



**Barker Rosholt
& Simpson LLP**

Albert P. Barker

EMAIL: apb@idahowaters.com

PHONE: 208.336.0700

WEB: idahowaters.com

Boise

1010 W. Jefferson St. Suite 102

Boise, Idaho 83702

p. 208.336.0700

f. 208.344.6034

Attorneys

John A. Rosholt

Albert P. Barker

John K. Simpson

Travis L. Thompson

Scott A. Magnuson

Jonas A. Reagan

Nicole L. Swafford

February 13, 2019

Via E-File

Kelly Houff
Chief, Engineering Resources Branch
Division of Hydropower Administration and Compliance
Federal Energy Regulatory Commission
Washington, DC 20423

Re: Project No. 4656-054 Idaho Arrowrock Dam Hydroelectric Project

Dear Mr. Houff:

In supplement to the Second Amended Exhibit A for project 4656, which was filed with the Commission on February 7, 2019, in response to your request we are filing an edited version of the Second Amended Exhibit A to clarify the technical description on Page A-8. No other changes to the Second Amended Exhibit A have been made.

Please let me know if you have any questions.

Very truly yours,

BARKER ROSHOLT & SIMPSON LLP

Albert P. Barker

APB/aje

**SECOND AMENDED EXHIBIT A:
PROJECT DESCRIPTION**

On August 1, 2008, the Commission issued an Order granting request for amendment of the License. 124 FERC ¶62,090. The Commission's Order reduced the authorized capacity from a 60 MW power plant with two 30 MW turbines at the existing Arrowrock Dam to a 15 MW capacity power plant with two 7.5 MW turbines. The power plant discharges into Lucky Peak Reservoir, the existing Corps of Engineers Reservoir, immediately downstream from Arrowrock Dam.

The original Exhibit A Project Description shall be changed as follows:

EXISTING PROJECT

Arrowrock Dam

Arrowrock Dam is a concrete arch structure 350 feet high, constructed in 1915, owned and operated by the Bureau of Reclamation.

The Bureau of Reclamation modified and upgraded the outlet works at the Arrowrock Dam through the Arrowrock Valve Rehabilitation Project, completed by Reclamation in 2004. In Reclamation's Valve Project, the existing lower level needle-valves were replaced with clamshell gates and the tunnels reinforced with steel liners. The upper level valves were sealed off. Under this Order, Licensee uses two of the outlets (Outlets No. 1 and 2, which are the two closest to the basalt bench on the south side of the reservoir) in the lower tier of outlets. These two outlets were originally intended for use as power conduits. These outlets are connected by bifurcations in the tunnels which divert water to the power plant. In 2011, Reclamation permanently sealed the five sluice gates outlet conduits at the base of the dam.

Arrowrock Reservoir

No new impoundments were created as part of the power project. Irrigation and flood control releases from the existing Arrowrock Reservoir are used for power production at the new powerplants. The power operation is incidental to the operation of the reservoir for its other purposes.

The storage capacity of Arrowrock Reservoir totals 286,600 acre-feet (at normal water surface elevation 3,216 feet). All storage space is usable; the reservoir contains no dead or inactive space. At full pool, the surface area of Arrowrock Reservoir is 3,100 acres.

Lucky Peak Lake

Releases from the new powerplant discharge into a tailrace area and then into Lucky Peak Lake, a reservoir impounded by the Corps of Engineers' Lucky Peak Dam. The dam is an earthfill structure completed in 1954. When Lucky Peak Lake is full, it backs water about 90 feet high on the downstream face of Arrowrock Dam.

Lucky Peak Dam is not affected or altered by the Arrowrock Powerplant. When Lucky Peak Lake is at high levels, however, it controls the tailwater elevation of the proposed powerplant.

The total storage capacity of Lucky Peak Lake is 293,000 acre-feet (at normal full pool elevation 3055), as follows:

<u>Lucky Peak Lake</u>	<u>Acre-feet</u>
Active capacity (elevation 3055 feet)	111,950
Irrigation Space	50,000
Idaho Department of Fish and Game	102,350
Noncontracted space	
Total Active Capacity	264,300 ¹

¹ Active capacity was formerly considered to be 278,000 acre-feet (at pool elevation 3060 feet). Under the current operation, however, the 13,900 acre-feet between elevations 3055 and 3060 feet is not filled except in unusual flood situations.

