# REVIEW OF APPLICATION FOR LOW IMPACT HYDROPOWER CERTIFICATION OF THE ARKANSAS RIVER DAM NO. 2 PROJECT (FERC NO. 3033)

## Introduction

This report reviews the application dated January 2010 by Arkansas Electric Cooperative Corporation (AECC or the Applicant) to the Low Impact Hydropower Institute (LIHI) for Low Impact Hydropower Certification for its Arkansas River Dam No. 2 Project (the Facility or project). The review was completed as explained below, per the LIHI Certification Program rules and Standards (8/31/2004 ed.).

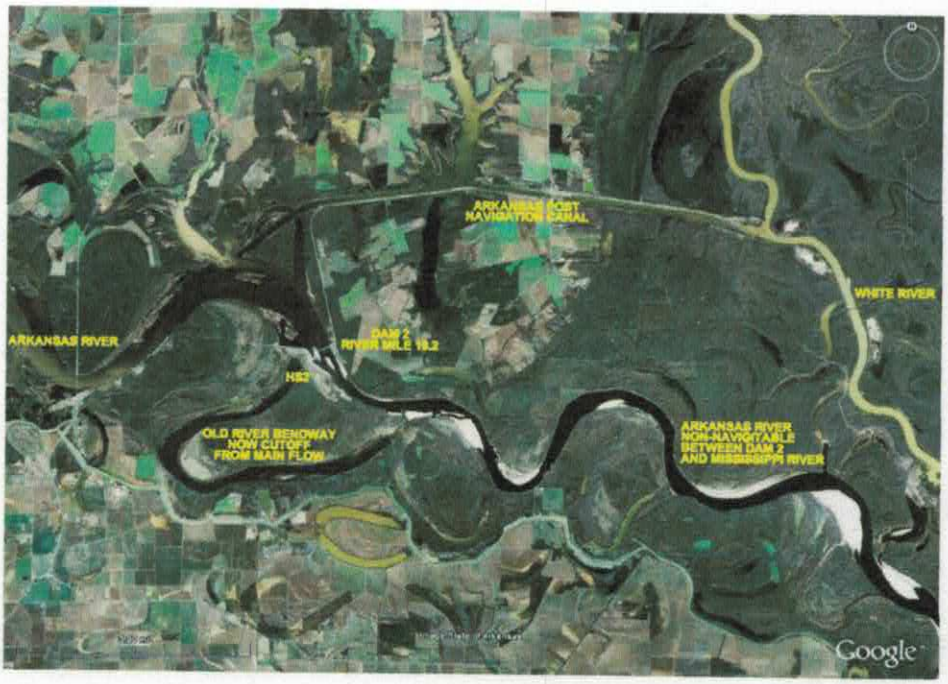
As per the Applicant, this 108 MW (installed capacity) project, with an average annual generation of 351 GWh, is located on the Arkansas River. The Federal Energy Regulatory Commission (FERC) issued a 50-year license for the Facility on 8/10/1983. This Facility is one of a number of projects constructed by retrofitting existing dams on the Arkansas River. Due to construction challenges and other factors, AECC did not seek to begin building the project until the 1990s. The hydropower project was completed and began operation in 1999.

## Project Description & Operation

AEEC's Arkansas River Dam No. 2 Project is located on the Arkansas River in Arkansas and Desha Counties, in southeast Arkansas, two miles southeast of river mile 19. The U.S. Army Corps of Engineers (Corps) originally constructed the dam in the mid 1960s to impound and maintain a minimum nine-foot deep navigation pool along this section of the Arkansas River. The Applicant, a rural electric cooperative corporation, developed the project as part of an effort to reduce long-term costs of producing energy for its 17 distribution cooperatives around the state and, equally important, to displace a portion of AECC's fossil-fuel derived energy with energy generated from renewable hydropower. No other forms of renewable energy such as wind, solar, and geothermal energy were or are economically or technically competitive with low-head hydroelectric generation in Arkansas.

The project is located at the Corps navigation Dam No. 2 on the Arkansas River, two miles southeast of river mile 19 on the McClellan-Kerr Arkansas River Navigation System (McClellan-Kerr). The McClellan-Kerr is a 445-mile-long-waterway with 18 locks and dams; for a majority of that distance, it and the Arkansas River are one and the same. The Corps constructed the waterway to achieve the primary goal of allowing barge traffic to overcome a 420-foot elevation difference between the Mississippi River and the head of navigation at Catoosa, Oklahoma. The Corps constructed the McClellan-Kerr between 1964 and 1970; Arkansas River Dam No. 2, also known as the Wilbur D. Mills Dam, was constructed between 1963 and 1968. The shallowness of the lowermost reach of the Arkansas River precluded direct navigation from the Mississippi up the Arkansas River. For that reason, the first 10 miles of the White River, which meets the Mississippi River upriver from the confluence of the Arkansas and Mississippi Rivers, provides the entrance channel to the McClellan-Kerr; a nine-mile artificial canal connects the White River

to the Arkansas River immediately upstream of Dam No. 2. Because there is no commercial navigation below Dam No. 2, the dam has no lock facilities.




