

**Pensacola Hydroelectric Project
FERC Project No. 1494**

**Exhibit H
Additional Information Required Under
18 CFR 5.18**

Final License Application

Prepared for



Prepared by



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LIST OF ABBREVIATIONS

Applicant	Grand River Dam Authority or GRDA
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
DSSMP	Dam Safety Surveillance and Monitoring Plan
DSSMR	Dam Safety Surveillance and Monitoring Report
EAP	Emergency Action Plan
ECC	Energy Control Center
FERC	Federal Energy Regulatory Commission
gpm	Gallon Per Minute
Grand Lake	Grand Lake O' the Cherokees
GRDA	Grand River Dam Authority
Licensee	Grand River Dam Authority or GRDA
MW	megawatt
MWh	megawatt hour
NGVD	National Geodetic Vertical Datum 1929
NHPA	National Historic Preservation Act
PD	Pensacola Datum
Pensacola Project	Pensacola Hydroelectric Project
Project	Pensacola Hydroelectric Project
Southwestern	Southwestern Power Administration
SPP	Southwest Power Pool
USACE	U.S. Army Corps of Engineers

1. Information Supplied by All Applicants – 18 CFR § 5.18 (c)

Grand River Dam Authority (GRDA), as Licensee of the Pensacola Hydroelectric Project (FERC Project No. 1494) (Pensacola Project or Project) and Applicant for a new license, is required to provide certain information about their plans and ability to operate and maintain the Project. This information includes the need for power and the examination of alternative sources, plans to modify the existing Project, GRDA's ability to operate and maintain the Project, and GRDA's electrical efficiency programs. The information also includes GRDA's safe management, operation and maintenance of the Project, its operational history and programs to upgrade, compliance with the current license, and Project actions that affect the public.

1.1 Section 5.18(c)(1)(i)(A) – Plans and Ability to Operate the Project

As described in Exhibit B, GRDA anticipates the following operational parameters during the new license term:

Although Congress, in the National Defense Authorization Act for Fiscal Year 2020, granted GRDA independence in Project operations relative to surface elevations at Grand Lake, GRDA understands the need for the Commission under the National Environmental Policy Act of 1969 to evaluate the effects of its proposed action, i.e., the relicensing of the Project. For purposes of accommodating the Commission's environmental review, GRDA hereby presents its anticipated parameters during the new license term, as follows:

1. GRDA will no longer utilize a rule curve with seasonal target elevations.
2. GRDA will maintain the reservoir between elevations 742 and 745 feet Pensacola Datum (PD)¹ for purposes of normal hydropower operations and until flood control operations are directed by the U.S. Army Corps of Engineers (USACE).
3. GRDA will continue to adhere to the USACE's direction on flood control operations in accordance with the Water Control Manual for the Arkansas River System (USACE, 1992).
4. Hydraulic flow for hydropower operations is anticipated to take place as the first priority for discharge when the USACE is directing operation under its exclusive jurisdiction over Grand Lake for flood control purposes.
5. Instead of managing the Project to target a specified seasonal elevation, GRDA's anticipated operations may fluctuate reservoir levels within the elevational range of 742 and 745 feet PD, for purposes of responding to grid demands, market conditions, and the public interest, such as environmental and recreational considerations.

1.1.1 Increase capacity or generation at the project

GRDA does not propose additional development or upgrades for the Pensacola Project at this time. Routine maintenance and/or replacement of project facilities will be implemented as-needed. The anticipated operation of the Project will result in additional annual energy production capability at the Project. Expected increases in generation are outlined in Exhibit B and Exhibit D.

¹ Unless stated otherwise, all elevations are presented in Pensacola Datum (PD). To convert from PD to the National Geodetic Vertical Datum of 1929 (NGVD29), add 1.07 feet. To convert from NGVD29 to the North American Vertical Datum of 1988 (NAVD88), add 0.33 feet.

1.1.2 Coordinate Upstream and Downstream

The Grand (Neosho) River watershed covers approximately 12,400 square miles in parts of Kansas, Missouri, Arkansas, and Oklahoma (United States Geological Survey, n.d.). The Grand Lake Basin covers approximately 10,300 square miles in Kansas, Oklahoma, Missouri, and Arkansas. The watershed is comprised of three major river systems (Spring, Neosho, and Elk Rivers) that converge within the State of Oklahoma to create Grand Lake. Grand Lake is the first of three reservoirs operated by GRDA. There are three additional reservoirs that lie upstream of Grand Lake in Kansas. The upstream reservoirs include John Redmond and Council Grove lakes on the Neosho River, and Lake Marion, which is located on the Cottonwood River, a tributary of the Neosho River. Water released from Grand Lake continues down the Grand River and flows through two other reservoirs (GRDA's Lake Hudson) and (USACE) Fort Gibson Lake before entering the Arkansas River near Muskogee, Oklahoma. Releases from Grand Lake are required to maintain downstream dissolved oxygen levels and to maintain an adequate elevation on Lake Hudson (619 feet NGVD) for the reliable operation of the Salina Pumped Storage Project (FERC No. 2524). Water originating from Grand Lake is also utilized again below GRDA's Lake Hudson, also known as the Markham Ferry Project (FERC No. 2183), to maintain dissolved oxygen during the summer months (Grand River Dam Authority, 2017).

Under Section 7 of the Flood Control Act of 1944, the United States Congress mandated that the USACE has the exclusive responsibility to direct the operations of the GRDA's Pensacola Dam and Robert S. Kerr Dam (Markham Ferry Project) for flood control. In addition to Pensacola and Markham Ferry, the USACE also regulates Fort Gibson as a subsystem of the upper Arkansas River Basin System, with similar percentages of the total flood control storage in each facility used during period of high flow. The USACE also seeks to match floodwater release rates with downstream conditions and river crests by percentage of flood control storage utilized during evacuation (USACE, 1992).

The Commission and GRDA lack responsibility and authority for flood control at the Project.

1.1.3 Coordinate with the Applicant's other electrical systems

The Project is an integral part of GRDA's generating system and is operated by GRDA for peak power production, load following, frequency control, dynamic voltage support, and system reliability. The Project often contributes to GRDA's generating system as a base load contributor when reservoir inflow necessitates 24-hour generation due to generation capacity limitations. Within the Licensee's system, hydroelectric generation is the least costly alternative and will be used to the extent possible.

According to the November 30, 2021 comments provided by the Southwestern Power Administration (Southwestern) on the Initial Study Report eFiled with the Commission on December 29, 2021,² indicated the following:

Southwestern's primary concern with the Pensacola relicensing is the operation and timing of Pensacola releases. Any proposed change in operational releases as a result of relicensing should be fully vetted with Southwestern and the other downstream Federal, State, and local agencies

² Accession # 20211229-5048-Appendix A, Page 10.

which may be impacted. Significant increases or decreases in releases as a result of changed operations could have negative impacts on hydropower and the other Congressionally authorized purposes at Fort Gibson and the four downstream Arkansas River Federal hydroelectric projects. Southwestern and the Corps have a Memorandum of Understanding (MOU) that states the responsibilities of both parties relating to the operation of the hydropower projects. Any changes to the operation and timing of Pensacola releases should not create undue difficulty for Southwestern or the Corps in meeting the needs of the Congressionally authorized purposes of the downstream projects and their responsibilities under the MOU.

The Project is also actively operated by the USACE for flood control operations.

1.2 Section 5.18(c)(1)(i)(B)(1) – Need for Electricity Generated by the Project

The Southwest Power Pool (SPP), a regional transmission organization covering areas in Arkansas, Kansas, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas, implemented an Integrated Marketplace in 2014, with a day-ahead-market optimizing the generation resources in the region. The SPP Integrated Market provides maximum cost-effectiveness for energy production as well and an Operating Reserves Market that includes a Consolidated Balancing Authority, facilitating the integration of renewable resources and improvement to the regional balancing of supply and demand. As a fast-start and dispatchable generation facility, the Pensacola Project will provide operational flexibility to make it an essential resource in the SPP Integrated Market to complement renewable generation assets and support overall grid stability. About every 45-60 days, the Pensacola Project contributes additional generation for grid stability due to the intermittent supply by wind and solar generation sources. When called upon by the SPP as a contingency reserve generation source, the SPP can directly dispatch the Project.

As intermittent renewable generation sources such as wind and solar continue to reshape the national energy profile, the Project will continue to support the grid stability through its baseload and dispatchable operation.

