

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

December 4, 2012

OFFICE OF ENERGY PROJECTS

Project No. 14446-000—Colorado
Peabody Trout Creek Reservoir
Hydroelectric Project
Peabody Trout Creek Reservoir LLC

Brian Yansen, Director of Real Estate Development
Peabody Trout Creek Reservoir LLC
701 Market Street
St. Louis, MO 63101-1826

Reference: Staff Study Requests, Comments on Studies, and Comments on PAD

Dear Mr. Yansen:

Commission staff, after reviewing both the Trout Creek Reservoir Hydroelectric Project Pre-Application Document (PAD) and the transcripts of our October 24 and 25, 2012 scoping meetings, requests Peabody Trout Creek Reservoir LLC (Peabody) include the studies in attached Schedule A in your proposed study plan. Besides the attached studies, we also provide comments in the attached Schedule B for you to consider as you draft your proposed study plan. The additional information should be included with your proposed study plan, which needs to be filed on or before January 18, 2013.

If you have any questions, please contact Shana Murray at (202) 502-8333 or shana.murray@ferc.gov.

Sincerely,

Timothy J. Welch, Chief
West Branch
Division of Hydropower Licensing

Enclosures: Schedule A
Schedule B

cc: Mailing list
Public Files

David Merritt
URS Corporation
713 Cooper Avenue, #100
Glenwood Springs, Colorado 81601

Schedule A Study Requests

We are requesting the following studies, which we evaluate with respect to the study criterion in section 5.9 of the Commission's regulations.

- (1) Water Quality Monitoring and Modeling Study
- (2) Hydrology Assessment and Reservoir Operations Model
- (3) Sediment Dynamics and River Geomorphology Study
- (4) Flow-Habitat Study
- (5) Fish Entrainment Study

(1) Water Quality Monitoring and Modeling Study

Goals and Objectives

§ 5.9(b)(1) — *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goals of this study are to:

- (1) assess the baseline water quality of Trout Creek by monitoring its existing physical and chemical conditions;
- (2) develop reservoir and stream water quality models reliable for the purposes of licensing;
- (3) collect sufficient water quality and physiographic information to enable the development of a reservoir water quality model for the proposed Trout Creek reservoir and a stream model for Trout Creek;
- (4) predict how the temperature and dissolved oxygen of the proposed Trout Creek reservoir will vary seasonally and vertically; and
- (5) predict how the temperature and dissolved oxygen on Trout Creek will vary seasonally and longitudinally immediately below the proposed project to the confluence of Trout Creek and the Yampa River.

§ 5.9(b)(2) — *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§ 5.9(b)(3) — *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

Sections 4(e) and 10(a) of the Federal Power Act (FPA) require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Appropriate water temperatures and levels of dissolved oxygen are required by aquatic organisms for subsistence, and are therefore essential to the integrity and sustainability of a healthy ecosystem. The effect of project construction and operation on aquatic resources is considered relevant to the Commission's public interest determination.

Background and Existing Information

§ 5.9(b)(4) — *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

The Pre-application document (PAD) includes limited information on the existing water quality in Trout Creek. The Colorado Department of Environmental Quality (Colorado DEQ) collected eight water quality samples from Trout Creek between 2001 and 2007. The United States Geological Service (USGS) also measured water quality on Trout Creek, although this information is not included in the PAD. Peabody has begun monitoring water temperature in Trout Creek and this information will be useful in modeling future water temperatures conditions. However, the number of sampling events and the associated parameters currently available are insufficient to properly assess water quality conditions on Trout Creek or predict future project effects.

Project Nexus

§ 5.9(b)(5) — *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

The construction and operation of a reservoir will likely affect water temperatures of Trout Creek above and below the proposed dam. Impounding water behind the proposed dam would increase the surface area and retention time of Trout Creek waters resulting in increased water temperatures near the surface of the reservoir. During the summer, the reservoir will probably stratify resulting in warmer, oxygenated water at the surface and colder, anoxic water in the lower levels of the reservoir. Releases of anoxic water from too low an elevation in the proposed reservoir could adversely affect levels of downstream dissolved oxygen in Trout Creek.

Results of the study would inform potential license articles pertaining to the water quality. The study would establish a baseline condition for the system in question, provide data to be used to predict water temperatures and dissolved oxygen in the reservoir and downstream of the dam. Results of the study could be used to identify proposed intake ports at optimal elevations to selectively withdraw water with adequate dissolved oxygen and cool temperatures so that releases from the reservoir will meet water quality standards.

