

825 N.E. Multnomah, Suite 1500  
Portland, Oregon 97232  
(503) 813-5000

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FEDERAL ENERGY  
REGULATORY COMMISSION



December 30, 2002

ORIGINAL

Magalie R. Salas, Secretary  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, D.C. 20426

**Subject: American Fork Hydroelectric Project, (FERC Project No. 696)  
Proposal for Decommissioning and Withdrawal of License Application**

Dear Ms. Salas:

PacifiCorp filed a license application for the American Fork Hydroelectric Project (FERC Project No. 696) on October 27, 1998. PacifiCorp received an Additional Information Request (AIR) on January 20, 2000, and timely responded to the FERC on June 19, 2001. The license expired on October 31, 2000, and the project has since been operating on annual licenses.

Communications with stakeholders during the relicensing process indicated that conditions included in the new license would render the project uneconomic. PacifiCorp, state and federal agencies, and non-governmental organizations involved in this proceeding began discussions regarding project decommissioning in early 2001. Based on a discussion paper prepared by the U.S. Forest Service and National Park Service, PacifiCorp and the stakeholders reached an agreement in principle in early summer 2002 regarding measures necessary for project removal. On May 28, 2002, PacifiCorp filed a notice of withdrawal of its pending application for relicensing of the American Fork project. The FERC responded on June 10 that, in order to withdraw its relicense application, PacifiCorp must first file an application to surrender the license. The FERC further noticed in its June 10 letter that PacifiCorp was to file a schedule for the filing of the surrender of the project within 90 days. PacifiCorp filed a letter with the FERC noticing that a Proposal for Decommissioning of the American Fork Project would be submitted by December 31, 2002.

Enclosed with this letter is a Proposal for Decommissioning of the American Fork Project. With submittal of this Proposal, PacifiCorp formally requests withdrawal of the previously submitted application for relicensing of the American Fork Project. The parties involved in this proceeding are in the final stages of review and completion of a Settlement Agreement, in which all conditions and issues regarding project removal will be resolved. PacifiCorp, in concert with the parties, intend to file an Offer of Settlement by February 14, 2003.

We appreciate your consideration.

Sincerely,

Monte Garrett  
PacifiCorp Licensing Project Manager

Enclosure

Cc: FERC Service List  
K. Hogan - FERC

AF\MG\08.27.02\FINAL

**CERTIFICATE OF SERVICE**

I certify that I have served, by U.S. Mail the foregoing document(s) upon each person designated on the official service list compiled by the Secretary of this proceeding.

In addition to the service list I also served the following:

Doug Sakaguchi, State of Utah Division of Wildlife Resources, 1115 N Main,  
Springville, UT 84663

Carolyn Wright, Governors Office of Planning & Budget, 116 State Capitol, SLC, UT  
84114

Reese Pope, Uinta National Forest, 88 West 100 North, Provo, UT 84601

Laura Berglund, US Fish & Wildlife Service, Lincoln Plaza, 145 East 1300 South,  
Suite 404, Salt Lake City, UT 84115

Gloria Smith, DOI Solicitor's Office, 1849 C St., NW, Rm. 6557, Washington, DC  
20240

Alan Matheson, Trout Unlimited, 8667 Snow Mountain Dr., Sandy, UT 84093-1756

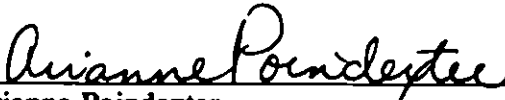
Stuart Hoff, Utah Department of Transportation, 2760 N. Frontage Road, Lehi, UT  
84043

Roger Roper, Dept. of Community & Economic Development, 300 S. Rio Grande St.,  
Salt Lake City, UT 84101

Duane Holmes, National Park Service, PO Box 25287, Denver, CO 80225

Ken Hogan, 888 First St. NE Rm 63-16, Washington, DC 20426

Dated at Portland, Oregon this 30<sup>th</sup> day of December, 2002.

  
Arianne Poindexter  
Licensing Project Coordinator  
American Fork Hydroelectric Project  
FERC Project No. P-696

# **PacifiCorp**

## **PROPOSAL FOR DECOMMISSIONING AMERICAN FORK HYDROELECTRIC PROJECT (FERC PROJECT NO. 696)**

### **SPECIFICATIONS FOR GENERAL CONSTRUCTION**

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## Section 1A – GENERAL DESCRIPTION AND SCOPE OF THE WORK

**1A.1 GENERAL.** This section covers the general description, scope of the work, and supplementary requirements for the work included under these specifications.

The work covered by these specifications will be incorporated into the American Fork Project Retirement, which consists primarily of the demolition of the existing intake structure and streambed restoration, removal of exposed pipeline and penstock, removal of portions of partially buried pipeline and the stream enhancements near powerhouse.

The American Fork Project is located on U.S. Forest Service (USFS) and National Park Service Monument (NPS) land in Utah County, Utah on the American Fork Creek near the city of American Fork (figure 1). The project consists of a concrete diversion dam, a water conveyance system, a powerhouse, a turbine generator, and a 12.5-Kv transmission line.

**1A.2 WORK INCLUDED UNDER THESE SPECIFICATIONS.** The work under these specifications shall include furnishing all equipment and materials fully operated and maintained until Company acceptance; providing all labor, supervision, administration, and management; and supply all construction equipment, materials, permits, and services necessary to perform the American Fork Project Removal, complete in accordance with these specifications, drawings, and other contract documents, except as specifically excluded under 1A.4.

Major components of the work under these specifications are as follows:

### A. Diversion Dam

Contractor shall demolish, remove and dispose of the existing concrete diversion dam, Tainter gates, hoists and steel structures, trash racks, and control building, as described in more detail in sections A.1 –A.8 below (see Figures 3-5). Demolition includes embedded foundations and existing electrical/control wiring, conduits, and panels. Materials will be disposed of at an appropriate site off federal lands. Revegetate disturbed areas and reconstruct the stream channel.

1. Construct cofferdam and install a temporary bypass structure.
2. Remove flash boards, security fence, walkway across top of the dam, structure that houses the flow monitoring equipment, intake gate and mechanisms, trash rack and sluice gate, existing electrical/control wiring, and conduits and panels.
3. Seal intake to flowline.
4. Remove the primary dam structure including imbedded foundations, apron and concrete intake structure. Remove all materials except concrete and

rebar fully encapsulated in concrete. Some of the broken concrete between 12 inches and 36 inches may be used as the core of a riprap revetment to protect the highway. Concrete in excess of what can be used on site must be removed and disposed of at an approved site off Federal lands. Any rebar or metal protruding from concrete used or left on site shall be cut off even with the concrete. Concrete used on-site will be covered with 1-2 feet of native rock at least 12 inches in size and covered with 1-3 feet of earth above bankfull height, defined as 36 inches vertical distance above the river bottom. The earth covering the rock will be revegetated using certified noxious weed-free seed mixes approved by the appropriate land management agency (i.e., NPS or USFS). Riprap below bankfull will consist of native rock at least 36 inches in size;