1.3 Section 5.18(c)(1)(i)(B)(2) – Increase in Fuel, Capital, and Any Other Costs Incurred

If GRDA does not operate the Project as anticipated, it would need to replace the approximate 26 GWh of lost hydroelectric generation that would be generated annually under anticipated Project operations. GRDA assumes this energy would either be supplied via a purchase on the open market or by increasing operation of GRDA's other dispatchable generation facilities. If GRDA opts to purchase the additional energy, rather than generate it under the anticipated Project operations, at the lowest cost of alternative sources in the region it would cost an additional \$1,638,000 each year.³

³ This figure uses the results from the 2022 Black & Veatch analysis of \$63/MWh as listed in Section 6 of Exhibit D.

1.4 Section 5.18(c)(1)(i)(B)(3) – Effects of Each Alternative Power Source

1.4.1 Effects on Applicant's customers (including wholesale customers)

The rates charged to customers for power generated by GRDA are based on the cost of production, operation, maintenance, and debt service. The use of alternative sources of power would increase the costs to GRDA electricity end users.

1.4.2 Applicant's operating and load characteristics

GRDA uses all power generated by the Pensacola Project. Alternative sources of power would have no significant effect on the GRDA operating and load characteristics.

1.4.3 Communities served or to be served, including any reallocation of costs associated with the transfer of a license from the existing licensee

GRDA is a not-for-profit, cost-of-service public power utility. This application does not propose transfer from the public power system managed by GRDA. If the Pensacola Project were transferred to a different entity, GRDA would still be responsible for providing power to customers within the area. The first take, lowest cost power currently generated by the Pensacola Project would need to be replaced by contracting with the new licensee or from another higher cost source. It is assumed a transfer of the existing license to another entity would therefore result in higher power costs for customers that utilize the power provided by GRDA to its customers.

1.5 Section 5.18(c)(1)(i)(C)(1) – Need for Power, Reasonable Cost, and Availability of Alternative Sources

The Project provides low-cost, emissions-free power to the SPP. The average annual cost of the power produced by the Project includes capital costs, operating costs, and costs associated with relicensing. The basis for that calculation is included in Exhibit D, Section 5. As markets participants of SPP, GRDA and other utilities are required to maintain resource adequacy to meet their load serving requirements, plus up to an additional 15% reserve margin. If the generating capability at the Project was reduced, alternative generation resources would be needed to meet such requirements and would be constructed or be secured by way of power purchase agreements.

1.6 Section 5.18(c)(1)(i)(C)(2)(i, ii, and iii) – Projected Resources to Meet Capacity and Energy Requirements

GRDA has existing and committed resources available to meet its customer capacity and energy requirements. Existing resources include: coal and gas-fired resources, hydroelectric resources, as well as wind purchases through power purchase agreements. GRDA also has planned power purchases from solar and battery energy storage projects beginning in 2026. The projected accredited capacity from GRDA's total resource portfolio is shown in **Table 1.6-1**.

Table 1.6-1 GRDA System Resources

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
MW	2,125	2,123	2,100	2,115	2,150	2,212	2,274	2,279	2,284	2,288	2,293	2,297	2,302	2,307	2,312

In 2022, GRDA's existing supply side resource mix was made up of 1,458 MW of thermal resources, 512 MW of hydroelectric resources, 380 MW of wind purchases, and 0 MW of demand response. The resources consist of owned generation resources and purchase power agreements.

GRDA's plans are developed recognizing the uncertainty associated with forecasting demand, as well as supply including the level of non-utility purchases and life-extendible capacity. The generation technologies, fuels used, sites, and costs for these resources will be determined through an integrated resource planning process, and subsequent resource acquisition efforts.

GRDA's resource mix is a diverse mix of generation sources. **Table 1.6-2** shows the Load and Resources Table from GRDA's 2023-2037 Integrated Resource Plan. This represents the most current forecast of system obligation and resource needs. The planned resources reflect the proposed preferred plan. New technologies and fuel types are continually evaluated to create a more diverse energy mix to prevent reliance on any single fuel, make better use of available resources, and satisfy customers demands for environmentally sound, low-cost energy.

Table 1.6-2 GRDA Load and Resources

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
MW	1,656	1,694	1,755	1,782	1,870	1,924	1,978	1,982	1,986	1,990	1,994	1,998	2,002	2,006	2,010

GRDA does not currently participate in demand side management programs or other load management measures.

GRDA is a member of the SPP, which requires members to carry a 15.0% reserve margin. GRDA's obligation and net capacity position reflects this requirement (see **Table 1.6-2**).

1.7 Section 5.18(c)(1)(i)(C)(2)(iv) – Alternative Sources of Power

For alternative sources of power, including generation of additional power at existing facilities, restarting deactivated units, the purchase of power off-system, the construction or purchase and operation of a new power plant, and load management measures such as conservation, GRDA provides as follows:

- (a) The total annual cost to purchase equivalent power off-system from an alternative source is estimated to be \$1,638,000⁴ per year.
- (b) The basis for the determination of projected annual cost was determined by multiplying the levelized cost of electricity from the 2022 Black & Veatch analysis (described in Exhibit D of this FLA) of \$63 per MWh by the additional power anticipated to be generated by the Project under its new license of 26 GWh.
- (c) With respect to the relative merits of each alternative, including the issues of the period of availability and dependability of purchased power, average life of alternatives, relative equivalent availability of generating alternatives, and relative impacts on the GRDA's power system reliability and

⁴ Based upon 26 GWh/year and \$63/MWh as listed in Section 6 of Exhibit D.

other system operating characteristics. GRDA has concluded that the best alternative source of power is power produced by its own facilities. If the Project does not operate as anticipated under a new license, the annual average increase in generation of approximately 26 GWh could be replaced in the short term with GRDA's required margin or purchased power. Given the generation mix of the SPP (approximately 28% coal and 45% natural gas), the replacement power would likely be generated by fossil fuel-fired facilities and not renewable facilities. The availability and dependability of purchased or generated alternative power is considered to be equal to the availability and dependability of the anticipated power increase from the existing hydroelectric plant.

(d) Other than an increased cost, no detrimental effect on direct providers or immediate customers of alternative sources of power would be expected. Rather, GRDA anticipates that adequate supply is available or could be developed to replace the additional power anticipated to be generated by the Project.

1.8 Section 5.18(c)(1)(i)(D) – Use of Project Power-Industrial Facility

Applicant does not use Project power to meet its own industrial needs; not applicable.

1.9 Section 5.18(c)(1)(i)(E) – Need for Power If Native American Tribes

GRDA is not a Native American Tribe applying for a license located on a Native American reservation.

1.10 Section 5.18(c)(1)(i)(F) – Impact on Transmission System

The continued production of generated energy will not impact the existing transmission system. The existing facilities are sized to accommodate the maximum capacity of the Pensacola Project. GRDA is not pursuing an increase in the installed capacity of the Project. No upgrade of the Project's interconnections will be required. The single-line diagram for the Project is provided in Exhibit A-4.

With the changing power grid from the integration of numerous solar and wind energy sources that supply intermittently on an almost daily basis, the anticipated operation of the Project that is not restricted to a specific rule curve will allow for an increase immediate response in increased or decreased generation to support the stability of the grid at all times. In the past, GRDA has been requested by SPP to increase generation to stabilize the grid in the region due to unexpected significant reductions of generation from numerous independent intermittent solar and wind energy sources.

1.11 Section 5.18(c)(1)(i)(G) – Plan to Modify Project

GRDA has no plans to construct new facilities at the Project. Anticipated changes to Project Operations are discussed in Exhibit B.

1.12 Section 5.18(c)(1)(i)(H) – Impacts Not to Modify Project

The Project will continue to produce renewable energy at a low cost. Discussion of the anticipated operation and the Project's conformance with comprehensive plans for developing or improving the waterway and for other beneficial uses is provided in Exhibit E.

1.13 Section 5.18(c)(1)(i)(I) – Ability to Maintain and Operate in New License Term

GRDA's successful operation of the Project since the previous licensing demonstrates its financial ability and personnel experience to operate the Projects during the new license term. A preventive maintenance program is employed by GRDA to increase reliability and efficiency of the mechanical and electrical components of the system. GRDA maintains hydro department personnel and financial resources that are sufficient to reliably maintain and operate its hydroelectric projects and has a demonstrated record of license compliance.

