Governor's Energy Office

Colorado Low-Impact Hydropower Permitting Guide

A How-To Guide for Project Developers Seeking Federal Energy Regulatory Commission (FERC) Exemptions

23 kW hydropower utilizing an existing irrigation ditch in Meeker, Colorado

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Introduction

The Colorado hydropower industry experienced rapid change in 2011. A Memorandum of Understanding (MOU) created in 2010 between the State of Colorado and the Federal Energy Regulatory Commission (FERC) forged a new path to expedite low-impact project permitting. As a result, projects that historically took three or more years for permitting were moving through the process at a record pace, in some cases taking less than six months.

Credit: NREL

The Colorado Governor's Energy Office (GEO) recognizes the potential of low-impact hydropower resources in the state and the cost benefits of reducing the permitting burden. Streamlining the permitting process for low-impact projects creates new opportunities for the industry to utilize existing water infrastructure resources and maximize the benefit of Colorado's natural resources.

This guide is a compilation of tips and lessons-learned, developed by GEO to assist low-impact hydropower project developers efficiently move through the Federal permitting process and avoid typical delays that add unnecessary costs. The guide clearly illustrates the required steps, and provides examples, illustrations, resources and tips.

"When you have small distributed generation projects going online in the state, the economic benefits not only stay in the state creating jobs for Coloradans, they also go to rural communities where they are needed the most," Francisco Flores, Colorado Governor's Energy Office.

Why is a FERC exemption required?

FERC is a federal agency tasked with the licensing and compliance of most hydropower projects in the United States. Similar to a builder obtaining a building permit prior to constructing a house, a hydropower project developer must obtain a FERC license prior to constructing a hydropower project. Most low-impact hydropower projects in the United States qualify for a FERC exemption, which is an expedited permitting process for projects that meet specific criteria. The criteria are highlighted on the following page.

FERC issues three types of development authorizations: conduit exemptions, 5 MW exemptions, and licenses.

This guide explains how to obtain either of the exemptions to construct and operate low-impact projects, while assuring adequate protection of environmental resources. This is intended for small projects that would result in minor environmental effects (e.g., projects that involve little change to water flow, little change to the water usage and are unlikely to affect threatened or endangered species).

What does "low-impact" mean?

Low-impact projects are easier to permit than projects like the Hoover Dam because they have much less impact on the water source and environment. To qualify as a "low-impact" project it must meet these criteria:

- Utilize existing infrastructure
- No significant changes to current operation of infrastructure
- No new stream diversions. (This also means you cannot draw a larger quantity of water, or more often from existing diversions.)
- Minimal or easily mitigated effects on water quality, fish passage, threatened or endangered species, and cultural or recreational resources
- Meet all requirements for a **FERC Conduit or 5 MW exemption** (see sidebar)

THE DIFFERENCE BEWEEN CONDUIT AND 5 MW EXEMPTIONS

Conduit Exemption:

- **Built on a conduit or other water infrastructure constructed primarily for non-power purposes**
- Issued in perpetuity
- 15 MW or less for non-municipal projects and 40 MW or less for municipal projects
- Power facility located entirely on non-federal lands
- Subject to mandatory fish and wildlife conditions (section 30(c)conditions)
- Categorically exempt from NEPA, although Environment Assessment needed in some circumstances
- Boundary is only around power facility

5 MW Exemption:

- **Built at an existing dam or uses a natural water feature**
- Issued in perpetuity
- 5 MW or less
- If the project exists, must add capacity
- Subject to mandatory fish and wildlife conditions (section 30(c) conditions)
- Require NEPA analysis
- Project Boundary is same as a licensed project (include dam and reservoir)
- Applicant must possess all real property rights at time of filing unless on federal land

Why is GEO's FERC Streamlined Permitting Process So Important?

The potential of low-impact hydropower resources is significant and can leverage an existing water infrastructure and help to develop 1,400 MW of new hydropower in Colorado.[1] The responsible development of low-impact hydropower projects supports GEO's mission to demonstrate leadership in renewable energy and help maximize the value of Colorado's natural resources.

In 2010, the state of Colorado signed a MOU with FERC to streamline the permitting process for low-impact hydropower projects. This created an avenue for the GEO to help move projects toward success. An American Recovery and Reinvestment Act of 2009 (ARRA) grant issued through the Department of Energy, provided the GEO with the ability to fund a pilot program capable of reducing the FERC permitting time to 180 days instead of up to three years. The FERC Small Hydro Streamlined Permitting Program was created and a dedicated technical assistance team worked closely with FERC and Regulatory Agencies to help Colorado applicants navigate through a new streamlined process to obtain a FERC exemption. The team recorded this process and consolidated the information into this simple guide, to help Coloradans benefit from the valuable lessons learned.

Using the new Streamlined Process, 6 exemptions were issued in the period of only twelve months. To put GEO's program success into perspective, since Colorado's FERC Small Hydro Streamlined Permitting Program launched, only six other hydropower exemptions have been issued in the rest of the United States. In the previous 30 years, *only 24* FERC exemptions were issued in the state of Colorado.

Catamount Dam – 695 kW

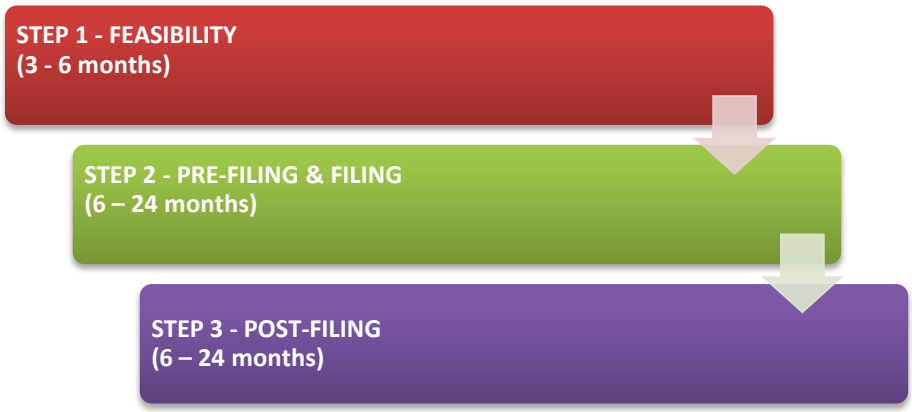
The program's success has been a catalyst, creating new momentum in the low-impact hydropower industry in Colorado. Each new project in Colorado creates jobs for Coloradans and economic benefits that often support hard-hit rural communities.

More information on the GEO's 2011 Streamlined Permitting Process, please see the fact sheet or the video link in the appendix.

[1] Federal Energy Regulatory Commission. *Small Hydropower Development in the United States, Item A-5 (presentation).* April 15, 2010. http://www.ferc.gov/media/news-releases/2010/2010-2/04-15-10-A-5-presentation.pdf

Low-Impact Hydropower Permitting Process

This guide was drafted to help you navigate FERC's permitting process in the absence of the Streamlined Permitting Program. The 3-step process outlined below was created to help simplify what otherwise can be a complicated and confusing process. Each step is defined and explained in detail in this guide, but the descriptions below offer an overview of each step.



Step 1 – Feasibility

In this step, applicants do research and fact-finding to identify whether it is cost effective to proceed with a project idea. During this step, it is important to uncover and address typical obstacles that prevent a successful project completion *before* too much money and time is invested. A checklist is provided to help identify key questions applicants should consider before moving to Step 2 and filing an application. Once all questions have been addressed, applicants can move forward with some assurance that their project is technically and financially feasible. Applicants should expect to spend up to 10% of the project costs in this step, depending on the project size and scope.

Step 2 – Pre-filing and application filing

In this step, applicants collect the information required for the application and prepare the application. Applicants are required to collect input from Resource Agencies and stakeholders, hold a public meeting and site visit, and do any of the required environmental studies requested by the Resource Agencies. Step 2 is where up to 20% of the project costs will be spent.

Step 3 – Post-filing

Once the application is filed, applicants need to respond back to FERC with any questions in a timely manner while the application is being reviewed. Detail about what to expect from FERC after the application is submitted and approved is detailed in this section. Step 3 can take anywhere from 6 to 24 months.

STEP 1 - Project Feasibility

Many projects are delayed during the regulatory reviews because critical information or supporting documents submitted with the application are missing, or because the project proposed is not feasible. This section outlines key activities and provides a simple checklist to help identify the feasibility of a hydropower project and potential project killers.

Activities during the Feasibility Step:

- Determine permitting feasibility
- Determine design feasibility
- Determine financial feasibility
- Determine operations feasibility

Typical time to complete:

- Estimated time can range from 3 -6 months

Typical cost to complete:

- Estimated up to 10% of the total project cost.*

***Depends on the project size and scope.**

Checklist

The simple checklist that follows will help identify projects that require more attention prior to regulatory submission. Uncovering these details early in the process can help eliminate unwanted steps, delays and unexpected costs during the pre-filing and post-filing steps. If applicants cannot answer all the questions at this early stage, that is O.K. However, you will need to address these questions at some point during the process and we have learned it is better to answer them sooner rather than later.

Project Feasibility

Determine Permitting Feasibility

☑ **Do you own or have rights to all lands needed for project construction and operation?**

Land ownership must be documented and easements in place for all lands effected by the project prior to filing with FERC.

- Conduit exemptions cannot be located on federal lands.
- 5-MW exemptions can be located on federal lands.
  - For lands adjacent to the project you may need to show ownership or right-of-way easements.

☑ **Will the project be located on federal or private lands?**

For almost all projects, applicants likely will need a FERC exemption prior to construction and operations. If the project will be located on a U.S. Bureau of Reclamation (USBR) facility, a FERC exemption may not be required. Instead, applicants must obtain a Lease of Power Privilege from the USBR. For more information, visit the USBR website at: http://www.usbr.gov. If development will be on public or private land that is not owned by the applicant, contact that landowner very early in the process.

☑ **Do you possess the water rights to the hydropower resource?**

For low-impact hydropower projects in Colorado, water ownership and allowable water use needs to be solidified and documented. An allowable use is your decreed water rights (e.g. agriculture, municipal.) If you have questions on your water rights, contact the Colorado Division of Water Resources as a resource.

What Are Resource Agencies?

Federal and state Resource Agencies with an interest in the effects of a hydropower project are provided an opportunity to review applications and provide input *before* FERC's official review. In addition, stakeholders, such as environmental organizations, neighbors and the public, also have an opportunity to comment. FERC pays close attention to Resource Agency and stakeholder comments. If issues are not addressed adequately, FERC may request additional information, which may delay the application's approval.

Resource Agencies and stakeholders involved in Colorado low-impact hydropower projects are listed on page 18.

Reach out to resource agencies and other stakeholders early and often.

Project Feasibility

- For conduit exemptions, the hydropower must be an incidental use of the water – water is used for something *other* than hydropower.
- For 5 MW exemptions, the water can be used specifically for hydropower.

