

LOW IMPACT HYDROPOWER INSTITUTE

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LOW IMPACT HYDROPOWER QUESTIONNAIRE

[Excerpted from Part VI, Section E of the Low Impact Hydropower Certification Program. Words in italics are defined in Part VI, Section C, and line-by-line instructions are available in Section D of the program, available on-line in PDF format at <http://www.lowimpacthydro.org>.

E. LOW IMPACT HYDROPOWER QUESTIONNAIRE

Background Information	
1) Name of the <i>Facility</i> .	Central Oregon Siphon Power Project
2) Applicant's name, contact information and relationship to the Facility. If the Applicant is not the Facility owner/operator, also provide the name and contact information for the Facility owner and operator.	Central Oregon Irrigation District, Owner & Operator Steve Johnson, District Manager 1055 SW Lake Court Redmond, OR 97756 Ph. 541-548-6047 Email: Stevej@coid.org
3) Location of Facility by river and state.	Deschutes River, Oregon Diversion at River Mile 170.9 Tailrace at River Mile 169.4
4) Installed capacity.	Two, 2.75 Megawatt generators for total of 5.5 Megawatts
5) Average annual generation.	22.55 Gigawatt hours
6) Regulatory status.	FERC Licensed, Project 3571 License Issued September 29, 1987 License expires September 1, 2037
7) Reservoir volume and surface area measured at the high water mark in an average water year.	No reservoir associated with project.
8) Area occupied by non-reservoir facilities (e.g., dam, penstocks, powerhouse).	6.5 acres including about 5.3 acres of facilities preexisting as part of the irrigation delivery system.
9) Number of acres inundated by the Facility.	None – No Reservoir

10) Number of acres contained in a 200-foot zone extending around entire impoundment.	None – No Impoundment
11) Please attach a list of contacts in the relevant Resource Agencies and in non-governmental organizations that have been involved in Recommending conditions for your Facility.	See attached List
12) Please attach a description of the Facility, its mode of operation (<i>i.e.</i> , peaking/run of river) and a map of the Facility.	See Attached Description
<p>Questions for For “New” Facilities Only:</p> <p>If the Facility you are applying for is “new” i.e., an existing dam that added or increased power generation capacity after August of 1998 please answer the following questions to determine eligibility for the program</p>	N/A
13) When was the dam associated with the Facility completed?	
14) When did the added or increased generation first generate electricity? If the added or increased generation is not yet operational, please answer question 18 as well.	N/A
15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?	N/A
16) Did the added or increased capacity include or require a change in water flow through the facility that worsened conditions for fish, wildlife, or water quality, (for example, did operations change from run-of-river to peaking)?	N/A
<p>17 (a) Was the existing dam recommended for removal or decommissioning by resource agencies, or recommended for removal or decommissioning by a broad representation of interested persons and organizations in the local and/or regional community prior to the added or increased capacity?</p> <p>(b) If you answered “yes” to question 17(a), the Facility is not eligible for certification, unless you can show that the added or increased capacity resulted in specific measures to improve fish, wildlife, or water quality protection at the existing dam. If such measures were a result, please explain.</p>	N/A
<p>18 (a) If the increased or added generation is not yet operational, has the increased or added generation received regulatory authorization (e.g., approval by the Federal Energy Regulatory Commission)? If not, the facility is not eligible for consideration; and</p> <p>(b) Are there any pending appeals or litigation regarding that authorization? If so, the facility is not eligible for consideration.</p>	N/A

A. Flows	PASS	FAIL
1) Is the Facility in <i>Compliance</i> with <i>Resource Agency Recommendations</i> 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?	<p>YES = Pass, Go to B</p> <p>N/A = Go to A2</p>	NO = Fail
2) If there is no flow condition 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?	<p>YES = Pass, go to B</p> <p>NO = Go to A3</p>	
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 = Pass, go to B	NO = Fail
B. Water Quality	PASS	FAIL
1) Is the Facility either: a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?	<p>YES = Go to B2</p>	NO = Fail
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?	<p>YES = Go to B3</p> <p>NO = Pass</p>	
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?	<p>YES = Pass</p>	NO = Fail

