Williams · Bradbury

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2012 MAY -4 PM 2:00

IDAHO PUBLIC
UTILITIES COMMISSION

May 4, 2012

Ms. Jean Jewell
Commission Secretary
Idaho Public Utilities Commission
472 W. Washington
Boise, ID 83702

Re: GNR-E-11-03

Dear Ms. Jewell:

Please find enclosed an original and nine copies of the Direct Testimony of Ted Sorenson on behalf of Renewable Energy Coalition for filing in the above referenced case. The first copy of the testimony is designated as the reporter's copy, together with the requested CD-ROM for the reporter.

Thank you for your assistance in this matter. Please feel free to give me a call should you have any questions.

Sincerely,

Ronald L. Williams

Ronald L. Williams

RLW/jr
Enclosures

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2012 MAY -4 PM 2:00
IDAHO PUBLIC
UTILITIES COMMISSION

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE COMMISSION'S REVIEW OF PURPA QF CONTRACT PROVISIONS INCLUDING THE SURROGATE AVOIDED RESOURCE (SAR) AND INTEGRATED RESOURCE PLANNING (IRP) METHODOLOGIES FOR CALCULATING PUBLISHED AVOIDED COST RATES.	CASE NO. GNR-E-11-03

RENEWABLE ENERGY COALITION

DIRECT TESTIMONY

OF

TED SORENSON

Q. Please state your name and business address.

A. My name is Ted Sorenson P E and my business address is 5203 S. 11th East, Idaho Falls, Idaho.

Q. By whom are you employed and in what capacity?

A. I am employed by and am the owner of Sorenson Engineering.

Q. What is your educational background?

A. I received a Bachelor of Science in Civil Engineering, December 1974, from the University of Idaho and a Masters in Civil Engineering, May 1976, also from the University of Idaho.

Q. Please describe your professional and work experience.

A. I am a registered professional engineer in in the states of Idaho, Oregon, Montana and Colorado. Attached as Exhibit No. 801 is a summary list of the hydroelectric projects I have completed in my career. I have ownership in 5 hydro projects in Idaho, and in other projects in other states and countries. I am also a member of the Renewable Energy Coalition.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to respond to some of the proposals of Idaho Power Company, Rocky Mountain Power, and Avista Utilities as they relate to small Q F projects, and more specifically, small canal and run-of-river hydro projects.

Q. Should the Commission continue distinctions between certain types and/or sizes of PURPA projects?

A. Yes. First, the Commission needs to recognize differences between larger and smaller PURPA projects, and also between certain types of PURPA projects. This includes the importance of recognizing the difference in needs and significance of existing hydroelectric projects versus proposed new projects. For example, I believe the standard rate eligibility cap for resources that cannot be disaggregated should be reinstated to ten megawatts, nameplate capacity. There should remain in place a threshold for access to a simpler, more efficient contracting system, for projects that do not have the ability to easily multiple one project into several. Because of the unique physical characteristics and location of small-scale hydroelectric facilities in Idaho, developers of hydro projects smaller than 10 MW should continue to have access to standard, published QF rates. They also need a more streamlined and transparent contracting process which would include a standard form power purchase agreement (PPA) for both existing and new projects, reasonable pre-conditions and certainty and/or predictability to changes in avoided cost prices.

Q. Why is this cap distinguishing certain types or sizes of QFs important?

A. Contrary to what is said or implied in some of the utility testimony, many small hydro developers do not have the sophistication and financial resources to separately negotiate individual PPAs, especially when avoided cost prices can change quickly or often. While the consulting and legal expertise needed to calculate individual IRP rates and negotiate a PPA can always be retained, the reality is that outside legal and consulting fees can quickly make a small hydro project uneconomic. Nor does a small hydro developer such as myself have the benefit of spreading the costs of negotiating one PPA over three, four of five additional mirror-image projects.

Q. What other recommendations do you have for small projects below the eligibility cap?

A. I endorse the recommendations of Mr. Don Schoenbeck, the expert witness for REC, the Twin Falls Canal Company and the North Side Canal company, related to standard rates, procedures and the time frames for changes in avoided cost rates, for projects below a 10 MW eligibility cap.