☑ **Is your project unlikely to affect threatened and endangered species or fish passage?**

Projects that have the potential to harm endangered species or block natural fish passage will have greater difficulty receiving a FERC exemption. The project could still receive an exemption if species are threatened, but the studies and mitigation required to receive the exemption may kill the project. Use the tool provided by the US Fish and Wildlife Service to review a list of any federally threatened and endangered species near your project site. Web link: http://ecos.fws.gov/ipac/wizard/chooseLocation!prepare.action

☑ **Is there little change to water flow use?**

If historical water diversion amounts are being changed for the hydropower project, the project will receive more scrutiny. You must have the proper water rights in order to divert more water from a stream, as there are ramifications for water users down-stream.

☑ **Have you built stakeholder consensus?**

The FERC exemption process provides the public and Resource Agencies appropriate time to comment and voice any concerns about your project and its potential effect. Those who proactively seek to build consensus by contacting local officials, nearby landowners, and resource agencies are much more likely to avoid setbacks later in the public commenting period that results in project delays or additional costs.

☑ **Have you contacted FERC staff to discuss your potential project?**

FERC has staff tasked to help permit a hydropower project. Many times developers do not contact FERC until they are ready to submit their final application and then are surprised when FERC says they forgot something and must resubmit. Instead, contact FERC staff early on and develop a relationship with them. They are a valuable resource that can help ensure you don't miss something that is necessary to review your project and that the project adequately adheres to their regulations.

Project Feasibility

Determine Design Feasibility

☑ **What is the estimated power potential at the site?**

It is important to determine the power potential early in the feasibility process to calculate the project's financials and Return on Investment (ROI). The power potential is determined by water flow (cubic feet per second - CFS) and head (feet – height of how far the water has fallen in elevation). With these two items, you can get an estimated power potential (watts) utilizing the following formula:

62.428 lb/ft^3 (water density) x 32.174 ft/s^2 (gravitational constant) x head ft x flow ft^3/s x turbine efficiency

An online calculator can assist you with these calculations. Visit: http://www.engineeringtoolbox.com/hydropower-d_1359.html

☑ **Have you developed a vision for your project, including sketches of layout and components?**

A clear vision of the project helps identify potential issues and costs. Even simple sketches can easily communicate your project vision to project partners and FERC.

☑ **What types of turbines or equipment is necessary for the project?**

It is important to identify needed equipment early in the process. It is helpful to reach out to potential manufacturers and explain the project vision. Many times, manufacturers will help you clearly envision the project and develop some key project drawings needed for permitting.

☑ **Have you developed all required engineering drawings?**

All applications for a hydroelectric project require maps and drawings. FERC must be able to determine: a) the exact location of the project and the extent of land area impacted by the project works, and

b) the proposed design of all power producing structures and equipment. The extent of maps and drawings is determined by the complexity of the project. All exhibit drawings must be of a quality and contain sufficient detail to make decisions regarding potential project impacts to the surrounding environment.

Professional quality, stamped drawings* are required for the final application, but sketches are acceptable in the Initial Consultation Document (ICD), in saved in .pdf format.
**See drawings section for more detail*

Determine Financial Feasibility

☑ **Have you calculated the estimated cost to build the system?**
Complete a cost analysis, with detailed cost estimates. Common costs include engineering, studies, equipment, construction, legal, utility interconnection fees, and taxes.

☑ **How do you plan to finance your project?**
Draft a financial analysis, including sources of financing and operations and maintenance costs so you have a comprehensive picture of the project's overall financial health.

Most hydropower projects qualify for federal or state incentives. To research these incentives, visit www.dsireusa.org for an extensive database

☑ **Have you identified potential power purchasers and the electric value for the power produced?**

Will you be able to consume the electricity produced on-site or will you be selling to the local utility? Either way, contact your local utility early to let them know your project vision.

If you are still not sure if your project qualifies for an exemption:

- Refer to the FERC Small Hydro/Low-Impact website at www.ferc.gov
- Call the small hydro hotline at **1-866-914-2849**
- Send FERC your project proposal or a draft of your application for review.

If you have additional questions related to the web site, applications or processes call the number above or E-mail: smallhydro@ferc.gov

Project Feasibility

Determine Operations Feasibility

☑ **Have you estimated operation and maintenance costs?**

Include costs for operation and maintenance of the structure and hydropower unit, personnel training. Also develop a maintenance schedule and estimate ongoing costs.

☑ **Have you identified who will perform the operations and maintenance?**

Once the project is constructed someone will have to physically operate and maintain it, so the logistics and costs must be considered. For small projects, often the project developer will be responsible for this role. However, for larger low-impact projects, a full time person may need to be hired or trained to support this role.

The checklist above provides applicants a snapshot of important project considerations and helps identify projects that are not feasible before the project accrues unrecoverable costs. Remember it is not critical to have all of these questions answered before moving on to the following section, but to save time and unnecessary cost it is better to uncover answers sooner rather than later.

STEP 2 – The Pre-filing & Filing Processes

The Pre-filing process to file a FERC exemption application involves the steps required to collect agency and public input on the project, complete required studies and compile all required information in the final application. This guide contains FERC's three pre-filing stages listed on their website, plus a section on final designs and a step-by-step section describing the process to submit an application and attachments electronically to FERC's website.

Activities during the Pre-Filing & Filing Process:

- **FERC Permitting**
  - 1 - File Information
    - Exhibits and Drawings
  - 2 - Resource Agency consultation & public meeting
  - 3 - Compile information (after public meeting)
  - 4 - Complete final designs
  - 5 - Prepare and file the application electronically

Typical time to complete:

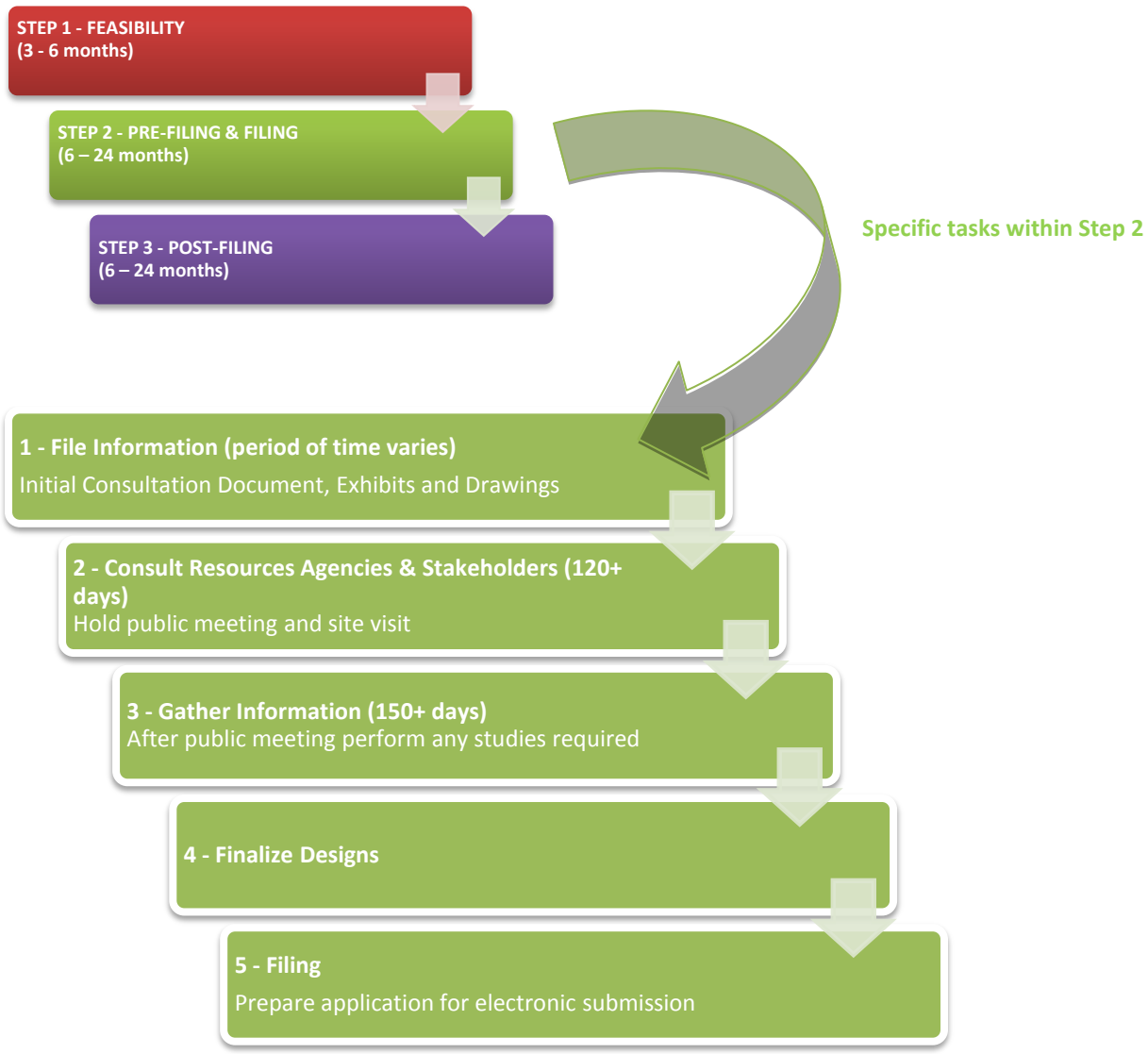
- Estimated time can range from 6-24 months

Typical cost to complete:

- Estimated up to approximately 20% of the total project cost. It may be more, depending on the complexity of the permitting.

Pre-filing & Filing Processes

The FERC permitting process builds on the feasibility step, and can be done in conjunction with the project design. The stages outlined below provide the applicant with an opportunity to sketch out their planned project, collect input from Resource Agencies and interested stakeholders, respond to comments and study requests, finalize designs and prepare the final application. The entire process time for Step 2 can vary greatly from applicant to applicant, but can be completed in as little as six months.



140 kW Del Norte Dam, credit: FERC

1 - FILE INFORMATION – Initial Consultation Document (ICD)

Before FERC reviews an application they require Regulatory Agencies and interested stakeholders, including the public and special interest groups, to have an opportunity to comment on the project. This process helps identify any risks and impacts to fish, wildlife, the water source or other factors. Applicants are responsible for identifying all relevant agencies, Indian tribes, and interested parties. The chart below will help you identify the typical agencies involved in Colorado hydropower projects.

To move a project through the review process quickly it is important to identify the specific information each Resource Agency wishes to see addressed in a low-impact hydropower project application. Typical areas of interest are outlined in a chart on the following page, organized by agency. This is not a comprehensive list, but it is a good representation of the agencies and questions that surface with Colorado low-impact hydropower projects.

Reach out to FERC, resource agencies and other stakeholders early and often.