Dead and inactive capacity (elevation 2905 feet)	28,800
Total storage capacity	293,100

Lucky Peak Lake has a water surface area of 2740 acres at normal full pool elevation 3055.

Anderson Ranch Reservoir

In addition to the storage regulation provided by Arrowrock Reservoir, the powerplant receives incidental benefits from storage regulation provided by Anderson Ranch Reservoir, located 48 miles upstream from Arrowrock Dam on the South Fork of the Boise River; the South Fork flows into Arrowrock Reservoir. Anderson Ranch Dam is a Bureau of Reclamation dam which was completed in 1950. Anderson Ranch Reservoir space totals 493,200 acre-feet as follows:

<u>Anderson Ranch Reservoir</u>	<u>Acre-feet</u>
Active storage capacity	423,000
Dead and inactive capacity	70,000
Total Storage capacity	493,200

Proposed Project

The power plant authorized by the license amendment has an installed generating capacity of 15 MW rather than 60 MW. The Original License allowed construction of a 60 MW project located on the South Fork of the Boise River in Elmore and Ada Counties, Idaho. The Project is located at the U.S. Bureau of Reclamation's existing Arrowrock Dam and Reservoir and the Project's tailrace discharges to the United States Army Corps of Engineers' Lucky Peak Reservoir. The amendment to the license decreased the project capacity by changing the project from the previously licensed project of two 30-MW generating units with two 13-foot diameter 180 foot long penstock through the Arrowrock Dam. In its stead, the Licensees developed a

15-MW project consisting of two 7.5 MW generating units. Rather than installing tunnels through the dam and a new outlet works, the Project receives water from two of the existing outlet works which lead to clamshell gates downstream of the dam. The intake of the existing outlets are at a lower elevation than the inlet as originally licensed. The Licensees also eliminated about 10 miles of transmission line from the Project as originally licensed. The Commission determined that an amendment to the License was necessary for these proposed changes. *Boise-Kuna Irrigation District, et al.* 112 FERC ¶ 61, 240 (September 1, 2005). As an amendment seeking a decrease in the Project capacity, the amendment is a non-capacity related amendment. 18 CFR § 4.201(b).

The amended Project involves tapping into the existing Outlet Conduits No. 1 and No. 2 near their downstream end, just upstream of the newly installed Clamshell Gates, for conveyance of flow through two penstocks to the powerhouse, containing two 7.5 MW units for a total capacity of 15-MW. The required bifurcations permit the two outlet conduits to be operated for releases when the powerhouse units are inoperable. This plan of utilizing the outlet conduits for conveyance of flow to the units required modification to the gate structure of the outlet conduits. These required modifications are shown on the drawings included. See Amended Exhibit F.

Operation of the conduits for flow releases produces considerable turbulence downstream of the outlets. In particular, releases through Outlet Conduits 1 through 3 produce considerable erosive forces against the rock bench in the area (the same rock bench considered as the powerhouse site for the recommended plan). Construction of the powerhouse harnesses the energy for beneficial uses, releases relatively tranquil flow some distance downstream, and eliminates this problem.

The powerhouse is located on the left bank (looking downstream) on the basalt rock

bench that is seasonally flooded and then re-emerges when the Lucky Peak Lake (immediately downstream reservoir) recedes in the fall. The powerhouse is located in the same location and footprint as originally licensed. The powerhouse is approximately 70 ft. high above its foundation. This results from the deep submergence requirement for the turbines and from the required flood protection when the Lucky Peak Lake reaches its maximum level in the summer recreational season.

The Project requires turbine selection for the very wide hydraulic head variation at the project. The head variation can range from about 180 feet to less than 50 feet. Francis turbines proved most attractive, considering the equipment costs, the cost of civil works construction, and the energy output. The tailrace channel slopes up and leads to a weir that controls the tailwater elevation for periods when the Lucky Peak Lake is drawn down.