Q. Idaho Power also proposes that QF contracts be limited to five years. What is your opinion of this recommendation?

A. It is a punitive proposal that seems primarily designed to wreck the QF industry, or at least would kill the small hydro QF industry. It would be virtually impossible to finance the building of a new hydro project based on the revenue stream of a five year contract. Hydro QFs, by their very nature, are extremely capital intensive and need longer-term contracts in order to debt finance the capital costs necessary for a new dam, turbines and other equipment. Idaho Power knows and understands this; it is a hydro rich utility and its ratepayers benefit from this legacy of large, long-term capital investments in similar assets. Once operating, hydro generation has virtually no fuel cost.

Q. How does Idaho Power's 5 year contract length also impact existing QF hydro projects?

A. Many existing projects with PPAs starting to expire could be at risk of continued operation. In essence, some of these legacy hydro QFs on the Idaho Power or PacifiCorp system might have to shut down, if only 5 year contracts were available. Dam repairs, equipment upgrades including interconnection, installation of better or more efficient environmental protection, and re-newed governmental permits are many times required at the end of a PPA. Without an adequate long-term PPA, these essential and often required repairs and improvements could not be financed. It is disingenuous for Idaho Power to expect its ratepayers to commit to paying for similar major capital investments involved in the Shoshone Falls power plant rebuild, but then assert that hydro PURPA projects should not be treated the same, in order to protect customers from market risk. The same risk applies to both types of projects, and the same benefits of preserving and extending the life of the hydro system applies equally to both QF hydros and utility owned hydros. I must also point out that Avista and Rocky Mountain do not appear to believe that 20 year QF contracts are a problem.

Q. Do you have a recommendation regarding standardization of avoided costs for smaller projects?

A. Yes. I agree with Rocky Mountain Power witness Brown where she recommends a standardization of avoided cost rates for non-wind and non-solar QFs below an eligibility cap threshold, because it provides a simple and transparent means of pricing that minimizes transaction costs.

Q. What about standard contracts and procedures?

A. I believe there are also elements of Rocky Mountain Power witness Clements' testimony, with respect to larger projects, that would have value for both the utility and the QF, for projects below the eligibility cap. For example, and without endorsing specific components of Mr. Clements' proposed Schedule 38, the concept of a list of requirements and schedule of actions and responses, would provide transparency, simplicity and certainty to QFs below a 10 MW cap. The major addition I believe is necessary for small projects would be to also develop standardized contracts. These are similar to requirements which Idaho Power and PacifiCorp must meet in other states and to a great extent already exist.

Q. Idaho Power proposes a new Schedule 74 which would allow the company to interrupt deliveries from QFs during periods of low load, and instead run its own base load generation, which it classifies as "must run." The Company classifies its run of river hydro plants as "must run," stating that it cannot back these units down. (Parks, at page 24).

Q. Do you agree that run-of-river hydro units should be classified as must run?

A. No. From a physical or operational standpoint, hydro units are very flexible in when and how much electricity they generate.

Q. Without getting into a discussion of legal issues concerning what Idaho Power's FERC licenses may or may not require, is it physically possible to ramp hydro generation, up or down?

A. Yes. For run-of –river hydro projects it is almost always physically possible to back down or curtail hydroelectric generation without impacting downstream flows. This can happen in several ways. If a hydro project is using a Pelton Turbine, water can still pass through the turbine, without the turbine actually generating electricity. For other types of turbines, such as Frances or Kaplan, direct water pass-through does not work and water would be diverted to pass around the turbine and be "spilled" into the river below.

Q. Can you provide an example?

A. Yes, a good example would be Idaho Power's Shoshone Falls hydro plant. If Idaho Power wished to curtail generation at this plant, it would simply divert water away from the plant's penstock leading down to plant, allowing the water to instead go over Shoshone Falls and into the river below the generating facility.

Q. Once curtailed, could generation at Shoshone Falls then be quickly brought back on line?

A. Yes. The turbine wicket gates would be opened, the water would again flow to the generators and the Shoshone Falls plant would be back on line, in a relatively short period of time.

Q. Rocky Mountain Power recommends that environmental attributes (EAs) generated by a QF project, including renewable energy credits (RECs), should go to the utility, along with the QF energy sold to the utility. Do you agree?