5. Retain the roadside cement wall of the intake structure as is. Remove streamside of the intake structure, but retain a portion of the wall to one foot below the final grade. Use or dispose of the concrete and materials as described in A.4. All pertinent Best Management Practices (BMPs) will be applied; including stockpiling and later redistributing any topsoil, and use of silt fences or certified weed-free straw bales or other devices to control erosion and entry of fines to the river.
6. The cofferdam used to divert the river during construction shall be removed following completion of construction. Material from the cofferdam shall be used on site or disposed of off site as described in A.4 above. Construct a floodplain on the side of the reconstructed river channel opposite the highway. Sediment and native rock from the earthen dam may be used to cover riprap on the terraces. The riprap will be covered with soil to a minimum of one foot, and replanted using native seedlings and seeded using a native, certified noxious weed-free seed mix approved by the USFS.
7. Reconstruct the stream channel using native materials. The reconstructed channel will follow approximately its current alignment, and the channel gradient will generally be uniform from the top of the existing pool to the bottom of the bypass outlet. Thirty yards of native rock, at least 36 inches in diameter, will be hauled in and stockpiled at an appropriate location on site approved by the USFS. The Parties will consult with the USFS to determine if the streambed should be stabilized using native rock. Based on this consultation, native rock will be used or left on site. Sediment may be used for on-site in restoration.
8. Lower the earthen dam to maintain stability of the river channel at bankfull, recontouring the site so that it is natural appearing and stable, and use the earth and native rock in rehabilitation of the channel and site. Any concrete in, or underlying the earthen dam will be used or disposed of as described in A.4 above. Riprap at least 36 inches in diameter will be used to fill the berm bisected by the bypass channel. The site will be covered with 1-3 feet of native soil and replanted using native seedlings and seeded using a

native, certified noxious weed-free seed mix approved by the USFS.

## **B. Powerhouse Facility**

Contractor shall repair powerhouse structure for conveyance to the U.S. Government, as described in more detail in sections B.1 – B.12 below (see Figures 6-9). Contractor will repair the powerhouse and remove the spillway, transformer pad, and miscellaneous metals; the tender's house, garage, and shed will be removed and site rehabilitated; the highway will be protected, the stream channel reconstructed, and the retaining wall protecting the powerhouse modified, as necessary, to prevent undercutting by the river. Power generation equipment and ancillary appurtenances in the powerhouse will be removed or left on site, as agreed to by the USFS and PacifiCorp.

1. Construct check dam and install bypass structure.
2. Leave the powerhouse building and foundations in a well-maintained condition, in consultation with and approval by the USFS. This includes repair of deteriorated woodwork, and refinishing exposed woodwork. All maintenance, repair, and/or restoration activities should be in accordance with the Secretary of Interior's standards for rehabilitation.
3. Plug with concrete the outlet from the powerhouse at the river.
4. Construct a footbridge, at a location approved by the USFS, that meets Americans with Disabilities Act (ADA) accessibility requirements, conforms to established visual quality objectives, and meets applicable safety standards for a footbridge used for public and administrative access (see supplement 1 & 2).
5. Remove transformer pad, misc. metals, tender's house, and the garage at the Upper American Fork Plant. Remove the shed, footbridge accessing the powerhouse, fencing, railing, and any power generation equipment in the powerhouse, unless otherwise agreed to by the USFS. Remove the abandoned Lower American Fork Plant flowlines.
6. Remove the old septic system (vault and drain lines) for the tender house, and replace on approximately the location of the existing garage with a USFS approved single unit vault toilet (see supplement 3). Develop parking for three vehicles, and construct an aggregate surface trail to the footbridge. Locations of the parking lot, trail, and toilet will be approved by the USDA Forest Service. The parking lot and trail will meet ADA standards. Ingress and egress designs will be approved by UDOT.
7. Protect the highway by backfilling concrete against the existing retaining wall or deepening the wall, if necessary. All concrete backfill must be

covered with 3 feet of native rock. The riprap must extend 2 feet below the depth of the reconstructed channel, or to bedrock, and be at least 36 inches in size to bankfull, except where the river channel bends at the lower intake. Riprap at the lower intake will be at least 48 inches in size to bankfull, and an interspersed of 36-48 inch riprap will be used to armor the new river channel for a length of 30 feet opposite the lower intake.

8. Remove the concrete diversion dam and spillway and roadside retaining wall downstream of the existing footbridge. Modify the powerhouse-side retaining wall, as necessary to prevent undercutting. The purpose of this measure is to ensure a retaining wall protecting the powerhouse and to prevent undercutting by the river.
9. Retain and fill the abandoned Lower American Fork diversion intake structure, including a top surface appropriate for the aggregate trail. Adjacent area will be replanted using native seedlings and seeded using a native, certified noxious weed-free seed mix approved by the USFS.
10. Reconstruct a new river channel in accordance with the designs included on Figure 8 and 9. The final gradient of the new river channel will be uniform from the upstream end of the powerhouse to the point where the new river channel rejoins the old river channel. The width of the channel at the bend of the powerhouse will be at least 25 feet. The river channel will be constructed with native materials where the diversion dam and spillway are removed.
11. Remove the cofferdam. Earth and native rock should be used onsite in channel reconstruction. Concrete in excess of what can be used for riprap to protect the roadway will be disposed of at an approved site off Federal lands. All concrete used on site will be covered with 1-3 feet of native soil and replanted using native seedlings and seeded using a native, certified noxious weed-free seed mix approved by the USFS.
12. Apply all pertinent Best Management Practices (BMPs) including stockpiling and later redistributing topsoil. Construct a floodplain on the hillside of the new channel. Armor the toe of the channel bank using native rock at least 36 inches in size except as indicated in B.7. Revegetate the streambank using native seedlings, and seed all disturbed areas using native, noxious weed-free seed. All seedlings and seed mixes, and specifications and locations for the reconstructed floodplain must be approved by the USFS prior to implementation.

#### **C. Flowline and Penstock**

Contractor shall remove exposed sections of the existing welded steel pipe and cap exposed pipe ends that are left on site, remove existing air vent piping, revegetate

disturbed areas, remove existing miscellaneous pipeline supports, grout fill pipeline under and next to Utah State Route 92 and cap ends, and grout fill pipeline below intake structure and cap ends (see Figure 2, Attachment A and Exhibit A). Work on the flowline within the Lone Peak Wilderness Area will be conducted in a manner consistent with the Minimum Tool Analysis (see Sec. 1A.8). The Minimum Tool Analysis authorizes the controlled use of cutting torches, portable welders, generators, air compressors, helicopters, and controlled blasting to close tunnel entrances, if necessary. The NPS and USFS will approve such work practices on Monument land and Wilderness land, respectively.

1. Remove fully and partially exposed sections of the pipeline and cap exposed pipe ends that are left on site. Leave the penstock (cement anchor blocks, 2 short penstock segments between the powerhouse and block, and about 550 feet of penstock above the block) for historical purposes. Cap the ends of unremoved flowline and penstock segments.
2. Remove existing air vent piping. Remove to at least 2 inches below ground level. If the entire pipe is not removed, cap the ends of the remaining pieces.
3. Remove the cement footers to at least 2 inches below ground level;
4. Grout fill pipeline under and next to Utah State Road 92, and below the intake structure, and cap ends.
5. Seed areas of disturbed soil with native, certified noxious weed-free seed mixes approved by the appropriate land management agency (i.e., NPS or USFS).