*Satellite view of the McClellan-Kerr Arkansas Navigation System in the vicinity of the project. The Arkansas River and White River flow southeasterly to the Mississippi River (not shown in photo).*

The 2/25/1999 *Memorandum of Agreement Establishing Procedures for Hydropower Operation at Wilbur D. Mills Dam* between the Corps and AECC stipulates:

> ...[the project is] operated as a run-of-river project (no dedicated storage for hydropower operations at Wilbur D. Mills Dam) and in coordination with [the] Dam. Releases from the Hydropower Project will be in conformance with instructions and criteria established on a real-time basis by [the Corps]...

and that

> *...the Licensee recognizes that navigation is the primary purpose of Wilbur D. Mills Dam.*

The dam consists of a gated spillway and an earthfill overflow and non-overflow embankments. The spillway section is a straight concrete gravity type structure with a crest length of 1130 feet

and 54 feet at the maximum height. Sixteen conventional tainter gates in the spillway control the upstream pool. The Corps constructed a non-overflow earth embankment on the west end of the dam to block the old Arkansas River channel. The access road to the dam is located on this non-overflow embankment that measures 3150 feet in length. The embankment has a crest elevation of 180 feet M.S.L. In the mid 1990s, AECC constructed the hydropower project as an integral part of this embankment.

Dam No. 2 creates a reservoir with a normal surface elevation of 10,560 acres at 162 feet msl. At an estimated average depth of about 12 feet, the reservoir volume is 127,000 acre feet. The Facility includes about 40 acres on non-reservoir facilities (e.g., dam, powerhouse, intake channel, switching station, and park facilities).

The hydropower facility included development of a reinforced concrete powerhouse with upstream and downstream channels to divert water from the Arkansas River. The channels pass water from Pool 2 (upstream of the existing Corps dam) through the powerhouse and immediately return it to the river downstream of the dam.

A headrace channel was constructed to divert the river flow and convey it into the powerhouse. Rip-rapped slope banks and reinforced concreted training walls forming the sides of the channel were built upstream from the powerhouse. Beyond the training walls, the stabilized sides of the channel were sloped to meet existing ground level. A log boom across the headrace is intended to trap large debris; however, a trash rack crane on the powerhouse is required to clear the trashrack of the extensive debris the Arkansas River can deliver. Water flow is directed back into the river by the tailrace channel. A portion of the existing navigation revetments were removed to construct the headrace and tailrace channels. These channels provide a transition to the undisturbed revetment areas.

The powerhouse is approximately 180 feet wide by 225 feet long. The upstream face of the powerhouse is located about 500 feet downstream from the dam axis. The powerhouse structure is located on the west side of the Arkansas River adjacent to the dam on the existing non-overflow embankment. The powerhouse elevation is at least as high as the non-overflow embankment. For this reason the high roof of the powerhouse will always be above flood level.

The powerhouse contains three horizontal-shaft, bulb-type, axial-flow hydraulic turbine-generator units. Each of the turbines is of the Kaplan propeller type with four adjustable blades, and adjustable wicket gates, complete with an electronically controlled hydraulically operated governor. The maximum net power head available to the turbines is approximately 44.5 feet. The turbines operate under a net head that normally ranges from 5 feet to 37 feet. The turbines are designed to rotate at 72 rpm. Each turbine is directly coupled to a generator by a horizontal shaft. Thus each of the generators also rotates about a horizontal axis at 72 rpm.

The electrical power and energy from the project is conveyed to the electrical network by a single span of 115 Kv transmission line to a new 115 Kv switching station. The 115 Kv switching station is connected to a new 115 Kv line which was constructed by the Arkansas Power and Light Company (now referred to as Entergy). This new section of line is outside of the FERC project boundary but was reviewed by FERC, the Corps, and other resources agencies throughout the licensing and permitting process since it was specifically required for the hydropower project. All applications and studies included this new section of 115 Kv line.