A. I think it should depend on the type of resource identified by the utility in its IRP as the next major identifiable avoided generating asset. If that avoidable resource is a renewable resource, then the EAs and RECs from the QF renewable resource should go to the utility as part of the power sale. After all, the QF resource in this instance is deferring the utility owned renewable resource, and it makes sense that the utility should also get the EAs and RECs as part of the power purchase.

On the other hand, if the next IRP identified avoidable resource of a utility that is used to set the standard avoided cost is not a renewable resource – for instance, a gas fired power plant – the EAs and RECs from a renewable QF sale should not also transfer to the utility along with the sale of power, without additional compensation. For Idaho Power and PacifiCorp, the next avoidable generating units appear to be gas fired power plants. In the case of these two utilities, the EAs and RECs for renewable QF projects selling power to them should remain with the developer and the standard contracts developed for projects below the 10 MW eligibility cap should contain a clear statement to that effect.

Q. Does this conclude your testimony?

A. Yes

CERTIFICATE OF DELIVERY

I HEREBY CERTIFY that on this 4th day of May, 2012, I caused to be served a true and correct copy of the foregoing document upon the following individuals in the manner indicated below:

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/s/ *Ronald L. Williams*

Ronald L. Williams

BEFORE THE

IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. GNR-E-11-03

RENEWABLE ENERGY COALITION

SORENSON, DI
TESTIMONY

EXHIBIT NO. 801

SUMMARY

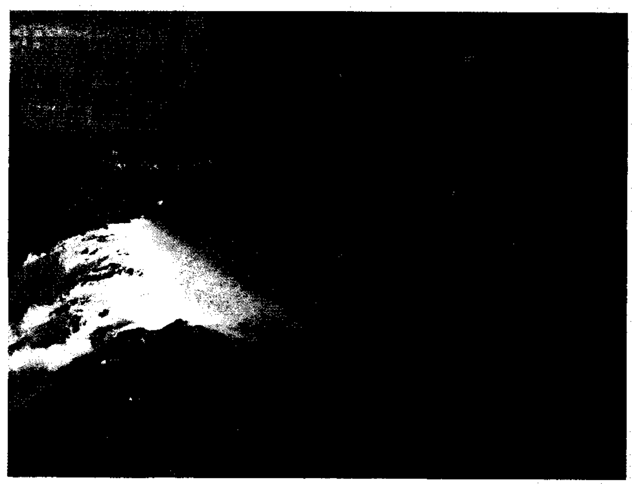
The following is a list of hydroelectric projects which Ted S. Sorenson, P.E. and principal of Sorenson Engineering has completed during his career. Additionally, projects which are owned, operated, and designed by Mr. Sorenson are also provided separately. One project which Mr. Sorenson purchased without designing is also listed. Below is a short summary of project totals.

1. Design of Hydroelectric Related Projects (35)
2. Design including Turbine/Generator and Switchgear for Hydroelectric Projects (31)
   - Completed over a period of 28 years, all are still operating.
3. Hydroelectric Projects Owned and Operated by Mr. Sorenson (11)
4. Projects with CHEC equipment (13)
5. Projects with Gilkes equipment (13)
6. Hydroelectric Projects not designed but owned by Mr. Sorenson. (1)

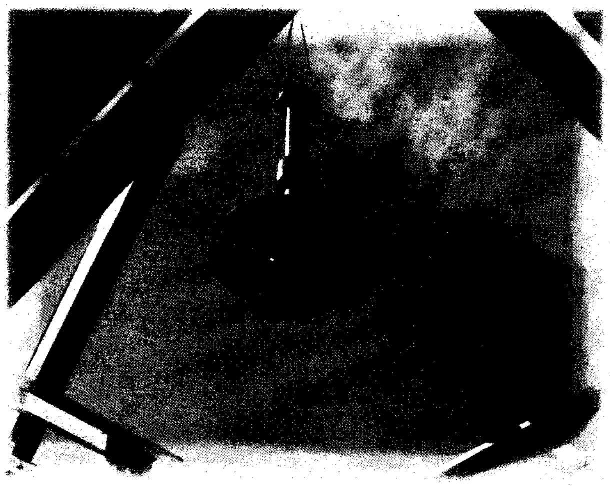
SORENSON ENGINEERING- DESIGNED HYDROELECTRIC PROJECTS

1. Arena Drop Hydroelectric
   Commissioned 2010
   Head 76 feet
   Penstock 450 L.F. of 48-inch diameter pipe
   Flow: 100 CFS
   CHEC- Horizontal Frances connected to 500 kW
   Location: Near Boise, Idaho
   Construction Cost: $920,000