Operationally, the Licensees utilize a smaller proportion of flows through the Arrowrock Dam than the originally licensed project. The flows which are not diverted to the powerhouse are passed through the other existing Reclamation outlet works and, if necessary, the spillway, according to existing Reclamation operation guidelines. The operation of the facility utilizes the authority of the FERC license that permits daily "shaping of the releases" which follow the need for power. Given the hydraulic capacity of the Project, the ability to shape releases occurs during the period from August to February, with shaping rarely during August and February. The plant will not operate below 70 feet of head, or below 3092 elevation in Arrowrock reservoir when fish entrainment conditions are more likely, because of operational limitations on the turbines.

The average annual energy generation for the project is 81,120 megawatt-hours per year, considering the entire period of record from October 1927 through September 2000. The

average annual generation for the best 30 consecutive year period is 86,940 MW-hours. The average annual generation for the worst 30 consecutive year period is 78,830 MW-hours.

The power output of the Project is stepped up to 34.5 kV for transmission and interconnection to the Idaho Power Company (IPC) system. Licensees replaced the existing Bureau of Reclamation's 23 kV line between Arrowrock Dam and IPC's 34.5-kV Boise Bench feeder with a new 34.5 kV line, utilizing the existing right of way, terminating where the existing 23 kV line is presently tapped from IPC's single circuit distribution line north of the Lucky Peak Nursery. Existing poles were utilized where appropriate, and others replaced by helicopter with new, as needed. The remainder of the licensed transmission line was not necessary for the Project. The amendment eliminates approximately ten miles of transmission line from this point of interconnection near the Lucky Peak Nursery to IPC's Boise Bench substation, as authorized by the original License.

Arrowrock Power Plant

The 15 MW power plant is constructed in the same location as originally licensed. It is housed in a power house structure on the left bank just downstream from Arrowrock Dam. The generating units receives flows from two penstocks which will be installed downstream of the face of the Arrowrock Dam. The new penstocks will originate at new bifurcations constructed just upstream of the existing clamshell gates for outlets No. 1 and 2. No penstocks were placed through Arrowrock Dam.

Alternative studies were made to analyze the power plant sizes. The proposed 15 MW power plant was selected as the best size based on hydrology and economics. The originally licensed 60 MW project was not economically feasible, and the Licensee was unable to obtain financing or a power purchaser for this larger project.

Future Pumped Storage Generating Potential

Licensee does not plan to operate this Project as a pumped storage facility.

Coffer Dam

Coffer dams were not necessary to protect the construction at the Arrowrock Power Plant site. The construction schedule planned excavation to take place in the Lucky Peak Reservoir only when the reservoir is drawn down through normal reservoir operations, between October and March. Construction in the reservoir took place during two consecutive draw down seasons.

Penstocks

Steel penstocks through the Arrowrock Dam are no longer required. Instead, existing arrangements for Outlets Nos. 1 and 2 at the dam were modified. New bifurcations were constructed just upstream of the existing clamshell gates. The bifurcations were engineered so that, when the turbines are shut down, water flows through Reclamation's existing clamshell gates. Two 90 inch (ID) penstocks transmit water from the two bifurcations to the powerhouse. Two 7.5 MW turbines and generating units are housed in the powerhouse. The powerhouse was built in the same location as the originally licensed facility. The powerhouse is smaller, with a size of about 68 feet in diameter and 70 feet high. This is a reduction from the 70 feet wide, 120 feet long and 130 feet height in the original licensed project. The powerhouse structure rises to elevation 3075, seven feet above maximum water surface elevation at Lucky Peak Lake.

Turbines and Generators

Two vertical Francis turbines were installed for maximum efficiency. Installed generating capacity of the two units totals 15 MW. The turbines are designed to operate up to a maximum net head of 180 feet and a minimum net head of 70 feet. The runner diameter is 5.6 feet. The maximum output is 10,050 horsepower for each unit. Rate of discharge is

approximately 725 cfs for each unit.

Turbine governors are of digital electrical type with hydraulic pumping unit designed for regulation of speed and power output of the units.