The project is run-of-river, with no ability to impound water and no discretion over flow releases, which are dictated by the Corps. The February 25, 1999 *Memorandum of Agreement Establishing Procedures for Hydropower Operation at Wilbur D. Mills Dam* between the Corps and AECC stipulates:

> *During normal operation the Hydropower Project will generate with one, two, or three units up to 24 hours per day when available river flows exist. All of the following flows are approximate. The flow range during which generation is possible is from 4,000 cfs (minimum turbine discharge) to 200,000 (flow at which units are shut down due to insufficient operating head). River flows from 4,000 cfs to 53,400 cfs (Hydropower Project maximum discharge capacity) normally will be passed through the powerhouse but may be passed through either, neither, or both the powerhouse and Wilbur D. Mills Dam in a coordinated effort, as the Corps deems appropriate. It shall be the responsibility of the Licensee to assure release rates are made as set by the Corps. The Licensee shall schedule all hydropower releases in compliance with the Lockmaster's needs and*

*instructions. For river flows between 53,400 and 200, 000 cfs, discharges will be made through both the powerhouse and Wilbur D. Mills Dam. At flows greater than 200,000 cfs, discharges will be made through Wilbur D. Mills Dam only. The Licensee agrees to fully cooperate with the Corps in the establishment of release schedules and in case of disagreement the Corps' decision will be final.*

In practice, each project turbine typically operates over a flow range of 4,100 to 16, 400 cubic feet per second (cfs). The maximum flow rate though the powerhouse is in the range of 51,000 cfs. At this flow range or below, all flows are normally only through the powerhouse and no flow is through the Corps spillway gates.

At total river flow above 51,000 cfs up to about 210,000 cfs, the Corps' spillway gates are opened to handle the flows beyond the 51,000 capacity of the powerhouse. Any river flow above 210,000 cfs usually has insufficient head for turbine operation, in which case all flows are released through the spillway gates.

**Recent Regulatory History**

This Facility is one of a number of projects constructed by retrofitting existing dams on the Arkansas River. The Federal Energy Regulatory Commission (FERC) issued a 50-year license for the Facility on 8/10/1983. As part of the licensing process, FERC determined that issuance of a license for the project would not constitute an action significantly affecting the quality of the human environment pursuant to the National Environmental Policy Act.

Due to construction challenges and other factors, AECC did not seek to begin building the project until the 1990s. The hydropower project was completed and began operation in 1999. Given the time lapse, the Facility plans underwent regulatory reviews by state and federal natural resource, environmental and cultural resource agencies in the early 1980s and again in the early 1990s. To support the LIHI application, the Applicant consulted key resource agencies to confirm compliance and demonstrate that the project is not adversely affecting fish and wildlife resources.

**Public Comments**

No public comments were received on this application.

**Agency Letters**

As part of the review process, Resource Agency officials were contacted to confirm that (1) the Resource Agency Recommendations[1] identified by the Applicant are still valid; and (2) the Applicant is in Compliance with the Recommendations.

[1] This means recommendations or conditions for operation, maintenance, construction of structures of the Facility submitted by Resource Agencies including those: (a) issued pursuant to a legal or administrative proceeding or other legally enforceable agreements between a

The following Resource Agencies[2] ("state, federal or tribal agency whose mission includes protesting fish and wildlife, water quality and/or administering reservations held in public trust") were contacted as part of the LIHI review process for this project:

- Arkansas Department of Environmental Quality (ADEQ)
- Arkansas Game & Fish Commission (AGFC)
- Arkansas Historic Preservation Program (ASHPO)
- Arkansas Natural Heritage Commission (ANHC)
- US Fish & Wildlife Service (USFWS)

The Resource Agencies offered Compliance[3] information. Copies of emails and other information key to this evaluation have been appended and are incorporated into this review report by reference.

**Conclusion & Recommendation.** Based upon my review of AEEC's application dated January 2010, other materials supplied by the Applicant, my consultation with Resource Agency staff, and the LIHI Certification Program and Criteria (08/31/04 ed.), it is my opinion that

> *the project's design and operation, given its location and physical constraints, appears to be consistent with LIHI criteria for certification.*

**I recommend certification with Standard Conditions if the Applicant completes the following actions before the LIHI Board votes to approve its application for certification:**

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Resource Agency and the dam owner/operator – e.g., FERC License conditions; (b) recent, if there are multiple Recommendations or a settlement agreement to which the Applicant is a party (the terms of which are considered Recommendations); and (c) most environmentally stringent.
Where there are conflicting Resource Agency Recommendations and the conflict is not resolved by applying the most Recent and Environmentally Stringent Recommendations, the conflict shall be resolved by applying the Recommendations based on the health of threatened or endangered biological organisms first, the health of other biological organisms second, Cultural Resources third and Recreation fourth, unless there is a statutory mandate to resolve the conflict otherwise.