The above explanations and listings are intended to give a general definition of the scope of the work under these specifications, and shall not be construed to be an itemized listing of each element of work required. The Contractor shall be responsible for construction or removal of complete facilities, conforming in all respects to the details and requirements of the specifications, drawings, and other contract documents.

**1A.2.2 COMPANY-FURNISHED MATERIALS.** The Company will furnish the following materials which shall be installed under this contract:

**1A.3 WORK NOT INCLUDED UNDER THESE SPECIFICATIONS.** The following items of work will be furnished by the Company:

**1A.4 WORK UNDER SEPERATE CONTRACTS.** In addition to the work under this contract, the Company will perform additional work concurrently or will interface with the work under this Contract. Work which will interface with work under this Contract includes but is not necessarily limited to, the following:

- Removal of equipment from the Powerhouse.
- Relocation of the power line running through the Wilderness Area.

The Contractor shall coordinate his actions and cooperate with other contractors and the Company in the best interest of the project.

**1A.5 DIMENSIONING.** All engineering drawings reflect dimensions taken from existing project drawings. The dimensions have not been field checked.

**1A.6 SCHEDULE.** The time of completion of the work is of the essence of the contract. This shall include the completion of various activities in accordance with the specified milestone dates given in the Contract Documents.

- 1) In regard to in-water work and demolition of the existing in-water structures: The Agencies have given a time frame from mid-May to mid-October. However, the recommended time frame is from after Labor Day to Mid-October (weekdays only).
- 2) In regard to the pipeline removal by Helicopter: The Agencies have given a time frame that includes the following conditions:
  - After Snow Melt.
  - Before Memorial Day.
  - On Weekdays only.

Or

  - After Labor Day to Mid-October.
  - On Weekdays only.

**1A.7 CONSTRUCTION ACCESS.** The methods, means and equipment required to access the construction areas shall be the responsibility of the Contractor and will be integral to the successful completion of the work within the required schedule. The contractor shall thoroughly familiarize itself with the existing site conditions through use of site visits, drawings, records, maps, and available photographs. Contractor shall develop a plan for personnel and equipment access, required construction equipment, crane placement, staging and lay-down areas, concrete delivery system, and the mobilization and demobilization and construction equipment and material.

The Contractor shall be aware that parts of the site are located in the Lone Peak Wilderness, National Forest Lands and crosses Utah State Route 92. The Contractor's access and equipment use methods shall conform to requirements of the regulatory agencies governing the project. The construction and operation of all access operations shall be coordinated with the Company.

**1A.8 WORK PRACTICES.** The Contractor shall perform all work practices within the Wilderness Areas and Timpanagos Cove Monuments Lands conforming to requirements of the regulatory agencies governing the project.

Exceptions to criteria requirements within the Wilderness Areas:

- Helicopters
  - Generators (Portable)
  - Air-Compressors (Portable)
  - Welders (Portable)
  - Gas-Cutting
  - Blasting of specified tunnels.
- Contractor shall procure the services of a licensed technical blaster that is acceptable to the Company and USDA-FS.

**1A.9 ENVIRONMENTAL CONSIDERATIONS.** The Contractor shall perform his work in such a manner so as to minimize the effect of the construction work on the environment and in accordance with the project permit requirements. It shall be the Contractor's responsibility to take appropriate measures to prevent the introduction of soil fines, cement particles, paint, petroleum products, or other deleterious materials into the existing river. All construction equipment that will be working or operating in and around the river shall be thoroughly cleaned prior to entering the construction area to satisfy federal, state, and local regulatory requirements for equipment in a freshwater environment. Work in the waterway shall also be performed in a manner which will minimize turbidity increases in the water, which tend to degrade water quality and damage aquatic life.

## Section 1B – DRAWING LIST.

1B.1 GENERAL. This section lists the drawings which have been prepared for the work under these specifications and documents.

1B.2 CONTRACT DRAWINGS. The following listed drawings shall be part of the contract document:

### Construction Drawings:

<u>Drawing No.</u>	<u>Title</u>
Figure 1	Vicinity Map and General Location
Figure 2	Pipe Cap Detail
Figure 3	Temporary Cofferdam, Diversion Dam Removal
Figure 4	Intake Modifications Temporary Cofferdam, Diversion Dam and Intake Modifications
Figure 5	Dam Removal and Channel Restoration
Figure 6	Powerhouse Facilities Removal, Existing Conditions, Plan and Section
Figure 7	Powerhouse Facilities Removal, Check Dam and Bypass Pipe, Plan and Sec
Figure 8	Powerhouse Facilities Removal, Proposed Final Layout, Plan and Section
Figure 9	Powerhouse Facilities Removal, Proposed Final Layout, Plan and Section

## **Section 1C – ENGINEERING DATA**

**1C.1 GENERAL.** This section covers engineering data including manufacturer's drawings which the Contractor shall submit for review. Timely submittal of engineering data is essential to the scheduled progress and completion of the project and is the essence of this Contract.

Engineering data covering all materials to be furnished under this Contract shall be submitted. These data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials; the external connections, anchorage, and supports required; and dimensions needed for installation and correlation with other materials.

The Company will accept engineering data submittals from the Contractor only.

All engineering data shall be identified with the materials represented by use of the nomenclature established by the contract documents.

**1C.2 CORRESPONDENCE.** Correspondence between the Contractor and the Company shall be as follows:

All submittals shall be made by overnight delivery to:

PacifiCorp  
825 N.E. Multnomah, 1500 LCT  
Portland, OR 97232

Attention: Mr. Mark Sturtevant

**1C.3 REVIEW OF ENGINEERING DATA.** The review of engineering data will cover only general conformity of the data to the specifications and documents, external connections, and interfaces with existing dimensions, which affect the project arrangement. The review does not indicate a thorough review of all dimensions, quantities, and details of the materials or item indicated or the accuracy of the information submitted; nor shall be construed as relieving the Contractor from any responsibility for errors or deviations from the requirements of the contract.

All engineering data submitted, after final processing and acceptance by the Company, shall become a part of the Contract documents and the work indicated or described thereby shall be performed in conformity therewith, unless otherwise required in writing by the Company.

#### **1C.4 DRAWING AND ENGINEERING DATA.**

**1C.4.1 SUBMITTAL.** Three prints of each drawing or data submittal shall be submitted to the Company prints shall be black line on white background (preferred) or blue line on white background.

**1C.4.2 PROCESSING.** A copy of each submittal reviewed will be returned to the Contractor as stipulated herein.

When drawings and data are returned marked EXCEPTIONS NOTED, the changes shall be made as noted thereon; and two corrected copies each shall be submitted to the Company.

When the drawing and data are returned marked RETURNED FOR CORRECTION, the corrections shall be made as noted thereon and two corrected copies each shall be submitted to the Company. Work shall not proceed on materials indicated on drawings or data which have been returned for corrections.

No work shall be performed in connection with the fabrication or manufacture of equipment and materials until the drawings and data have been reviewed by the Company except at the Contractor's own risk and responsibility. Work may proceed on equipment and materials when the drawing and data have been returned marked NO EXCEPTIONS NOTED; and when submittals have been returned marked EXCEPTIONS NOTED, provided the work is performed in accordance with the notations.