Proposed Methodology

§ 5.8(b)(6) — *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field seasons(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Using generally accepted practice in the scientific community:

- (1) identify appropriate models that will be able to predict temperature and dissolved oxygen in both Trout Creek and Trout Creek reservoir;
- (2) between April 1 and October 30, continuously monitor water temperatures and daily flows in Trout Creek and its tributaries from the point of inflow to the reservoir downstream to the confluence of Trout Creek and the Yampa River;
- (3) to ensure reliable temperature modeling, information on the following factors may be necessary:

- solar radiation
 - air temperature
 - relative humidity
 - cloud cover
 - wind speed
 - stream elevations
 - streambed profiles
 - Manning's N (roughness coefficient)
 - shade/vegetation cover
 - stream flow
- (4) develop a predictive reservoir water quality model which estimates Trout Creek reservoir water temperatures and dissolved oxygen concentrations resulting from the construction and operation of the proposed project which considers reservoir stratification and the resulting impact on water quality; and
- (5) develop a predictive stream temperature model which estimates downstream Trout Creek water temperatures and dissolved oxygen levels resulting from the construction and operation of the proposed project. The geographic scope of the model should include Trout Creek from a point immediately downstream of the project to the confluence with the Yampa River.

Level of Effort and Cost

§ 5.9(b)(7) — *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The total cost for conducting the analysis is estimated to be approximately \$170,000. The proposed study could be completed in 15 months. The study will require the installation of at least three continuous water temperature recorders and monthly downloads of temperature measurements. Monthly water quality samples in low flow months and twice monthly sampling in high flow months for dissolved oxygen, suspended solids, and nutrients are also estimated to be required starting in the spring and continuing through fall. The installation of sampling equipment and retrieval of data can be performed by technicians. Modeling and reporting will require an estimated four to five work weeks of a qualified engineer.

(2) Hydrology Assessment and Reservoir Operations Model

Goals and Objectives

§ 5.9(b)(1) — *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goals and objectives of this analysis are to:

- (1) measure and record the stream flow of Trout Creek over the course of a year;
- (2) compare the measured stream flow of Trout Creek with the stream flow that would be predicted by using the stream flow simulation methodology developed by TZA Water Engineers (TZA);
- (3) verify whether the TZA methodology is reasonable and adjust, if necessary, the TZA methodology to more accurately simulate stream flow on Trout Creek;
- (4) develop a reservoir simulation model that uses simulated stream flow of Trout Creek as inflow, daily time steps, and proposed reservoir operating rules to produce a stream flow record for flows downstream of the proposed project;
- (5) analyze pre- and post-project stream flow records to produce monthly flow duration curves and monthly reservoir elevation durations curves; and
- (6) provide stream flow records to inform other studies and analyses such as the Physical Habitat Simulation (PHABSIM) study.

The information obtained will be used to predict pre- and post-project stream flow conditions on Trout Creek which, in turn, will be used to predict potential impacts on aquatic resources.

§ 5.9(b)(2) — *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§ 5.9(b)(3) — *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

Sections 4(e) and 10(a) of the FPA require the Commission to give equal

consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Providing an accurate description of the stream flow available for project operations and for instream beneficial uses would provide information necessary to fulfill the Commission's responsibilities under the National Environmental Policy Act (NEPA). This evaluation is relevant to the Commission's public interest determination.

Background and Existing Information

§ 5.9(b)(4) — *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

TZA, a consultant for Peabody, developed a simulated flow record for Trout Creek at the proposed project site. The TZA methodology predicts that the flow in Trout Creek at the project is equal to 10.5% of the flow of Elk River as measured by the Elk River at Clark gage (USGS No. 09241000). The Elk River at Clark gage is located 20 miles north of the proposed project. The TZA methodology for predicting stream flow takes into account differences between Trout Creek and Elk Creek in terms of drainage area, precipitation and runoff characteristics.