Pre-filing & Filing Processes

Resource Agencies	Areas of review	What they look for in an application
FERC	Their regulations	You can consult with FERC at any time if you have questions. Involve them early.
U.S. Fish & Wildlife Service	Impacts to fish and wildlife	Will the hydropower project impose any risks on fish and wildlife in the area? Are there endangered species in the area that may be affected?
U.S. Department of the Interior – Bureau of Indian Affairs	Project boundaries	Will the project affect any current or native tribal land?
Colorado Parks and Wildlife	Impacts to wildlife	See U.S. Fish and Wildlife Service
Colorado Department of Public Health & Environment	Water Quality	Will the project affect the quality of the water being utilized for the project?
Colorado Division of Water Resources	Water rights	Does this project have the proper water rights to operate?
State Historical Society	Impacts to historical structures	Will the project have an adverse effect on any declared properties listed on the National Register of Historical Places?
ONLY for dam project:		
Colorado Division of Water Resources – Dam Safety	Dam infrastructure and dam safety	If the project involves a dam this agency will review the design of the hydropower structures to ensure it does not compromise the integrity of the dam structure.

Other Stakeholders	Areas of review	What they look for in an application
American Rivers	Impacts to rivers, fish and wildlife	Will projects negatively affect any existing waterways and fish habitats?
Trout Unlimited	Impacts to fish	Will projects negatively affect any existing waterways and fish habitats?
Neighboring property owners	Project boundaries, impacts to surrounding land and water	Will projects negatively affect me or my property? (E.g. noise, aesthetics, water quality, etc.)
Public	Same as above	Same as above

A comprehensive search for Resource Agencies and mailing addresses can be found on the FERC website at: **http://tinyurl.com/cgak5x7**

Initial Consultation Document

Applicants must provide information, in the form of an **Initial Consultation Document (ICD),** to all Resource Agencies and stakeholders. This document must identify any environmental concerns, provide recommendations and identify agencies and stakeholders involved so these parties are able to understand the project, request more information, and possibly recommend studies you will need to include in your application. Once completed, the ICD is mailed to each interested stakeholder and Regulatory Agency.

NOTE: Keep a copy of all ICD letters sent. You will need to include a record of a letter to each agency in the final application.

FERC Waiver

http://tinyurl.com/d33vwum

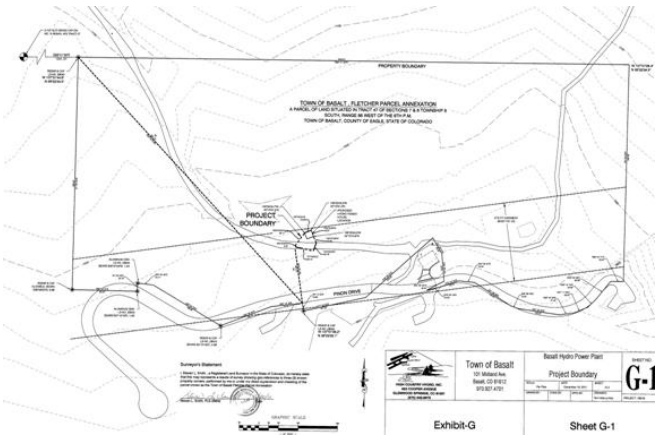
http://tinyurl.com/cyulx24

The applicant may request that FERC waive any or all of the consultation requirements. Details for a waiver request may be found on FERC's website here: **http://tinyurl.com/bqzwnae**

TIP: Does it make sense to pursue a waiver?

A request to waive consultation requirements is not complicated, but it still may not be worth pursuing. Although FERC might waive certain agencies' review, it is unlikely they will waive review from agencies they consider critical.

Exhibit Drawings



The initial consultation document includes project exhibit drawings to describe and show all project features, boundaries, and other information to provide a full understanding of the project. Maps and drawings are identified as Exhibit F and Exhibit G, and each needs to meet specific standards. Exhibit drawings will vary slightly for a 5 MW exemption and a conduit exemption project.

FERC recognizes that low-impact projects are small in size, and for these projects they have made it possible to relax some of the drawing requirements, while still providing an adequate level of detail for review.

FERC created a guidance document for exhibits, and a web link is provided in the Appendix, web links section for more detailed information on this topic.

Project Features (Exhibit F Drawings)

Exhibit F drawings contain critical energy infrastructure information (CEII), which includes the details about the hydropower unit including the structures involved (inlet structure, powerhouse, tailrace, generating equipment), a site plan and the profile views. Turbine and generator drawing details received from the manufacturer may be used in place of original drawings if they fully represent the project. You may ask FERC if a professional engineer stamp is required for your drawings. If a stamp is not required, the drawing must still meet all of the other requirements for an Exhibit F drawing.

See a detailed Exhibit F example with recommendations in the appendix, and a link to example FERC drawings in the appendix.

While complete, stamped drawings are required in the final application, FERC may permit sketches in the Initial Consultation Document. Check with your FERC contact to confirm.

Map of Hydropower Project and Boundaries (Exhibit G Drawings)

- Exhibit G drawings are maps with detailed drawings showing the principal features in relation to the affected body of water and other geographical features, such as nearby towns, rivers, roads, structures typically found on a map, transmission lines that can be recognized in the field.
- Shows the project boundary, which is a line enclosing all project work
    - For a conduit exemption, the project boundary should enclose the powerhouse and related hydropower facilities, but not the entire conduit on which the hydroelectric facility is located.
    - For a 5 MW exemption, the project boundary should enclose the powerhouse, any dam, reservoir up to the elevation of the spillway crest or flashboard elevation, transmission line extending to the interconnection with the regional grid, and related hydropower facilities.
- All hydropower facilities must be contained in a project boundary
- Drawings must be drawn to scale
- They must have three known reference points (i.e. GPS or latitude/longitude coordinates)
- Be stamped by a registered land surveyor
- Be in geo-referenced format (each project feature and the coordinates for the reference points must be shown in relation on a map)
- List all of the owners of property on which the project is located

See the example drawing in the appendix, and on FERC's website

NOTE: Applicants for Conduit and 5 MW exemption projects may request a waiver from some of the requirements for the Exhibit F & G drawings.

Question Why do Exhibit G drawings require a licensed surveyor stamp?

- Hydropower project boundaries must be accurate. FERC has discovered many errors in the location of project boundaries. Having a surveyor review and stamp the plans helps to ensure the drawings meet a *minimum* standard.
- A new survey is not necessarily required.

2 - RESOURCE AGENCY & STAKEHOLDER CONSULTATION & MEETING

Resource Agency and stakeholder consultation takes place in a joint meeting and through follow-up comments. Applicants are required to invite all stakeholders, including the public to the joint meeting, and provide an opportunity for a site visit. The meeting helps applicants obtain input from multiple agencies at the same time, reducing the overall review time.

Required Meeting and Site Visit

Applicants must hold at least one joint meeting with stakeholders to explain the project (i.e., its facilities and operation), review your existing information, discuss the project's potential environmental effects, and find out if there are any needed studies to fill information gaps.

1. Set this meeting 30-60 days from the mailing of the ICD to all agencies.
   See an example letter to invite agencies in the Appendix.
2. Hold the meeting at the site, or a site nearby and allow for a site visit.
3. You must file a public notice at least 14 days in advance of the meeting in the local newspaper, and keep a copy of the notice to submit with your application.
   See an example newspaper notice in the Appendix.
4. You must have a way to collect comments during the meeting. All comments and answers to each comment will be included in the final application.
5. Stakeholders have 60 days from the date of the joint meeting to submit any comments or study requests to the applicant.
6. Utilize FERC's Dispute Resolution Service if stakeholders disagree on any needed studies.

NOTE: The Colorado Division of Dam Safety only needs to consult on projects that involve dam infrastructure.

A site visit can help resource agencies and stakeholders understand your project.

Pre-filing & Filing Processes

It is important to note certain Resource Agencies provide recommendations and others provide conditions that you must incorporate prior to submitting your application to FERC. You are able to negotiate with all agencies that provide conditions. Below are some tips to help you distinguish which comments are critical to include.

Tip

- FERC typically follows the guidance of all U.S. Fish and Wildlife recommendations. Some can be mandatory.
- When you consult with the U.S. Fish & Wildlife Service ask about any fees they might require. Typically for small exemption projects fees are not required, however proof of this request is required in the final application.

Tip

- You need to identify the specific tribes that may have an interest in the project. This may include not only tribes that currently have a presence near the project site today, but also tribes' native lands. For example, a tribe that has an old burial ground on the site would have an interest. Maps of these tribes are available, and FERC has specialists who can help you identify the correct tribes. Information about tribes is located in the Appendix. Although the Department of the Interior Bureau of Indian Affairs is the federal regulatory agency responsible, the federal agency does NOT need to be consulted, only the individual tribes.

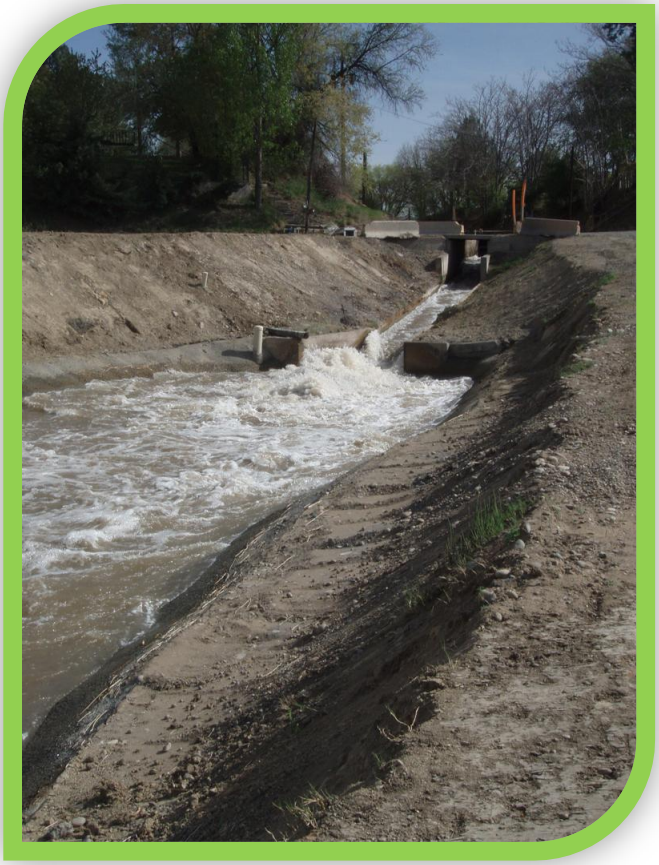
Tip

- A search of the project site for historical sites can be obtained for free from this site: http://www.historycolorado.org/oahp/file-search
- An example letter to the History Colorado organization and a link to the specific letter requirements are included in the appendix.

Tip

- Special interest groups (Trout Unlimited, American Rivers) may make recommendations to your project, but implementation of these comments will be determined by FERC .

It is also important to note that ANY of the agencies can potentially stop a project from being built. If you ignore certain agency suggestions it may be possible to receive a FERC permit and build your project, *yet not receive permission to operate it*. For example, if you don't properly address water rights, the Colorado Division of Water Resources has the authority to turn off your project once it is permitted and built.