C. Fish Passage and Protection	PASS	FAIL
1) Is the Facility in Compliance with <i>Mandatory Fish Passage Prescriptions</i> for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?	<p>YES = Go to C5</p> <p>N/A = Go to C2</p>	NO = Fail
<p>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 (<i>e.g.</i>, because passage is blocked at a downstream dam or the fish run is extinct)?</p> <p>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 part to the Facility?</p> <p>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?</p>	<p>YES = Go to C2a</p> <hr/> <p>NO = Go to C3</p> <hr/> <p>YES = Go to C2b N/A = Go to C2b</p> <p>YES = Go to C5 N/A = Go to C3</p>	<p>NO = Fail</p> <p>NO = Fail</p>
<p>3) If, since December 31, 1986:</p> <p>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 C2a above), and</p> <p>b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,</p> <p>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?</p>	<p>NO = Go to C5</p> <p>N/A = Go to C4</p>	YES = Fail

<p>4) If C3 was not applicable:</p> <p>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</p> <p>b) If the Facility is unable to meet the fish passage standards in 4.a., 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?</p>	<p>YES = Go to C5</p> <p>N/A</p>	<p>NO = Fail</p>
<p>5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of <i>Riverine</i> fish?</p>	<p>YES = Go to C6</p> <p>N/A = Go to C6</p>	<p>NO = Fail</p>
<p>6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?</p>	<p>YES = Pass, go to D</p> <p>N/A = Pass, go to D</p>	<p>NO = Fail</p>
<p>D. Watershed Protection</p>	<p>PASS</p>	<p>FAIL</p>
<p>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 around 50 - 100% of the impoundment, and for all of the undeveloped shoreline</p>	<p>YES = Pass, go to E and receive 3 extra years of certification</p>	<p>NO = go to D2</p>
<p>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 D.1.,and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?</p>	<p>YES = Pass, go to E and receive 3 extra years of certification</p>	<p>NO = go to D3</p>
<p>3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has 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)</p>	<p>YES = Pass, go to E</p>	<p>NO = go to D4</p>
<p>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.</p>	<p>YES = Pass, go to E</p>	<p>No = Fail</p>

E. Threatened and Endangered Species Protection	PASS	FAIL
1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?	YES = Go to E2 NO = Pass, 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 or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?	YES = Go to E3 N/A = Go to E3	NO = Fail
3) If the Facility has received authority to incidentally <i>Take</i> 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 an 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?	YES = Go to E4 N/A = Go to E5	NO = Fail
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 operations?	YES = Pass, go to F	NO = Fail
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 = Pass, go to F	NO = Fail

F. Cultural Resource Protection	PASS	FAIL
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 = Pass, go to G N/A = Go to F2	NO = Fail
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 <i>Native American Tribe</i> , or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?	YES = Pass, go to G	NO = Fail
G. Recreation		
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 = Go to G3 N/A = Go to G2	NO = Fail
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?	YES = Go to G3	NO = Fail
3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?	YES = Pass, go to H	NO = Fail
H. Facilities Recommended for Removal		
1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?	NO = Pass, Facility is Low Impact	YES = Fail

Questionnaire Supporting Information For Central Oregon Siphon Power Project

Background Information

6. Regulatory Status

The project has been issued a FERC License No. 3571 (see Exhibit I) on September 29, 1987 for 50 years ending on September 1, 2037. Prior to issuing the license, FERC performed an environmental assessment of the project and issued a "Finding of no Significant Impact" dated September 24, 1987 (see Exhibit II). The license contains several articles that address both pre and post licensing requirements. Articles 201 and 202 address fees to be charged by FERC and maintenance of project lands. Articles 301, 302, and 303 address drawings and construction time frame.

Both pre and post license issues involving resource agencies are addressed in license articles 401 through 414. Some of these are resolved and some are ongoing over the license period.

11. List of contacts in the relevant Resource Agencies and in non-governmental organizations that have been involved in recommending conditions for facility.

US Fish and Wildlife Service
Oregon Department of Fish and Wildlife
Bend Metro Park and Recreation District
Mt. Bachelor Village
Sunrise Village Homeowners
Oregon Water Resources Department
Deschutes County
City of Bend
State Historical Preservation Office
Oregon Department of Environmental Quality

12. Description of the facility, its mode of operation and a map of the facility.

The facility consists of the use of the pre-existing Central Oregon Irrigation District's Central Oregon Canal system including the Deschutes River diversion and the downstream approximately two miles of water conveyance system to deliver water to the facility penstock and powerhouse. The diversion and water conveyance were constructed in the

early 1900's and utilized an on grade wood flume to transport the irrigation water out of the steep river canyon where the water entered an open canal to deliver irrigation water to lands north and east of Bend. The wood flume was replaced in the early 1970's with a ten foot diameter steel pipe in a double inverted siphon configuration to transport the irrigation water from the diversion to the open canal. The siphon pipe was designed for a flow of about 800 cubic feet per second which is more than the irrigation demand most of the time.