## Section 1D - CONSTRUCTION SCHEDULE AND PROGRESS REPORTS

**1D.1 GENERAL.** This section covers the schedule and scheduling requirements for performance and completion of the work included under this Contract. The schedule shall be incorporated into weekly progress reports as specified herein.

**1D.2 CONSTRUCTION SCHEDULE.** The time of completion is of the essence of the contract. The Contractor shall comply with the dates established in the detailed construction schedule agreed to by the Company and the Contractor.

**1D.2.1 MILESTONE DATES.** The milestone dates specified by the Company in the Contract Documents are associated only with the major items of work under this Contract.

The listing of activities and dates is not intended to be a complete or detailed listing of all work under this Contract.

It is understood and agreed that the dates specified by the Company in the Contract Documents are the latest feasible completion dates and that earlier dates may be attained as agreed to by the Company and the Contractor.

**1D.3 CONTRACTOR'S DETAILED SCHEDULE.** Within 90 calendar days after the Company provides Contractor with letter of "Notice to Proceed", the Contractor shall submit a detailed construction schedule. The detailed schedule shall be based upon the dates specified by the Company in the Contract Documents.

The detailed construction schedule shall be in bar graph form acceptable to the Company.

The detailed construction schedule shall contain all activities of the construction plan, including acquisition, fabrication, and installation of equipment and materials. For all equipment and materials fabricated or supplied by the Contractor especially for this project, the schedule shall include the sequence of activities including issuance of purchase orders, preparation of shop drawings, fabrication, and delivery. Each activity shall be identified on the schedule by a descriptive title and shall be assigned an estimated number of working days required and an expected completion date. Periods of multiple shift work and overtime shall be noted.

The Contractor is responsible for determining the sequence and time estimates of the detailed daily construction activities; however, the Company reserves the right to require the Contractor to modify any portion of the schedule the Company determines to be impractical, infeasible, or unreasonable, and as required to coordinate the Contractor's activities with those of other parties and operation of the existing plant, and to assure the completion of the work by the stipulated date.

Schedules returned to the Contractor for revision or correction shall be resubmitted for review within 7 calendar days. Upon acceptance by the Company of the detailed schedule of activities, the Contractor will be responsible for maintaining such schedule.

Once a week the Contractor shall submit with the progress report a complete list of all deviations from the detailed construction schedule to reflect the actual progress of the work, together with his proposed actions to alleviate any delays caused by the deviations.

**1D.4 COORDINATION.** The Contractor shall coordinate his work with that of other parties and shall cooperate fully with the Company in maintaining orderly progress towards completion of the work as scheduled. The Company's decision regarding priority between the Contractor's work and the work of other parties at the project site shall be final and shall not be cause for extra compensation or extension of time, except where extension of time is granted because of actual and unavoidable delay.

**1D.5 PROGRESS REPORTS.** The Contractor shall submit one copy of the progress report to the Company once each week in a format approved by the Company. Each topic shall include a brief narrative with use of charts, graphs, etc., as appropriate. The following topics shall be included:

1. Progress of work.
2. Construction schedule.
3. Installed/Removed quantities.
4. Problem areas.
  - a. Potential delays.
  - b. Potential claims.
5. Material testing and results.
6. Work to be performed during the next week.

## Section 1E - CONSTRUCTION SEQUENCE AND WATER MANAGEMENT PLAN

**1E.1 GENERAL.** This section covers the sequence of construction activities and the management of river flows and construction water for the work included under this Contract.

The construction sequence and water management plan shall coordinate the construction work to meet the project's minimum stream flow requirements downstream of the dam, and satisfy regulatory agency requirements stipulated in the construction permits for the project.

**1E.2 HISTORICAL RIVER FLOW DATA.** The historical river flow data for the months of July, August, September, and October are as follows:

<u>Percent of Time Flow Exceeded</u>	<u>River Flow (cfs)</u>			
	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>
100	13	9	10	12
95	27	16	14	14
90	33	20	17	15
80	43	25	19	18
70	54	28	21	19
60	65	31	22	20
50	77	35	24	21
40	87	37	26	24
30	98	40	29	25
20	119	52	32	26
10	157	63	36	28
5	178	73	45	42

**1E.3 CONSTRUCTION SEQUENCE AND WATER MANAGEMENT.** The work under these specifications shall incorporate the following water management considerations. The Contractor shall submit a detailed construction sequence and water management plan in accordance with Sections 1C and 1D of these specifications.

**1E.3.1 Mobilization.** The Contractor shall mobilize his work force and assemble the necessary equipment and materials to start the construction work. A laydown area is provided onsite for the Contractor's use during construction. Contractor submittals shall also be submitted for approval.

**1E.3.2 Preparation of Facilities for Water Passage During Construction.** The existing project facilities shall be prepared to accommodate the construction of cofferdams and the management of river flow during construction as follows:

Remove diversion dam stoplogs from slots and drain intake.

Clear, grub, and strip area designated for bypass channel construction, and temporary road. Remove cleared and grubbed material from the site.

Excavate bypass channel beginning at the lower end of earth fill on the south side of the American Fork River and working upstream.

Excavate river channel to divert river into bypass channel.

**1E.6.3 Cofferdam Installation.** Installation of the cofferdams shall include the following activities:

Install upstream cofferdam from between bypass channel and diversion dam across the existing river channel with materials from the excavation of the bypass channel.

**1E.3.4 Diversion Dam and Spillway Apron Removal.** Below the dewatered cofferdam area, the Contractor shall perform the work included in these specifications with the following general sequences of activities:

Remove diversion dam, spillway apron and south side wing wall.

Place removed materials upstream of intake.

Fill intake with concrete rubble and removed embankment material.

Install existing fuse plug Rip Rap alongside intake and newly deposited concrete materials.

**1E.6.5 Cofferdam Removal.** The removal of the project cofferdams shall be performed as follows:

Remove upstream cofferdam, distribute along stream banks, contour and create a floodplain, cover with soil and revegetate.

**1E.6.7 Demobilization.** The Contractor shall demobilize his workforce and remove all construction equipment and materials from the site. The Contractor's laydown area shall be returned to its original condition.

## **Section 2A - RAZING AND ALTERATIONS**

**2A.1 GENERAL.** This section covers razing, removal, and alteration of existing structures and materials.

Structures designated to be razed or modified shall include, but shall not be limited to, the existing structures and materials described in this section and designated on the drawings.

Equipment and materials shall be removed within the indicated areas. These include but are not limited to the following:

Existing diversion dam.

Existing intake controls building.

Existing intake tainter gate.

Existing intake trashracks (two).

Existing intake hoist structures.

Existing stoplogs and stoplog slots.

Existing walkways, railing, fencing, gates, and miscellaneous metals.

Existing spillway apron.

Designated portions of existing steel pipeline.

Existing House, Septic System, and Transformer Pad.

Existing Old American Fork Flowline.

Materials shall be removed at least flush with or beyond the limits indicated.

Equipment and materials to be turned over to the Company for salvage include the following:

Existing motor actuator

Existing control panels

Existing hoist

Contractor shall notify Company's on-site representative when these materials have been removed and are ready for pick-up by Company crews.

