 miles, turns sharply to the southwest, crosses the pipeline and continues for 0.75 mile, dropping off Horton Rim and crossing both North Poe Valley Road and E Canal as it enters the west side of Poe Valley. The route heads due south through farmland for 0.54 mile, then heads east for 0.24 mile. It then heads southeast for 0.87 mile, crossing the Lost River and wetlands on the northern side of the river bank. After crossing the river it continues southeast for 0.47 mile. The line turns and heads south for 0.35 mile, crossing South Poe Valley Road and the F Canal. The route heads southeast for 0.61 mile, crossing F Canal two more times, and then proceeds east for 0.28 mile and crosses F Canal again. The line continues south for 0.43 mile and crosses F Canal again. Turning to southeast for 0.64 mile, the line crosses Webber Road and then crosses F Canal three times. The route proceeds directly east for 1.03 miles, paralleling South Poe Valley Road 0.22 mile to the north. The line crosses Schaupp Road, heads southeast for 0.50 mile, and then heads due east for 1.33 miles, paralleling South Poe Valley Road 0.50 mile to the north. The route makes a sharp turn and heads directly south for 0.52 mile. The line continues south-southwest for 0.77 mile, crosses Bedfield Cemetery Road, proceeds east for 0.25 mile, and crosses Harpold Road. The line leaves Poe Valley by heading east for 3.23 miles into the uplands.

In the uplands the route heads 0.69 mile southeast and then continues south-southeast for 1.50 miles towards the Captain Jack Substation where it crosses the existing 500-kV high voltage lines at a perpendicular angle. It continues south-southeast for 1.20 miles, crossing the access road to the Captain Jack Substation. It heads 2.67 miles southeast along the escarpment at the northwest side of Tule Valley, paralleling the existing high voltage transmission lines. The route heads south-southeast for 1.14 miles and continues south for 1.63 miles, passing the Loveness Landing Strip and crossing the Ruby Pipeline. It continues south for 1.03 miles, crossing the access road to the Malin Substation and leaving Tule Valley. The route then turns slightly and heads southsoutheast for 1.46 miles, crossing County Road 114. The route extends southeast for the final 0.31 mile to the proposed open air terminal.

1.2.1.3. Route 3

The route leaves the open air terminal and heads west-southwest for 1.35 miles along the spoil bank. The route then heads directly west for 0.66 mile before heading south parallel to White Line Road for 0.68 mile and crossing it diagonally. The route again crosses White Line Road and heads west along the south side of White Line Road for 0.97 mile. When the route meets Swan Lake Road it turns south and runs along the east side of the road for 0.74 mile before crossing over diagonally to the west side of the road and continuing south for 2.02 miles. It then crosses Swan Lake Road and heads east for 1.01 miles through farmland before heading south for 1.23 miles alongside an irrigation canal. The route runs east for 2.01 miles across farmland and then turns south and follows an irrigation canal for 0.47 mile. It then heads south-southeast, leaving the farmland and running along the base of a forested hill for 1.48 miles before heading directly south for 0.22 mile to meet Swan Lake Road. The route runs along the east side of Swan Lake Road for 0.47 mile. The line then breaks away from the road and heads southeast for 0.50 mile, crossing Highway 140 just northeast of the intersection of Swan Lake Road and Highway 140, and running up to the northwest tip of Horton Rim.

The route proceeds south-southeast for 2.62 miles up the west side of Horton Rim. It then parallels the TransCananda pipeline along the south side of Horton Rim, heading southeast for 1.75 miles and east-southeast for 2.58 miles. The route crosses over the pipeline diagonally and continues along the Horton Rim for 1.92 miles. It then drops down from Horton Rim into Poe Valley and heads south for 2.23 miles, crossing North Poe Valley Road and the Lost River before following a private road to South Poe Valley Road. It makes a sharp turn to the east, crossing Harpold Road and continuing for 1.49 miles out of Poe Valley.

The line heads into the uplands, traveling southeast for 3.17 miles and 1.50 miles south-southeast towards the Captain Jack Substation. The line crosses the 500-kV existing high voltage lines at a perpendicular angle and continues south-southeast for 1.20 miles, also crossing the access road to the Captain Jack Substation. Continuing along the escarpment on the northwest side of Tule Valley, the line heads southwest for 2.67 miles, paralleling the existing high voltage transmission lines located approximately 0.25 mile away. The route heads south-southeast for 1.14 miles and then continues south for 1.63 miles, passing the Loveness Landing Strip and crossing the Ruby Pipeline. The line continues south for 1.03 miles, crossing the access road to the Malin Substation and leaving Tule Valley. The route then turns slightly to the south-southeast and continues for 1.46 miles, crossing County Road 114. The final segment runs southeast for the final 0.31 mile to the proposed open air terminal.