[2] The Federal Energy Regulatory Commission (FERC) is not a Resource Agency for LIHI certification purposes.

[3] A Facility is in Compliance with a requirement or Recommendation if it complies at the time the questionnaire is filled out and has not had any material violations or formal notices of violation issued by a state or federal agency within the last year. If the Facility has been in violation of a requirement or Recommendation but the Applicant does not believe the violation is material, the violation must be disclosed and its materiality explained in the application.

- **Obtains confirmation of Compliance with LIHI threatened and endangered plant species Standards from ANHC;**
- **Obtain confirmation of Compliance with LIHI cultural resources protections Standards from ASHPO; and**
- **Obtains confirmation of Compliance with LIHI recreation Standards from the Corps.**

With the minor exceptions noted immediately above which are expected to be eliminated before the LIHI Board considers this application, this project meets LIHI Standards. From all reports, it is well run and is a good candidate for certification. The Resource Agencies agree with this assessment.[4] The Applicant is proud of the plant's environmental attributes and is eager to obtain recognition of the same from an independent body like LIHI.

My full evaluation using the LIHI questionnaire and criteria is provided below. This report includes numerous excerpts from AEEC's LIHI application and other supporting materials, as well as documents issued by FERC.

[4] Note that Resource Agency comments for LIHI review purposes were limited to the effects of the hydroelectric facility alone, separate from the effects of the (pre-existing) Corps Dam No. 2 generally.

**ANALYSIS of the**
**Low Impact Certification Criteria**

Goals, Standards (A through H), Applicant's Responses, and Additional Information

**A. River Flows**

***Goal:*** *The Facility (dam and powerhouse) should provide river flows that are healthy for fish, wildlife, and water quality, including seasonal flow fluctuations where appropriate.*

***Standard:*** *For instream flows, a certified Facility must comply with recent Resource Agency Recommendations for flows. If there were no qualifying Resource Agency Recommendations, the applicant can meet one of two alternative standards: (1) meet the flow levels required using the Aquatic Base Flow methodology or the "good" habitat flow level under the Montana-Tennant methodology; or (2) present a letter from a Resource Agency prepared for the application confirming the flows at the Facility are adequately protective of fish, wildlife, and water quality.*

**Criteria:**

**1) Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?**

✓ **NOT APPLICABLE**

***If YES, go to B***
***If NOT APPLICABLE, go to A2.***
***If NO, Facility fails***

**2) If there is no flow recommended by any Resource Agency for the Facility, or if the Recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?**

✓ **NO**

***If YES, go to B.***
***If NO, go to A3.***

**3) If the Facility is unable to meet the flow standards in A.2, has the Applicant demonstrated and obtained a letter from the relevant Resource Agency confirming**

**that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife and water quality?**

✓ **YES**

The flow schedule for this Facility in particular is not determined by the Applicant, but rather by the Corps pursuant solely to its navigation, flood control, and water allocation requirements. Article 48 of the FERC license required the Applicant to, prior to commencement of operation, enter into a memorandum of agreement with the Corps describing the mode of hydropower operation accept to the Corps. On 2/25/1999, the Applicant and the Corps entered into a *Memorandum of Agreement Establishing Procedures for Hydropower Operation at Wilbur D. Mills Dam* (Operating Agreement). That Operating Agreement stipulates:

> *During normal operation the Hydropower Project will generate with one, two, or three units up to 24 hours per day when available river flows exist. All of the following flows are approximate. The flow range during which generation is possible is from 4,000 cfs (minimum turbine discharge) to 200,000 (flow at which units are shut down due to insufficient operating head). River flows from 4,000 cfs to 53,400 cfs (Hydropower Project maximum discharge capacity) normally will be passed through the powerhouse but may be passed through either, neither, or both the powerhouse and Wilbur D. Mills Dam in a coordinated effort, as the Corps deems appropriate. It shall be the responsibility of the Licensee to assure release rates are made as set by the Corps. The Licensee shall schedule all hydropower releases in compliance with the Lockmaster's needs and instructions. For river flows between 53,400 and 200, 000 cfs, discharges will be made through both the powerhouse and Wilbur D. Mills Dam. At flows greater than 200,000 cfs, discharges will be made through Wilbur D. Mills Dam only. The Licensee agrees to fully cooperate with the Corps in the establishment of release schedules and in case of disagreement the Corps' decision will be final.*

In practice, each project turbine typically operates over a flow range of 4,100 to 16, 400 cubic feet per second (cfs). The maximum flow rate though the powerhouse is in the range of 51,000 cfs. At this flow range or below, all flows are normally only through the powerhouse and no flow is through the Corps spillway gates.