**2A.2 CONDITIONS OF STRUCTURES.** The drawings indicate the assumed locations of existing construction and equipment, but the Company does not guarantee this data. The full extent and nature of the work shall be determined by a thorough inspection of the site.

**2A.3 PROTECTION.** Existing utilities shall be disconnected by the Company. Temporary service shall not be provided during construction.

Existing structures, utilities, and equipment that are designated to remain in place shall be protected from damage. All damaged structures and equipment shall be promptly repaired. Special attention shall be directed to the safety and protection of plant operating personnel and construction personnel engaged on the premises.

Razing and alteration activities performed on existing structures shall be performed in accordance with applicable regulations and ordinances. Paint materials on existing surfaces may contain lead, chromate, or other objectionable compounds. The blasting, torching, or cutting of the existing materials may expose workmen and bystanders to hazardous wastes and vapors. When such materials and compounds are located, they shall be handled in accordance with the applicable regulations and ordinances.

The Contractor shall use protection measures to prevent concrete dust and rubble from entering the water.

**2A.4 RAZING.** Razing methods shall be in accordance with all codes, ordinances, and requirements of the governing authority; shall be acceptable to the Company; and shall ensure the safety of persons, equipment, and existing structures.

Materials and equipment designated to be salvaged for reuse or turned over to the Company for future use shall be removed without damage.

Materials not salvaged for reuse or turned over to the Company shall be disposed of in accordance with the article titled SALVAGE AND RUBBISH.

**2A.5 CONCRETE MODIFICATIONS.** Concrete removal shall be planned and executed to proceed without delay. Vibration, dust, and rubble shall be kept to a minimum. Sections of concrete designated to be removed shall have the outline of the section scored on the exposed surface with a concrete or masonry saw. Score lines shall be straight and parallel or perpendicular to the major axis of the structure, unless otherwise designated by or acceptable to the Company.

Concrete rubble to be placed into intake area shall have a maximum size of 12 to 24 inches square.

Exposed broken and irregular surfaces of remaining concrete shall be finished to match comparable adjacent exposed concrete surfaces unless indicated otherwise on the drawings.

Razed concrete and other debris shall be removed from the site in accordance with the

article titled SALVAGE AND RUBBISH.

**2A.6 MISCELLANEOUS METAL MODIFICATIONS.** Razed metal materials shall be reused only if indicated on the drawings or as specified. Materials not designated or specified to be reused shall be disposed of in accordance with the article titled SALVAGE AND RUBBISH.

Welding shall be in accordance with the section titled STRUCTURAL STEEL AND MISCELLANEOUS METALS. No unauthorized welding shall be performed on existing structures. Paint shall be removed from the joint surfaces to be welded.

Cuts shall be neatly made and ground smooth. Weld metal remaining on existing steel after modifications shall be ground flush with the remaining surfaces.

**2A.7 SALVAGE AND RUBBISH.** Except for materials or equipment designated to be retained, all razed materials, debris, and rubbish shall become the property of the Contractor and be promptly removed from the site and legally disposed of in accordance with all applicable laws, ordinances, rules, and regulations.

**2A.8 CLEANUP.** At the completion of razing work, the entire razed area shall be cleaned of all construction related debris to the satisfaction of the Company.

## Section 2B - DEWATERING

**2B.1 GENERAL.** This section covers Contractor designed, furnished, installed, maintained, and operated dewatering systems for all cofferdams and excavations required for spillway modifications covered under these specifications.

Should pumping systems be required, selection of pumping capacity for dewatering systems furnished for the upstream cofferdam shall be made by the Contractor.

The Contractor shall notify the Company prior to beginning dewatering of any cofferdam or excavation.

## **Section 2C - CLEARING, GRUBBING, AND STRIPPING**

**2C.1 GENERAL.** This section covers clearing, grubbing, and stripping for the cofferdam installation and temporary road construction on the north bank.

**2C.2 CLEARING AND GRUBBING.** Clearing shall include clearing and removing all trees and stumps within the cofferdam and temporary road areas; the cutting and removal of all brush, shrubs, debris, and all vegetation to approximately flush with the ground surface; and the disposal of all cuttings and debris. Mowing will be considered adequate for the cutting of light vegetation.

Grubbing shall include the removal and disposal of all stumps and roots larger than 2 inches in diameter, including matted roots regardless of size. Vegetation up to 2 inches in diameter shall be crushed, shredded, and incorporated with stockpiled topsoil materials.

Grubbing shall extend to a depth of 6 inches below the natural surrounding ground surface.

Equipment utilized in the clearing and grubbing work shall be kept within the limits of the areas.

## **Section 2D - COFFERDAMS**

**2D.1 GENERAL.** This section covers materials and installation requirements for cofferdams.

The Contractor shall furnish and install complete cofferdam systems in accordance with the alignments and details indicated on the drawings.

The Company will obtain the permits for work to be completed in the water. The Contractor shall perform all work in accordance with all provisions of the permits and these specifications.

Any materials found not to be in compliance with these specifications shall be removed and replaced at the Contractor's expense.

The Contractor shall notify the Owner prior to beginning construction of any of the cofferdams.

Dewatering shall be as specified in Section 2B-DEWATERING.

**2D.2 DRAWINGS AND DATA.** Installation methods and schedule for cofferdam shall be provided in the Proposal.

The Contractor shall include in his proposal price the cost of cofferdam specified herein and indicated on the drawings. The Contractor may propose as an option, however, alternate cofferdam designs. The acceptance of optional cofferdam systems is at the discretion of the Owner. The design of any proposed cofferdam alternatives will be the responsibility of the Contractor.

**2D.3 MATERIALS.** Materials for cofferdam systems shall be as follows:

Earthen cofferdams

Rockfill material taken from Company's diversion dam plug.

**2D.4 COFFERDAM CONSTRUCTION.** Cofferdam systems shall be constructed at the locations indicated on the drawings. Construction shall be in accordance with the lines, grades, cross sections, and details indicated on the drawings.

Earthen cofferdams shall be constructed by placing, spreading, and compacting fill material. Compaction shall be provided by a minimum of 3 passes of earth moving equipment.

**2D.5 COFFERDAM REMOVAL.** All cofferdams shall be removed by the Contractor after their function is complete. All cofferdam and temporary road construction rockfill material shall be removed following completion. Materials shall be used onsite to create a

floodplain or be disposed of at an approved site off federal lands

All disturbed areas reestablished to their original contour and condition in accordance with Section 2E - EROSION CONTROL.

## Section 2E - EROSION CONTROL

**2E.1 GENERAL.** This section covers the furnishing of materials and equipment, and the performance of all operations in connection with establishing vegetation as indicated on the drawings or areas disturbed by the construction. All areas disturbed or newly created by the construction activity shall be seeded.

All disturbed areas shall be rough graded at project completion to match existing ground contours.

The Contractor shall not start erosion protection or preparatory work until notified by the Company and until excavation and trenching, backfill, embankments, rough grading, and surfacing are completed in the vicinity of the erosion protection work.

**2E.2 MATERIALS.** Materials and workmanship shall comply with the USDA-FS selections for seeding.

**2E.3 TEMPORARY EROSION CONTROL.** During the construction work, the Contractor shall provide silt fences, straw bales, or other devices to control erosion and to prevent fines from entering the river due to surface runoff from disturbed areas.