1.2.1.4. Route 4

The proposed transmission line leaves the Swan Lake Substation and runs south-southwest for 0.04 mile. It then heads south-southeast for 0.42 mile, dropping to the floor of Swan Lake Valley. The line continues south-southeast for 4.56 miles following a private dirt access road along the base of the Swan Lake Rim escarpment on the east side of Swan Lake Valley. The route then turns to the south-southwest for 0.21 mile toward the northeast corner of Hopper Hill. From there the route heads south for 0.65 mile toward the eastern side of Hopper Hill. It then continues south-southeast for 0.91 mile on the east side of the existing private dirt access road between the eastern side of Hopper Hill and the western edge of Swan Lake Rim. The line then heads south for 1.02 miles into Pine Flats, running along the east side of the existing private dirt access road, turning southeast for 0.51 mile, and then traveling south for 0.5 mile.

The line crosses Highway 140 East and OC&E Wood Line State Trail as it continues south for another 0.63 mile to the base of Dairy Hill. The route ascends south-southeast for 1.16 miles up the west side of Dairy Hill as it leaves Pine Flats. From the saddle between the southwest side of Dairy Hill and Horton Rim, the route descends and proceeds southeast for 3.56 miles along the northeast side of Horton Rim facing Alkali Lake and crosses over the TransCanada Pipeline. It continues east-southeast for 1.68 miles and crosses over Horton Rim. The next segment drops down from Horton Rim into Poe Valley near Harpold Dam and heads southeast for 0.26 mile, crossing Burgdorf Road, the Lost River, and Harpold Road.

After crossing Harpold Road, the line proceeds south-southeast for 3.12 miles into the uplands along the center of the Harpold Ridge on the east side of Poe Valley. The line proceeds southeast toward the Captain Jack Substation for 3.10 miles through uplands towards before heading south for 0.81 mile and crossing existing 500-kV high voltage lines at a perpendicular angle. Continuing southeast for 0.48 mile, the line crosses the access road to the Captain Jack Substation and nears another existing high voltage line ROW. The line then turns south-southeast and proceeds for 0.79 mile parallel to the COTP line. Heading southeast, it runs parallel to the COTP line for 2.61 miles before turning slightly south-southeast and continuing for 0.69 mile. The route continues to parallel the COTP line, running south for 3.23 miles and crossing the Ruby Pipeline and the access road to the Malin Substation. The route then turns slightly and heads south-southeast for 0.92 mile, crossing County Road 114 and paralleling the COTP line. It continues south for 0.55 mile and then south-southwest for a final 0.24 mile to the proposed California Substation.

1.2.1.5. Route 5

The route leaves the open air terminal and heads east-southeast for 0.68 miles, climbing up the escarpment. The route follows the upper edge of the escarpment east of Swan Lake Valley southeast for 1.34 miles, passing the southwest edge of the Project's upper reservoir. The line continues to follow the edge of Swan Lake Rim, running southwest for 0.46 mile and then southeast for 3.54 miles. The route moves away from the edge and heads southeast for 2.17 miles on the Swan Lake Rim. The line runs due south for 1.16 miles, crossing the OC&E Woods Line State Trail. It heads directly southeast for 0.24 mile and crosses Highway 140 E just east of the town Dairy.

The line continues south-southeast for 2.37 miles along the Horton Rim. The route then heads 1.96 miles southeast along the northeast side of Horton Rim facing Alkali Lake where it crosses the TransCanada Pipeline. The line continues southeast for 1.28 miles and crosses over Horton Rim. It then drops down from Horton Rim into Poe Valley and heads south for 2.23 miles, crossing North Poe Valley Road and the Lost River before following a private road to South Poe Valley Road. At South Poe Valley Road the line turns sharply to the east, crosses Harpold Road, and continues for 1.49 miles out of Poe Valley and into the uplands.

In the uplands the line runs southeast for 3.17 miles, then south-southeast for 1.50 miles towards Captain Jack Substation where it crosses the existing 500-kV high voltage lines at a perpendicular angle. It continues south-southeast for 1.20 miles, crossing the access road to the Captain Jack Substation. Running along the escarpment on the northeast side of Tule Valley, the line runs southeast for 2.67 miles, paralleling the existing high voltage transmission lines located just over 0.25 mile away. The route heads south-southeast for 1.14 miles and then runs south for 1.63 miles, passing the Loveness Landing Strip and crossing the Ruby Pipeline. The line continues south for 1.03 miles, crossing the access road to the Malin Substation and leaving Tule Valley. The route then turns slightly and heads south-southeast for 1.46 miles, crossing County Road 114. The final segment of the route runs southeast 0.31 mile to the proposed open air terminal.

1.3. Pre-Application Alternatives Grading

The Applicant created a grading system to compare the relative impacts of the five transmission route alternatives for the Project. A grade of 1 to 4 was assigned for individual resource impacts associated with each alternative. Grades were awarded based on existing information that included public comments, as well as the results of environmental, cultural, and engineering studies completed during the pre-application phase of the FERC licensing process (Table B.3).

Definitions for the grades are as follows:

Grade 1. No impacts are anticipated due to the construction and operation of the Project.

Grade 2. Impacts are unlikely to occur due to the construction and operation of the Project.