2. *Arrowrock Hydroelectric (Pictured right)*
   Commissioned 2010
   Head 150feet
   Penstock 150 L.F. of 96-inch diameter pipe, two penstocks
   Flow: 1500 CFS
   CHEC-Vertical Frances connected to 8.0 MW generator, two units total 16.0 MW
   Transmission Line: 5 miles
   Location: Near Boise, Idaho
   Construction Cost: $28,500,000



3. Midway Hydroelectric
Commissioned 2006
Head 27 feet
Penstock 90 L.F. of 98-inch diameter pipe, two penstocks
Flow: 1300 CFS
CHEC-Horizontal Manually regulated Kaplan connected to Single 1.6 MW generator, two units total 2.6 MW
Transmission Line: 1 mile
Location: Hansen, Idaho
Construction Cost: $4,500,000



4. *Mora Drop Hydroelectric (Pictured Right)*
Commissioned 2006
Head 38 feet
Penstock 90 L.F. of 120-inch diameter pipe
Flow: 550 CFS
CHEC-Vertical Manually regulated Kaplan connected to Single 1.6 MW generator
Transmission Line: 61 miles
Location: Kuna Idaho
Construction Cost: $2,200,000

5. Cove Flume Test Section for Pacific Power/Utah Power & Light
Completed 1998
Feasibility and Design for Test Section for Open Channel Flume
Flow 1500 cfs
Cast-in-Place and Precast Concrete Sections

6. Mopan Hydroelectric
Completed 1996
Feasibility and power sales for 12 megawatt Facility to include 42 meter high roller compacted concrete dam and 92 kilometer transmission line in remote area.
Location: State of Petan , Guatemala, Central America.

7. Twin Falls Hydroelectric
Completed 1995
Fabrication Drawings for penstocks for 30 megawatt facility. Penstocks 14 feet in diameter.
Location: Near Twin Falls, Idaho

8. Fall River Hydroelectric
Commissioned 1993
Head 250 feet
Penstock 2700 L.F. of 96-inch diameter pipe
Flow: 550 CFS
Bouvier- Two Frances turbines connected to two 5 MW generators
Transmission Line: 861 miles
Location: Ashton , Idaho
Construction Cost: $14,000,000

9. Milner Dam Hydroelectric
Completed 1992
Completed Design portion of design build contract for five
32-feet wide by 18-feet high radial gates
Location: Near Burley, Idaho
Fabrication Cost: $1,800,000

10. Friant Fish Release Hydropower Project
Commissioned 1992
Head 120 Feet
Flow 35 cfs
Gilkes- 500 KW Francis Turbine on Fish Hatchery Release Waters –
-Friant Dam and Friant River Canal
Location: Near Fresno, California
Construction Cost: $800,000

11. Ingram Ranch Lower Hydroelectric Project
Commissioned 1990
Head 320 feet
11,000 L.F. of 30" Diameter Steel Penstock
20,000 L.F. of Trapezoidal Canal
Flow 25 cfs
Gilkes- Twin Jet Turgo
500 KW Induction Generator
Location: Near Challis, Idaho
Construction Cost: $600,000

12. Smith Falls Hydroelectric Facility
Commissioned 1990
Head 1585 Feet
Flow 370 cfs
28,000 L.F. of 72", 69" and 57" Diameter Steel Penstock
Bouvier- Three Pelton Units; Two Twin Jets and One Single Jet
38,000 KW Aggregate Capacity of 3 Generators
Location: Boundary County, Idaho
Construction Cost: $14,000,000

13. Faulkner Land & Livestock Hydroelectric Project
Commissioned 1989
Head 140 feet
950 L.F. of 51" Diameter Steel pipe Penstock through rough mountain canyon terrain
Flow 80 cfs
Gilkes- Frances Turbine
875 KW Induction Generator
Utility Grade Switchgear, 2 miles of 14 KV transmission line
Location: Near Bliss, Idaho
Construction Cost: $1,000,000