## Section 3A - GROUTING

3A.1 GENERAL. These specifications cover materials, methods, and procedures for grouting. Grout shall be placed at location indicated on drawings

3B.2 MATERIALS. Materials shall be in accordance ATTACHMENT A (Flowable Fill).

ASTM C-618      Class F  
AASHTO M-43-88

3A.2 PRELIMINARY REVIEW. The source and quality of concrete materials and the grout proportions proposed for the work shall be submitted to the Company for acceptance before awarding of contract. Complete certified reports covering the materials and proportions shall be prepared by an independent testing laboratory and submitted to the Company.

3A.2 PLACEMENT. A complete description of equipment, materials and methods used to install the grout shall be submitted to the Company for acceptance before awarding of contract.

## Section 3B - CAST-IN-PLACE CONCRETE

**3B.1 GENERAL.** This section covers cast-in-place concrete and includes reinforcing steel, forms, finishing, curing, and other appurtenant work.

**3B.2 MATERIALS.** Materials shall be in accordance with the following requirements. Acceptable products and manufacturers are listed with the materials below. Products of other manufacturers may be used if acceptable to the Company:

Cement	ASTM C150, Type I or II.
Fine aggregate	Clean natural sand, ASTM C33. Manufactured sand will not be acceptable.
Coarse aggregate	Crushed stone, washed gravel, or other acceptable inert granular material conforming to ASTM C33, class designation 4S.
Water	Potable and free from deleterious substances. Iron shall not exceed 0.25 ppm.
Admixtures	
Plasticizer	ASTM C494, Type A.
Grace	"WRDA 17."
Master Builders	"Pozzolith 300N."
Protex	"Procrete N."
Sika Chemical	"Plastocrete 161."
Cormix	"PSI-N."
Air-entraining agent	ASTM C260.
Grace	"Darex AEA."
Master Builders	"Micro Air."
Protex	"Air Entraining Solution."
Sika Chemical	"AER."
Cormix	"Airtite."

Plasticizing retarder	ASTM C494, Type D.
Grace	"Daratard 17."
Master Builders	"Pozzolith 300 R."
Protex	"Procrete R."
Sika Chemical	"Plastocrete 161R."
Cormix	"PSI-Retarder."
Reinforcing steel	
Bars not otherwise noted	ASTM A615, Grade 60. Yield strength shall be determined by full size bar tests.
Bar supports	CRSI Class 3 where in contact with formed surfaces that will not be exposed. CRSI Class 1 plastic protected for use in contact with forms for exposed surfaces.
Form coating	
Nox-Crete	"Nox-Crete Form Coating"
L&M	"Debond."
Protex	"Pro-Cote."
Richmond	"Rich Cote."
Polyethylene film	Fed Spec L-P-378D, Type I; 6 mil.
Epoxy bonding compound	
Sika Chemical	"Sikadur Hi-Mod."
Membrane curing compound and floor sealer	Styrene-acrylate or styrene-butadiene; minimum 18 percent solids, nonyellowing, unit moisture loss 0.039 g/sq cm maximum.
Cormix	"Sealco 800."
ProSoCo	"Kure and Seal."
Procrete	"Cure-N-Seal 30."
Sonneborn	"Kure-N-Seal 800."
L&M	"Dress & Seal."

**3B.3 PRELIMINARY REVIEW.** The source and quality of concrete materials and the concrete proportions proposed for the work shall be submitted to the Company for acceptance before starting the concrete work. Complete certified reports covering the materials and proportions shall be prepared by an independent testing laboratory and submitted to the Company.

**3B.4 LIMITING REQUIREMENTS.** These requirements shall apply to concrete containing either the specified plasticizer or plasticizing retarder. A plasticizer or plasticizing retarder shall be included in all concrete mixes:

		<u>MIX CLASS TABLE</u>					
		7 Day	28 Day	Coarse	Minimum		Max
		Strength	Strength	Aggregate	Max Cement		Water/
<u>Mix</u>	<u>Usage</u>	<u>(psi)</u>	<u>(psi)</u>	<u>Size,</u>	<u>Slump (lb/cu yd)</u>		<u>Cement</u>
<u>Class</u>				<u>No.4</u>			<u>Ratio</u>
				<u>Sieve to</u>			
I	Spillway Lower Wall	3,000	4,000	3/4"	4"	600	0.45

Total volumetric air content of concrete after placement shall be 5 percent with a tolerance of plus or minus 1 percent. Air-entraining admixture may be added to the concrete onsite to meet the tolerance criteria provided the mixing truck turns 50 revolutions after addition of the agent.

**3B.5 BATCHING AND MIXING.** Batching and mixing shall be performed at an acceptable ready-mix concrete supplier. Ready-mixed concrete shall conform to ASTM C94, except as otherwise specified.

Truck mixers shall have a revolving drum and shall be equipped with a mixing water tank. The required amount of mixing water for the concrete mix shall be placed in the tank, unless the tank is equipped with a metering device that allows verification of the water amount added to each batch.

A delivery ticket shall be prepared for each load of ready-mixed concrete. A copy of each ticket shall be handed to the Company's site representative by the truck operator at the time of delivery. Tickets shall indicate the mix identification, the number of yards delivered, the quantities of each material in the batch, the outdoor temperature in the shade, the time the cement and water were added, and the numerical sequence of the delivery.

After the addition of water to the cement, truck mixers shall discharge concrete within 1-1/2 hours and before the mixing drum makes 300 revolutions. In hot weather, or under conditions contributing to quick stiffening of the concrete, a time less than 1-1/2 hours may be required by the Company. When a truck mixer is used for the complete mixing of the concrete, the mixing operation shall begin within 30 minutes after the cement has been added to the aggregates.

**3B.6 PLACEMENT.** The handling, depositing, and compacting of concrete shall conform

to these specifications. Adjustment may be made by the Company for weather or placement conditions.

The Company shall be notified at least 24 hours in advance of the times and locations where concrete is being placed.

Concrete shall not be pumped through aluminum or aluminum alloy pipe.

The space receiving concrete shall be completely clean and cleared of all debris and standing water, and the entire installation shall be acceptable to the Company before concrete is placed.

Surfaces encrusted with dried mortar or concrete from previous placement operations shall be cleaned before placing new concrete.

The surface of hardened concrete, upon which fresh concrete is placed, shall be rough, clean, and damp. Surface mortar shall be removed to expose the aggregate. The hardened surface shall be cleaned of all foreign substances, washed with clean water, and kept saturated during the 24 hour period preceding placement of fresh concrete.

Concrete shall be conveyed to the placement location by methods that prevent separation or loss of the ingredients.

Compaction shall be in accordance with ACI 301. Concrete shall be compacted using mechanical immersion type vibrating equipment.

**3B.7.1 Hot Weather Concreting.** Hot weather concreting shall be in accordance with the recommendations of ACI 305R. A water reducing retarder shall be added to the concrete mix when the placement temperature of the concrete exceeds 75 F.

At air temperatures of 90 F and above, special procedures shall be used to keep the concrete as cool as possible during placement and curing. The temperature of concrete shall not exceed 90 F when placed.

When the air temperature exceeds 95 F, membrane cured slabs shall be kept wet during the curing period.