Grade 3. Direct and/or indirect impacts will likely occur as a result of the construction and operation of the Project

Grade 4. Direct and indirect impacts will occur as a result of the construction and operation of the Project

TABLE B.2: COMPARISON OF TRANSMISSION ROUTE ALTERNATIVES

Resources	Route 1	Route 2	Route 3	Route 4	Route 5
Geology and Soils	3	3	3	2	2
Water Resources	2	2	2	1	1
Fish and Aquatic Resources	2	2	2	1	1
Botanical Resources	3	3	3	3	3
Wildlife Resources	4	4	4	3	4
Wetland and Riparian Resources	2	2	2	1	1
Federally Listed Species	1	1	1	1	1
Recreation and Land Use	2	2	2	1	3
Aesthetic Resources	4	4	4	3	4
Socioeconomic Resources	4	4	4	2	2
Cultural and Tribal Resources	2	2	3	3	4
Total	**26**	**26**	**27**	**18**	**23**

1.4. Preferred Alternative Selection

A refined version of Route 4 was selected by the Applicant as the preferred transmission line route (Figure B.3). The primary factors in selecting this route as the preferred alternative are listed below:

1. Route 4 would have the fewest number of transmission poles on agricultural lands.
2. Route 4 would affect fewer residences than routes 1, 2, and 3.
3. Route 4 would have fewer aesthetic impacts to residents in Swan Lake Valley in comparison to routes 1, 2, 3, and 5.
4. Route 4 would have fewer aesthetic impacts to residents in Poe Valley in comparison to routes 1, 2, and 3.
5. All five routes affect some private and public lands. Route 4 has fewer impacts to public lands in comparison to Route 5 and fewer impacts to private lands in comparison to Routes 1, 2, and 3.

6. Route 4 has less potential to negatively impact wildlife and waters of the United States in comparison to Routes 1, 2, 3, and 5.
7. Route 4 best addresses concerns raised at public meetings by minimizing impacts to agriculture, private landowners, and wildlife.
8. Route 4 is the shortest route in length, thereby reducing the number of impacts to a variety of resources, as well as Project costs.

Two significant revisions were made to Route 4 for the purposes of review in the DLA based on comments received on or after October 11, 2011. These revisions included eliminating a section of Route 4 that crossed private lands in the northeastern portion of Poe Valley and altering a portion of the southern alignment in close proximity to the Loveness Rural Airstrip to meet Federal Aviation Administration (FAA) regulations.

Three additional alterations to Route 4 were made based on comments on the DLA received on or before March 31, 2012. Revisions included:

1. Straightening the route along the northeast side of Hopper Hill where the transmission route exits Swan Lake Valley to reduce impacts to existing ponderosa pines.
2. The alignment in Pine Flats north of Highway 140 was also straightened to accommodate private landowner preferences.
3. A portion of the route was moved south along Horton Rim (south of Highway 140) to reduce visual impacts to the community of Dairy and exclude known deer bedding area.

Additional changes were made to Route 4 due to agency consultation and changes in Project design prior to the FLA. These include:

1. Removal of direct impacts to NRCS lands by moving 2.6 miles of the transmission line up in elevation toward Swan Lake Rim near Swan Lake.
2. At Hopper Hill, the route now travels to the west, rather than the east, of the small hill to the east of Hopper Hill.
3. The route around Dairy Hill now travels to the west and south of the hill, between Horton Rim and Dairy Hill, reducing visual impacts of the line.
4. The line now terminates north of the state line, at the Malin Substation.

Resource impacts related to the construction and maintenance of the preferred transmission line corridor are described in Exhibit E of the FLA.

1.5. Transmission Line Construction Access Analysis

The Applicant considered the following design criteria during the conceptual layout of the transmission line access roads:

- 15 percent maximum grade (10 percent preferred)
- 40-foot centerline radius minimum on any proposed road curves
- Utilize existing access roads where possible
- Minimize access road length
- Minimize the elevation difference between existing access and tower location to take advantage of existing topography where appropriate
- No retaining wall designs at this stage
- No significant cuts on steep slopes
- No switchback arrangements; if a switchback is required up a steep slope the site will be designated a helicopter site
- Avoid creeks and sensitive areas (including wetlands near Swan Lake)
- Minimize impact to existing agricultural fields and structures

The proposed access routes were delineated and screened for conformance to the design criteria with an effort to minimize road construction where there was potential for visual impacts from the valley floors. For example, any sites which required significant cuts across steep rock slopes or switchback construction up these slopes were designated as "helicopter sites" in anticipation that helicopter access would be preferable to new road construction.

1.6. Facility Designs, Processes, and Operations Alternatives

The Project's reservoirs were designed for a 9.5-hour generation cycle at maximum output. The Project will be capable of generating below maximum output for longer periods of time. However, an assumption that the Project would operate in a 9.5-hour generation cycle at maximum output was used for Project development. Further descriptions of design criteria can be found in Exhibit F and the Preliminary Supporting Design Report.

2. PREFERRED ALTERNATIVE SELECTION

2.1. Market Demand

The project as proposed in the DLA was a 1,000MW facility that would seek to maximize the benefits of economies of scale for the civil works of the Project (see Figure B.1). Since the filing of the DLA, the Applicant reviewed the characteristics of the DLA Project and performed an analysis of the economic benefits and expected operations of the Project at various capacity sizes through scenario analysis.