1.13.1 Financial Resources

GRDA is a non-appropriated agency of the State of Oklahoma. It has the financial resources to operate the Project during the term of the new license.

1.13.2 Personnel Resources

The Project is a fully staffed facility with an on-site crew of eleven (11) full-time employees as well as seasonal part-time employees during the summer. This base staff is supported by centralized management, technical services, asset management, and dam safety teams. GRDA has a consistent record of satisfactory performance with respect to reliability, availability, performance, price competitiveness, and safety. Hydro department personnel conduct routine training and have adopted standardized practices for all GRDA facilities.

In addition to the on-site crew and the centralized teams, GRDA has created a law enforcement division, of which its members are State of Oklahoma Certified Peace Officers and recognized as the law enforcement officers for GRDA. The law enforcement officers for GRDA may enforce GRDA rules and regulations, those rules and regulations as may be issued pursuant to the provisions of Section 400 et. seq. of Title 63 of the Oklahoma Statutes, the provisions of Section 861 et. seq. of Title 82 of the Oklahoma Statutes, and all violations of criminal laws occurring within the boundaries of the counties where real property owned or leased by GRDA is located. The enforcement officers have the power of peace officers during the performance of their duties, except in the serving and execution of civil process.

GRDA's law enforcement officers may cooperate with federal, state, and local law enforcement officers in the enforcement of all federal and state laws upon the waters, lands, and properties of GRDA (Grand River Dam Authority, 2008a).

1.14 Section 5.18(c)(1)(i)(J) – Notification of Adjacent Landowners

GRDA is not proposing any expansion of the Project onto additional lands.

1.15 Section 5.18(c)(1)(i)(K) – Electric Consumption Efficiency Programs

GRDA is in compliance with applicable energy conservation regulatory requirements. Since 2011, when the State of Oklahoma introduced the Oklahoma First Energy Plan that was developed to accommodate the beginning of an energy revolution that is expected to fundamentally change the way energy is produced and used within the state, GRDA has taken steps to mitigate the detrimental impacts of wasted energy and lay the groundwork for large-scale efficiency programs and practices. Oklahoma has recognized the opportunities associated with efficiency and demand-side management as a tool to offset the need for new generation (State of Oklahoma Office of the Governor, n.d.).

In 2017, GRDA began operation of its ultra-efficient Unit 3 Combined Cycle natural gas fired facility at the Grand River Energy Center with an installed capacity of 495 megawatts (MW). Unit 3 combined with other newly developed, high efficiency combined cycle natural gas turbines in combination with renewable resources, such as Oklahoma wind (GRDA currently has 385 MW of wind energy power purchase agreements combined with the operation of the Salina Pumped Storage Project), have the capability to significantly reduce emissions as envisioned by the Oklahoma First Energy Plan. Additional opportunities exist to shift daily peak energy consumption into significant ratepayer savings and smart metering. The strategy associated with Oklahoma First Energy Plan and specifically with power generation and transmission is to (1) promote energy efficiency to preclude the need for power generation and to manage consumers' energy bills; (2) address the issue of electric power dispatch preferences as it relates to Oklahoma resources; (3) emphasize the importance of system reliability and fuel diversity; (4) preserve Oklahoma's relative low cost of energy advantage to maintain a healthy business environment; and (5) encourage the build out of electric transmission to optimize power generation assets in the grid (State of Oklahoma Office of the Governor, n.d.).

1.16 Section 5.18(c)(1)(i)(L) – Native American Tribes Affected by Proposed Project

GRDA has identified 7.962 acres of Tribal lands held in trust for the Wyandotte Tribe of Oklahoma, 0.07 acres of Tribal lands held in trust for the Seneca Eastern Shawnee, and 0.09 acres of Tribal lands held in trust for the Seneca-Cayuga Nation.⁵ Early in the relicensing process, GRDA identified and contacted the following Native American tribes and organizations for the purposes of consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA), and has consulted with these tribes and organizations throughout the licensing process:

Alabama-Quassarte Tribal Town
PO Box 187
Wetumka, OK 74883

Apache Tribe of Oklahoma
511 E Colorado
Anadarko, OK 73005

⁵ These figures are based upon the information provided to the BIA on March 9, 2023. As of the writing of this application the BIA is reviewing the information provided on March 9, 2023 and has not had an opportunity to provide a response. If the figure requires additional update based upon future discussions with the BIA, the updated information will be filed with the Commission.

Caddo Nation of Oklahoma
PO Box 487
Binger, OK 73009

Cherokee Nation
PO Box 948
Tahlequah, OK 74465

Delaware Nation
PO Box 825
Anadarko, OK 73005

Iowa Tribe of Oklahoma
335588 E 750 Road
Perkins, OK 74059

Eastern Shawnee Tribe of Oklahoma
70500 E 128 Road
Wyandotte, OK 74370

Kiowa Tribe Office of Historic Preservation
PO Box 369
Carnegie, OK 73015

Little Traverse Bay Bands of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Miami Tribe of Oklahoma
PO Box 1326
Miami, OK 74354

Modoc Nation
22 N Eight Tribes Trail
Miami, OK 74354

Muscogee (Creek) Nation
PO Box 580
Okmulgee, OK 74447

Osage Nation
627 Grandview Avenue
Pawhuska, OK 74056

Otoe-Missouria Tribe of Indians
8151 Hwy 177
Red Rock, OK 74651

Ottawa Tribe of Oklahoma
PO Box 110
Miami, OK 74355

Peoria Tribe of Oklahoma
PO Box 1527
118 South Eight Tribes Trail
Miami, OK 74354

Quapaw Tribe of Oklahoma
PO Box 765
Quapaw, OK 74363

Sac and Fox Nation of Oklahoma
920883 S Hwy 99, Building A
Stroud, OK 74079

Seneca-Cayuga Nation
PO Box 453220
23701 South 665 Road
Grove, OK 45345-3220

Shawnee Tribe of Oklahoma
PO Box 189
29 S Highway 69A
Miami, OK 74354

Tonkawa Tribe of Oklahoma
1 Rush Buffalo Road
Tonkawa, OK 74653

United Keetoowah Band of Cherokees
PO Box 746
Tahlequah, OK 74465

Wichita and Affiliated Tribes, Oklahoma
(Wichita, Keechi, Waco, and Tawakoni)
PO Box 729
Anadarko, OK 73005

Wyandotte Tribe of Oklahoma
64700 East Highway 60
Wyandotte, OK 74370

2. Information Supplied by Existing Licensee - 18 CFR § 5.18 (c)

2.1 Section 5.18(c)(1)(ii)(B)(1) – Statement to Ensure Safe Management, Operation and Maintenance

The Project's anticipated operation is described in the respective portions of Exhibit B.

Project flood control operation is the exclusive jurisdiction of the USACE.

The Project is in compliance with the terms and conditions of the existing license. It is also in compliance with all federal, state, and local safety requirements including those listed in the Commission's regulations under 18 C.F.R. Part 12 and has the necessary monitoring and warning devices in place.

There are no proposed changes to the operation of the Pensacola Project that might affect the existing Emergency Action Plan at this time. In the event GRDA personnel detect an actual or potential failure through remote surveillance or direct observation, they will implement the FERC approved Emergency Action Plan.

Power generation at Pensacola Dam is controlled by GRDA's Energy Control Center (ECC) located off-site. The ECC is manned continuously. The ECC operators are responsible for operating GRDA's hydroelectric units and its integrated transmission system. The operating condition of all hydroelectric generators, headwater and tailwater levels, and other status information is continuously updated and available to operators from GRDA's supervisory control and data acquisition system. The ECC has recently been updated with state-of-the-art control equipment and was expanded to include a central security center that monitors all GRDA facilities.

The maintenance staff are always available whether on-duty or on call and additional operators can be called to the site if assistance is needed. Operators in the ECC are responsible for contacting off-duty maintenance staff when necessary (Grand River Dam Authority, 2021b).

2.2 Section 5.18(c)(1)(ii)(B)(2) – Discussion of Any Warning Devices Used to Ensure Downstream Public Safety

As outlined in GRDA's most-recent update to the Public Safety Plan for the Project dated July 29, 2020, and accepted by the Commission on August 4, 2020, GRDA maintains three strobe lights and a horn on the downstream side of the powerhouse accompanied by a siren on the bridge crossing the tailwater approximately 3,000 feet downstream of the powerhouse.