**3B.7.2 Cold Weather Concreting.** Cold weather concreting shall comply with ACI 306.1.

Calcium chloride shall not be used.

**3B.8 FINISHING UNFORMED SURFACES.** Unformed surfaces shall be finished by screeding and floating.

Float finished and screeded surfaces shall be finished to provide a flat profile within 1/4 inch deviation as measured from a 10 foot straightedge. Trowel finished surfaces shall be finished to form a flat plane.

**3B.9 CURING.** Concrete shall be protected from loss of moisture for not less than 7 days after the concrete is placed.

**3B.9.1 Water Curing.** Water saturation of concrete surfaces shall begin immediately after initial set of the concrete. The rate of water application shall be regulated to provide complete surface coverage with a minimum of runoff. The concrete surface shall not be permitted to dry.

**3B.9.2 Membrane Curing.** Membrane curing compound shall be applied within 30 minutes after final finishing of the surface or as soon as possible after finishing without causing damage to the surface. Membrane curing compound shall be spray applied at a coverage of not more than 300 square feet per gallon. Membrane curing shall not be used on surfaces that will be covered at a later date with mortar, concrete, dampproofing, tile, or any coating.

**3B.10 REPAIRING DEFECTIVE CONCRETE.** Surface defects in formed concrete shall be repaired to the satisfaction of the Company within 24 hours. Concrete that is porous, honeycombed, or otherwise defective to a depth in excess of 1 inch shall be cut out and removed to sound concrete. Edges shall be square cut to avoid feathering. Cut surfaces shall be coated with epoxy bonding compound before the concrete is placed.

Defective concrete shall be replaced within 48 hours after the forms have been removed.

Concrete repair work shall not interfere with the curing of surrounding concrete. Mortar and concrete used in repair work shall be adequately cured and shall be finished to match adjacent surfaces.

## Section 5A - STRUCTURAL STEEL AND MISCELLANEOUS METALS

**5A.1 GENERAL.** This section covers the materials, fabrication, and erection requirements for structural and miscellaneous metals.

Except as otherwise specifically noted on the drawings, or specified herein, all materials furnished and work performed in connection with miscellaneous metals work shall be in conformity with the AISC "Manual of Steel Construction, Allowable Stress Design, Ninth Edition."

**5A.2 MATERIALS.** Materials shall be new and undamaged and shall conform to pertinent AISC and ASTM standard specifications and the following requirements:

### Welding electrodes

ASTM A36 steel,  
ASTM A500 Grade B  
steel, ASTM A441  
steel, and ASTM A572  
Grades 42 and 50  
steel

Low-hydrogen types (for SMAW),  
AWS D1.1-94 (as specified in  
Table 4.1 "Matching filler metal  
requirements"). Tensile strength  
range of 70,000 psi minimum.

**5A.3 CARBON STEEL WELDING.** Except as otherwise specified, all welds, welding, and related operations for carbon steel shall be in conformity with the applicable provisions of the AWS Structural Welding Code, AWS D1.1-94 as issued by the American Welding Society.

Except as otherwise specified, welding shall be performed using only those joint details and welding procedures which are prequalified in accordance with the referenced AWS code.

Welds that are not dimensioned on the Engineer's drawings shall be sized to develop the full strength of the least strength component involved in the connection.

Components to be welded shall be accurately positioned and shall be rigidly secured during welding.

**5A.5 ERECTION.** Metal materials shall be erected in accordance with AISC, the Engineer's drawings, the erection drawings, and these specifications.

## LARGE-FORMAT IMAGES

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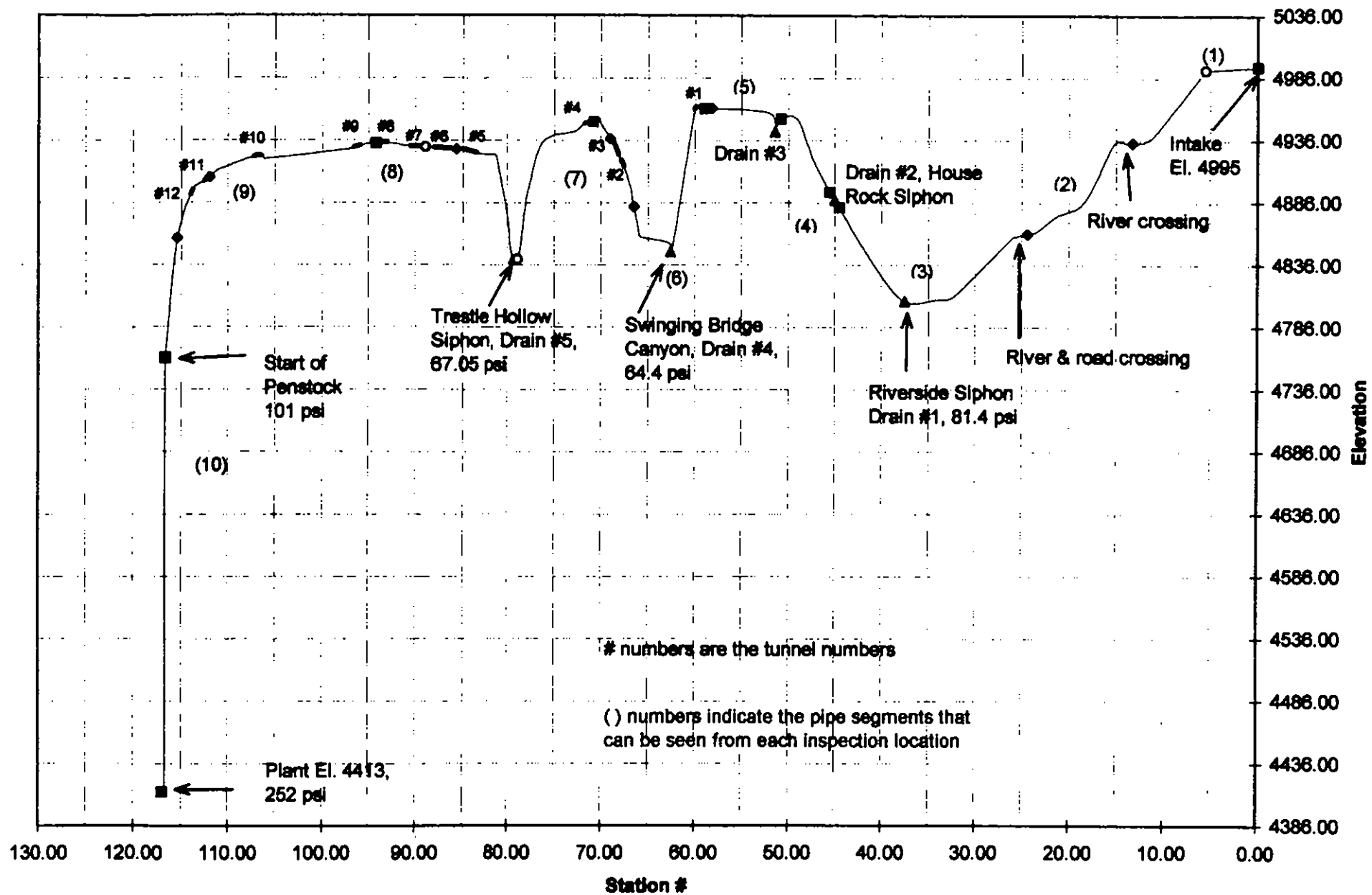
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# American Fork Flowline Profile