Early indications of the review revealed that a large project, such as the proposed DLA Project, would not achieve economies of scale in creation of economic benefit, though it would create economies of scale in cost alone. Looking at the net-cost-benefit, a larger DLA Project would be underutilized, provide less benefit to the grid, and be non-competitive with other energy technology. Further, such a large project would create additional congestion on the existing transmission grid, and would likely require significant transmission infrastructure improvements that would further significantly reduce the benefit of the DLA Project.

The scenario analysis looked at projects of smaller size, at the 600MW and 400MW level. It was determined that a distinct inflection point in the economic data at approximately 400MW was visible where the net-cost-benefits became markedly worse above this level of capacity. Smaller capacity sizes down to 300MW were technically feasible, but no less expensive due to many engineering constraints. The applicant began a redesign with an eye toward optimizing Project capacity for many factors, which included:

1. incorporating a host of comments from stakeholders on environmental impacts, seeking to reduce or avoid identified impacts
2. maximizing economies of scale on cost within a constrained multi-factor analysis
3. maximizing utilization of the topographic head available
4. minimizing the amount of excavation required to create the reservoirs
5. minimizing congestion impacts on the existing grid and reducing incremental cost of additional transmission infrastructure
6. maximizing net-cost-benefit

An optimized new Project size of 393.3 MW of generating capacity and 415.8 MW of pumping capacity was identified (FLA Project).

2.1.1. *Geological Considerations*

After the DLA was filed in 2011, the Project was able to complete additional geo-technical explorations in the Project Area. The large size of the DLA Project limited the locations available to economically construct the reservoirs and connect them in an efficient manner. Through a field geological survey the DLA Project was identified as having to cross two faults with its underground water conduit which created a certain level of geological risk for the Project and potential for collapse of the tunnel. The geotechnical exploration revealed further geological risk that had not yet been identified in the form of a significant likelihood of liquefaction of the lower reservoir at the sedimentary location that could lead to breach of the retaining dam. Collectively, these risks challenged the DLA Project substantially.

The applicant reviewed the characteristics of the DLA Project and performed an analysis of the economic benefits and expected operations of the Project at various capacity sizes through scenario analysis, and identified an optimized new project size of 393.3 MW of generating capacity and 415.8 MW of pumping capacity (FLA Project). This smaller Project capacity size with its smaller reservoirs now allowed placement in natural hollows or bowls in the topography. A pair of new reservoir locations adjacent to those of the DLA Project were identified that removed the liquefaction risk of the Project by relocation to more solid basalt rock and away from a sedimentary location. Both reservoirs were additionally designed with a partially sub-surface excavation to house a substantial amount of the retained water below the local grade as a further deterrent to seismic impacts. Lastly, the water conduit connection of the new reservoirs only crossed one fault further reducing seismic risk of a collapsed tunnel due to a seismic event.

The field geological survey identified in the escarpment many layers of alternating basalt rock and ash at frequent intervals that would create a significant construction hazard to laborers in a tunnel or shaft. Wishing to remove this health and safety risk and also further reduce seismic impacts, the Applicant relocated the water conduit and the powerhouse in the FLA Project to an above ground set of structures that completely eliminated the personnel hazard. An aboveground steel penstock is now proposed as the water conduit and is fully observable for maintenance and easy repair in the event of seismic damage.

The FLA Project is more robust than the DLA Project, and in its redesign has significantly reduced or eliminated many types of seismic risk. Further, the FLA Project has a higher degree of feasibility and has reduced risk to construction personnel by eliminating its underground works.

2.1.2. *Public Lands and Environmental Considerations*

The primary Project facilities and access roads for the Project as described above and in the December 2011 DLA included lands owned and/or managed by the BLM and the Natural Resources Conservation Service (NRCS). Both agencies had concerns with the locations of Project features as proposed in the DLA (Appendices E-19 and E-20). The preferred alternative for Project facilities and access as proposed in this FLA eliminates potential impacts to NRCS Wetland Reserve Program (WRP) lands and considerably reduces the acreage of BLM lands impacted by the Project's primary facilities including access roads.

2.1.2.1. NRCS Swan Lake WRP Lands

The NRCS filed comments in 2012 with specific concerns about Project features and their impacts to the NRCS's Swan Lake WRP as described in the DLA. In response, the Applicant studied possible revisions to Project features that would reduce impacts to NRCS WRP lands. The Applicant held a meeting at NRCS's Portland, Oregon Offices on September 3, 2014 to provide NRCS with an update on the Project and discuss potential changes to the design to address the NRCS's comments on Project features as proposed in the DLA. Attendees included: Bari Williams NRCS, Joe Eberhardt EDF-Renewables, and Erik Steimle, ERM (consultant to EDF-Renewables).