Turbine inlet shutoff valves are butterfly type with flow-through design to reduce head loss. The diameter of the butterfly valve is 90 inches (ID) and located with centerline at elevation 3022. The hydrogenerators are a vertical shaft three phase AC synchronous generators with brushless exciters, rated output 7500 kVA, power factor of 0.9, 60 hertz. Speed of rotation of the generators is rated at 277 rpm with runaway speed of 640 rpm. Generator voltage is rated at 13.8 kV.

A tailrace approximately 55 feet wide and approximately 135 feet long was blasted and excavated to provide draft tube submergence. A tailwater control weir with a weir crest at elevation of about 3022 is installed at an angle beginning at the downstream end of the tailrace to assure turbine submergence. When Lucky Peak is above the tailwater weir elevation, the elevation of Lucky Peak Lake will control.

Switch Yard

A switch yard with an 18 MVA, 34.5, 13.5 kV transformer is located adjacent to the powerhouse.

Other Mechanical and Electrical Equipment

One main transformer is provided to increase the generator bus to 34.5 kV. The project has two draft tube bulkhead gates and a walkway for service of the gates. A small 200 kW diesel generator has been provided for periods when transmission is disrupted.

Auxiliary

The station has a full complement of auxiliary electrical equipment including new circuit

breakers, transformers, switch gear, motor control center, power batteries, metering supervisory and remote operation interface, interior and exterior lighting.

Road Improvements

The road improvements in the original license have been completed by the highway district. The bridge crossing the spillway channel has been reconstructed by the Bureau of Reclamation. None of the road improvements described in the original Exhibit A were necessary.

Transmission Lines

The project required transmission lines from the dam for approximately 5.5 miles to a point of interconnection with Idaho Power Company's 34.5 kV bench feeder. A previously existing 23 kV line was in use to supply power from Idaho Power to the Arrowrock Dam. The project replaced the existing 23 kV line in its original location with an upgraded 34.5 kV line to connect to the Idaho Power grid. Station service at the dam is provided from an auxiliary transformer installed as part of the project.

Fishery and Mitigation Measures

Articles 402 and 403 of the original license limit the ability to shape flow releases during bass spawning and incubation periods in Lucky Peak. This revised project is not able to shape flow releases in the May/June time period because the volume of water released during this time greatly exceeds the capacity of the 15 MW power plant. Article 402 was changed to require the project to be operated in run-of-the-river mode for May 1 through June 30. Article 403 was deleted.

Article 401 was amended to require consultation with resource agencies prior to land clearing and land disturbing activities.

Recreation Measures

The boat launch ramp at Spring Shores recreation area and expansion of the parking area at that recreation area have already been completed. Accordingly, the project does not include those recreation measures.

Recreation at Lucky Peak Reservoir has reached maximum capacity. No additional access areas to Lucky Peak Reservoir were required. A toilet was constructed for use by watercraft users with approval of the Corps of Engineers. Operation and Maintenance was assumed by the Corps.

Historic and Archeological Measures

A cultural resources plan was prepared and approved. No archeological sites were disturbed during the construction. The project HAER report was approved by the Commission on July 30, 2014.

Lands of the United States

The transmission line occupies 13.48 acres of federal land. 144 FERC ¶62,260. This includes 9.73 acres of Corps of Engineers land, 0.90 acres of Reclamation land, and 2.85 acres of U.S. Forest Service lands within the Boise National Forest. 145 FERC ¶ 62,014. The land within the project boundary at the powerplant site totals 3.2 acres in Section 13, T03N. R04E, Boise Meridian, on Reclamation withdrawn lands within the Boise National Forest.

166 FERC ¶ 62,074

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Boise-Kuna Irrigation District, New
York Irrigation District, Nampa and
Meridian Irrigation District, Wilder
Irrigation District, and Big Bend
Irrigation District

Project No. 4656-054

ORDER APPROVING REVISED EXHIBIT A, REVISING ANNUAL CHARGES,
AND REVISING PROJECT DESCRIPTION

(Issued February 15, 2019)

1. On February 7, 2019, and supplemented February 13, 2019, Boise-Kuna Irrigation District, New York Irrigation District, Nampa and Meridian Irrigation District, Wilder Irrigation District, and Big Bend Irrigation District, licensees for the Arrowrock Dam Hydroelectric Project No. 4656,¹ filed confirmation of the project's installed capacity and a revised Exhibit A. The licensees' filing is in response to a discrepancy identified during a July 2018 environmental inspection and subsequent letters from Commission staff. The project is located on the South Fork of the Boise River in Elmore and Ada counties, Idaho, and occupies federal lands managed by the Bureau of Reclamation, the U.S. Corps of Engineers, and lands managed by the U.S. Forest Service within the Boise National Forest.