In the early 1980's the site was identified as a potential small hydro site and in 1982 the district applied for a FERC License that was issued in 1987. The existing diversion consisted of a diversion structure with two control gates to regulate the amount of water diverted. The diversion that was modified in 1970 featured a louver array to guide fish entering the diversion to a return facility to move the fish back into the river. The amount of water diverted for power generation varies from a minimum of about 80 cfs up to about 640 cfs and is dependant on the capacity of the siphon pipe in excess of the irrigation demand and the minimum streamflow requirement of 400 cfs between the diversion and the point of returning flow to the river at the powerhouse. The water available for power generation depends on irrigation flow releases from upstream storage reservoirs during the irrigation season and typically the flow in the bypassed reach is much more than the minimum 400 cfs. During the non irrigation season, flow available will range from none to the maximum generation capacity of about 640 cfs.

Downstream of the fish protection facility, the water enters the 10 foot diameter double inverted siphon pipe. About 1200 feet downstream of the start of the open canal, a buried 9 foot diameter pipe is utilized to deliver excess water to the power facility about 800 lineal feet from the canal where the water enters the turbines and is delivered back into the river.

The power generated is transported underground for about 800 feet to a small project substation located out of sight from the river where it is stepped up from 4160 volts to a nominal 69,000 volts where it is delivered to the power purchaser.

A. Flows

A project operation minimum stream flow between the river diversion and the powerhouse tailrace was approved by the Oregon Department of Fish and Wildlife (ODFW) that establishes 400 cubic feet per second (cfs) as the minimum flow in the project reach. An agreement with the Central Oregon Irrigation District (COID) was signed by ODFW and COID on March 24, 1987 (see Exhibit A-1) establishing the minimum flow and also establishing a "mitigation and enhancement" fund to "ensure that no net loss of wild game fish or fish and wildlife related recreation opportunities results from construction and operation to the project". The FERC License Article 402 establishes the minimum flow in the bypassed reach at 400cfs. This minimum flow is also documented in the Order issued by the State of Oregon Water Resources Commission on November 18, 1987 (see Exhibit A-2). On March 27, 1987 the US Fish and Wildlife Service approved the 400 cfs minimum flow in the project reach (see Exhibit A-3) and in combination with the signed Mitigation and Enhancement agreement with the Oregon Department of Fish and Wildlife concurred that project caused losses to fish and wildlife would be offset and fish and wildlife habitat in the project area would be improved.

A ramping rate of 3 inches per hour was approved for the bypassed reach in a steep narrow section of the river just downstream of the diversion. This is documented in License Article 405 with the Final Order issued in 1991 (see Exhibit A-4) following consultations with ODFW and USFWS. Since the project operates as “run-of-the-river”, peaking rate conditions are not applicable. The river below the tailrace was not specifically addressed but experiences river level variations much less than the project reach since the project diverted water is returned to the river where it is wider and has a much flatter gradient.

FERC License Articles 403 and 404 address the maintenance and measurement of the minimum bypass flow (see Exhibit A-5). The initial requirement was to modify the diversion facility to automatically release the minimum flow and this was revised during project construction and startup under these two license articles as follows:

- 1) Manual operation of the diversion gates was retained.
- 2) The river gauging in the bypass reach was established with the aid of the Oregon Water Resources Department’s Regional Water Master.
- 3) Recording and reporting the daily maximum and minimum flows in the bypassed reach was required.
- 4) Quarterly project reach streamflow reports are provided to FERC, USFWS, and ODFW.
- 5) Minimum flow violations during initial operation and startup were reported and reviewed and operations were modified to minimize flow violations (see Exhibit A-6).

B. Water Quality:

Water quality certification, as required by Section 401 of the Clean Water Act, was waived for the project by the Oregon Department of Environmental Quality, on September 23, 1982. On December 18, 2009, the Central Oregon Irrigation District requested the Oregon Department of Environmental Quality to provide a determination relating to water quality impacts of this project. The Department conducted an assessment of the project's water quality impacts relative to Oregon's water quality standards and the state's Clean Water Act Section 303(d) list of impaired water bodies (see Exhibit B). Based upon this assessment, the department determined that the project, as currently operated, neither contributes to current 303(d) water quality impairments of the Deschutes River, nor to violations of current state water quality standards.

C. Fish Passage and Protection

C.1 thru C.4. Not applicable since anadromous and catadromous fish are not present at the Facility because passage is blocked at downstream dams and natural barriers.