185 kW Dividers site photo

Many low-impact projects can be developed without the need to conduct extensive environmental studies. For example, conduit exemptions do not require a National Environmental Protection Act (NEPA) review to be conducted, but 5 MW exemptions do require a NEPA review. Often the environmental effects of a low-impact project are minor and existing information can be used to characterize the existing environment in the proposed project area.

It is important to consult directly with FERC early and often. The relationship you create with your FERC representative can help applicants with important information that can save time and unnecessary steps.

For example, FERC representatives can guide applicants through the process and review the final application and drawings prior to the official FERC submission. This informal review can save valuable time and effort and the FERC representative can make sure the application is complete. Even though your official FERC point of contact will not be assigned until you submit your application, contacting FERC early gives the agency an opportunity to become familiar with the project prior to their official review.

State of Colorado Water Quality Certification fulfilling requirements of Clean Water Act, Section 401

While not specifically required by FERC, a hydropower project will have to receive a "401 Water Quality Certificate" prior to construction. The Colorado Water Quality Control Division (WQCD) reviews and issues Water Quality Certifications under Section 401 of the federal Clean Water Act (CWA). A **401 certificate** is required for any federal license or permit that is issued to construct or operate a facility, which may result in any fill or discharge into the navigable waters of the United States to ensure projects do not inadvertently harm water quality. **You will receive this certificate in place of a letter from this agency.**

A 401 certificate must be obtained from the WQCD representative located at the Colorado Department of Public Health and Environment (CDPHE). To receive a 401 certificate send the representative a copy of your ICD and explain your project. The representative contact information and a website with more information about the 401 certificate are included in the appendix.

The representative will review the project and post the relevant water quality project details in the agency's monthly newsletter for public comment. The public comment period lasts 30 days from when the newsletter is published. The representative will review any comments received and will decide whether or not to issue the 401 certificate for your project.

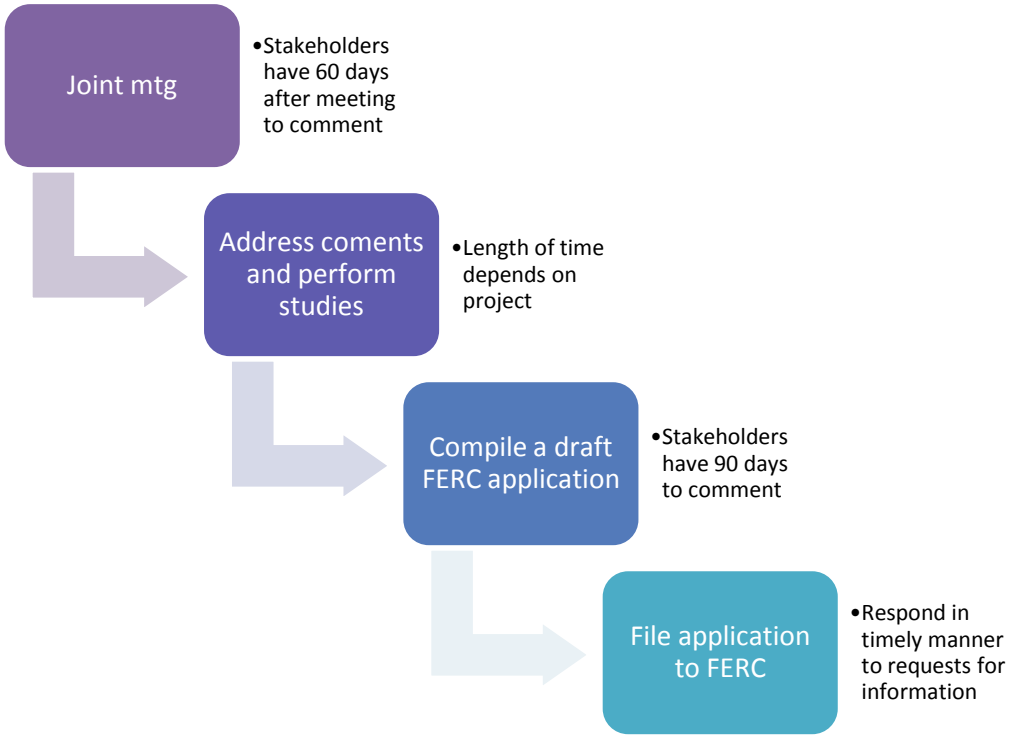
If a 401 certificate is required, applicants typically receive a copy within 60 days of the project being published in the agency's monthly newsletter. Once an applicant receives a 401 certificate, it must be filed with FERC for their records.

3 - GATHER INFORMATION

Within 60 days from the joint meeting, stakeholders and resource agencies must provide comments and request any required studies. Applicants must address each of the comments and perform required environmental or archaeological studies, and include them in the application. If there is an objection to performing a requested study for a legitimate reason, applicants may plead the case with FERC and a ruling will be made on the need for the study.

Once applicants have addressed the comments and performed the requested studies, they must then compile a draft FERC application and send it to all stakeholders and resource agencies. FERC allows resource agencies and stakeholders 90 days to comment on the application prior to the submission to FERC.

If there aren't any comments after the 90 days applicants can file the application with FERC. If everyone responds before 90 days you are able to submit early. Applicants need to show evidence that they reached out to all agencies, so keep copies of all correspondence to and from resource agencies, and include this documentation in the application.



4 - Finalize Designs

As you design your project, include specific details about how the system works together. Include detail about specific equipment and components installed. For example, some of the general system components you should factor in your plan include:

- Intake
- Penstock
- Powerhouse and Turbine Generator
- Controls
- Tailrace
- Interconnectivity and Distribution of Power

The project design will almost certainly evolve throughout the permitting process. Resource agencies may even require certain elements to be designed into the project (e.g. fish screens, special intakes, etc.). The design is not finalized until the FERC drawings are complete and the application is filed.

Intake

The intake for your project is where you take water from that flows to the turbine. There are three categories for the intake:

1. Water from a river at an existing diversion – the intake is then the diversion structure in the river.
2. Water from an existing ditch or canal – the intake will then be like a diversion off of the ditch or canal.
3. Water from an existing pipe – the intake will then be a wye in the pipe to bring water to the turbine.

The design of the intake system will need to address several things including how to control the amount of water getting to the turbine. This is often done using headgates or orifice plates. The design should also address how to remove debris and silt from the water so it doesn't damage the turbine blades. This can often be accomplished by adding a settling area or a forebay. In Colorado, consider how the system will respond in the winter. If the intake water freezes and the water is unable to flow to the turbine, the system might have to be shut down in the winter.

Penstock

The penstock is the pipe that connects the incoming water to the turbine/generator. The penstock is typically a significant cost component of a system, especially if the distance from the source of water is far from the powerhouse. Your design should plan to assess the need for anchor blocks which hold the penstock in place and thrust blocks which keep the pipe from moving or breaking when there are bends in the penstock. It is important to verify that the pipe is strong enough to handle the pressure of the water that results from the possibility of water hammer. The penstock design should also incorporate ways to prevent water hammer, by using surge tanks and slow closing valves.

Power House

The powerhouse is where the hydropower equipment is installed. The enclosure should provide enough room to safely work around and maintain the equipment. Consider installing a light and auxiliary heat in the powerhouse.

Operation Control

The design will address how the system will be controlled. For example, you may only need a system that has the standard automated safety controls and is predominantly operated manually. Or you may need a system that is very automated and can be controlled and monitored remotely. Talk with the turbine manufacturers about the site and goals for the project. In general, the more automation you have, the more expensive the system will be.

Tailrace

The tailrace is where the water leaves the turbine and returns to the river, ditch, canal or pipe. If the tailrace returns the water to the river or a ditch, you will most likely want to orient the tailrace to line up with the river or ditch. The type of turbine you get will determine if you will have an open channel or a closed pipe tailrace.

Electrical Interface

The power generated from the hydropower system will either be connected to your electrical loads directly or connected to the grid. Connections with the grid are much simpler and your local electric utility can help you make sure that the connection is made so the grid remains safe.

5 - Prepare and File Application

The final project application will be submitted to FERC and should:

1. Provide proof and an explanation, at the time of filing, that the applicant has all real property interests to all project features, unless on federal lands.
2. Provide proof that the Fish and Wildlife agencies have been asked to estimate fees to process the application.
3. Include drawings in the appropriate file format

Drawing Electronic Submission

FERC requires electronic copies of all exhibit drawings in a common, nonproprietary format that minimizes file storage space and is universally read by most computer software. Aperture cards will continue to serve as archival project exhibit information.

Electronic versions of the Exhibit drawings are required by the Commission. They are usually filed on CD-ROM format. The CD should be labeled "**Project Maps and Drawings**". Exhibit F drawings must be segregated from other project information and identified as **(CEII) material**. Each exhibit drawing must be contained in a separate electronic raster file; which meets the following format specification:

FILE NAME – MUST use the format (including commas and dashes)

P-####-####, G-1, Project Boundary, MM-DD-YYYY.TIF

IMAGERY - black & white raster file

FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4

RESOLUTION – 300 dpi desired, (200 dpi min)

DRAWING SIZE FORMAT – 24" x 36" (min), 28" x 40" (max)

FILE SIZE – less than 1 MB desired

The filename for each drawing must include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, FERC approval date, and file extension in the following format [P-1234-####, G-1, Project Boundary, MM-DD-YYYY.TIF]. If the file name is not in this format, the filing will be rejected. For more details on FERC drawings, see the web link to **FERC Drawings Guidance** in the appendix.

How to File a FERC Application Electronically

1. All applications must be submitted digitally via the FERC e-file system. To begin, visit: http://www.ferc.gov/docs-filing/efiling.asp
2. If you do not have an account, you must e-Register to create an account and password.
3. Log in using your username and password and click on "e-filing"
4. Categorize your filing type as: **Hydro: Washington DC →Application for License/Relicense – No Project No. → Appl for License/Relicense**
5. Upload all files associated with the project. Files should be in .puff format and be labeled for public except for Exhibit F drawings. These need to labeled as **Critical Energy Infrastructure Information (CEII).** The applicant should delete any sensitive information from the version of the application materials made available to the public. For example, the location of the project site should be withheld if it is situated within an area of archeological significance, where public disclosure could expose the site to potential theft.
6. Specify the filing party (i.e. Who are you filing on behalf?)
7. Provide your contact e-mail address. If you are representing the project, click "add as signer".
8. In your submission description, make sure to note the application is for a 5 MW or Conduit Exemption if applicable. Also, clearly indicate the development entity and desired project reference name.
9. Review details and submit.
10. An e-mail confirmation will be sent to your email upon submission.

Example of a Final Application

A final application example is provided in the appendix.

STEP 3 – Post-Filing

Project construction cannot begin until the FERC exemption is issued. This section identifies FERC-related activities to be aware of after the application is submitted to FERC.

Activities during the Post-filing:

- Timely response to FERC questions

Typical time to complete:

- Estimated time can range from 6-24 months

Typical cost to complete:

- Estimated approximately 5% of the total project cost.