— Elevation ■ Start/End ▲ Drain Valve ■ Air/Vac ♦ Expansion ○ Coupling — Tunnels

**EXHIBIT A**  
**American Fork Removal Project**  
**Flowline Retirement Plan**

<b>STATIONS (Approx.)</b>	<b>LENGTH (feet)</b>	<b>DESCRIPTION</b>	<b>RETIREMENT PLAN</b>	<b>ITEM</b>
0+00 - 5+00	500	Partially exposed	Grout fill and cap ends	5a
5+00 - 15+00	1000	Partially exposed	Remove and cap ends, remove any remaining wood flowline	5b
22+93 - 25+97	304	Partially exposed and crosses river	Remove and cap ends	5b&5c
26+40 - 30+00	360	Under State Highway 92	Grout fill and cap ends	5a
37+52 - 37+72	20	Near drain #1	Remove and cap ends	5b
37+52	60	Drain #1	Remove pipe, drain valve and cap both ends	5b
45+80 - 46+55	75	Partially exposed east of repair area (W7)	Remove and cap ends	5c
43+80 - 45+80	200	Between expansion joints (W) Repaired area	Remove and cap ends	5d
50+76	75	6" air vent pipe near #3 drain (W)	Remove	5d
51+45	-	#3 valve stem and protector pipe (W)	Remove	5d
51+45	50	Along cribbing section (P)	Remove top section of cribbing, pipe and cap both ends	5e
60+43	10	6" air vent pipe above tunnel #1 (P)	Remove	5e
60+43		Tunnel # 1	Do nothing	5f
60+43 - 62+10	167	Partially exposed (P)	Cover area with vegetation	5e
65+82 - 68+00	218	Fully exposed thru Tunnel #2 (P)	Remove pipe and cap ends, remove old wood at entrance	5d
67+32 - 67+82	-	Tunnel #2 (P)	Do nothing	5f
68+00 - 68+50	50	Fully exposed between tunnels #2 and #3 (P)	Remove and cap ends	5d
68+42 - 68+70	-	Tunnel #3 (P)	Do nothing	5f
68+96 - 70+50	154	Fully exposed pipeline between #3 and #4 tunnels (P)	Remove pipe, pipe cables, center support and cap both ends	5d
70+25 - 71+76	-	Tunnel #4 (P)	Do nothing	5f
72+94 - 73+24	30	Partially exposed (P)	Remove and cap ends	5e
74+00 - 74+40	40	Partially Exposed (P)	Remove and cap ends	5d
78+90 - 79+35	46	Fully exposed pipeline crossing Tressel Hollow (P)	Remove and cap ends (leave cribbing in-place)	5d
84+96	-	Tunnel #5 (W)	Do nothing	5f
85+15 - 86+35	120	Fully exposed (W)	Remove and cap ends	5d

**EXHIBIT A**  
**American Fork Removal Project**  
**Flowline Retirement Plan**

86+20 - 87+88	-	Tunnel #6 (W)	Do nothing	5f
88+50 - 89+55	105	Fully exposed (W)	Remove and cap ends (leave rock wall in-place)	5d
90+43 - 90+68	-	Tunnel #7 (W)	Do nothing	5f
93+25 - 94+61	-	Tunnel #8 (W)	Do nothing	5f
94+61	70	Air vent pipe (W)	Remove	5e
94+61 - 95+21	60	Partially exposed (W)	Remove and cap ends	5e
94+65	30	6" air vent pipe (W)	Remove	5d
95+71 - 96+67	-	Tunnel #9 (W)	Do nothing	5f
106+30 - 107+12	-	Tunnel #10 (W)	Do nothing	5f
111+16 - 112+00	84	Fully exposed (W)	Remove pipe, center support and cap ends	5d
112+36	-	Tunnel #11 (W)	Do nothing	
113+60	-	Tunnel #12 (W)	Do nothing	
113+95 - 116+17	222	Fully exposed (W)	Remove and cap end	5d
116+17 - powerhouse	550	Exposed penstock (W)	Do nothing	

**Total            4,050    Amount of Pipe to be removed**

(W) - Lone Peak Wilderness Area (USFS)

(P) - Timpanogos Cave National Monument Area (NPS)

<b>Subject:</b>	<b>ATTACHMENT A</b>	<b>Section:</b>
<b>FLOWABLE FILL</b>		<b>605</b>

**605.1  
DESCRIPTION**

**605.1.1** Specialized concrete designed to fill around small conduit (type A) and large pipe (type B).

**605.1.2** Furnish and place Flowable Fill, type A or B as shown.

**605.2  
MATERIALS**



**605.2.1** Use specified size aggregate, concrete sand, Type II or III Portland Cement, Type F Fly Ash, and approved accelerator.

**605.2.2** Proportion Type A mix as follows (2.0 m<sup>3</sup> min.):

**605.2.2.1** 40% coarse aggregate — Use AASHTO #7 aggregate.

**605.2.2.2** 60% concrete sand

**605.2.2.3** 95 kg cement

**605.2.2.4** 28 kg type F Fly Ash

**605.2.2.5** Calcium chloride 2% max or an approved accelerator

**605.2.2.6** Slump 130 to 170 mm.

**605.2.3** Proportion Type B flowable fill as follows (2.0 m<sup>3</sup> min.):

**605.2.3.1** Type B mix — Use AASHTO #68 aggregate with 0-15% passing the 75 mm sieve, and concrete sand.

**605.2.3.2** 28 kg cement/m<sup>3</sup> (minimum)

**605.2.3.3** 94 kg type F Fly Ash/m<sup>3</sup>

**605.2.3.4** Accelerator 2% maximum if calcium chloride; other approved accelerators as recommended by manufacturer

## **SECTION 605 -- FLOWABLE FILL**

### **605.3 CONSTRUCTION REQUIREMENTS**

**605.2.3.5 Slump 130 to 250 mm**

**605.2.3.6 Maximum compressive strength 1725 kPa @ 28 days.**

**605.2.3.7 Minimum compressive strength 345 kPa @ 28 days.**

#### **605.3.1 Components**

**605.3.1.1** Combine all components except the calcium chloride or approved accelerator as follows: A minimum of 2 m<sup>3</sup> from an acceptable batch plant. Add the calcium chloride or an approved accelerator at the job site within 60 minutes after initial batching and mix for 70 revolutions at the recommended RPM.

**605.3.1.2** Place and vibrate the flowable fill.

#### **605.3.2 Type**

**605.3.2.1 Type A flowable fill** — Provide a minimum cure time of 3 hours.

**605.3.2.2 Type B flowable fill placement:** Discharge the fill from a ready mix truck by any reasonable means into the area to be filled. Bring the fill up to the bottom of the asphalt concrete unless otherwise shown.

### **605.4 METHOD OF MEASUREMENT**

#### **605.4.1 General**

**605.4.1.1 Type A flowable fill** — will not be measured.

**605.4.1.2 Type B flowable fill** — by the cubic meter, in place.

**605.4.1.3 Type B excavated area:** The measurement will be limited to vertical planes 0.6 m wider than the outside pipe diameter.