Background

2. Article 201 of the license, as amended,² states:

¹ *Boise-Kuna Irrigation District, New York Irrigation District, Nampa and Meridian Irrigation District, Wilder Irrigation District, and Big Bend Irrigation District*, 46 FERC ¶ 61,385 (1989).

² *Boise-Kuna Irrigation District, Nampa & Meridian Irrigation District, New York Irrigation District, Wilder Irrigation District, and Big Bend Irrigation District*, 124 FERC ¶ 62,090 (2008) (2008 Order), and *Boise-Kuna Irrigation District, Nampa & Meridian Irrigation District, New York Irrigation District, Wilder Irrigation District, and Big Bend Irrigation District*, 144 FERC ¶ 62,260 (2013).

“Article 201. The licensees shall pay the United States the following annual charge, effective the first day of the month in which this license is issued:

- a. For the purpose of reimbursing the United States for the cost of administration of Part I of the FPA [Federal Power Act], a reasonable amount, as determined in accordance with the provisions of the Commission’s regulations in effect from time to time. The authorized installed capacity for that purpose is 20,900 horsepower.
- b. Recompensing the United States for the use, occupancy, and enjoyment of 13.48 acres of its lands for transmission line right-of-way.
- c. For the purpose of recompensing the United States for utilization of surplus water or water power from a government dam, a reasonable amount, as determined in accordance with the provisions of the Commission’s regulations in effect from time to time.”

3. An environmental inspection performed by the Commission’s contractor in July 2018 identified the actual turbine nameplates as 15,540 kilowatts (kW) (two units at 7,700 kW each) and the generator nameplates as 15,000 kW (two units at 7,500 kW each). These capacities are not consistent with the capacity information in the approved revised Exhibit A and the authorized installed capacity in Article 201. Commission staff, in a letter dated October 2, 2018, required the licensees, within 60 days from the date of the letter, to file an explanation for the discrepancy. The licensees filed an explanation for the discrepancy on December 6, 2018, and Commission staff, in a letter dated December 7, 2018, required the licensees to file a revised Exhibit A, for Commission approval, within 60 days.

Review

4. The licensees’ filing confirms that the capacities on the turbine and generator nameplates are accurate and includes a revised Exhibit A for Commission approval. We have reviewed the revised Exhibit A and the licensees have accurately revised the exhibit to reflect the capacities on the nameplates. The licensees have also made minor revisions to more accurately describe the project as built. The Exhibit A conforms to the Commission’s rules and regulations and should be approved, superseding any previous Exhibit A.

5. The Commission’s regulations state, in part, “authorized installed capacity means the lesser of the ratings of the generator or turbine unit.”³ The authorized installed

³ 18 C.F.R. § 11.1(i) (2018).

capacity for the project is 15,000 kW, governed by the generators rating. Ordering paragraph (B) of this order revises Article 201 of the license. Ordering paragraph (C) of this order revises the project description in ordering paragraph (B)(2) of the license⁴ to reflect the correct authorized installed capacity and as-built conditions of the project.

The Director orders:

(A) Boise-Kuna Irrigation District, New York Irrigation District, Nampa and Meridian Irrigation District, Wilder Irrigation District, and Big Bend Irrigation District's filing of a revised Exhibit A, filed on February 13, 2019, for the Arrowrock Dam Hydroelectric Project No. 4656, conforms to the Commission's rules and regulations and this order approves the Exhibit A and makes it part of the license. The previous Exhibit A is eliminated from the license.

(B) This order revises Article 201 of the license to read as follows:

Article 201. The licensees shall pay the United States the following annual charge, effective the issuance date of this order:

- a. For the purpose of reimbursing the United States for the cost of administration of Part I of the Federal Power Act, a reasonable amount, as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 15,000 kilowatts.
- b. Recompensing the United States for the use, occupancy, and enjoyment of 13.48 acres of its lands for transmission line right-of-way.
- c. For the purpose of recompensing the United States for utilization of surplus water or water power from a government dam, a reasonable amount, as determined in accordance with the provisions of the Commission's regulations in effect from time to time.