What to expect from FERC

After FERC reviews the application to make sure all required information is presented, they will give the public 30 days to comment on the project, and possibly ask the applicant for more information. Applicants can expect to have approximately 15 days to respond to any questions or public comments. After FERC receives the applicant's response they may go back to concerned parties to determine whether remaining issues have been addressed. The time it takes to review each application varies, and can take as little as six months, or up to 24 months, depending on the project.

How to know the exemption has been issued

FERC will issue an "Exemption Order". This outlines the granted exemption and any requirements that must be fulfilled in order to construct the project. FERC may also ask follow-up questions and require applicants to fill out follow-up paperwork or update drawings based on their review.

When FERC issues an exemption it is posted publicly on the Federal Register. https://www.federalregister.gov/agencies/federal-energy-regulatory-commission

Post-Filing

Once you receive your FERC exemption you are cleared by FERC to begin construction, but you must still adhere to local building and zoning guidelines. You can now begin construction, commission the project, interconnect with the utility, and begin producing electricity.

Project construction, commissioning and maintenance are not covered in this guidebook, but each is important to plan for.

FERC Compliance Guide

The FERC Division of Hydropower Administration and Compliance (DHAC) ensures that exemptees comply with the requirements and conditions contained in exemptions issued. During construction, FERC engineers frequently inspect a project, and once construction is complete, they may continue to inspect it on a regular basis and require reports. This section outlines what to expect, and a web link to FERC's guidebook on compliance is included in the appendix.

What to expect:

Compliance Procedures - Articles in an exemption order require an exemptee to adhere to requirements that may govern project operations, conduct monitoring studies, or address a variety of issues related to environmental effects and engineering. Exemption articles may require the exemptee to file study plans, mitigation plans, study schedules, or results with FERC.

Non-Compliance Procedures - DHAC ensures the exemptee adheres to deadlines, construction and operation requirements, and operating compliance. Financial penalties can be enforced if an exemptee is out of compliance.

On-site Inspections - On-site inspections will be conducted periodically to make sure the project adheres to the exemption order. Exemption orders reserves FERC's right to conduct investigations with respect to any acts, complaints, facts, conditions, practices, or other matters related to the construction, operation, and maintenance of the exempt project, and allows FERC to revoke the exemption if any term or condition of the exemption is violated.

For project involving a dam or reservoir:

Expect FERC's Division of Dam Safety and Inspections to inspect the project during construction, and regularly once construction is complete to make sure the project does not compromise dam infrastructure. For more information on Dam safety and Inspections see FERC's website: http://www.ferc.gov/industries/hydropower/safety.asp

Lessons Learned and Special Considerations

The GEO's team garnered some very valuable lessons while working with FERC and the various Resource Agencies. Several of these are shared in this section to help others identify potential obstacles before they cause unnecessary delays and costs.

Project Planning

- Transmission line capacity to and from a renewable energy site can determine how large a project can be more so than the available renewable resource.

- City councils or County Planning Commissions should be supportive of a project before any exemption can be expected to be issued by FERC. An example of a public meeting agenda is included in the appendix.

- Pursuing a FERC permit should not be used as a feasibility test for a project. Taking this path often uncovers project pitfalls too late, after time and money is already spent.

- Conduit projects were able to qualify for Federal 1603 grants.

Financing

- A renewable energy project resource must be confirmed prior to pursuing the financing of a project. The confirmed resource will also lead to financing and is often the first question asked by a financier.

- The financial viability of a project should be known prior to pursuing a FERC permit.

- Local banks are often not well-versed in the various renewable energy opportunities, and often lack the knowledge to provide favorable financing for small hydropower projects.

- Utilities will not offer Power Purchase Agreements (PPA) until a FERC exemption has been issued for the project. Utilities seem to be more receptive to discussing a PPA if the project is further developed.

Land ownership and water rights

- Land ownership must be evident and easements in place prior to filing with FERC.
- Water rights must be clearly documented in order to prove allowable water use and consumption.
- Projects have run into property right issues in that the city does not know who owns the land adjacent to a project so, therefore, the applicant cannot receive an easement on the project. This can hold the development of a project up while a court determines who owns the land.
- Project boundaries for 5 MW systems must include the "reservoir" behind the dam. Any shoreline for the reservoir must have easement with landowners.
- Cannot permit projects on federal facilities if for example it is owned and operated by U.S. Bureau of Reclamation.

Additional Tips and Useful Information

- Colorado state electrical inspectors currently are not allowing reverse motors to qualify as generators for systems less than 25kW unless you submit a letter from the manufacturer clarifying that your specific model has been tested by a U.S. – accredited testing lab.

Appendix:

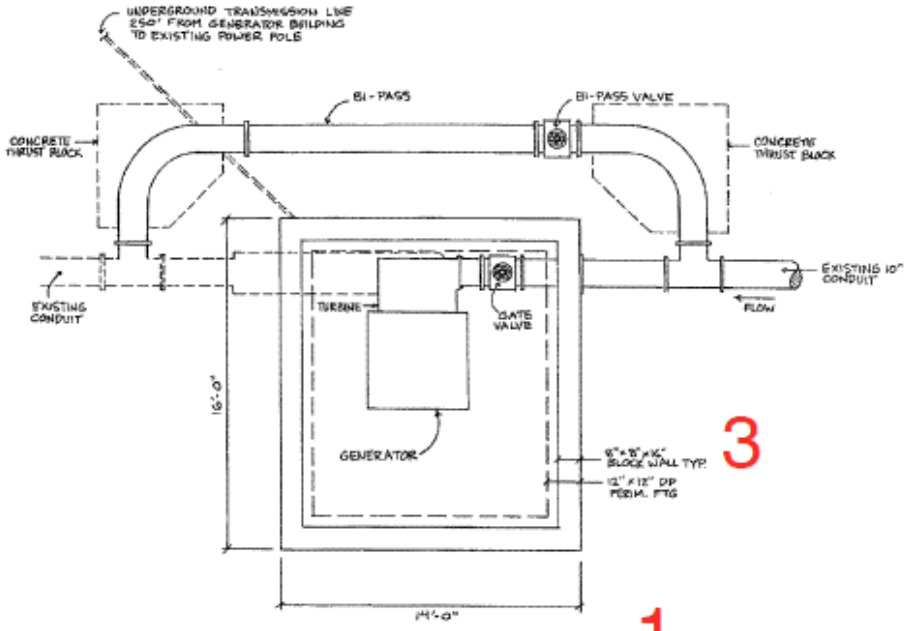
Below is an example Exhibit F drawing from an approved application, with notes provided to help describe and identify important drawing element.

Exhibit F Example – Basalt

Courtesy of the Renewable Energy Development Team (REDT)

Notes about this drawing

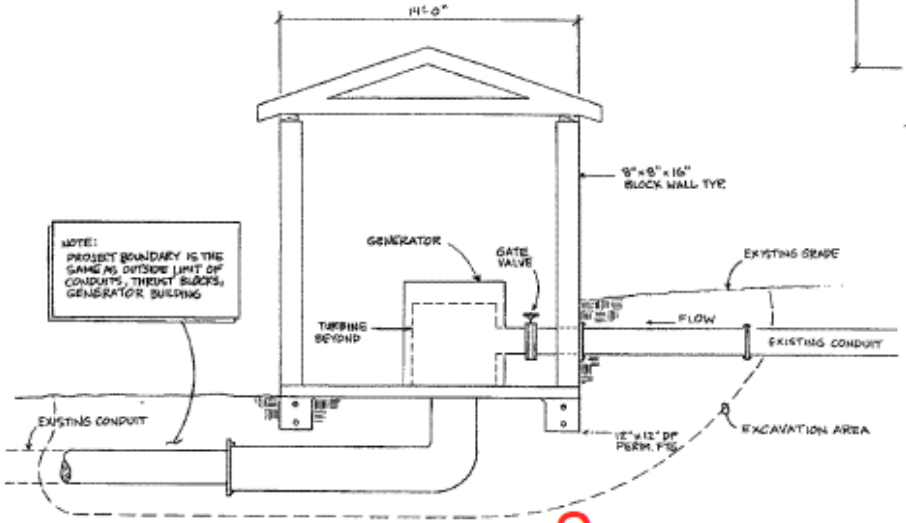
1. Drawing of the powerhouse and generating unit plans from overhead.
2. Side or section view of powerhouse and generating unit.
3. Dimensions of important structures (e.g. – dam and powerhouse)
4. Title block with the drawing title, graphical and numerical scale, and other pertinent information concerning the drawing.
5. Scale for drawings depicting project structures must be no smaller than one inch equals 50 feet for plans, sections, and profiles and one inch equals 10 feet for sections.
6. Project structures in need of drawings include inlet structure, powerhouse and tailrace, generating equipment.
7. Manufacturer turbine drawings many times are sufficient.
8. The drawings should be identified and designated as Critical Energy Infrastructure Information (CEII)



Plan View - Powerhouse
scale 1" = 30 ft.

3

1



Section View - Powerhouse
scale 1" = 30 ft.

2

4

FERC Project No. 43210
Plan & Elevation Exhibit F-1
Any Hydroelectric Project County, State Small Conduit Hydro Company

Exhibit G Example - Basalt

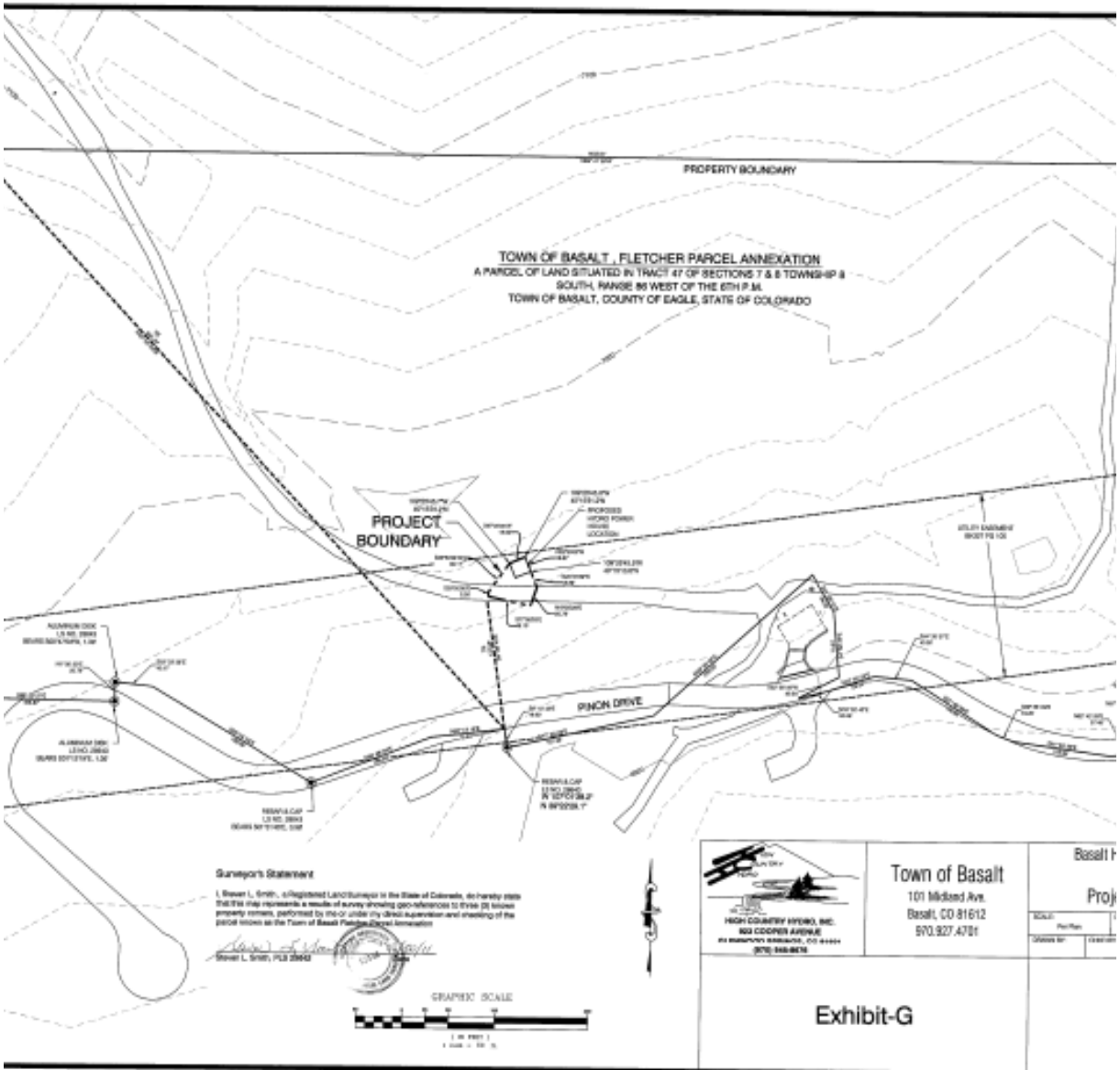
Courtesy of the Renewable Energy Development Team (REDT)