The Elk River watershed, which TZA uses to predict flows on Trout Creek, is a larger watershed, at a higher elevation, with more rugged topography and fewer irrigation diversions than the Trout Creek watershed. Consequently, the low base flows in the Elk River might be more consistent than on Trout Creek due to the larger watershed and relatively fewer irrigation diversions. In addition, high Elk River spring flows at the upper end of the hydrograph, caused by snow melt or storm runoff at the higher elevations, likely produce relatively more surface runoff than the lower, flatter, Trout Creek watershed would produce. Typically, for new dams on previously ungaged streams, the generally accepted scientific practice is to collect and record actual stream flow to verify that the assumptions that were made to predict project inflows were reasonable. Peabody, in recognition of this practice, has begun measuring flow on Trout Creek which will be useful in confirming probable inflows and modeling future flow conditions.

Project Nexus

§ 5.9(b)(5) — *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

The proposed project operations will significantly alter the existing stream flow regime. Water quality and aquatic habitat on Trout Creek will be significantly influenced by the timing and volume of stream flow. Therefore, to evaluate project impacts on aquatic resources, we need information that accurately quantifies the existing stream flow conditions and properly models future conditions.

Proposed Methodology

§ 5.8(b)(6) — *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field seasons(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Stream Flow Measurement

This effort would consist of the following components:

- (1) install a stream gage on Trout Creek at the location of the proposed dam;
- (2) determine mean daily and mean monthly stream flows for a one-year period at the project site; and
- (3) develop an annual flow record at the intake location.

Comparison and Analysis of Actual and Predicted Stream Flow

This effort would consist of the following components:

- (1) verify that the TZA methodology accurately predicts flow on Trout Creek by comparing measured flow with flow that would be predicted using the TZA methodology;
- (2) adjust, as appropriate, the TZA methodology based on the verification process;

- (3) develop a reservoir operations model that will use inflow and proposed reservoir operations to predict stream flow below the project;
- (4) use the inflows and outflows from the reservoir operations model to develop monthly pre- and post-project stream flow duration curves; and
- (5) use the output of reservoir operations model, as needed, to predict stream flow and aquatic habitat conditions downstream of the project to the confluence of Trout Creek and the Yampa River.

Level of Effort and Cost

§ 5.9(b)(7) — *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The total cost for conducting the analysis is estimated to be approximately \$40,000.¹ The proposed study could be completed in 15 months. Gage installation, and periodic data downloads can be accomplished by two technicians. Data downloads can be done every two months. Verification of the TZA methodology and the development of a reservoir operations model will probably require at least one work week of a qualified engineer.

(3) Sediment Dynamics and River Geomorphology Study

Goals and Objectives

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to develop a baseline estimate of the quantity and transport of sediment in Trout Creek and to estimate the potential effect of the proposed project on the quantity and movement of sediment. The objective of this proposed study is to provide for a better understanding of the potential for project-related effects, and possible mitigation strategies. Specifically, the objectives of the study are to:

¹ The stream gage, instantaneous flow monitoring equipment, and installation and monitoring costs are expected to be \$10,000. The data analysis and reporting costs are expected to be \$15,000.

- (1) estimate the volumetric flux of total sediment in Trout Creek, from the proposed reservoir footprint, downstream to the confluence with the Yampa River on an average annual basis; and
- (2) estimate the effect of the proposed dam on sediment storage in terms of a volumetric measurement on an average annual basis, as well as the downstream geomorphological response to project-affected sediment and flow dynamics.

§5.9(b)(2) – *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) – *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

The Federal Energy Regulatory Commission must decide whether to issue a license to Peabody for the Trout Creek project. Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Appropriate sediment grain sizes and quantities are required by aquatic organisms for subsistence, and are therefore essential to the integrity and sustainability of a healthy ecosystem. Additionally, the stability of sediment dynamics is directly related to the stability and proper functioning of the river channel. The effect of project construction and operation on sediment dynamics is considered relevant to the Commission's public interest determination.

Background and Existing Information

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information*

The PAD provides only a qualitative description of sediment and channel morphology in Trout Creek. The PAD indicates that Trout Creek is in an advanced state

of armoring, containing a high proportion of coarse bed materials. The PAD further indicates that the poorly armored and vegetated stream banks enable the channel to freely degrade horizontally.

No existing information provides an estimate of baseline sediment movement, or an estimate of the effect of the proposed dam on sediment storage, downstream availability, and any corresponding geomorphological response.

Project Nexus

§5.9(b)(5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

Constructing a dam on a currently free-flowing river could trap sediment moving downstream, thereby altering sediment dynamics. Trapped sediment could result in further channel armoring downstream of the proposed dam, a reduction in coarse sediment required by certain species of fish for spawning in Trout Creek and the Yampa River, as well as changes in the morphology of the river, including downcutting and lateral channel migration.