On September 3, 2014, the Applicant discussed ongoing geotechnical studies needed to complete Project design alterations in response to comments in the DLA as well as a timeline for an NRCS WRP Easement Modification and associated mitigation for Project features proposed on NRCS WRP lands. A portion of the proposed transmission line corridor and access roads as described in the PAD and DLA were within the NRCS's WRP wetland reserve. The area is comprised of shrub-steppe upland habitat and does not contain jurisdictional wetlands, but nevertheless was included in the NRCS's Swan Lake WRP (Symbiotics 2011). Prior to filing of the DLA, the NRCS had recommended to the Applicant that a WRP easement modification request for Project features could be filed in parallel to the FLA as the NRCS would need to include FERC's NEPA document as part of the application. On September 3, 2014 the NRCS discussed a second possible option to the easement modification request, a subordination agreement with the Applicant for the specific linear Project features in the NRCS WRP. This option has been used by the NRCS for other linear developments crossing NRCS managed lands.

In response, the Applicant requested that NRCS make a determination whether subordination would be viable option for certain Project features associated with the Project. EDF submitted a formal subordination determination request to NRCS on October 16, 2014. In addition, the Applicant filed a compatible use authorization (CUA) application with NRCS on September 29, 2014 to complete geotechnical investigations on NRCS lands to address in part NRCS's written concerns about specific Project features on NRCS lands described in the DLA. On November 17, 2015, Bari Williams notified the Applicant that the NRCS would not have the authority to subordinate the Swan Lake WRP and the Applicant would need to go through the WRP easement modification request process for any Project features associated with the Project on NRCS managed lands. On December 16, 2015 the Applicant's environmental contractor (ERM) notified the NRCS that geotechnical studies were no longer necessary on NRCS managed lands to further refine Project features and respond to their comments on DLA. On March 31, 2015 ERM notified Ms. Bari Williams and Kevin Conroy of the NRCS that the Applicant had revised the Project features and access roads in part due to the NRCS's comments on the DLA as well as 2014 meetings and correspondence to avoid NRCS WRP lands entirely and would begin to present these revisions to resource agencies, tribes, and the public in the Spring of 2015. The first formal public meeting discussing post-DLA Project changes occurred on April 8, 2015 in Klamath Falls. The

Oregon Water Resources Department hosted the meeting and agencies including the NRCS, tribes, NGOs, and other stakeholders were invited to listen to the Applicant's proposed changes to the Project and OWRD's description of Project groundwater use (Appendix E-2).

2.1.2.2. BLM Lands

The BLM has been an active participate in the FERC licensing process for the Project since the Applicant's original preliminary permit filing. On March 13, 2012 the BLM filed comments on DLA with specific concerns about Land Resources, Cultural Resources, and Compliance with NEPA. The BLM has requested that to the extent practical Project features including new roads and ROWs be kept to a minimum on BLM lands. On July 16, 2013 the Applicant met with the BLM to provide an update on the Project and to discuss potential changes to the Project features due in part to DLA comments. In September 2014, the Applicant begin coordinating with BLM on a revised ROW application incorporating Project changes on BLM lands and additional geotechnical investigations to further assist in the finalizing the Project design for the FERC FLA. On February 7, 2015 the Applicant filed an updated ROW application with BLM the included the revised Project features and a reduced footprint on BLM lands. The primary Project features in the Applicant's preferred alternative (described in Exhibit A of the FLA), excluding the transmission line corridor, reduces the Project footprint on BLM lands from 120 acres as described in the DLA to 22 acres. The Applicant has continued to meet with BLM and has maintained ongoing discussions regarding about Project changes with the agency, as described in the Agency Consultation sections for each of the resource areas discussed in Exhibit E.

3. PROJECT OPERATION

3.1. Proposed Project Operation

The proposed Project will operate as an energy storage project. At the initiation of the cycle, approximately 2,110 acre-feet of water will be pumped from the lower reservoir through a large-diameter conveyance system made primarily of a steel penstock to the upper reservoir. To generate power, water will be released from the upper reservoir and passed through an aboveground powerhouse containing three variable speed, reversible pump-turbine units and four 131.1-MW generator units. The Project is designed to generate for 9.5 hours a day of full power generation, at a maximum of 393.3 MW and a minimum of 321 MW, and pump water from the lower reservoir to the upper reservoir in about 11.5 hours. This pumping and generation process will be dictated by market demand but is limited to a maximum of 9.5 hours of generation per day at maximum generating output, without repeating the cycle during the day. Modeled operations indicate that the market will likely dispatch the Project on a cycle frequency of 0.8 times on average per day. A maximum cycle frequency of 1.2 times is an engineering/physical constraint, and this limit seasonally shows up in the modeled operations.

3.2. Manual Operation

The Project will be staffed with on-site operations staff 24 hours a day, seven days a week.

3.3. Annual Plant Factor

The Project has been designed to generate for 9.5 hours each day. The actual run time of the Project will be dependent on market demands. It is projected that the annual electrical energy production will be 1,187 gigawatt hours (gWh) assuming the Project was in generating mode for 8.3 hours each day. With an annual generation of 1,187 gWh, the plant factor would be approximately 35 percent. Plant factor is defined as the average production for a given time divided by the total maximum production at full design capacity. The actual generation will be dependent on the market.

3.4. Operations during Adverse, Mean, and High Water Years

The initial 2,581 acre-feet of water to fill the Project system would be supplied by nearby groundwater wells. Following the initial fill, 400 acre-feet per year of supplemental water would be supplied to the system from nearby groundwater wells on a periodic basis to restore water loss from evaporation and seepage. Due to the storage function of the Project and its lack of connectivity to natural bodies of water, Project operation would not be directly impacted by adverse, mean, and high water years.