14. O. J. Power Hydroelectric Facility
Commissioned 1988
Head 410 feet
6,000 L.F. 18" Diameter Steel pipe Penstock
Flow 7 cfs
Gilkes- Single Jet Turgo Turbine
180 KW Induction Generator
Industrial Grade Switchgear
Location: Oneida County, Idaho
Construction Cost: $250,000

15. Mink Creek Hydroelectric Facility
Commissioned 1987
Head 470 feet
11,000 L.F. of 50" Diameter Steel pipe Penstock through rough mountain canyon terrain
Flow 100 cfs
Gilkes- Twin Jet Turgo Turbine
3,000 KW Synchronous Generator
Utility Grade Switchgear
Location: Franklin County, Idaho
Construction Cost: $2,500

16. Amy Ranch Hydroelectric Facility
Commissioned 1987
Head 940 feet
20,200 L.F. of 18" Diameter Steel pipe Penstock
Flow 11 cfs
Bouvier- Twin Jet Pelton Wheel Turbine
700 KW Induction Generator
Industrial Grade Switchgear
Location: Butte County, Idaho
Construction Cost: $850,000

17. Snedigar Ranch Hydroelectric Facility
Commissioned 1986
Head 190 feet
Penstock 4,000 L.F.
30" Diameter Steel pipe through rough canyon terrain
Flow 35 cfs
Barber-Frances Turbine
540 KW Induction Generator
Industrial Grade Switchgear
Construction Cost: $650,000

18. Littlewood River Hydroelectric Facility
Commissioned 1986
Head 29 feet
3,000 L.F. of canal in lava rock
Flow 460 cfs
Gilkes- Two Frances Open Flume Turbines
960 KW Two Induction Generators
Industrial Grade Switchgear, 1/2 mile transmission line
Location: Near Gooding, Idaho
Construction Cost: $1,400,000

19. Geo Bon II Hydroelectric Facility
Commissioned 1986
Head 31 feet
Penstock 120 L.F.
120" Diameter Steel pipe
3,000 L.F. canal and tailrace in lava rock
Flow 480 cfs
Voith- Double Regulated Kaplan Turbine
1,030 KW Synchronous Generator
Utility Grade Switchgear
Location: Near Shoshone, Idaho
Construction Cost: $1,700,000

20. Schaffner Ranch Hydroelectric Facility
Commissioned 1986
Head 1,230 feet
Penstock 11,000 L.F.
18" Diameter Steel pipe
Flow 5 cfs
Gilkes- Pelton Turbine
440 KW Induction Generator
Utility Grade Switchgear, 2.5 miles high voltage (46 KV) transmission line
Location: Lemhi County, Idaho
Construction Cost: $1,600,000

21. Ingram Ranch Upper Hydroelectric Facility
Commissioned 1985
Head 185 feet
Penstock 900 L.F.
48" Diameter Steel pipe; 20,000 L.F. trapezoidal canal
Flow 80 cfs
Gilkes-Frances Turbine
1,060 KW Synchronous Generator
Utility Grade Switchgear
Location: Near Challis, Idaho
Construction Cost: $1,100,000

22. Georgetown Irrigation Hydroelectric Facility
Commissioned 1984
Head 220 feet
Penstock 18,500 feet of existing irrigation main
30" Diameter through 42" Diameter Steel pipe
Flow 30 cfs
Gilkes- Twin Jet Turgo Turbine
480 KW Induction Generator
Industrial Grade Switchgear
Location: Georgetown, Idaho
Construction Cost: $500,000