Results of this requested study would form the basis for inclusion of potential license articles to protect, mitigate, or enhance the fishery in Trout Creek and the Yampa River and/or the geomorphic stability of Trout Creek.

Proposed Methodology

§5.8(b)(6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

Using existing data and available scientific literature and specific methodology that is generally accepted practice in the scientific community:

- (1) estimate the volumetric flux of total sediment in Trout Creek, from the proposed reservoir footprint, downstream to the confluence with the Yampa River on an average annual basis;

- (2) estimate the effect of the proposed dam on sediment storage and downstream sediment supply in terms of a volumetric measurement on an average annual basis; and
- (3) estimate the geomorphological response of Trout Creek downstream of the proposed dam to project-related flow and sediment supply alterations.

Level of Effort and Cost

§5.9(b)(7) – *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The estimated cost of this work is approximately \$40,000. The *Sediment Dynamics and River Geomorphology* study may be completed in one study season.

This study would require three technicians to conduct approximately 10 days of fieldwork. Model construction and output should take a modeler one work week. Report preparation should take a geomorphologist one work week.

(4) Fish Species and Habitat Utilization Study

Goals and Objectives

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to evaluate the species assemblage, including a description of any temporal and spatial variations, in Trout Creek from the confluence with the Yampa River upstream, terminating at the approximate location of the proposed dam site. The objective of this proposed study is to define a baseline condition that will provide for a better understanding of the potential for project-related effects, and possible mitigation strategies. Specifically, the objectives of the study are to:

- (1) identify species composition and relative abundance of fishes in the study area; and
- (2) describe any seasonal or spatial variations in species composition and relative abundance.

§5.9(b)(2) – *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) – *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

The Federal Energy Regulatory Commission must decide whether to issue a license to Peabody for the Trout Creek project. Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

The abundance and diversity of fish species in a river system correlates to that river's overall ecosystem health and integrity. In order to properly perform any analysis of potential effects, it is essential to establish a baseline that describes the existing species, relative abundance, and any related spatial and/or temporal patterns of utilization. The effect of project construction and operation on fisheries resources is considered relevant to the Commission's public interest determination.

Background and Existing Information

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information*

The PAD indicates that an electrofishing study at four sites on Trout Creek was performed on two dates (October 4 and 5) in 2011. Three of the four sites were located within the footprint of the proposed dam and the fourth was located approximately one mile downstream of the proposed dam and three miles upstream of the confluence with the Yampa River. The PAD also notes the results from fish sampling conducted by Colorado Parks and Wildlife (CPW) in 1993 and 2006. In both cases, the furthest downstream extent of sampling occurred at a site approximately 0.3 miles below the proposed dam location.

Fish sampling events in Trout Creek have primarily been focused in areas within proximity of the proposed dam footprint and locations upstream. Existing information

does not adequately describe fish species composition, abundance, and distribution in the reach downstream of the proposed dam to Trout Creek's confluence with the Yampa River. Furthermore, existing information is inadequate to portray any seasonal variations in the species composition, abundance, and distribution in the reach.

In section 3.3.2, *Project Impacts*, of the PAD, the applicant notes the potential for project-related effects upon fish habitat downstream. However, the applicant does not propose any study that would establish baseline conditions in Trout Creek downstream of the proposed dam to its confluence with the Yampa River, in order to evaluate this potential project-related effect.

Project Nexus

§5.9(b)(5) – *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

Currently, Trout Creek experiences natural hydrologic conditions and sediment dynamics. Proposed project operations could modify the timing and magnitude of water flows, alter water quality, and change sediment supply and transport characteristics downstream of the proposed dam. Flow, water quality, and sediment/substrate are important habitat characteristics to fish and other aquatic organisms.

Trout Creek is a tributary to the Yampa River. Tributaries often serve important functions as refuge, spawning, and rearing habitat for fishes. Utilization of tributary habitats by fishes may exhibit consistent seasonal variations, depending on species and life stage.

For these reasons, establishing a baseline profile species composition, abundance, and distribution, including spatial and temporal variations, is considered necessary to develop a more complete understanding of potential project-related effects. Results of this requested study would form the basis for inclusion of potential license articles to protect, mitigate, or enhance the fishery in Trout Creek.