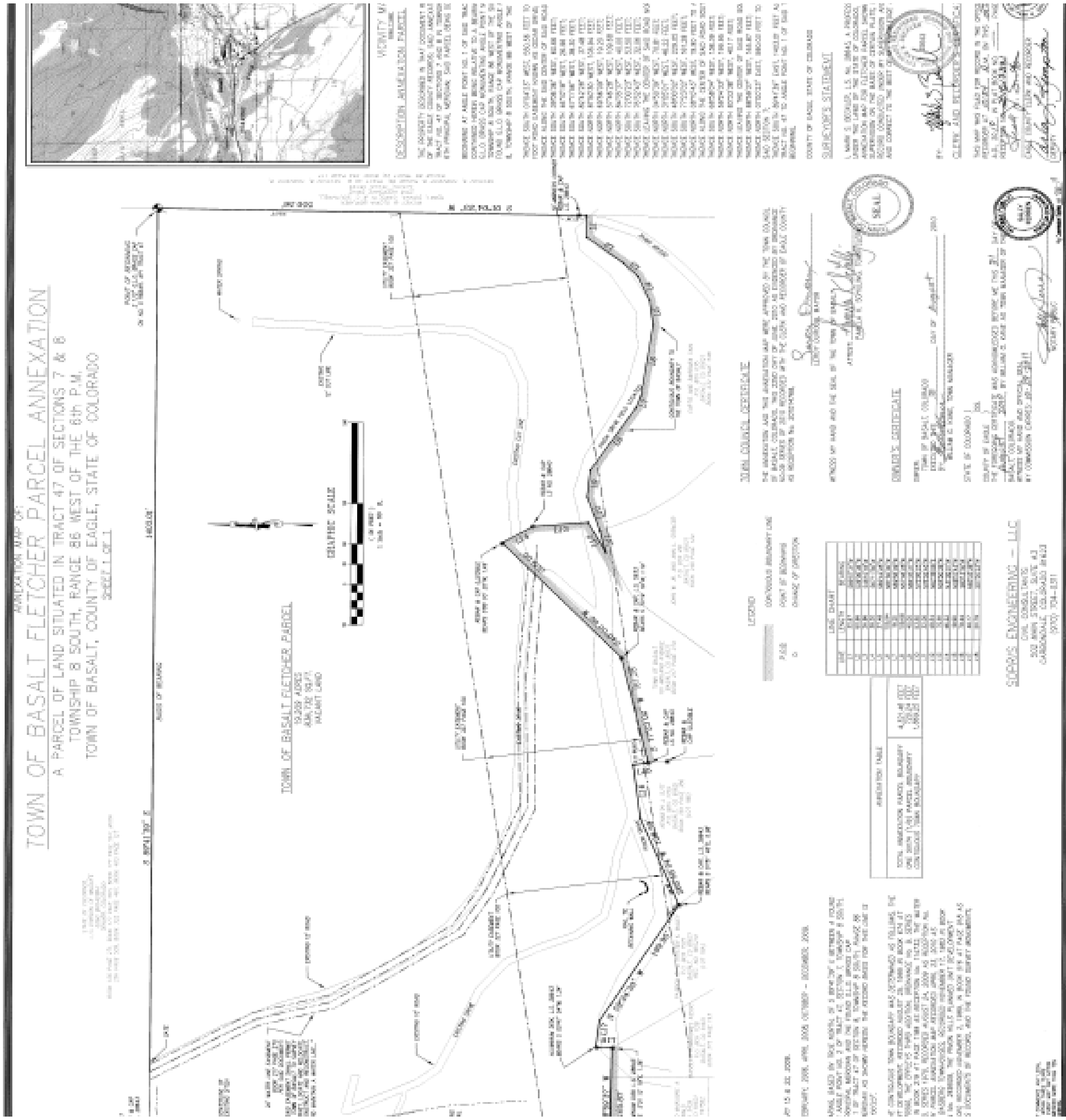
Notes about this drawing

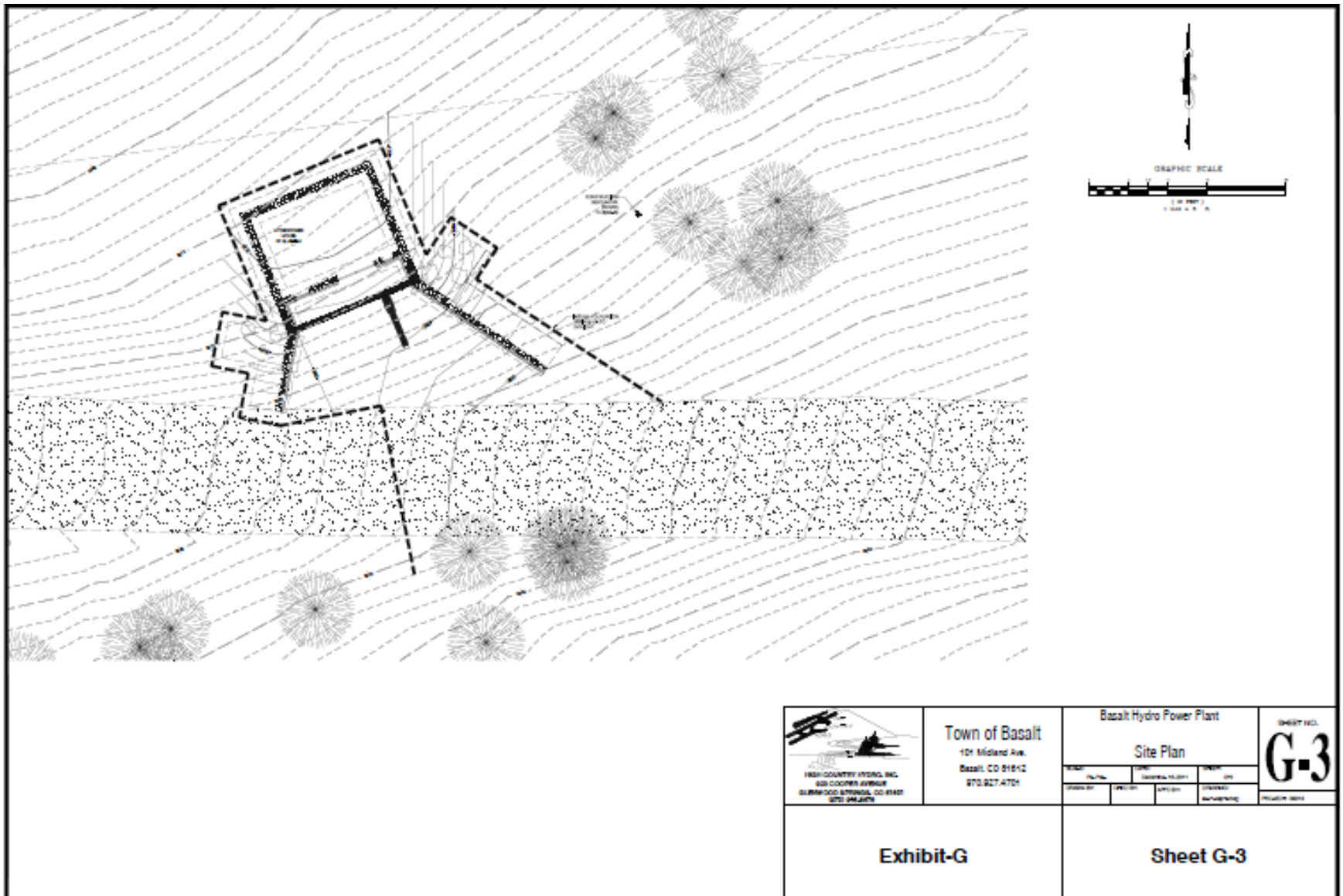
1. Project must include a vicinity map show project in relation to nearest town
2. Project boundary must be clearly indicated on drawing. All project facilities must be located within this boundary.