SORENSON ENGINEERING- DESIGNED HYDROELECTRIC PROJECTS- IN PROGRESS

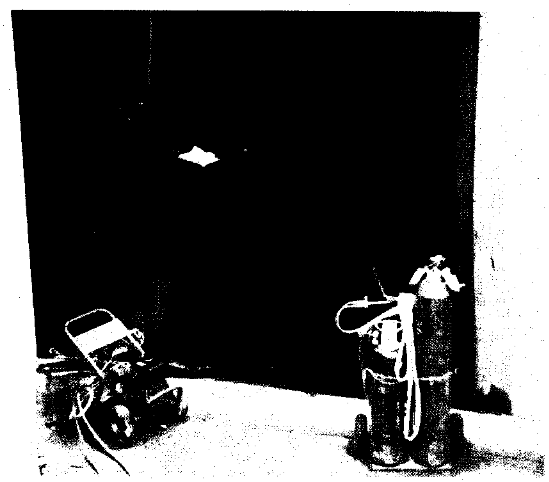
1. South Canal Drop 1 Hydroelectric
Expected Commissioning 2013
Head: 54.2 feet
Flow: 1000 CFS
CHEC- Vertical Kaplan connected to a 4.0 MW generator
Penstock: 1,130 feet 132 inch dia. steel pipe
Location: Near Montrose, Colorado

2. South Canal Drop 3 Hydroelectric
Expected Commissioning 2013
Head: 47.3 feet
Flow: 1000 CFS
CHEC- Vertical Kaplan connected to a 3.5 MW generator
Penstock: 290 feet 132 inch dia. steel pipe
Location: Near Montrose, Colorado

3. Fargo Hydroelectric

Expected Commissioning 2013
Head: Unit 1 140 feet, Unit 2 81 feet
Flow: Unit 75 cfs, Unit 2 40 cfs
CHEC- Two Horizontal Frances Turbines connected single 1.1 MW generator
Penstock: 1,130 feet 132 inch dia. steel pipe
Location: Near Montrose, Colorado

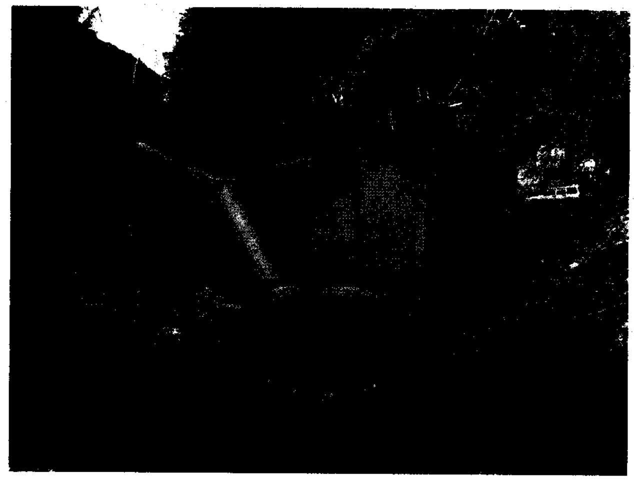
1. <u>C-Drop Hydroelectric (Pictured Right)</u>
   Commissioned 2012
   Head: 23 feet
   Flow: 700 cfs
   CHEC- Vertical Kaplan connected to a 1.1 MW generator
   Location: Klamath Falls, Oregon
   CONSTRUCTION COST $ 1,800,000



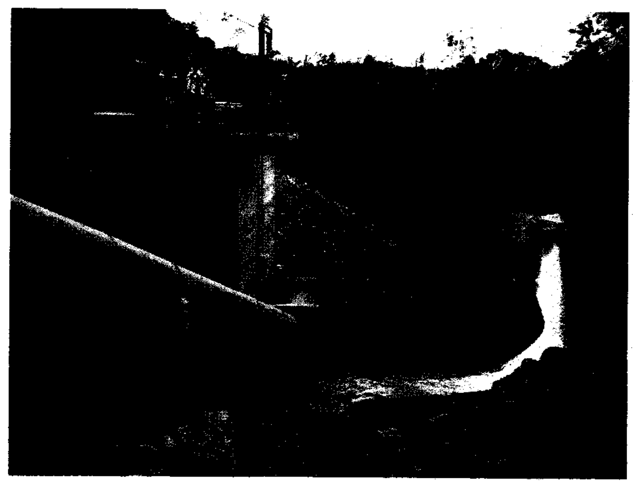
2. <u>Lower Turnbull Hydroelectric</u>
   Commissioned 2011
   Head 150feet
   Penstock 2,215 L.F. of 108-inch dia. pipe,
   Flow: 700 CFS
   CHEC- Vertical Frances connected to 7.8 MW generator,
   Transmission Line: 1.7 miles
   Location: Near Fairfield, Montana
   Construction Cost: $7,000,000