The warning devices are activated once the generation start command is given. After one minute, the warning devices are deactivated, and the generators are started and begin releasing water.

GRDA also maintains a buoy line across the tailwater area approximately 350 feet downstream of the powerhouse. The buoy line prohibits recreationists traveling upstream from entering the area below the powerhouse.

At the main or west spillway, GRDA maintains a strobe light on the top of the spillway. The siren for the main spillway is located on the top of the west bank near the powerhouse. For the middle and east spillway, GRDA maintains a strobe light on the top of each spillway and the siren for the middle and east spillway is located on the west shore of the channel approximately 1,500 feet below the middle spillway.

Prior to raising spillway gates, GRDA Law Enforcement and GRDA hydro personnel evacuate downstream recreationists from the water course area. Campers at state parks are warned of swift water. The sirens are activated as soon as personnel reach the spillway area. Upon verification that the water coarse areas are clear, gate opening is commenced. Personnel return to the downstream area, and remain in place with radio communication with gate personnel, until the flow is stabilized. Boat ramps adjacent to the spillways are closed when flood gates are open. When determined useful, GRDA Police can enhance observation and response with the use of the GRDA helicopter and drones.

GRDA Law Enforcement division is available to provide additional public safety services at the Project. The officers are dispatched from a 911 center located inside the Project's Energy Control Center. They are trained and equipped to respond to emergency calls in their service areas for medical emergencies, swift water rescues, vessel collisions and enforcement of state law. GRDA Police conduct water safety and public education programs throughout Northeast Oklahoma.

GRDA also maintains an Emergency Action Plan (EAP) for its Project that was developed in consultation with the FERC and the local emergency management organizations. The EAP identifies the actions to be taken by GRDA during a potential or actual emergency situation.

2.3 Section 5.18(c)(1)(ii)(B)(4) – Description of Existing and Planned Monitoring Devices

GRDA has a Dam Safety Surveillance and Monitoring Plan (DSSMP) for the Pensacola Project that describes the existing and planned monitoring devices. The plan was last submitted to the Commission as Section 7.0 of the Supporting Technical Information Document filed with the Commission on February 5, 2021. In addition to the DSSMP, GRDA files an annual Dam Safety Surveillance and Monitoring Report (DSSMR). The last DSSMR was filed with the Commission on March 31, 2023.

As further described in the DSSMP, the monitoring instruments at the Project include water level recorders, piezometers, alignment monuments, and leakage or seepage monitoring weirs that are briefly described below.

Water level recorders are located both in the reservoir and tailwater and continuously monitor water levels. The readings are continuously available to both GRDA and the USACE. Wire weight devices are used as backup and calibration.

Piezometers have been installed below several of the arches and in the inspection gallery to measure uplift pressures. All active piezometers are monitored monthly or more frequently, when prescribed in the monitoring program.

Seepage through the dam foundation and leakage from the cracks at the base of many of the arches is collected in the ditch located at the toe of the dam. The water collected is discharged to the tailwater by four pumps. To monitor this discharge on two of the pumps, the runtime of the pumps is recorded on runtime meters for each of the pumps and the recorded runtimes are typically documented on a weekly basis. To monitor the discharge on the two remaining pumps is recorded by totalizing flow meters and the total flow is typically documented on a weekly basis.

Seepage through the west abutment is also monitored monthly. The monitoring method is timed by filling a bucket.

Leakage from select cracks at the base of the arches are monitored for seepage rate by observation and flow rate. Monitored crack seepage is collected with a bucket.

Seepage bypassing piezometer casings interior of the arches are directed to weir boxes. The weir boxes are visually monitored for sediment monthly.

Alignment monitors have been installed on the dam and the middle and east spillways. Alignment survey accuracy has been problematic and is under redevelopment.

2.4 Section 5.18(c)(1)(ii)(B)(5) – Employee and Public Safety

2.4.1 Employee Safety

GRDA views its employees as their greatest asset and operates the Project consistent with its corporate commitment to employee safety. This involves best industry practices and compliance with applicable local, state, and federal regulations regarding the safe operation of its facilities.

GRDA implements a rigorous safety program for its workers. GRDA's Corporate Safety Group takes an active role in its safety program and works closely with other safety representatives within the organization. This involves employee training sessions as well as making safety information available to employees. GRDA is anticipating no changes to the Project or Project operations that will affect the Project's safety, and all safety measures will continue to be consistent with FERC regulations and dam safety requirements.

Twenty-three lost-time accidents have been recorded to GRDA's Pensacola Dam operations and maintenance team since 1992.

2.4.2 Public Safety

Public safety is a high priority for GRDA. GRDA's internal law enforcement staff patrols the Project and acts as liaisons to the public regarding public safety while on patrol. GRDA's 2020 update of its Public Safety Plan also demonstrates its commitment to public safety. Fencing is in place to restrict access to unsafe areas, signs warn of extreme danger in floodgate areas, and red warning buoys and cabling are located above spillway gates and downstream in the power generation channel to restrict access to dangerous areas associated with power generation and gate operation. Sirens and flashing lights are used in various locations prior to the operation of hydroelectric generators and/or floodgates.

GRDA also maintains several lighthouses on Grand Lake around the shoreline and in areas of shallow water (Grand River Dam Authority, 2021b).

Injuries and deaths that have occurred within the Pensacola Project boundary during the current License term are shown in **Table 2.4.2-1**.

Table 2.4.2-1 Injuries and Deaths Occurring within Project Boundary

Date	Injury/ Death?	Description
7/3/1999	1 fatality	Boating accident
7/6/1999	2 injuries	Boating accident
7/24/1999	5 injuries	Boating accident
7/25/1999	1 fatality	Medical condition
8/9/1999	1 injury	Boating accident
9/5/1999	1 injury	CO inhalation from boat generator
10/15/1999	1 fatality	Drowning-fell out of boat
10/15/1999	1 fatality	Drowning-fell off dock
12/12/1999	1 fatality	Drowning-unknown cause
5/14/2000	1 injury	Personal watercraft (PWC) accident
5/27/2000	1 fatality	Drowning-fell off PWC
5/28/2000	1 injury	Tubing accident
5/29/2000	1 fatality	Drowning-swimming
5/31/2000	1 fatality	Medical condition
6/4/2000	1 injury	Diving (swimming) accident
6/13/2000	1 injury	Boating accident
7/15/2000	1 injury	Diving (swimming) accident
7/15/2000	1 injury	PWC accident
7/23/2000	1 fatality	Boating accident
7/23/2000	1 injury	Boating accident
4/29/2001	1 injury	Boating accident
6/9/2001	1 injury	PWC accident
7/22/2001	2 injuries	Boating accident
8/19/2001	1 injury	Tubing accident
5/6/2002	1 injury	Boating accident
7/27/2002	1 injury	PWC accident
8/11/2002	1 fatality, 1 injury	PWC accident
8/12/2002	1 fatality	Drowning-swimming
7/25/2004	1 fatality	Boating accident
8/4/2004	1 fatality	Drowning-swimming
8/14/2004	1 fatality	Drowning-fell off boat
9/3/2004	1 fatality	Boating accident-alcohol related

Date	Injury/ Death?	Description
9/25/2004	1 fatality	Boating accident
9/30/2004	1 fatality, 1 injury	Boating accident
1/18/2005	2 fatalities	Drowning-vehicle accident
4/9/2005	1 fatality	Drowning-unknown cause
7/12/2006	1 fatality	Drowning-unknown cause
2/27/2007	1 fatality	Medical condition
9/16/2007	1 fatality	Drowning-fell off boat
6/1/2008	1 fatality	Drowning in tailrace-fell in water during high flows
7/19/2008	1 fatality	Drowning-fell off boat
8/17/2008	1 fatality	Drowning-fishing in tailrace (FERC required updated PSP and added safety signage)
11/18/2008	1 fatality	Boating accident
3/30/2009	2 fatalities	Boating accident
6/24/2009	1 fatality	Drowning-alcohol related
3/9/2010	1 fatality	Drowning-fell off dock
7/14/2010	1 fatality	Drowning-fell off boat-alcohol related
9/24/2010	1 fatality	Boating accident-alcohol related
5/21/2011	1 fatality	Drowning-alcohol related
6/17/2011	1 fatality	Drowning-vehicle accident
6/21/2011	1 fatality	Dock accident-alcohol related
5/2/2012	1 fatality	Drowning-alcohol related
5/29/2012	1 fatality	Drowning-fell off PWC
7/29/2012	1 fatality, 3 injuries	Boating accident
9/9/2013	1 fatality	Drowning-fell in water
5/16/2013	2 fatalities, 2 injuries	Vessel Accident
12/31/2013	fatality	Unknown
12/20/2014	fatality	Subject Jumped from Pensacola Dam
3/16/2015	fatality	Drowning
6/25/2016	fatality	Drowning
7/23/2016	fatality	Drowning
1/19/2017	fatality	Drowning
3/24/2018	fatality	Off Road Accident
5/6/2018	fatality	Unknown
3/31/2019	fatality	Drowning
4/2/2019	fatality	Drowning
8/18/2020	fatality	Drowning
2/15/2021	1 fatality	Drowning-unknown cause
2/16/2021	1 fatality	Drowning-fell through the ice
5/10/2021	1 fatality	Drowning-unknown cause