    5 MW Exemptions
    - If dam and reservoir is involved, must include reservoir in project boundary
    - The point of electricity interconnection into the local grid must be included

    Conduit Exemption
    - Should only include the area where the hydropower unit will be located including the powerhouse.
3. Land ownership parcels clearly indicated on drawings
    - Must include neighboring land parcels
    - Clearly indicated public lands
    - All lands that contain shoreline along reservoir (5 MW only)
4. Four points of reference (latitude, longitude)
5. All permanent structure such as roads, structures, and transmission lines must be included
6. Affected stream or body of water
7. Clearly labeled inlet structure, powerhouse and tailrace, penstock and proposed electricity lines
8. Scale should be no smaller than one inch equals 0.5 mile for transmission lines, roads, and similar linear features and no smaller than one inch equals 1,000 feet for other project features including the project boundary.
9. Each drawing must contain a title block with the drawing title, graphical and numeric scale, and other pertinent information concerning the drawing.
10. Must include a north arrow
11. Must be stamped by a licensed engineer or land surveyor


PROPERTY BOUNDARY
TOWN OF BASALT , FLETCHER PARCEL ANNEXATION
A PARCEL OF LAND SITUATED IN TRACT 47 OF SECTIONS 7 & 8 TOWNSHIP 8
SOUTH, RANGE 88 WEST OF THE 6TH P.M.
TOWN OF BASALT, COUNTY OF EAGLE, STATE OF COLORADO
PROJECT
BOUNDARY
PINON DRIVE
Surveyor's Statement
GRAPHIC SCALE
Town of Basalt
101 Midland Ave.
Basalt, CO 81612
970.927.4701
Exhibit-G


ANNEXATION MAP OF:
TOWN OF BASALT FLETCHER PARCEL ANNEXATION
A PARCEL OF LAND SITUATED IN TRACT 47 OF SECTIONS 7 & 8
TOWNSHIP 8 SOUTH, RANGE 86 WEST OF THE 6th P.M.
TOWN OF BASALT, COUNTY OF EAGLE, STATE OF COLORADO
TOWN OF BASALT FLETCHER PARCEL
GRAPHIC SCALE
SOPRIS ENGINEERING – LLC



HIGH COUNTRY HYDRO, INC. 420 COOPER AVENUE GLENWOOD SPRINGS, CO 81601 (970) 384-8979	Town of Basalt 101 Midland Ave. Basalt, CO 81612 970.927.4701	Basalt Hydro Power Plant Site Plan	SHEET NO. G-3
Exhibit-G		Sheet G-3	

Example of historical site search

COLORADO HISTORICAL SOCIETY
Office of Archaeology and Historic Preservation
1560 Broadway, Suite 400 Denver, Colorado 80202

Dr. Lindsay George
Applegate Group, Inc.
118 West 6th St., Suite 100
Glenwood Springs, CO 81601

March 17, 2011

Re: FERC Permit
File Search No. 16232

At your request, the Office of Archaeology and Historic Preservation has conducted a search of the Colorado Inventory of Cultural Resources within the following areas:

PM	T	R	S
6th	1S	94W	2, 11

0 sites and 1 survey were located in the designated area(s).

If information on sites in the project area was found, detailed information follows the summary. If no sites or districts were found, but surveys are known to have been conducted in the project area, survey information follows the summary. We do not have complete information on surveys conducted in Colorado, and our site files cannot be considered complete because most of the state has not been surveyed for cultural resources. There is the possibility that as yet unidentified cultural resources exist within the proposed impact area.

Therefore, in the event there is Federal or State involvement, we recommend that a professional survey be conducted to identify any cultural resources in the project area, which are eligible to be listed in the National Register of Historic Places. We look forward to consulting with you regarding the effect of the proposed project on any eligible cultural resource in accordance with the Advisory Council on Historic Preservation Procedures and the Preservation and Protection of Historic and Cultural Resources (36 CFR 800). Please provide this office with the results of the cultural resource survey for our review of professional adequacy and compliance with regulations.

If you have any questions, please contact the Office of Archaeology and Historic Preservation at (303) 866-3395 or 3392.

Thank you for your interest in Colorado's cultural heritage.

Richard Wilshusen
Deputy State Historic Preservation Officer for Archaeology
State Archaeologist

Kevin Black
Assistant State Archaeologist

*Information regarding significant archaeological resources is excluded from the Freedom of Information Act. Therefore, legal locations of these resources must not be included in documents for public distribution.

ferc_sy

ID	RB.SC.NR1
TITLE	RIO BLANCO LIMITED RESULTS CULTURAL RESOURCE SURVEY REPORT ON PRIVATE LANDS - GEORGE WENSCHHOF
PROCEDUF	MULTIPLE LINEAR
COUNTY	Rio Blanco
AGENCY	USDA Natural Resources Conservation Service (NRCS) (Soil Conservation Service)
ORG	USDA Natural Resources Conservation Service (NRCS) (Soil Conservation Service)
AUTHOR	HARVEY, TIFFANY
NAME	RIO BLANCO LIMITED RESULTS CULTURAL RESOURCE SURVEY REPORT ON PRIVATE LANDS - GEORGE WENSCHHOF
METHOD	CLASS III
DATE	08/03/2009>01/10/2011
ACRES	10
SITES	0
IFS	0
MAP	L O 7 HILL
LOCATION	6TH;T1S;R94W;2>6TH;T1S;R94W;11
X	13;250893>13;251877>13;251882>13;250898
Y	4430951>4430946>4430587>4430607

Example Historical Society Letter

The Historical Society requires specific information in their letter. This detail is listed on their website at: http://www.historycolorado.org/oahp/consultation-guidance

September 20, 2011

Dan Corson c/o
Edward C. Nichols
State Historic Preservation Officer
Civic Center Plaza
1560 Broadway, Suite 400
Denver, CO 80202

RE: Small Hydro Permitting Pilot Program - 185kW_Dividers_Guenther_FERC

Dear Mr. Nichols:

The Federal Energy Regulatory Commission will review the following small hydro project for a permit for an Exemption from Licensing through the Colorado Small Hydro Federal Streamlined Permitting Pilot Program for the Grand Valley Irrigation Company.

The project is located at 630 Horizon Drive, in Grand Junction in Mesa County. Its UTM coordinates are:

Zone: 12
Easting: 711097
Northing: 4330076

The following is a description of the project as provided by the applicant:

> The Dividers is a site on the Grand Valley Irrigation Canal where the Mainline canal splits into the Highline and the Lower Mainline. The Lower Mainline drops through a concrete lined chute into a stilling basin. There is approximately 200 cfs and 13 feet of head available to be used for power production. This is a unique low head site, that will require an innovative low head technology for development. The site will produce about 770 MWhrs of electricity annually with very minimal impact.

The Grand Valley Irrigation Canal is used predominantly for irrigation and water delivery purposes. The Grand Valley Irrigation Canal is approximately 100 miles long and provides irrigation water to 40,000 acres within Grand Junction and the surrounding towns. The project site is surrounded by a residential area.

There will be slight modifications to the inlet and outlet of the concrete chute. The project will result in minimal nearby land disturbance. The nearby land has been disturbed previously for the construction of the diversion dam. No buildings will be directly affected or vacated as part of the project. Slight modifications to the existing concrete will be made. The proposed structure will be designed to appear very similar to the existing structure and no visual resources are expected to be impacted.

The Grand Valley Irrigation Ditch is older than 50 years old. A Cultural Resource Inventory has been completed by Alpine Archaeological Consultants, Inc. (Alpine) of Montrose, CO and is enclosed with this letter. The project site is within the study segment 5ME 4680.6 in the enclosed report.

Please find the attached project location maps, site photographs, Cultural Resource Inventory, Pilot Program Application, and Resource Agency Letter Template.

We welcome your agency's review and comments regarding the project. Once your agency has had the opportunity to review the project, we request a letter from your agency that has your comments and some specific language requested from FERC. The document enclosed titled "Resource Agency Letter Template_Updated" provides a loose outline for this requested letter.

Upon your review of the project, please email or mail a copy of the requested letter to me. Also, if you have any preliminary mandatory conditions, please include these. We hope to receive your project specific comments and letter within 30 days.

Sincerely,

FERC's Example of a public meeting notification

[**Date**]

Ms. Kimberley Bose, Secretary
Federal Energy Regulatory Commission
888 First Street N.E.
Washington, DC 20426

Applicant Name
Applicant Address

Notice of Public Meeting for the [**Name of Project**]

Dear Secretary Bose:

Pursuant to the Federal Energy Regulatory Commission's (FERC) letter dated [**Date**] authorizing the use of the Traditional Licensing Process, the [**Applicant**] has scheduled a public meeting for all pertinent agencies, Indian tribes, and interested members of the public to present the components of the proposed [**Name of Project**] and solicit comments. The [**Applicant**] is transmitting the Agenda for the meeting and copies of the letters that were mailed to the pertinent agencies, Indian tribes, and interested members of the public. A public notice for the meeting will be published in the [**Name of local newspaper**] on [**Date**].

If you have any questions regarding the upcoming meeting, please contact [**Applicant Name or Acting Agent**] at [**Phone**] **xxx-xxx-xxxx** or by email [email address if applicable].

Sincerely,

[**Applicant Name or Acting Agent**]

FERC's Example of a public meeting agenda

Southern Nevada Water Authority
Arrow Canyon Conduit Energy Recovery Hydroturbine Project
Joint Agency Meeting

October 26, 2009
10:00 AM to 12:00 PM

Grand Canyon Conference Room, 7th Floor
100 City Parkway
Las Vegas, Nevada 89106

AGENDA

Power Point Presentation

Introduction

Applicant- Southern Nevada Water Authority
Arrow Canyon Project
FERC
BLM

Project Description

Facilities (include location of all facilities)

Construction

Operation

Environmental Concerns/protection Measures (include all resource areas that have the potential to be affected by construction and operation of the project)

Biological Resources
Cultural Resources
Visual Resources
Noise
Air Quality

Questions

Site Visit (Optional)

FERC's Example of public/joint agency newspaper notice

On _____ *[date],* _____ *[Applicant name]* will hold a meeting to explain the proposed project and potential environmental impacts and discuss the data and studies to be provided in its upcoming application to the Federal Energy Regulatory Commission for a _____*[specify conduit exemption, 5-megawatt exemption, or minor license*] for the _____ Hydroelectric Project, FERC No. _____. The project would be located at _____ _____ *[river, county, state, nearest town, as appropriate]*.

The meeting will be held at _____ *[time, date, and location of meeting].* The major issues to be discussed include:

_____

_____

_____.

A site visit is also scheduled for _____ *[specify time, date, logistics]*. For more information, contact _____

_____ *[name and phone number].*

Overview of GEO's Streamlined Permitting Program

REDT
Renewable Energy Development Team

Governor's Energy Office

Colorado FERC Small Hydro Streamlined Permitting Program

Colorado Small Hydropower Development Opportunities

Colorado's small hydropower potential is estimated to be approximately 1,000 – 2,000 MW. Small hydropower takes advantage of existing dams, irrigation canals and pipelines to generate clean energy with minimal environmental impact. It is a low-cost, low-maintenance, low-impact renewable energy technology with a high capacity factor (50% - 85%). Government surveys have identified several hundred potential small hydro project sites available in Colorado. Many of these have the potential to help farmers and ranchers fuel their energy needs with existing resources, while improving the economics of their operations and supporting economic development in rural areas.

A vast majority of the hydropower projects in the U.S. must be permitted by the Federal Energy Regulatory Commission (FERC), regardless of size. The current permitting process can be arduous, expensive and a disproportionate burden is placed on the developers of small projects, making it prohibitive for most who wish to utilize a small hydro operation. As a result, the development of this renewable resource is stifled nationwide.