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4. DEPENDABLE CAPACITY AND ANNUAL ENERGY PRODUCTION

The capacity of the Project is estimated to be a maximum of 393.3 MW. The Project will provide a dependable capacity of at least 321 MW and up to 393.3 MW for 9.5 hours a day. The actual run time of the Project will be dependent on the market. It is projected that the annual electrical energy production will be 1,187 gWh, assuming the Project was in generation mode for 8.3 hours each day based on operational modeling.

Pumped storage projects are designed to provide dependable capacity to the regional electric grid and are specifically configured based upon these anticipated grid requirements. Since the Project is proposed as a closed-loop configuration, it will not be subject to river flows, meteorological cycles, or other adverse external events. The dependable capacity for the Project is based on a maximum of 9.5-hour daily generation at least 321 MW and up to 393.3 MW, or 3,736 megawatt hours (MWh) per day, five days per week. The reservoirs are sized for the anticipated duration of generation (how long to provide dependable generation) and the equipment nameplate generation (how much dependable energy is needed). In its simplest context and exclusive of ancillary services values, the Project is tailored to the needs of the grid for load during peak demand periods. In other words, the Project is tailored to serve the load cycle within that region or other regions served by the regional grid, and this has been supported by modeled operations.

Project reservoirs would also include an additional 15 percent reservoir capacity for operational issues which could be used for occasional extra generation beyond the grid requirements that define dependable capacity. This extra 15 percent storage is incorporated for a number of operational reasons, including the following: (1) to provide a reservoir capacity buffer to accommodate periods between addition of makeup water; (2) to provide additional portal submergence to mitigate against vortex formation at low reservoir levels, and (3) to maintain internal pressures and minimize wide swings in internal pressure within the steel penstock conveyance system.

Modern pumped storage projects can operate in a highly flexible regimen apart from the simple daily generation cycle, depending on grid needs at the time. Grid demands will ultimately determine the optimum operating protocols for the Project.

4.1. Project Flow Data

The proposed reservoirs are new and off-channel, therefore there are no flow data available in relation to the Project. Based on preliminary estimates, approximately 330 acre-feet of net evaporation and leakage is expected to be lost from the combined reservoir system each year. The initial water available to fill the Project system would be supplied from nearby groundwater wells. Following the initial fill, supplemental water would be supplied to the system from nearby groundwater wells on a periodic basis to restore water loss from evaporation and seepage.

4.2. Reservoirs

4.2.1. *Upper Reservoir*

At the proposed maximum normal operating pool elevation of 6,128 AMSL, the upper reservoir has a storage capacity of 2,562 acre-feet and a surface area of 64 acres at full pool. A preliminary elevation capacity curve representing generation mode for the upper reservoir is shown in Figure B.4. The water level in the upper reservoir will be maintained such that the low-level outlet is completely submerged at all times to prevent air from entering the headrace tunnel during power generation. The proposed minimum pool elevation of 6,084 feet AMSL submerges the low-level outlet by four feet.