Date	Injury/ Death?	Description
5/14/2021	1 fatality	Explosion
5/16/2021	1 fatality	Drowning-unknown cause
5/30/2021	1 fatality, 1 injury	Boating accident
6/1/2021	1 fatality, 1 injury	Boating accident
11/27/2021	1 fatality	Fall-trespass
1/29/2022	1 fatality	ATV accident
3/3/2022	1 fatality	Drowning-unknown cause
6/11/2022	1 fatality	Drowning-boating related
7/2/2022	1 fatality	Drowning-unknown cause
9/19/2022	1 fatality	Drowning

2.5 Section 5.18(c)(1)(ii)(C) – Current Operation Including Constraints

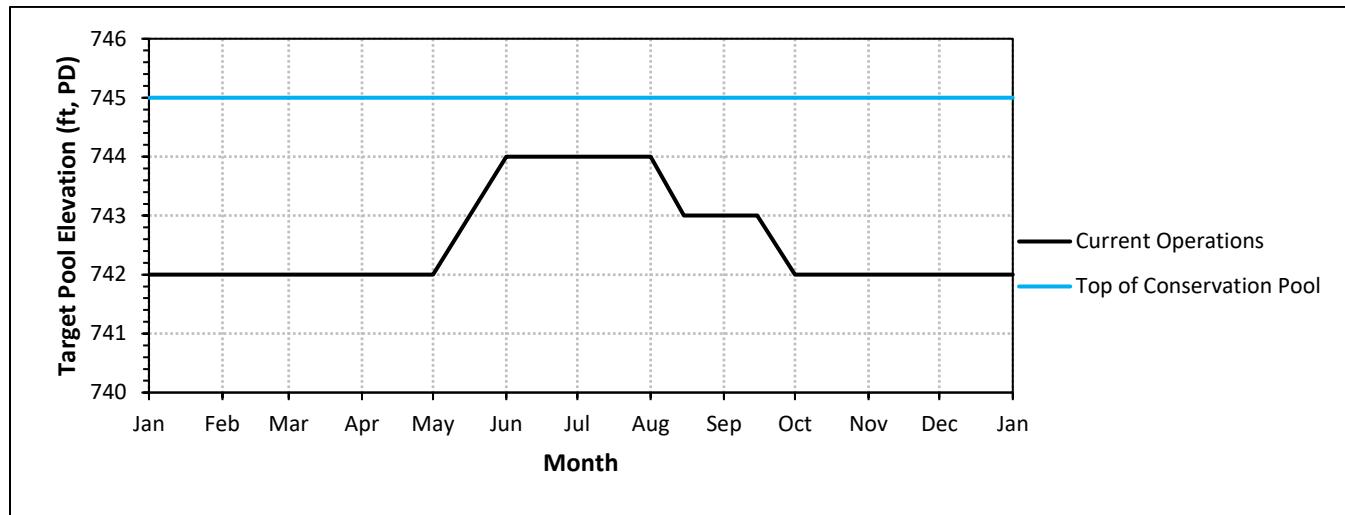
Under the expiring license, the Pensacola Project is operated according to an operational curve that sets target reservoir surface elevations pursuant to Article 401, as amended in an order issued August 15, 2017 (160 FERC 61,001). Article 401 requires GRDA to operate the Pensacola Project to maintain, to the extent practicable, the following seasonal target reservoir elevations shown in **Table 2.5-1** and **Figure 2.5-1**, except as required by the Storm Adaptive Management Plan and Drought Adaptive Management Plan, and as necessary for the USACE to provide flood protection (Federal Energy Regulatory Commission, 2017). During periods of low DO, GRDA utilizes air induction ports within the turbines to draw in air that is mixed with the water as it passes through the turbines to help oxygenate the water within the tailrace (Grand River Dam Authority, 2021b).

The operational curve places constraints upon GRDA by requiring it to target certain elevations regardless of the inflows provided by nature in any given year. It restricts GRDA's abilities to fulfill required Project purposes including balancing multiple uses of the resource. Such constraints in the curve also limit the ability of GRDA to respond to evolving market needs for generation, reduce its generation of renewable electricity, increase the regions reliance on fossil-fueled sources of electricity thereby reducing the Project environmental benefit potential to the region, reduce its ability to provide adequate reservoir elevations for recreational purposes during the peak recreation season, and reduce its ability to provide additional water storage, if necessary, to assist in maintaining DO concentrations in the river below the Project and below the Markham Ferry Project located immediately downstream.

Table 2.5-1 Target Elevations for the Pensacola Project

Period	Reservoir Elevation (Feet PD)
May 1 through May 31	Raise elevation from 742 to 744
June 1 through July 31	Maintain Elevation at 744
August 1 through August 15	Lower Elevation from 744 to 743
August 16 through September 15	Maintain Elevation at 743
September 16 through September 30	Lower Elevation from 743 to 742
October 1 to April 30	Maintain Elevation at 742

Figure 2.5-1 Pensacola Dam Rule Curve-Seasonal Target Elevations



2.6 Section 5.18(c)(1)(ii)(D) – History of Project Operation and Upgrade Programs

Since the Project's original development, Congress has mandated that USACE, and not the Commission, regulates the Project for flood control purposes. The Federal Power Commission approved a license to construct and operate the Pensacola Project in 1938. Construction of the dam began in 1938 and was completed in 1940. Since that time, there have been few Project modifications of significance other than the installation of additional generating units. The original design for the Project included only four hydropower units with provisions for two future units. The fifth generating unit was installed shortly after the initial dam construction was completed. Installation of the sixth generating unit was completed in the early 1950's. GRDA has completed routine maintenance of the facility and Project upgrades as needed (Grand River Dam Authority, 2021b). See Exhibit C in Volume 1 for a full reporting of construction activities.

GRDA routinely maintains its Project electrical and mechanical equipment, along with its associated facilities. Maintenance consists of scheduled maintenance or inspection activities on the turbine/generator units and other mechanical portions of the Project such as gate hoists, gates, and overhead cranes or unscheduled maintenance if equipment is not working properly. Maintenance is scheduled to minimize effects on public safety and energy production. Project electrical and mechanical equipment underwent major rehabilitation and upgrade between 1998 and 2002.

Daily, weekly, monthly, and annual inspections occur of various components of the civil structures and continual maintenance is performed as needed.

2.7 Section 5.18(c)(1)(ii)(E) – Summary of Last Five Years - Unplanned Outages and Lost Generation

Lost generation data is provided in **Table 2.7-1** for the period of January 2018 through December 2022 and is considered representative of typical operations.