(C) This order revises the project description in ordering paragraph (B)(2) of the license to read as follows:

(2) Project works consisting of: (a) two 90-inch-diameter, 120-foot-long penstocks connected to two outlet conduits near their downstream end just upstream of the

⁴ As amended by the 2008 Order and *Big Bend Irrigation District, Boise-Kuna Irrigation District, Nampa and Meridian Irrigation District, New York Irrigation District, and Wilder Irrigation District*, 132 FERC ¶ 62,199 (2010).

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clamshell gates; (b) a 68-foot-diameter, 70-foot-high powerhouse, located on the south side of the river channel, immediately downstream of Arrowrock Dam; (c) two 7.5-MW generating units operating under a maximum head of 180 feet; (d) an approximately 55-foot-wide, 135-foot-long tailrace discharging into Lucky Peak Lake over a weir at an elevation of approximately 3,022 feet mean sea level; (e) 13.8-kV generator leads; (f) a switchyard located adjacent to the powerhouse containing a 13.5-kV/34.5-kV transformer; (g) an approximately 5.5-mile-long 34.5-kV transmission line connecting to Idaho Power Company's 34.5-kV bench feeder, located adjacent to the Lucky Peak Nursery south of Mores Creek Bridge; (h) an access road from the Arrowrock Dam to the powerhouse; and (i) appurtenant facilities.

(D) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825l (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2018). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensees' failure to file a request for rehearing shall constitute acceptance of this order.

Kelly Houff
Chief, Engineering Resources Branch
Division of Hydropower Administration
and Compliance

timeline created by Michele Edl		for WR #63-10240				
Date	Event					
6/29/1981	BPBoC files application for preliminary permit with FERC					
2/9/1984	MOU between USBoR and BPBoC for feasibility study					
4/19/1984	USBoR files application for permit with IDWR			is not FERC applicant		
May 1984	application for permit 63-10240 is advertised and protested					
7/27/1984	BPBoC files application for major license with FERC			is not WR applicant		
5/16/1985	Feenor pre-hearing Conference					
9/18/1985	IDWR files motion to intervene with FERC					
9/19/1986	hearing tentatively scheduled					
10/29/1986	Pioneer Irr Dist files objection and motion to FERC for both Lucky Peak & Arrowrock					
	delayed hearing pending FERC					
3/27/1989	FERC major license issued to BPBoC					
4/25/1989	BPBoC requests rehearing from FERC					
4/26/1989	Pioneer Irr Dist and Settlers Irr Dist request rehearing from FERC					
1/9/1991	FERC grants extension of time to start construction now due 3/26/1993					
1/29/1991	IDWR letter to FERC: water permit required before construction					
2/4/1991	USBoR assigns WR application to BPBoC			(on permit assignmt form but is given ID#)		
2/15/1991	fees paid; BPBoC contract with USBR					
3/13/1991	another pre-hearing conference; conditions proposed					
4/13/1992	Settlers Irr Dist withdraws protest of 63-10240					
5/8/1992	hearing delayed to June 17, 1992 again to May 1995, then to July					
	still no FERC ruling on contested FERC lic					
May 1992	WR application advertised statewide					
3/22/1993	FERC grants 2nd extension of time to start construction now due 3/26/1999					
11/30/1993	no power purchaser found					
6/5/1995	permit conditions proposed by attorney					
8/4/1999	Act of US Congress extends the construction authorization for the project					
3/2/2000	all protestants agree to abide by specific conditions					
8/16/2001	FERC grants another extension to begin construction now 3/26/2003					
11/29/2001	Spackman pre-hearing conf					
1/22/2002	Spackman pre-hearing conference					
4/18/2002	settlement agreement					
4/25/2002	Spackman hearing vacated					
8/6/2002	permit 63-10240 issued; proof due 2007					
7/23/2007	'proof' extension requested; granted to 8/1/2012					
6/7/2010	'proof' statement submitted					