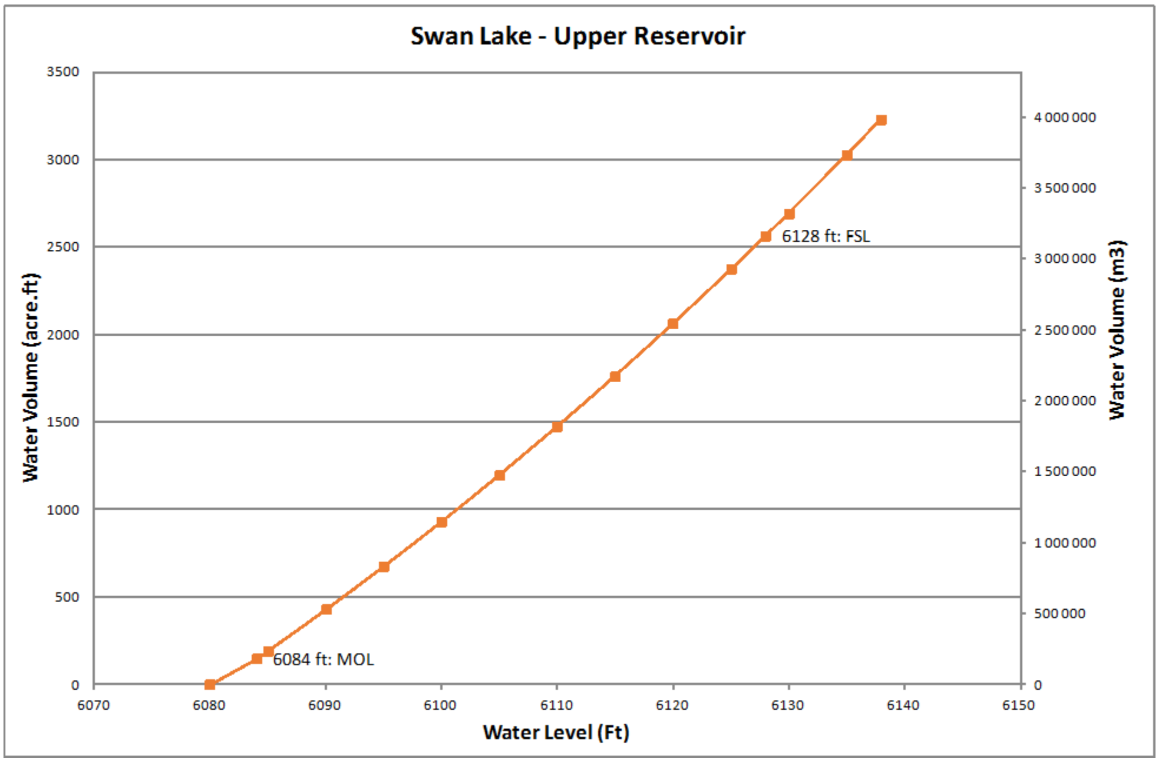

FIGURE B.4: UPPER RESERVOIR ELEVATION CAPACITY CURVE

4.2.2. *Lower Reservoir*

At the proposed maximum normal operating pool elevation of 4,457 feet AMSL, the lower reservoir has a gross storage capacity of 2,581 acre-feet and a surface area of 60 acres at full pool. A preliminary elevation capacity curve for the lower reservoir is shown in Figure B.5. Similar to the upper reservoir, the water level in the lower reservoir will be maintained such that the low-level outlet is completely submerged at all times to prevent air from entering the headrace tunnel during power generation. The proposed minimum pool elevation of 4,408 feet AMSL submerges the low-level outlet by 4 feet.

During generation mode, water stored in the upper reservoir will be released through the intake and flow through the large-diameter water conveyance system, pass through the pump-turbines, and discharge into the lower reservoir. The upper reservoir water surface elevation decreases as the lower reservoir water surface elevation increases. During the pumping mode this process is reversed. The generating and pumping times will be dependent on the market needs, however, if a 9.5-hour generating period occurred continually, the upper reservoir will be at its minimum pool level after 9.5 hours and the lower reservoir would be at its maximum normal pool level. Project operation can alternate between pumping and generating modes quickly and for different lengths of time to respond to market needs.

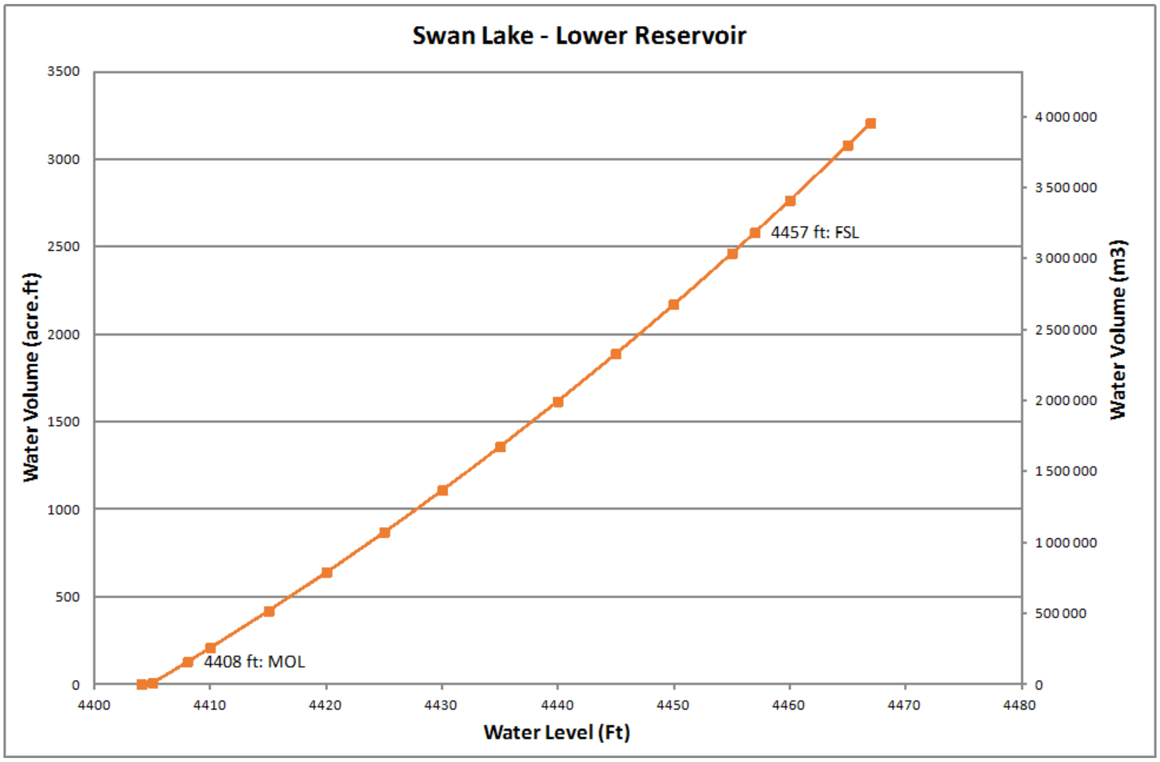

FIGURE B.5: LOWER RESERVOIR ELEVATION CAPACITY CURVE

4.3. Project Flow Range

The Project has an estimated operating flow of up to 3,072 cfs at 393.3 MW when in generation mode, the maximum generation capacity. The Project has an estimated operating flow of up to 2,427 cfs at 415.8 MW when in pumping mode, the maximum pumping load.