C.5. The Facility is in Compliance with Mandatory Fish Passage Prescriptions of downstream passage of Riverine fish. The pre-project irrigation diversion that is also being used for diversion of the water for the hydropower project was constructed in the early 1970's and provided downstream passage using a louver array. The FERC License Articles 406 and 407 required modification of the passage facility and evaluation of the louver array and to quantify

fish losses at the existing facility. The evaluation was performed after the facility was operational and it was determined that fish losses were unacceptable. An evaluation of downstream fish passage options was made by the district and fixed panel vertical screens with one-eighth inch openings was proposed and agreed to by the Oregon Department of Fish and Wildlife and the U. S. Fish and Wildlife. The criteria established for the facility was for juvenile fish since the evaluation did not find any fry present at the diversion. The new facility was evaluated by the district in cooperation with ODFW and it was determined that the facility met the survival criteria of ODFW and USFWS for all fish passing through the facility, including fry.

C.6. The Facility is in Compliance with Resource Agency Recommendations for Riverine fish entrainment protection, such as tailrace barriers. Tailrace barriers in the form of screens were installed across the tailrace channel where it enters into the river. Following start of operation of the facility, ODFW indicated that they felt that the barrier was not needed for the riverine fish present at the site due to the velocity of the water exiting the turbines and the configuration of the water entering the river. The district proposed to monitor the tailrace area for indications of fish injury and or mortality and report the results to ODFW, USFWS, and FERC. The screens were removed and ongoing monitoring of the site is being performed and reported on a quarterly basis.

D. Watershed Protection

D. 2. The district entered into an agreement with the Oregon Department of Fish and Wildlife "to ensure that no net loss of wild game fish or fish and wildlife-related recreation opportunities results from construction and operation of the Project". Per the agreement, mitigation and enhancement work included work within the diversion reach of the Project and within the Deschutes River Basin. Anticipated work includes development and maintenance of public access, placement of gravel for spawning, river bank stabilization to reduce erosion and subsequent siltation of river substrate, and instream placement of boulders and/or woody debris for cover and spawning habitat. Funding for the work is provided from project revenues and continues over the license period of 50 years. The agreement has been approved by USFWS, Deschutes County, and the Oregon Department of Water Resources and is included as a condition of the FERC License.

E. Threatened and Endangered Species Protection

E.1. As indicated in the "Environmental Assessment" completed by FERC in September 24, 1987, in Section V, Environmental Analysis, Paragraph 5, Vegetation and Wildlife Resources, it was indicated that the only threatened or endangered species in the project area is the bald eagle. FERC indicated that "it is occasionally observed along the river, but no nest sites have been identified in the area". Some twenty miles downstream of the project at the Pelton-Roundbutte Complex, threatened and endangered Bull Trout and reintroduced steelhead are present in Lake Billy Chinook. Migration upstream in the Deschutes River is blocked by natural barriers upstream of Lake Billy Chinook as well as three man made barriers just downstream of the project. Operation of the project should not have any effect on the listed fish species 20 miles downstream since the water entering the project is returned to the river and the water quality is not affected as indicated under Section B, Water Quality.

F. Cultural Resource Protection

F.1. Article 412 of the FERC License required the district to consult with The Oregon State Historical Preservation Officer (SHPO) prior to starting any land clearing on land disturbing activities outside the project boundaries. On March 26, 1987, SHPO issued a finding (see Exhibit F) of likely no impact to archeological resources and indicated that no cultural resource surveys were required.

G. Recreation

G.1. The facility is in compliance with recreational conditions in the FERC License. Article 410 addresses white water use in the project area and required a study following consultations with the National Park Service, the Oregon Parks and Recreation Division, and the Bend Metro Park and Recreation District to monitor white water boating use in the bypassed reach. The license article was amended (see Exhibit G-1) to not require the monitoring at the present time, since use in this reach of the river is minimal and very hazardous. This reach is used primarily by experienced kayakers and warning signs have been installed upstream of the reach advising boaters of the hazardous water. Article 411 requires a public access trail from a public street across district owned property to the Deschutes River at the tailrace. The access trail ties into a public river access trail developed by the Bend Metro Park and Recreation District. The irrigation district provided an easement for the river trail to continue about 0.75 miles upstream where a foot bridge was installed by the park district to connect with a river trail on the opposite side of the river and extend about 1.5 miles downstream to complete about 3 miles of loop trail along the river. The irrigation district provides a restroom and garbage can along the access trail and no fee is charged for use of the trail and facilities (see Exhibit G-2).

H. Facilities Recommended for Removal

H.1. Not Applicable.