Proposed Methodology

§5.8(b)(6) – *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Using generally accepted practice in the scientific community:

- (1) sample fish in at least three sites within the river reach beginning at the confluence with the Yampa River and terminating upstream at the site of the proposed dam (study reach). Exact site locations within the specified study reach should be chosen at random, using a scientifically accepted method. The sampling method should accommodate juvenile size classes and produce a relative abundance metric, such as catch per unit effort (CPUE);
- (2) sampling should be conducted seasonally at least three times within a calendar year, in order to describe any seasonal variations in composition, distribution, and abundance. Timing of sampling events consider spawning and rearing periods of any relevant game and special-status fishes; and
- (3) prepare a report that includes an analytical summary and graphical representations of the data from the above studies. All data used to develop the report (including date and time of collection) should be included within an appendix to the report.

Level of Effort and Cost

§5.9(b)(7) – *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The estimated cost of this work is approximately \$54,000. The *Fish Species and Habitat Utilization* study may be completed in one study season.

Each sampling event would require three technicians to conduct three to five days of fieldwork. This study would require, at a minimum, three sampling events. Report preparation should take a biologist one work week.

(5) Flow-Habitat Study

Goals and Objectives

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to assess potential project-related effects upon flow-habitat for fishes. The objective of this proposed study is to provide for a better understanding of the potential for project-related effects, and possible mitigation strategies. Specifically, the objectives of the study are to:

- (1) identify mesohabitat(s) in Trout Creek from the proposed reservoir footprint downstream to the confluence with the Yampa River;
- (2) identify fish species and life stages of interest; and
- (3) describe the potential project effects on flow habitat in Trout Creek from the proposed reservoir footprint downstream to the confluence with the Yampa River rates for those identified species and life stages.

§5.9(b)(2) – *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable.

§5.9(b)(3) – *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

The Federal Energy Regulatory Commission must decide whether to issue a license to Peabody for the Trout Creek project. Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Depth and velocity of water in a river is a critical measure of habitat for fishes. The abundance and diversity of fish species in a river system correlates to that river's overall ecosystem health and integrity. The effect of project construction and operation on fisheries resources is considered relevant to the Commission's public interest determination.

Background and Existing Information

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal,*

and the need for additional information

The PAD indicates that one Physical Habitat Simulation System (PHABSIM) site was established in Trout Creek, approximately one mile downstream of the proposed dam footprint. In the PAD, Peabody notes that it proposes to collect additional flow data, as results from the PHABSIM are unavailable at this time because it could not perform hydraulic modeling due to insufficient flow data. Regarding the completed PHABSIM sampling, Peabody did not indicate which fish species and life stages are being investigated, which Habitat Suitability Curves (HSCs) are proposed for use, or how they were developed, or the representativeness of the sampled reach to the entirety of Trout Creek downstream of the dam footprint to its confluence with the Yampa River. Currently, the information available is unsuitable to perform any PHABSIM analyses, or to make critical evaluations of the methodology used to perform the existing study.

Project Nexus

§5.9(b)(5) – *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

As proposed, proposed project structures and operations may alter the natural hydrology of Trout Creek, including the timing, magnitude, and duration of flows. River flow, measured by the depth and velocity of water, is an essential aspect of fish habitat. Therefore, any changes to flow may impact the amount and quality of downstream habitat available to fishes, depending upon species and life stage.

For these reasons, establishing the magnitude of any project effects upon flow-habitat is considered necessary to develop a more complete understanding of potential project-related effects. Results of this requested study would form the basis for inclusion of potential license articles to protect, mitigate, or enhance the fishery in Trout Creek.

Proposed Methodology

§5.8(b)(6) – *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Using existing data and available scientific literature and specific methodology

that is generally accepted practice in the scientific community:

- (1) perform a 1-D flow-habitat analysis of Trout Creek from the proposed dam footprint, downstream to the confluence with the Yampa River;
- (2) consult with appropriate resource agencies to identify mesohabitat(s) in Trout Creek from the proposed reservoir footprint downstream to the confluence with the Yampa River. Each distinct mesohabitat should be analyzed;
- (3) consult with appropriate resource agencies to identify fish species and life stages of interest and choose appropriate HSCs. If no existing HSCs are suitably transferable, HSCs should be created; and
- (4) prepare a report that describes the potential project-related effects upon flow-habitat for the species and life stages of interest from the proposed dam footprint, downstream to the confluence with the Yampa River.