4.4. Tailwater Rating Curve

The lower reservoir is considered the project tailwater. The tailwater elevation increases as a function of reservoir volume instead of project flow.

4.5. Project Capability versus Head

The Project is designed to maintain at least 321 MW of capacity throughout a 9.5-hour period. As water is released from the upper reservoir into the lower reservoir, the Project head is reduced as the upper reservoir elevation decreases and the lower reservoir level increases. The changing reservoir levels and resulting Project head impacts the maximum generation level achievable falling from 393.3 MW at a full upper reservoir to 321 MW at the lowest operational level of the upper reservoir. The maximum gross head would be when the upper reservoir is at maximum surface elevation and the lower reservoir is at its minimum surface elevation. The minimum gross head would be when the upper reservoir is at its minimum surface elevation and the lower reservoir is at its maximum surface elevation. The range of generating mode capacity (and pumping mode capacity) is shown in Figure B.6.

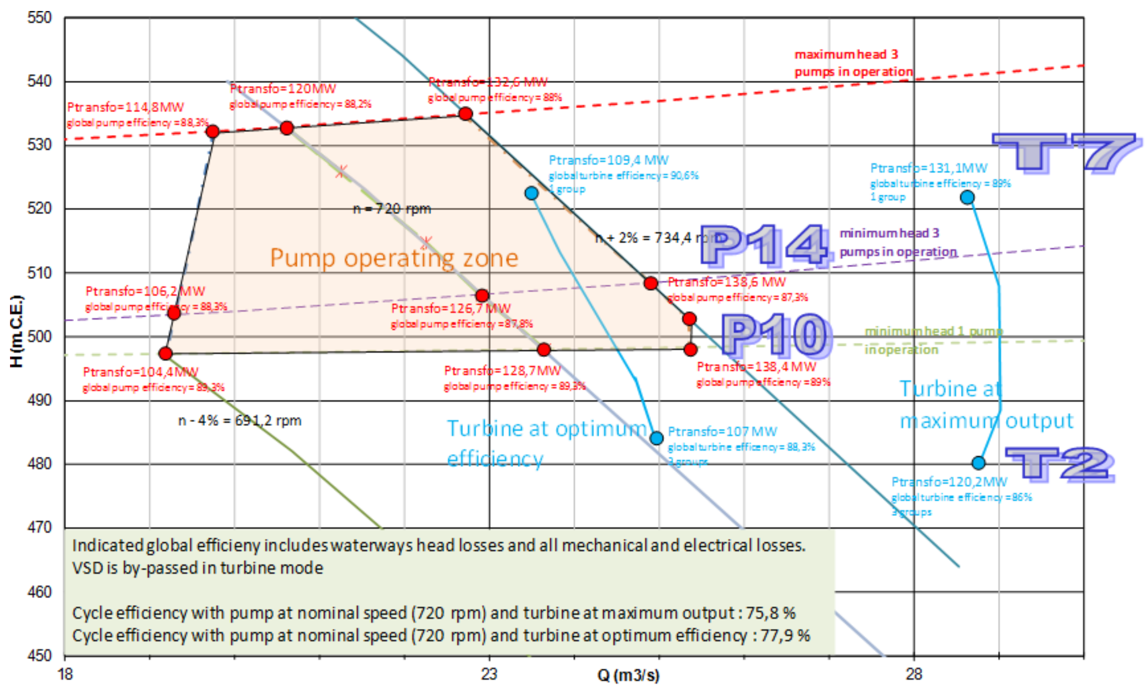

FIGURE B.6: SWAN LAKE REVERSIBLE UNITS CHARACTERISTICS PUMP AND TURBINE MODES

5. USE OF POWER

The electrical energy produced at the Project will be marketed to electric utilities servicing this region. The electrical energy used on site will include basic utilities and the energy needed to pump the water to the upper reservoir. For every 9.5 hours of full power generation, at a maximum of 393.3 MW and a minimum of 321 MW, the Project is assumed to have an 11.5-hour pumping cycle.

The power absorbed during pumping mode will come from the wholesale energy market and will be purchased when the energy system is imbalanced and is in surplus. The energy created during generation mode and delivered to the wholesale market will help satisfy demand during periods of peak demand and when grid flexibility is required. All of the power generated, up to 393.3 MW/hour, will be sold in the wholesale market to purchasers that may include Portland General Electric, Puget Sound Energy, Bonneville Power Administration, Pacific Gas and Electric, Southern California Edison and PacifiCorp.

The Applicant is an independent power producer building a single project for grid interconnection and is not responsible for system or regional planning needs.

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6. FUTURE DEVELOPMENT PLANS

The Applicant has no plans for future development of the Project or of any other existing or proposed water power at this site beyond what has been proposed in this application.

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