At total river flow above 51,000 cfs up to about 210,000 cfs, the Corps' spillway gates are opened to handle the flows beyond the 51,000 capacity of the powerhouse. Any river flow above 210,000 cfs usually has insufficient head for turbine operation, in which case all flows are released through the spillway gates.

Consultation with OGFC and USFWS has confirmed that the Applicant is in Compliance with the Operating Agreement, and that the Facility is not responsible for any previously existing or potentially adverse flow-related impacts to fish and wildlife resources.

***If YES, go to B.***

***If NO, Facility fails.***

**THE FACILITY PASSES**

**A. River Flows - The Facility is in Compliance with LIHI Standards.**

**B. Water Quality**

***Goal:*** *Water quality in the river is protected.*

***Standard****: The water quality criterion has two parts. First, a Facility must demonstrate that it is in Compliance with state water quality standards, either through producing a recent (after 1986) Clean Water Act Section 401 certification, or demonstrating Compliance with state water quality standards (typically by presenting a letter prepared for the application from the state confirming the Facility is meeting water quality standards). Second, a Facility must demonstrate that it has not contributed to a state finding that the river has impaired water quality under Clean Water Act Section 303(d) (relating to water quality limited streams).*

**Criteria:**

**1) Is the Facility either:**
**a) in Compliance with all conditions issued pursuant to a Clean Water Act (CWA) Section 401 water quality certification issued for the Facility after December 31, 1986? OR**
**b) in Compliance with quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act (CWA) in the Facility area and in the downstream reach?**

✓ **YES**

Water Quality Certifications (WQC) were issued for this Facility in 1981 and again in 1994. The first WQC was issued by the State of Arkansas Department of Pollution Control and Ecology (ADPCE) (reorganized in 1991) as one of the several low head hydropower projects the Applicant retrofitted to reduce costs and displace fossil-fuel derived energy. The 1981 WQC required only that the Applicant to apply best management practices to prevent erosion from spoils disposal area and the transmission line corridors. The second WQC was issued by ADPCE to support a Section 404 permit application to fill 23.6 acres of wetlands as part of construction of the (new) dam. No special conditions were attached to this approval.

***If YES, go to B2.***
***If NO, Facility fails.***

**2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?**

✓ **NO**

The Arkansas River in the vicinity of the Arkansas River Dam No. 2 Project meets all statewide water uses. At the time of FERC licensing, this stretch of river is classified as Class B for use (suitable for desirable species of fish, wildlife and other aquatic and semi-aquatic life; raw water source for public water supplies; and secondary contact recreation) and Class W for warm water fishery.

Consultation with ADEQ has confirmed that the Arkansas River in the vicinity of the project currently meets all statewide water uses and standards.

***If YES, go to B3.***
***If NO, go to C.***

**3) If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?**

***If YES, go to C.***
***If NO, the Facility fails.***

**THE FACILITY PASSES**

**B. Water Quality – The Facility is in Compliance with LIHI Standards.**

**C. Fish Passage and Protection**

***Goal:*** *The Facility provides effective fish passage for Riverine, anadromous and catadromous fish, and also protects fish from entrainment.*

***Standard:*** *For Riverine, anadromous, and catadromous fish, a Facility must be in Compliance with recent (after 1986) mandatory prescriptions regarding fish passage (such as a Fish and Wildlife Service prescription for a fish ladder) as well as any recent Resource Agency Recommendations regarding fish protection (e.g., a tailrace barrier). If anadromous or catadromous fish historically passed through the Facility area but are no longer present, the applicant must show that the fish are not extirpated or extinct in the area because of the Facility and that the Facility has made a legally binding commitment to provide any future fish passage recommended by a Resource Agency.*

*When no recent fish passage prescription exists for anadromous or catadromous fish, and the fish are still present in the area, the Facility must demonstrate either that there was a recent*

*decision that fish passage is not necessary for a valid environmental reason, that existing fish passage survival rates at the Facility are greater than 95% over 80% of the run, or provide a letter prepared for the application from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service confirming the existing passage is appropriately protective.*

**Criteria:**

**1) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions[5] for upstream and downstream passage of anadromous and catadramous fish issued by Resource Agencies after December 31, 1986?**

✓ **NOT APPLICABLE**

At the time of FERC licensing and currently, there are two diadromos fish species that may exist in the Mississippi River Basin: the catadromous American eel (anguilla rostrata) and the anadromous Alabama shad. At the time of licensing, eel were found in the project vicinity, but shad were not.