GEO's Renewable Energy Development Team

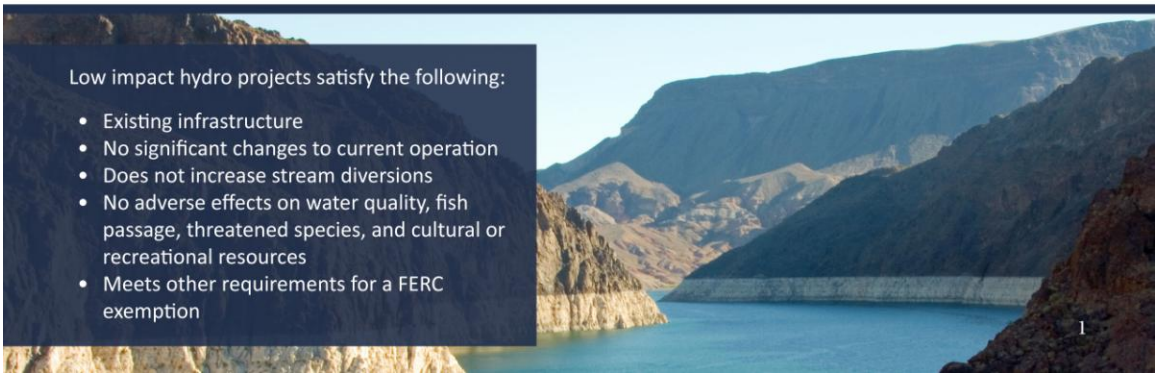
The Colorado Governor's Energy Office (GEO) has received national attention for pioneering partnership efforts with FERC and reducing barriers to small hydropower development. In 2010 the Colorado GEO signed a Memorandum of Understanding with FERC to streamline the permitting process. The streamlined process can typically provide FERC permits within 180 days, a significant reduction over the current average that historically has been proven to take up to three years.

Hydro in Colorado	
Current Capacity:[1] 666 MW	5.3% of State Total
Generation ('08): 2,039,000 MWh	3.8% of State Total
Untapped potential [2] (projects <5MW):	> 1,400 MW
Jobs per MW:[3]	5.5 FTE
Total Job Potential:	>7,700 FTE

1 Energy Information Agency
2 Idaho National Laboratory (does not include pumped hydro)
3 Navigant Consulting/National Hydropower Association.

How to Apply

Visit the Governor's Energy Office website: www.rechargecolorado.com and search for "Renewable Energy Development Team". If you have a small hydropower project in Colorado and you would like to apply into the FERC Pilot Program, please submit your application soon. Space in the pilot program is limited and is quickly filling. For more information, please contact Ryan Broshar at (303) 233-1275 or ryan_broshar@sra.com.



REDT
Renewable Energy Development Team

Governor's Energy Office

An Example of a Colorado Success

23 kW Small Hydro Meeker Wenschhof Project

Project Name:
Meeker Wenschhof

Site Location:
Meeker, CO

Project Capacity:
23kW

Annual Generation:
100,000 kWh

Project Details

The Meeker Wenschhof project in Rio Blanco County is a 23 kW small hydropower project that will utilize water historically used for irrigation to produce power that will offset the electricity consumption of a water-saving irrigation sprinkler.

This low impact project provides a rural Colorado rancher new revenue in the form of electricity savings, and is easy to duplicate, providing other ranchers in the state an avenue to replicate the project and associated savings.

The project will save between $10,000-15,000 per year with a one to five year rate of return. This project would not have had the chance to be developed without the technical assistance of the GEO's REDT FERC Streamlining Permit Program.

Project Location

Rancher is utilizing a small hydro system in Colorado

For More Information on the Governor's Energy Office visit: RECHARGECOLORADO.COM

RECHARGE COLORADO.COM

The Governor's Energy Office promotes sustainable economic development in Colorado through advancing the state's energy market and industry to create jobs, increase energy security, lower long term consumer's costs, and protect our environment.

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Contacts

Organization/Contact	E-mail	Phone
FERC Online Support	FERCOnlineSupport@ferc.gov	(866) 208-3676
FERC Resource Agency Search Site	http://www.ferc.gov/industries/hydropower/enviro/consultlist.aspx?State=Colorado	
Colorado Water Quality 401 Certifications		
John Hranac	john.hranac@state.co.us	(303) 692-3586
Address	WQCD-WSP-EDU-B1 Colorado Department of Public Health & Environment 4300 Cherry Creek Drive South Denver, Colorado 80246-1530	
Colorado History		
Dan Corson	dan.corson@chs.state.co.us	(303) 866-2673
Mark Tobias	mark.tobias@state.co.us	(303) 866-4674
Address	History Colorado 1200 Broadway Denver, CO 80203	
Colorado Parks and Wildlife		
Mark Uppendahl	mark.uppendahl@state.co.us	(303) 291-7267
Address	6060 Broadway Denver, CO 80216	
US Fish and Wildlife Service		
Patty Gelatt	mark.uppendahl@state.co.us	(970) 243-2778 x26
Address	764 Horizon Drive, Building B Grand Junction, Colorado 81506	
Colorado Division of Water Resources – Water Rights		
Mark Haynes	mark.haynes@state.co.us	(303) 866-3581 x8276
Karlyn Adams	karlyn.adams@state.co.us	(303) 866-3581
Address	1313 Sherman Street Suite 818 Denver, CO 80203	
Colorado Division of Water Resources – Dam Safety		
Bill McCormick	Bill.McCormick@state.co.us	(719) 530-5536

Address	1313 Sherman St. Suite 821 Denver, CO 80203	
American Rivers		
Matt Rice	mrice@americanrivers.org	(303) 454-3395
Address	1536 Wynkoop Street Office B500 Denver, CO 80202	
Trout Unlimited		
David Nickum	DNickum@tu.org	(720) 581-8589
Address	1536 Wynkoop St Suite 302 Denver, CO 80202	

Colorado Tribal Contacts (pdf): http://www.historycolorado.org/oahp/review-compliance

Online resources

Applications may be filed electronically via the Internet:
www.ferc.gov/docs-filing/efiling.asp

Example of a Successful Low-Impact Hydropower Application:
http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12712192

Video of Successful Low-Impact Project (Meeker, CO)
www.colorado.gov/cs/Satellite/GovEnergyOffice/CBON/1251616729024

FERC Conduit Initial Consultation Document (ICD) template
www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/templates/conduit-icd-template.doc

and FERC 5 MW ICD template

www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/templates/5-mw-exemp-template.doc

FERC Consultation Waiver
The applicant may request that FERC waive any or all of the consultation requirements. Details for a waiver request may be found on FERC's website here:
www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/prepare-application/process-overview/consult-stakeholders/identify-stake.asp

FERC Resource Agency Search Site

A comprehensive search for Resource Agencies and mailing addresses:
www.ferc.gov/industries/hydropower/enviro/consultlist.aspx?State=Colorado

FERC Newspaper Notice Template for Resource Agency and Public Joint Meeting

www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/prepare-application/process-overview/consult-stakeholders/joint-newspaper-notice.doc

FERC Conduit application template and FERC 5 MW application template

www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/prepare-application/process-overview/application-preparation.asp

FERC Drawings Guidance

http://www.ferc.gov/industries/hydropower/gen-info/guidelines/drawings-guide.pdf

FERC one page brochure

Developing Small/Low-Impact Hydropower Projects

The Federal Energy Regulatory Commission (FERC) is experiencing increased interest from those seeking to develop small/low-impact hydropower projects. This brochure explains how best to obtain Commission authorization to construct and operate these small/low-impact projects while assuring adequate protection of environmental resources. Benefits of developing these projects include:

- Emission-free renewable source of energy
- Low impacts to environmental resources
- Financial incentives to developers under state Renewable Portfolio Standards

FERC's Role

Under the Federal Power Act, FERC is charged with the authorization and regulation of the nation's non-federal hydropower resources. FERC issues three types of authorizations:

- **License** – Issued for 30- to 50-year terms. Must be renewed. Gives the licensee the power of "eminent domain" to obtain lands or other rights needed to construct, operate, and maintain the hydroelectric project.
- **5-Megawatt (MW) Exemption** – Issued in perpetuity. Must be located at the site of an existing dam or use a natural water feature. Must propose increased capacity. The exemptee must own all lands and facilities other than federal lands to be eligible.
- **Conduit Exemption** – Issued in perpetuity. Must use the potential of a conduit constructed primarily for non-hydropower purpose. The exemptee must own the proposed powerhouse and the lands upon which the powerhouse will be located. A conduit exemption may not use federal lands.

General Process for License and Exemption Applications

Getting started

- Contact FERC staff to get advice on the best way to obtain authorization for your project (1-866-914-2849 or smallhydro@ferc.gov)

Pre-filing consultation and initial project review

- Gather needed information to identify project-related effects
- Send package describing your proposal and environmental effects to Commission staff, all relevant government and tribal agencies, and non-government and public entities
- Meet with all affected agencies and entities to explain your proposal and to request input
- Determine whether and to what degree affected agencies and entities are willing to expedite the consultation process or forego a consultation stage
- Apply for and obtain a state Water Quality Certification or waiver
- Prepare and file a license or exemption application

Application processing

- Commission staff requests comments on application from all interested agencies and entities
- Commission staff conducts comprehensive project review, including issuing environmental document (not usually required for conduit exemption)
- Commission acts on application

How FERC May Expedite the Process

- With resource agency cooperation, waive some pre-filing consultation requirements
- Combine scoping of issues with pre-filing consultation
- Combine public noticing requirements
- Shorten comment periods
- Use a single environmental document in lieu of draft and final documents

Factors that Reduce Time and Cost

- Project at existing dam
- Little change to water flow and use
- Unlikely to: affect threatened and endangered species; or need fish passage
- Applicant owns all lands needed for project construction and operation
- Information on existing environmental resources and project effects readily available
- A complete application that addresses all issues

Examples of Successfully Expedited Projects

- Lower Turnbull Drop Project No. 12597 (5.0 MW), Upper Turnbull Drop Project No. 12598 (4.1 MW), Mill Coulee Drops Project No. 12599 (1.05 MW)- licenses issued (07/28/06) 8 months from filing
- Corriveau Project No. 12629 (350 kW)- exemption issued (10/24/06) 10 months from filing

www.ferc.gov/industries/hydropower/gen-info/licensing/small-low-impact/small-hydro.pdf

Detailed FERC Licensing Handbook
www.ferc.gov/industries/hydropower/gen-info/handbooks/licensing_handbook.pdf

Colorado Department of Public Health and Environment – Guide on Water Quality Certification: fulfilling the requirements of Clean Water Act Section 401
www.cdphe.state.co.us/wq/assessment/Assess_pdf/401Brochure.pdf

Historical Site Search

A free search of the project site for historical sites can be obtained here:
www.historycolorado.org/oahp/file-search

History Colorado Consultation Letter Requirements
http://www.historycolorado.org/oahp/consultation-guidance

Calculator to determine Power Potential:
http://www.engineeringtoolbox.com/hydropower-d_1359.html

FERC exemptions posted publicly on the Federal Register:
www.federalregister.gov/agencies/federal-energy-regulatory-commission

FERC Compliance Guidebook:

http://ferc.gov/industries/hydropower/gen-info/handbooks/compliance_handbook.pdf

To research federal or state financial incentives:
www.dsireusa.org

U.S. Bureau of Reclamation (USBR)
www.usbr.gov

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380 kW Catamount Dam, Credit: Catamount Metropolitan District