Level of Effort and Cost

§5.9(b)(7) – *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The estimated cost of this work is approximately \$50,000. The *Flow-Habitat* study may be completed in one study season.

This study would require four technicians one workweek of field data collection. Report preparation should take a biologist three to four work weeks.

(5) Fish Entrainment Study

Goals and Objectives

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to assess potential fish entrainment at the proposed project. The objective of this proposed study is to provide for a better understanding of the potential for project-related effects, and possible mitigation strategies. Specifically, the objectives of the study are to:

- (1) identify fish species and life stages that occur in the vicinity of the project, as well as those species that may be likely to be introduced;
- (2) identify the swimming speed capabilities of those species and life stages and the potential velocity pattern at the project intakes; and
- (3) describe the potential entrainment-related survival rates of those identified species and life stages.

§5.9(b)(2) – *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Not applicable

§5.9(b)(3) – *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

The Federal Energy Regulatory Commission must decide whether to issue a license to Peabody for the Trout Creek project. Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

The abundance and diversity of fish species in a river system correlates to that river's overall ecosystem health and integrity. The effect of project construction and operation on fisheries resources is considered relevant to the Commission's public interest determination.

Background and Existing Information

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information*

No existing information identifies the species-specific entrainment potential of the proposed project, nor does the applicant propose such a study.

Project Nexus

§5.9(b)(5) – *Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.*

The creation of the proposed reservoir could result in habitat conditions that are more favorable to introduced, non-native aquatic species. Such species could pass downstream through proposed project works, potentially negatively impacting existing downstream ecosystems

Additionally, resident fish passing through proposed project works could be injured or killed via changes in water pressure or by physically contacting the proposed turbine.

Establishing information concerning the probability of entrainment and estimates of survival for differing life stages of resident fish species and potential introduced non-native species, is considered necessary to develop a more complete understanding of potential project-related effects. Results of this requested study would form the basis for inclusion of potential license articles to protect, mitigate, or enhance the fishery in Trout Creek and the proposed reservoir.

Proposed Methodology

§5.8(b)(6) – *Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Using existing data and available scientific literature and specific methodology that is generally accepted practice in the scientific community:

- (1) identify fish species and life stages that occur in the vicinity of the project, as well as those species that may be likely to be introduced;
- (2) identify the swimming speed capabilities of those species and life stages and the potential velocity patten at the project intakes; and

- (3) prepare a report that describes the potential entrainment-related survival rates of those identified species and life stages.

Level of Effort and Cost

§5.9(b)(7) – *Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.*

The estimated cost of this work is approximately \$12,000. The *Fish Entrainment* study may be completed in one study season.

This study would not require fieldwork. Report preparation should take a biologist two to three work weeks.

Schedule B Comments on PAD

In schedule B, we outline our specific comments on your PAD. Some of these comments request more specific information.

General Comment

1. Please include in your proposed study plan a master schedule that includes the estimated start and completion date of all field studies, when progress reports will be filed, who will receive the reports and in what format, and the filing date of the initial study report. All studies, including field work, should be initiated and completed during the first study season, and the study reports should be filed as a complete package to avoid piecemeal review. Finally, if you are likely to propose any plans for measures to mitigate project impacts (i.e. Revegetation Plan, Weed Management Plan, Wetland Mitigation Plan, Historical Properties Management Plan, etc.) drafts of those plans should be filed with the Preliminary Licensing Proposal.

Cultural Resources – Comments on the Draft Cultural Resources Study

2. In section 3.9, you propose to conduct an intensive cultural resources inventory and make recommendations whether cultural resources within the proposed project's area of potential effects (APE) are eligible for inclusion in the National Register of Historic Places (National Register). In section 4.2.6, you state that you propose to do a cultural resources study that would include; inventorying, evaluating, and determining of effects, and resolution of project-related adverse effects to any historic property (i.e., any cultural resource considered to be eligible for the National Register) within the proposed project's APE. However, you have not specifically defined the APE and we are unclear on how you would specifically carry out the various tasks involving your proposed study.

As a result, and pursuant to 18 CFR 5.9 (b) (4) of our regulations, we ask you to include the following in your study proposal for cultural resources:²

²Include in you study proposal that you would also consult with the Colorado State Historic Preservation Office (SHPO), Bureau of Land Management (BLM), and any involved Indian tribe (interested parties) in formulating each of the tasks listed below.