The FERC license does not include any fish passage requirements for American eel because it was not then a species of concern (it is not federally listed at this time). Natural resource agencies reviewed the project post-licensing in conjunction with the 1994 Section 404 permit and did not recommend fish passage at that time. The agencies did not indicate that they considered issuing such recommendations, nor did they identify technological infeasibility of fish passage as a reason for foregoing the opportunity to make such recommendations.

Recent consultation with the USFWS indicates that limited passage is available upstream of the project via the Arkansas Post Canal, which connects the White River (a tributary to the Mississippi River) to the Arkansas River immediately upstream of the Facility. Limited passage is also available at the Facility during overflow and pass through flood conditions. As per USFWS and AGFC, this passage is adequate.

***If YES, go to C5.***
***If NOT APPLICABLE, go to C2.***
***If NO, Facility fails.***

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[5] Means upstream and downstream fish passage requirements issued by Resource Agencies that must be included in a FERC license or exemption or otherwise must be complied with by the Facility owner/operator, usually pursuant to Section 18 of the Federal Power Act (FPA), or, if applicable, Section 4(e) of the FPA, Section 401 of the Clean Water Act, the Endangered Species Act (ESA), or other relevant state or federal provisions. Recommendations included in the ESA Biological Opinion or Recovery Plan are considered Mandatory Fish Passage Prescriptions. If different Resource Agencies have differing prescriptions, the most environmentally stringent prescription shall apply.

**2) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct?)**

✓ **NO**

Please see answer to question C1, above.

***If YES or NOT APPLICABLE, go to C2a.***
***If NO, go to C3.***

**a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or in part to the Facility?**

***If YES, go to C2b.***
***If NOT APPLICABLE, go to C2b.***
***If NO, Facility fails.***

**b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?**

***If YES, go to C5.***
***If NOT APPLICABLE, go to C3.***
***If NO, Facility fails.***

**3) If, since December 31, 1986:**
**a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2 above), and**
**b) the Resource Agency declined to issue a Mandatory Fish Passage Prescription,**
**c) was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?**

✓ **NO**

Resource Agencies had a chance to issue Mandatory Fish Passage Prescriptions as part of the FERC licensing process in or before 1983, and again as part of the Section 404 permit process in 1994. The Resource Agencies declined to issue a Mandatory Fish Passage Prescription based on their conclusion that the project, with its non-storage run-of-river retrofitted dam, does not have an impact on upstream habitat or adverse impacts to diadromous species.

***If NO, go to C5.***
***If NOT APPLICABLE, go to C4.***
***If YES, Facility fails.***

**4) If C3 was not applicable:**
**a) are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? OR**
**b) If the Facility is unable to meet the fish passage standards in 4a, has the Applicant demonstrated, and obtained a letter from the US Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource?**

***If YES, go to C5.***
***If NO, Facility fails.***

**5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?**

✓ **NOT APPLICABLE**

At the time of FERC licensing, there were about 40 species of fish that were abundant in the Facility area. These fish included warm-water game fish and non-game fish. It was noted that the river immediately downstream of the dam contains few, if any, areas suitable for spawning due to steep banks, a relatively deep channel and swift currents.

No passage was prescribed for passage of Riverine fish during the licensing process or Section 404 permitting process. Recent consultation with AGFC and USFWS confirmed that there is no concern currently about resident fish or adverse impacts to residence fish resources from the Facility.

***If YES or NOT APPLICABLE, go to C6.***
***If NO, Facility fails.***

**6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?**

✓ **NOT APPLICABLE**

None was prescribed. At the time of FERC licensing, it was noted that entrainment is not a major threat to fish or drifting fauna existing at or near the Facility. Recent consultation with AGFC and USFWS confirms that currently there are no concerns about fish entrainment at the Facility.

***If YES or NOT APPLICABLE, go to D.***
***If NO, Facility fails.***

**THE FACILITY PASSES**

**C. Fish Passage and Protection - The Facility is in Compliance with LIHI standards.**

**D. Watershed Protection**

***Goal**: Sufficient action has been taken to protect, mitigate and enhance environmental conditions in the watershed.*

***Standard**: A certified Facility must be in Compliance with Resource Agency Recommendations and FERC license terms regarding watershed protection, mitigation or enhancement. These may cover issues such as shoreline buffer zones, wildlife habitat protection, wetlands protection, erosion control, etc. The Watershed Protection Criterion was substantially revised in 2004. The revised criterion is designed to reward projects with an extra three years of certification that have: a buffer zone extending 200 feet from the high water mark; or, an approved watershed enhancement fund that could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1 and has the agreement of appropriate stakeholders and state and federal resource agencies. A Facility can pass this criterion, but not receive extra years of certification, if it is in Compliance with both state and federal resource agencies Recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.*