Table 2.7-1 Pensacola Project Lost Generation Summary (2018-2022)

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P1	3684 - Other voltage system protection devices	03/22/2018 07:35 CPT	03/22/2018 08:00 CPT	Trip Protection relay 64G J.Cook	0.30	0.02
P1	4551 - Generator bearings	03/26/2018 17:16 CPT	03/26/2018 17:42 CPT	05D Thrust bearing temp alarm	0.31	0.02
P1	4551 - Generator bearings	03/28/2018 10:42 CPT	03/28/2018 10:58 CPT	Trip due to false alarm on thrust bearing oil temp	0.19	0.01
P1	7142 - Wicket gate shear pin	07/03/2018 07:00 CPT	07/03/2018 07:27 CPT	Shear Pin Replacement	0.33	0.02
P1	7009 - Bearing Oil System	07/17/2018 16:21 CPT	07/17/2018 16:36 CPT	Turbine Bearing Oil Flow Alarm	0.18	0.01
P1	9020 - Lightning	07/31/2018 03:21 CPT	07/31/2018 12:18 CPT	Transformer Inspection After Lightning Strike	6.51	0.37
P2	3684 - Other voltage system protection devices	03/14/2018 13:42 CPT	03/14/2018 14:12 CPT	RTD high temp	0.36	0.02
P3	3644 - AC Protection devices	10/02/2018 13:48 CPT	10/05/2018 14:34 CPT	Unit Tripped During Synchronization	52.90	3.03
P3	4550 - Generator bearings and lube oil system (including thrust bearings on hydro units)	10/16/2018 10:48 CPT	10/16/2018 11:28 CPT	Lower Guide Bearing Temperature Trip	0.48	0.03
P3	4609 - Other exciter problems	12/12/2018 16:14 CPT	12/13/2018 10:07 CPT	Replacing Transducer	13.00	0.75
P4	3684 - Other voltage system protection devices	03/12/2018 02:57 CPT	03/12/2018 03:34 CPT	Gen over voltage alarm	0.45	0.03
P4	3684 - Other voltage system protection devices	03/12/2018 03:37 CPT	03/12/2018 04:39 CPT	Gen over voltage alarm	0.75	0.04
P4	3684 - Other voltage system protection devices	03/13/2018 11:20 CPT	03/13/2018 12:47 CPT	05E protection relay	1.05	0.06
P4	7009 - Bearing Oil System	05/17/2018 16:35 CPT	05/17/2018 17:12 CPT	Trip due to turbine bearing oil pump failure.	0.45	0.03
P4	7009 - Bearing Oil System	05/17/2018 23:25 CPT	05/18/2018 00:22 CPT	Trip due to turbine bearing oil pump failure.	0.69	0.04
P4	7009 - Bearing Oil System	05/18/2018 14:35 CPT	05/18/2018 15:03 CPT	Trip due to turbine bearing oil pump failure.	0.34	0.02

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P4	3983 - PLC - internal and termination wiring	06/06/2018 15:50 CPT	06/06/2018 16:05 CPT	Thrust bearing temp. alarm - Loose wire on RTD - B. Bays & B. Beisley	0.18	0.01
P4	7009 - Bearing Oil System	09/02/2018 20:03 CPT	09/02/2018 20:44 CPT	Turbine Bearing Pump Failure	0.50	0.03
P4	7009 - Bearing Oil System	09/03/2018 12:00 CPT	09/03/2018 12:42 CPT	Turbine Oil Level Alarm	0.51	0.03
P4	7009 - Bearing Oil System	09/03/2018 15:40 CPT	09/03/2018 16:20 CPT	Bearing Oil Level Alarm	0.48	0.03
P4	7009 - Bearing Oil System	09/03/2018 18:52 CPT	09/03/2018 20:33 CPT	Turbine Bearing Oil Pump Failure	1.22	0.07
P4	7009 - Bearing Oil System	09/03/2018 22:31 CPT	09/03/2018 22:35 CPT	Turbine Bearing Oil Pump Failure	0.05	0.00
P4	7009 - Bearing Oil System	09/07/2018 20:12 CPT	09/07/2018 21:10 CPT	Turbine Bearing Pump Failure	0.70	0.04
P4	4550 - Generator bearings and lube oil system (including thrust bearings on hydro units)	12/07/2018 15:23 CPT	12/07/2018 15:41 CPT	Unit Tripped While Tightening Connections on Oil Tub RTD.	0.22	0.01
P5	4550 - Generator bearings and lube oil system (including thrust bearings on hydro units)	07/31/2018 13:02 CPT	07/31/2018 13:33 CPT	Thrust Bearing Oil Level Alarm	0.38	0.02
P5	4899 - Other miscellaneous generator problems	11/03/2018 23:59 CPT	11/04/2018 01:44 CPT	Unit tripped - No Alarms	1.27	0.07
P5	7050 - Turbine governor	12/05/2018 06:47 CPT	12/05/2018 09:48 CPT	Working on Valves in Governor Cabinet	2.19	0.13
P1	9135 - Lack of water (hydro)	02/18/2019 02:00 CPT	02/18/2019 06:00 CPT	Lake level below 742.00' target.	2.91	0.17
P1	7142 - Wicket gate shear pin	04/26/2019 14:01 CPT	04/26/2019 15:18 CPT	Replace Shear Pin	0.93	0.05
P1	7009 - Bearing Oil System	08/22/2019 06:50 CPT	08/23/2019 22:26 CPT	Repair Thrust Bearing Oil Leak	28.79	1.65
P1	3601 - Switchyard transformers and associated cooling systems	10/24/2019 17:19 CPT	10/29/2019 14:33 CPT	Substation repairing transformer oil leak	85.22	4.88

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P2	9135 - Lack of water (hydro)	02/18/2019 02:00 CPT	02/18/2019 06:00 CPT	Lake level below 742.00 target.	2.91	0.17
P2	3983 - PLC - internal and termination wiring	03/07/2019 08:05 CPT	03/07/2019 08:30 CPT	Upper Guide Bearing RTD High Temp	0.30	0.02
P2	7053 - Governor Oil System	03/14/2019 07:02 CPT	03/14/2019 08:00 CPT	Replace Pressure Switch	0.70	0.04
P2	3644 - AC Protection devices	04/13/2019 18:47 CPT	04/13/2019 19:23 CPT	Upper Guide Bearing Temp Alarm. Loose wire on RTD.	0.44	0.03
P2	3644 - AC Protection devices	04/13/2019 19:26 CPT	04/13/2019 19:53 CPT	Upper Guide Bearing Temp Alarm. Loose Wire on RTD.	0.33	0.02
P2	7142 - Wicket gate shear pin	04/26/2019 14:01 CPT	04/26/2019 15:18 CPT	Replace Shear Pin	0.93	0.05
P2	7053 - Governor Oil System	12/22/2019 07:00 CPT	12/22/2019 07:52 CPT	Oil Level Alarm	0.63	0.04
P3	3981 - PLC - data highway	02/06/2019 14:39 CPT	02/06/2019 15:34 CPT	Replace RTD	0.67	0.04
P3	9135 - Lack of water (hydro)	02/18/2019 02:00 CPT	02/18/2019 06:00 CPT	Lake level below 742.00 target.	2.91	0.17
P3	7142 - Wicket gate shear pin	04/25/2019 12:06 CPT	04/25/2019 13:21 CPT	Replace Shear Pin	0.91	0.05
P3	3644 - AC Protection devices	09/03/2019 08:51 CPT	09/03/2019 09:40 CPT	Ground Protection Relay	0.59	0.03
P3	7053 - Governor Oil System	10/11/2019 14:48 CPT	10/11/2019 14:58 CPT	Unit tripped while blowing down oil tank	0.12	0.01
P3	3983 - PLC - internal and termination wiring	11/20/2019 19:42 CPT	11/20/2019 19:56 CPT	Loose RTD Connection.	0.17	0.01
P4	9135 - Lack of water (hydro)	02/18/2019 02:00 CPT	02/18/2019 06:00 CPT	Lake level below 742.00 target.	2.91	0.17
P4	7124 - Penstock	10/22/2019 14:30 CPT	10/22/2019 16:00 CPT	Penstock Inspection	1.09	0.06
P5	9135 - Lack of water (hydro)	02/18/2019 02:00 CPT	02/18/2019 06:00 CPT	Lake level below 742.00 target.	2.91	0.17
P5	7050 - Turbine governor	11/20/2019 17:00 CPT	11/20/2019 17:34 CPT	Voltage Transducer Repair	0.41	0.02
P6	3985 - PLC - upgrades	02/11/2019 14:43 CPT	02/12/2019 12:13 CPT	Unit Testing Not Complete	15.63	0.90