- a) Define the APE for the proposed project that would include all potential direct (i.e., all ground disturbing activities and inundated areas)³ and indirect effects (such as other activities associated with increased recreation use to areas within the project that might affect cultural resources, or noise or visual effects due to project construction, operation and maintenance activities). In your APE definition, include a buffer zone of 100 feet around all proposed construction activities. Include a detailed map showing all aspects of the APE, including designations of land ownership.⁴
- b) Include the techniques on how you would carry out the systematic pedestrian survey, in addition to any other methods (if needed) on how other cultural resources may be inventoried that might be indirectly affected by the proposed project.
- c) Develop a process on how you would evaluate all cultural resources for their National Register eligibility during the field inventory stage, and afterwards, through additional second season field investigations (if need be), including some kind of strategy for examining, testing, or excavating cultural resources.
- d) Elaborate on what methods you would use to identify any existing effects on cultural resources recorded during the field inventory, and determine how project construction and operation may potentially affect them.
- e) Include in any study report: (1) a background section on previous work in and around the APE; (2) a culture history of the research area; (3) definition and map of the APE; (4) methods used for the archival research and field pedestrian survey and how the APE was systematically inventoried; (5) the results of the survey and detailed descriptions of the cultural resources found (including a table depicting type of cultural resources, age, property location, associated artifacts, existing and potential effects, and National Register eligibility); (6) results of National Register evaluations for all

³ Also include all proposed transmission line corridors, borrow areas, ingress and egress routes, and allow a buffer zone around these areas, as well.

⁴ Once you have defined your APE, send your APE definition and APE map to the Colorado SHPO and seek their concurrence. The APE definition and map should be included in your study proposal, along with a record of consultation with the Colorado SHPO on the APE.

cultural resources located within the APE;⁵ (7) a description of existing effects on cultural resources considered to be eligible for inclusion in the National, and what potential project-related effects could occur on them; and (8) a concluding statement on whether historic properties (National Register-eligible cultural resources) were located within the APE, and whether the proposed project would have an adverse effect to any historic property within the APE.

- f) Put a statement in your study proposal to explain that if historic properties are located within the proposed project's APE and the proposed project may have potential adverse effects to any of them, you would prepare a historic properties management plan (HPMP) in consultation with the involved parties and file a draft HPMP along with your preliminary licensing proposal, and a final HPMP with your final license application.⁶ Among other things, the HPMP should provide site-specific measures to resolve any potential project-related adverse effect to historic properties located within the proposed project's APE.⁷
- g) Provide a schedule for carrying out all of the various tasks involving your study, including the filing of draft and final reports and HPMPs.
- h) Provide estimated costs associated with the various tasks in your study, along with the costs of report production and crafting the HPMP.

⁵ In consultation with the involved parties, once you have determined which cultural resources may, or may not be eligible for the National Register, submit your evaluations to the Colorado SHPO for concurrence.

⁶ Note that once the Commission finds the HPMP to be final, we would attach it to a programmatic agreement and after noticing the Advisory Council on Historic Preservation, we would execute the programmatic agreement with the Colorado SHPO, if the Advisory Council on Historic Preservation declines to participate. Execution of the programmatic agreement would evidence that the Commission has resolved any potential adverse effects to historic properties involved with the proposed project.

⁷ You should use the Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects, developed by the Advisory Council on Historic Preservation and Commission in May 2002.

3. You request that we designate your professional contractor, Dr. Gordon Tucker, Jr., as the non-federal representative for cultural resource issues involving this proposed project. We note that although we remain ultimately responsible for all findings and determinations involving section 106, we have authorized Peabody, (not your professional contractor personally) to initiate section 106 on our behalf, and to carry out all of the day-to-day section 106 activities, including defining the APE, inventorying, evaluating, determining effects, and resolving adverse effects to historic properties involving this proposed project.⁸

Terrestrial Resources – Comments on the Draft Migratory Birds and Raptors Survey and the Draft Wetlands Delineation

4. Commission staff agrees that Peabody's proposed studies to (1) identify the species and status of any potential migratory bird or raptor nests as well as any migratory bird or raptor activity in the Trout Creek Project area; and (2) identify and complete wetland delineation for the Trout Creek Project area are necessary to form the basis for inclusion of potential license articles to protect, mitigate, or enhance terrestrial resources in the Trout Creek Project area and will assist the Commission in making its license decision.

⁸ You are allowed, however, to use your professional contractor to carry out the work for section 106 purposes.