3. <u>Upper Turnbull Hydroelectric (Pictured Right)</u>
   Commissioned 2011
   Head 100feet
   Penstock 967 L.F. of 108-inch dia. pipe,
   Flow: 700 CFS
   CHEC-Vertical Frances connected to 5.7 MW generator,
   Transmission Line: 1.3 miles
   Location: Near Fairfield, Montana
   Construction Cost: $5,000,000

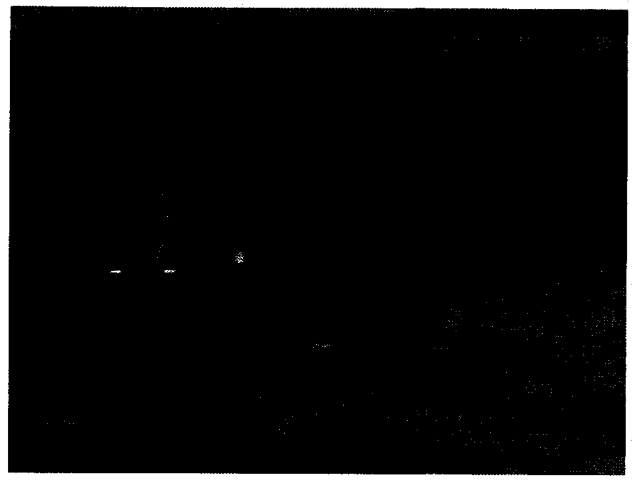
4. <u>Belize Hydroelectric *(Pictured)*</u>
Commissioned 2007
Head 120 feet
Penstock 550 L.F. of 72-inch diameter pipe
Flow: 375 CFS
CHEC- Two Frances Turbines connected to Single 3.4 MW generator
Transmission Line: 61 miles
Location: Toledo District, Belize, Central America
Construction Cost: $4,000,000



5. <u>Pancheri Hydroelectric</u>
Commissioned 2010
Head 503 feet
Flow 9 cfs
CHEC- Twin Jet Pelton , 290 KW
Penstock: 10,000 feet 20 inch dia.
Location: Near Howe Idaho
Cost: $600,000



6. <u>Tiber Dam Hydroelectric *(Pictured Right)*</u>
Commissioned 2004
Head 175 feet
Penstock 90 L.F. of 96-inch diameter pipe
Flow: 700 cfs
Gilkes-Frances Turbines connected to
Single 7.5 MW generator
Transmission Line: 1 mile
Location: Liberty County, Montana
Construction Cost: $7,000,000



7. <u>Marsh Valley Hydroelectric Facility</u>
Commissioned 1993
Head 100 feet
Penstock 600 L.F. of 60-inch diameter pipe
Flow: 250 cfs
Chinese (Not CHEC)- Two Frances Turbines connected to Single 1900 KW generator
Transmission Line: 3 miles
Location: Bannock County, Idaho
Construction Cost: $1,800,000

8. <u>Oregon North Fork Sprague River Hydroelectric Project</u>
Commissioned 1988
Head 185 feet
5,700 L.F. of 51" Diameter Steel pipe
Penstock through rough mountain canyon terrain
Flow 100 cfs
Bouvier- Twin Frances Turbines mounted on Single Generator
1,230 KW Induction Generator
Utility Grade Switchgear, 6 miles of 14 KV transmission line
Location: Near Klamath Falls, Oregon
Construction Cost: $1,400,000

9. <u>Birch Creek Hydroelectric Facility</u>
Commissioned 1986
Head 517 feet
22,000 L.F. 51" Diameter Steel pipe Penstock; 12 miles trapezoidal canal
Flow 75 cfs
Gilkes-Twin Jet Turgo Turbine (1986)
CHEC- Pelton Wheel (re-powered in 2007)
2,700 KW Synchronous Generator
Utility Grade Switchgear
Location: Clark County, Idaho
Construction Cost: $3,200,000

TED SORENSON- OWNED HYDROELECTRIC PROJECTS, NOT DESIGNED BY SORENSON ENGINEERING

1Dry Creek Hydroelectric Project

Commissioned 2000
Head: 1,220 feet
Flow: 55 CFS
Gilkes- 3.4 MW
Penstock: 60,000 feet 42 inch dia. steel pipe
Location: Near Howe Idaho