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P6	7050 - Turbine governor	02/14/2019 02:00 CPT	02/14/2019 06:30 CPT		3.27	0.19
P6	9135 - Lack of water (hydro)	02/18/2019 02:00 CPT	02/18/2019 06:00 CPT	Lake Level Below 742 Target	2.91	0.17
P6	3982 - PLC - hardware problems (including card failure)	02/25/2019 08:56 CPT	02/25/2019 11:22 CPT	Faulty Power Supply on Fiber Optic Converter.	1.77	0.10
P6	3690 - Station Service Power Distribution System; General	03/15/2019 12:42 CPT	03/15/2019 14:33 CPT	Lost Communication - Lost Station Service which Caused Power loss to PLC	1.34	0.08
P6	3984 - PLC - logic problems	03/19/2019 13:31 CPT	03/19/2019 13:49 CPT		0.22	0.01
P6	4609 - Other exciter problems	05/03/2019 07:26 CPT	05/03/2019 08:41 CPT	Bad mounting bushing on exciter cooling fan. Fan rubbing mount. Replaced motor.	0.91	0.05
P6	9020 - Lightning	06/23/2019 07:32 CPT	06/23/2019 08:32 CPT	Possible Lightning Strike	0.73	0.04
P6	4810 - Generator output breaker	10/24/2019 18:00 CPT	10/24/2019 19:48 CPT	Faulty Manual Safety Switch	1.31	0.08
P6	4810 - Generator output breaker	11/20/2019 16:00 CPT	11/20/2019 16:52 CPT	Breaker Charging Motor Failure	0.63	0.04
P6	4810 - Generator output breaker	11/21/2019 08:29 CPT	11/21/2019 10:30 CPT	Breaker Charging Motor Failure	1.47	0.08
P6	3989 - Other PLC problems	12/30/2019 10:02 CPT	12/30/2019 10:58 CPT		0.68	0.04
P6	3989 - Other PLC problems	12/30/2019 14:46 CPT	12/30/2019 14:59 CPT	Network Conflict in PLC	0.16	0.01
P1	7110 - Intake channel or flume (including trash racks)	05/18/2020 14:05 CPT	05/18/2020 15:17 CPT	Repairing trash rack on units 3 and 4	0.87	0.05
P1	7142 - Wicket gate shear pin	06/29/2020 06:54 CPT	06/29/2020 09:45 CPT		2.07	0.12
P1	3684 - Other voltage system protection devices	07/05/2020 06:02 CPT	07/05/2020 08:15 CPT		1.61	0.09
P1	9135 - Lack of water (hydro)	07/19/2020 15:00 CPT	07/19/2020 20:00 CPT		3.63	0.21

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P2	7110 - Intake channel or flume (including trash racks)	05/18/2020 14:05 CPT	05/18/2020 15:17 CPT	Repairing trash rack on units 3 and 4	0.87	0.05
P2	4609 - Other exciter problems	07/13/2020 07:30 CPT	07/13/2020 08:19 CPT	Exciter Breaker Repair	0.59	0.03
P2	3899 - Other miscellaneous auxiliary system problems	07/27/2020 19:04 CPT	07/27/2020 19:41 CPT		0.45	0.03
P2	4609 - Other exciter problems	07/28/2020 14:14 CPT	07/28/2020 15:24 CPT	Timer	0.85	0.05
P2	3898 - Miscellaneous plant auxiliary process and services instrumentation and controls	11/17/2020 05:18 CPT	11/17/2020 06:13 CPT		0.67	0.04
P2	4840 - Inspection E	11/30/2020 09:26 CPT	11/30/2020 09:39 CPT		0.16	0.01
P2	7121 - Shutoff valves	12/08/2020 09:03 CPT	12/08/2020 09:49 CPT	Butterfly Valve Maintenance	0.56	0.03
P3	7142 - Wicket gate shear pin	04/13/2020 00:18 CPT	04/13/2020 05:30 CPT	Replaced Shear Pins	3.78	0.22
P3	3644 - AC Protection devices	04/21/2020 08:55 CPT	04/21/2020 09:32 CPT	Relay Department Tripped Unit While Testing Relays	0.45	0.03
P3	7110 - Intake channel or flume (including trash racks)	05/18/2020 14:05 CPT	05/18/2020 15:17 CPT	Repairing trash rack on units 3 and 4	0.87	0.05
P3	7003 - Lube oil system (use code 7007 to report bearing failures due to lube oil problems)	06/16/2020 12:28 CPT	06/16/2020 12:50 CPT	Turbine Bearing Oil Alarm	0.27	0.02
P3	9135 - Lack of water (hydro)	07/19/2020 15:00 CPT	07/19/2020 20:00 CPT		3.63	0.21
P3	3620 - Main transformer	07/31/2020 11:27 CPT	08/01/2020 07:57 CPT		14.90	0.85
P3	4840 - Inspection E	11/30/2020 09:26 CPT	11/30/2020 11:19 CPT		1.37	0.08
P4	7110 - Intake channel or flume (including trash racks)	05/06/2020 06:15 CPT	05/06/2020 11:30 CPT	Sonar Inspection of Trash Racks	3.82	0.22

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P4	7142 - Wicket gate shear pin	05/08/2020 07:15 CPT	05/08/2020 08:05 CPT	Shear Pin Alarm	0.61	0.03
P4	7142 - Wicket gate shear pin	05/08/2020 08:20 CPT	05/08/2020 09:45 CPT	Shear Pin Replacement	1.03	0.06
P4	7130 - Spiral case	05/12/2020 14:05 CPT	05/14/2020 11:40 CPT	Debris in Scroll Case	33.14	1.90
P4	7110 - Intake channel or flume (including trash racks)	05/18/2020 14:05 CPT	05/18/2020 15:17 CPT	Repairing trash rack on units 3 and 4	0.87	0.05
P4	3684 - Other voltage system protection devices	08/10/2020 23:57 CPT	08/11/2020 01:44 CPT		1.30	0.07
P4	4899 - Other miscellaneous generator problems	11/30/2020 09:23 CPT	11/30/2020 14:35 CPT		3.78	0.22
P4	7053 - Governor Oil System	12/17/2020 06:56 CPT	12/17/2020 08:00 CPT	Oil Pump Issue	0.78	0.04
P5	7110 - Intake channel or flume (including trash racks)	05/18/2020 14:05 CPT	05/18/2020 15:17 CPT	Repairing trash rack on units 3 and 4	0.87	0.05
P5	9135 - Lack of water (hydro)	07/19/2020 15:00 CPT	07/19/2020 20:00 CPT		3.63	0.21
P5	4899 - Other miscellaneous generator problems	11/30/2020 09:26 CPT	11/30/2020 11:00 CPT		1.14	0.07
P5	4899 - Other miscellaneous generator problems	11/30/2020 11:00 CPT	11/30/2020 11:19 CPT		0.23	0.01
P6	7053 - Governor Oil System	02/25/2020 02:02 CPT	02/25/2020 03:25 CPT	Governor Tank Low Pressure	1.01	0.06
P6	7003 - Lube oil system (use code 7007 to report bearing failures due to lube oil problems)	03/31/2020 06:10 CPT	03/31/2020 07:00 CPT	Turbine Oil Pump Failure	0.61	0.03
P6	7110 - Intake channel or flume (including trash racks)	05/18/2020 14:05 CPT	05/18/2020 15:17 CPT		0.87	0.05
P6	4720 - Generator synchronization equipment	06/16/2020 06:22 CPT	06/16/2020 13:15 CPT		5.00	0.29
P6	3985 - PLC - upgrades	10/01/2020 07:10 CPT	10/01/2020 10:12 CPT		2.20	0.13