**Criteria:**

1) **Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year round 50-100% o the impoundment, and for all of the undeveloped shoreline?**

   ✓ **NO**

***If YES, go to E and receive 3 extra years of certification***
***If NO, go to D2.***

2) **Has the Facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D1, and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?**

✓ **NO**

***If YES, go to E and receive 3 extra years of certification***
***If NO, go to D3.***

3) **Has the Facility owner/operator established through a settlement agreement with appropriate stakeholders and that has the state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)?**

✓ **NO**

***If YES, go to E.***
***If NO, go to D4.***

4) **Is the Facility in Compliance with both state and federal resource agencies Recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project?**

✓ **YES**

Resource Agencies did not issue such a recommendation, nor was the project required to prepare a shoreland management plan as part of FERC licensing.

Lands within the immediate vicinity of the project area were and still are used predominantly for pasture and cropland, although many land areas immediately adjacent to the river are covered by bottomland hardwood forests.

***If YES, go to E.***
***If NO, Facility fails.***

**THE FACILITY PASSES**

**D. Watershed Protection – The Facility is in Compliance will be LIHI's standards.**

**E. Threatened And Endangered Species Protection**

***Goal:*** *The Facility does not negatively impact state or federal threatened or endangered species.*

***Standard:*** *For threatened and endangered species present in the Facility area, the Facility owner/operator must either demonstrate that the Facility does not negatively affect the species, or demonstrate Compliance with the species recovery plan and any requirements for authority to "take" (damage) the species under federal or state laws.*

**Criteria:**

**1) Are threatened or endangered species listed under state or federal Endangered Species Act (ESA) present in the Facility area and/or downstream reach?**

✓ **YES – Pending**

There are 3 federally listed animal species that are or may be present. The Interior Least Tern has been found to inhabit areas downstream of the facility. The Pallid sturgeon and Fat pocketbook mussel may or may not be present in the lower Arkansas River downstream of the facility.

At the time of FERC licensing, there were two species listed as endangered: the American alligator and Bald eagle. Neither of these species is currently listed as federally threatened or endangered.

In March of 1982, the Arkansas Natural Heritage Commission (ANHC) issued a letter regarding any designated natural areas or other locations within or near the project boundaries known to contain significant components of the State's natural diversity. That review noted the following significant components: a stand of corkwood which probably did not exist at the time of construction (record was from 1955); the striped mullet, species of salty or brackish water, records for which indicated only a single fish ever seen in the project area; a barn owl nesting site; and an exemplary community of cattail.

The Applicant currently is working with ANHC to update the threatened and endangered plant information, expecting a reply on or about the week of 4/13/2010. The Applicant does not anticipate any issues here.

***If YES, go to E2.***
***If NO, go to F.***

**2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act (ESA) or similar state provision, is the Facility in Compliance with all Recommendations in the plan relevant to the Facility?**

✓ **YES**

The USFWS issued recovery plans for all three species prior to construction of the Facility. Those plans contained no requirements that would apply to the Facility. Consultation has confirmed this information.

***If YES or NOT APPLICABLE, go to E3.***
***If NO, Facility fails.***

**3) If the Facility has received authority to incidentally *Take* a listed species through: (i) having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) obtaining and incidental Take permit pursuant to ESA Section 10; or (iii) for species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?**

✓ **NOT APPLICABLE**

The Facility has no authority for an incidental Take.

***If YES, go to E4.***
***If NOT APPLICABLE, go to E5.***
***If NO, Facility fails.***

**4) If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that:**
**a) the biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? OR**
**b) the biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? OR**
**c) there is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? OR**
**d) the recovery plan under active development will have no material effect on the Facility's operation?**

***If YES, go to F.***
***If NO, Facility fails.***

**5) If E.2 and E.3 are not applicable, has the applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?**

✓ **YES**

As per USFWS and AGFC, the Facility currently does not negatively affect listed species. The Facility does not impact the recovery of Interior Least Tern, and there is insufficient information

to indicate whether or not Pallid sturgeon and Fat pocketbook mussel are present in the river system or to suggest adverse affects associated with the Facility.

***If YES, go to F.***
***If NO, Facility fails***

**THE FACILITY PASSES CONDITIONALY**

**E. Threatened and Endangered Species Protection – The Facility is in Compliance with LIHI's Standards if the Applicant obtains confirmation from ANHC of Compliance for plants.**

**F. Cultural Resources Protection**

***Goal:*** *The Facility does not inappropriately impact Cultural Resources.*

***Standard:*** *Cultural Resources must be protected either through Compliance with FERC license provisions, or, if the project is not FERC regulated, through development of a plan approved by the relevant state, federal, or tribal agency.*

**Criteria:**

**1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?**

✓ **YES - Pending**

FERC license Article 50 requires the Applicant to consult with the ASPHO and Arkansas State Archaeologist (ASA) to design and carry out a survey to identify, describe and assess the significance of archaeological and historical resources within project impact areas. If the survey identifies significant resources that will be adversely affected by the project construction or operation, the Applicant must develop a mitigation plan in consultation with the state agencies.

The Applicant developed a Monitoring Plan in consultation with ASHPO and ASA prior to initiating project construction. Archaeological surveys were completed in 1994 and 1995 with results filed with FERC after consultation with ASHPO and ASA.

Recent efforts to reach ASHPO Steve Imhoff to comment on the project currently were unsuccessful. As per the applicant, there are no known compliance issues at this time. The Applicant is in the process of contacting ASHPO for confirmation.

***If YES, go to G.***
***If NOT APPLICABLE, go to F2***

***If NO, Facility fails.***

**2) If not FERC-regulated, does the Facility owner/operator have in place (and is in Compliance with) a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or *Native American Tribe*, or a letter from a senior officer of the relevant state or federal agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?**

***If YES, go to G.***
***If NO, Facility fails.***

**THE FACILITY PASSES CONDITIONALLY**

**F. Cultural Resources – The Facility is in Compliance with LIHI's Standards if the Applicant obtains confirmation from ASHPO of Compliance.**

**G. Recreation**

***Goal:*** *The Facility provides free access to the water and accommodates recreational activities on the public's river.*

***Standard:*** *A certified Facility must be in Compliance with terms of its FERC license or exemption related to recreational access, accommodation and facilities. If not FERC-regulated, a Facility must be in Compliance with similar requirements as recommended by resource agencies. A certified Facility must also provide the public access to water without fee or charge.*

**Criteria:**

**1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?**

✓ **YES - Pending**

At the time of FERC licensing, there were three recreational sites located at or in the vicinity of the project, all of which were developed and operated by the Corps in the overall management of the McClellan-Kerr Navigation System:

- ✓ Pendleton Bend Park lies on the right bank adjacent to the dam.
  - This park consists of two developed areas. The first (61 acres) offers fishing access, day use and camping activities; the second (89 acres) provides fishing

access and facilities for picnicking. The two developed areas are separated by a 973-acre undeveloped, partly wooded area.

- ✓ Notrebes Bend Park lies on the left bank adjacent to the dam.
- ✓ Merrisach Island is also located on the left bank, but upstream from and adjacent to the Arkansas Port Canal.

Only Pendleton Park was determined to be affected by the construction of the project. This park was a favorite fishing spot for local fishermen. A portion of it was to be relocated as an in-kind replacement to preserve and enhance existing recreational facilities. The FERC license discusses recreation and references an Article 17 that would reserve the right to require future additional recreational development, if there is a demonstrated need. However, there appears to be no Article 17 of the FERC license.

As part of the Section 404 permit process in 1993, the Applicant filed a Pendleton Bend Park Master Plan in consultation with the Corps. In 1996, the Applicant completed the park relocation (and renamed it the Wilbur D. Mills Park), resulting in a great improvement in the public recreation facilities along the Arkansas River.

No Resource Agency was able to comment on recreation. The Corps is responsible for park at Dam No. 2. The Applicant is in the process of contacting the appropriate person to confirm compliance.

***If YES, go to G3.***
***If NOT APPLICABLE, go to G2.***
***If NO, Facility fails.***

**2) If not FERC-regulated, does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as Recommended by Resource Agencies or other agencies responsible for recreation?**

***If YES, go to G3.***
***If NO, Facility fails.***

**3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?**

- ✓ **YES**

The Applicant permits free public access to the reservoir and downstream reaches without fees or charges.

***If YES, go to H.***
***If NO, Facility fails.***

**THE FACILITY PASSES CONDITIONALLY**

**G. Recreation – The Facility is in Compliance with LIHI's Standards if the Applicant obtains confirmation from the Corps.**

**H. Facilities Recommended for Removal**

***Goal**: To avoid encouraging the retention of facilities that have been considered for removal due to their environmental impacts.*

***Standard:** If a Resource Agency has recommended removal of a dam associated with the Facility, certification is not allowed.*

**Criterion:**

**1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?**

✓ **NO**

Consultation with AGFC and USFWS confirmed this status.

***If NO, Facility is low impact.***
***If YES, the Facility fails.***

**THE FACILITY PASSES**

**H. Dam Removal – There is no Resource Agency Recommendation for removal of the dam.**

## ➢ FACILITY IS CONDITIONALLY LOW IMPACT