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P6	3989 - Other PLC problems	11/03/2020 19:50 CPT	11/03/2020 20:31 CPT	Prosoft Communication Issue	0.50	0.03
P6	3684 - Other voltage system protection devices	11/25/2020 17:00 CPT	11/25/2020 18:11 CPT	Reverse Power relay	0.86	0.05
P6	4840 - Inspection E	11/30/2020 09:26 CPT	11/30/2020 09:39 CPT	maintenance investigation	0.16	0.01
P1	3985 - PLC - upgrades	01/21/2021 16:02 CPT	01/22/2021 07:26 CPT		11.19	0.64
P1	3985 - PLC - upgrades	01/22/2021 14:55 CPT	01/25/2021 08:42 CPT		47.82	2.74
P1	9135 - Lack of water (hydro)	02/18/2021 13:30 CPT	02/25/2021 09:49 CPT		119.44	6.85
P1	9036 - Storms (ice; snow; etc)				0.00	
P1	7142 - Wicket gate shear pin	04/22/2021 17:02 CPT	04/22/2021 18:42 CPT		1.21	0.07
P1	3620 - Main transformer	08/30/2021 01:56 CPT	08/30/2021 09:21 CPT	GSU transformer tripped. Substation tested and reset.	5.39	0.31
P1	4609 - Other exciter problems	12/25/2021 23:10 CPT	12/26/2021 20:59 CPT	Excitation license error	15.86	0.91
P2	9135 - Lack of water (hydro)	02/18/2021 13:30 CPT	02/25/2021 08:16 CPT		118.32	6.78
P2	9036 - Storms (ice; snow; etc)				0.00	
P2	7120 - Headgates	02/25/2021 08:17 CPT	03/03/2021 16:16 CPT		110.48	6.33
P2	4609 - Other exciter problems	03/12/2021 22:00 CPT	03/12/2021 23:09 CPT	Timed out	0.84	0.05
P2	9900 - Operator error	05/04/2021 15:00 CPT	05/04/2021 15:38 CPT		0.46	0.03
P3	7300 - Routine Hydro Planned Outage	02/08/2021 16:13 CPT	02/09/2021 08:13 CPT		11.63	0.67
P3	7124 - Penstock	03/04/2021 08:26 CPT	03/05/2021 15:25 CPT		22.52	1.29
P3	3842 - Service air valves	04/01/2021 08:46 CPT	04/01/2021 10:00 CPT		0.90	0.05

Unit ID	Cause Code	Event Start	Event End	Verbal Description	Equivalent MWh	Total Duration (Hours)
P3	4609 - Other exciter problems	12/25/2021 20:56 CPT	12/26/2021 21:41 CPT	Excitation license error	17.99	1.03
P4	9135 - Lack of water (hydro)	02/18/2021 13:30 CPT	02/22/2021 06:00 CPT		64.33	3.69
P4	9036 - Storms (ice; snow; etc)				0.00	
P4	4540 - Brushes and brush rigging	04/02/2021 09:00 CPT	04/02/2021 09:33 CPT		0.40	0.02
P4	4609 - Other exciter problems	12/25/2021 23:10 CPT	12/26/2021 21:59 CPT		16.59	0.95
P5	9135 - Lack of water (hydro)	02/18/2021 13:30 CPT	02/25/2021 14:56 CPT		123.16	7.06
P5	9036 - Storms (ice; snow; etc)				0.00	
P5	7120 - Headgates	02/25/2021 14:57 CPT	03/05/2021 07:36 CPT		134.23	7.69
P5	4810 - Generator output breaker	12/20/2021 07:00 CPT	12/20/2021 10:47 CPT	Loose wire & bad fuse holder	2.75	0.16
P6	9135 - Lack of water (hydro)	02/18/2021 13:30 CPT	02/27/2021 06:46 CPT		152.12	8.72
P6	9036 - Storms (ice; snow; etc)				0.00	
P6	3689 - Other voltage system problems	04/29/2021 01:00 CPT	04/29/2021 02:01 CPT	O5D low voltage startup problem	0.74	0.04
P6	4740 - Emergency generator trip devices	05/21/2021 03:21 CPT	05/21/2021 04:18 CPT		0.69	0.04
P6	4609 - Other exciter problems	11/15/2021 16:30 CPT	11/16/2021 09:37 CPT	Excitation license error	12.44	0.71
P6	4609 - Other exciter problems	12/25/2021 23:10 CPT	12/26/2021 22:16 CPT	Excitation license error	16.79	0.96

2.8 Section 5.18(c)(1)(ii)(F) – License Compliance Activities

There are no known outstanding compliance issues associated with the Pensacola Project.

2.9 Section 5.18(c)(1)(ii)(G) – Actions that Affect the Public

During the time GRDA has been the Licensee of the Pensacola Project, it has become an integral part of the community in which it operates. In addition to providing low-cost renewable generation, GRDA

contributes to the local economies through salaries of its employees, hiring of local contractors, and purchasing materials locally.

To become more involved in the community, GRDA created the Ecosystems and Lake Management Department to spearhead efforts to balance the needs of all lake users, including fish and waterfowl, while working to protect and enhance natural ecosystems. GRDA also completed construction of the Ecosystems and Education Center (Eco Building) on the shores of Grand Lake adjacent to the Pensacola Dam. The Eco Building incorporates a state-of-the-art water research laboratory and hosts educational activities. GRDA staff are supplemented by intern assistance and partnerships with Oklahoma State University, University of Oklahoma, Northeastern State University, and Rogers State University.

In addition to maintaining five recreation sites within the Project boundary, GRDA spearheads the following programs within the Project's local communities that have a positive effect on the public:

2.9.1 Educational Activities

The Ecosystems and Education Center hosts hundreds of students (from elementary school through college) annually for field trips and presentations about water quality, safety, hydroelectricity production, wildlife habitat, and related topics (Grand River Dam Authority, 2020).

2.9.2 Water Quality Monitoring

There are fifteen established sampling sites on Grand Lake, six on Lake Hudson, and one on the W.R. Holway Reservoir. These monitoring locations are visited twice monthly during the recreation season, and once monthly during the off-season, allowing GRDA to conduct long-term water quality monitoring. The data collected, when paired with agency and university partnerships, allows water quality professionals to make more informed decisions on watershed management techniques (Grand River Dam Authority, 2020).

2.9.3 Rush for Brush Program

GRDA began a program called "Rush for Brush" in 2007 to enhance the fisheries of GRDA waters. The event encourages volunteers to partner with GRDA in fisheries enhancement efforts constructing and deploying artificial fish structure (known as spider blocks) in Grand and Hudson Lakes. GRDA supplies the materials and volunteers supply the labor. Once the structures are complete, volunteers place them into their favorite areas of the lakes, where they provide cover and habitat for fish, helping to improve fishing success on GRDA lakes. The fishing success has led to many fishing tournaments being held on GRDA managed lakes, bringing a significant economic boost to the entire area (Grand River Dam Authority, n.d.a).

2.9.4 Adopt-the-Shoreline Program

GRDA sponsors the Grand Lake Adopt the Shoreline program to remove trash and debris from the shoreline, safeguard the ecosystem and enhance the quality of life for those using Grand Lake. The program enables participants to organize cleanups through shoreline adoption, with assistance provided by GRDA. GRDA staffs its own full-time shoreline clean-up crew with a barge and equipment necessary to remove large debris from the shore. Volunteers, homeowners, organizations,

and civic groups adopt portions of the shoreline and participate in annual clean-ups (Grand River Dam Authority, n.d.b).

2.9.5 Neosho Bottoms Hunting Opportunities

Neosho Bottoms consists of approximately 3,600 acres along the Neosho River, west of Commerce Oklahoma. This area is comprised of pecan groves, grasslands, hardwood timber, crop fields, and wetlands. GRDA uses this area for outdoor recreation along with university research and education. GRDA allows about 2,000 acres to be hunted for deer, waterfowl, and turkey through a public draw in application process. The remaining land is available to veterans for hunting activities.

2.10 Section 5.18(c)(1)(ii)(H) – Reduced Ownership and Operating Expense if License Transferred

If GRDA does not receive a new license for the Project, annual costs would be reduced by the amount of the Project's capital and operation and maintenance costs described in Exhibit D.

2.11 Section 5.18(c)(1)(ii)(I) – Annual Fees Paid for Use of Federal or Native American Tribal Lands

Under the prior licenses, the Commission concluded that the Project did not occupy any federal lands, including lands held in trust for Native American tribes or individuals. Those prior licenses contained no requirement for GRDA to pay annual charges for the use and occupancy of federal lands.

During the current relicensing effort, GRDA has assessed landholdings within the Project boundary and concluded that the Project occupies 65.812 acres of Federal lands, including 8.122 acres⁶ that are held in trust for the benefit of Native American Tribes or individuals. It is GRDA's understanding that much of these lands have been placed into trust over the past several years, during the existing license term. Regardless, in section 7612 of the National Defense Authorization Act for Fiscal Year 2020, Congress exempted the Project from annual charges for the use and occupancy of federal lands pursuant to section 10(e)(1) of the Federal Power Act.

3. PURPA Benefits – 18 CFR § 5.17(e) and 4.38(b)(2)(vi)

The Project has an installed capacity of greater than 80 MW. Therefore, it is not a qualifying hydroelectric small power production facility under 18 CFR § 292.204(a)(1) and cannot seek PURPA benefits.

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⁶ This acreage figure is based upon the shape files provided to the BIA and DOI on March 15, 2023. See also Appendix A-5.

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