Drinking Water State Revolving Fund Green Project Reserve

- Final –

Hauser Lake Water Association Drinking Water Project

SRF Loan #DW 1210 (pop. 1000)

$1,974,700

Final Green Project Reserve Justification

Business Case GPR Documentation

1. INSTALLS NEW WATER STORAGE TANK AND TRANSMISSION LINE FOR GRAVITY FEED TO SYSTEM, THEREBY ELIMINATING MAIN BOOSTER PUMP STATION (Energy Efficiency) Business Case per 3.5-3: *Projects that cost effectively eliminate pumps or pumping stations.* ($844,737).

2. PREMIUM ENERGY EFFICIENT MOTOR AND PUMP WITH VFD (Energy Efficiency). Premium energy efficient motor and pump with VFD will be installed in Well no 1. GPR Business Case per Section 3.2-2: *Use of premium efficiency motors and VFD pumps in a new project.* ($115,561).

Prepared by the State of Idaho SRF Loan Program
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1. STORAGE TANK & TRANSMISSION LINE

Summary

- A new storage reservoir and transmission line will be constructed as part of a water system upgrade project; the reservoir has been located such that the main booster pump station can be eliminated.
- Loan amount = $1,974,700
- Energy savings (green) portion of loan = 43% ($844,737)

Background[1]

- The main booster pump station currently includes 2-5HP pumps and 2-7.5HP pumps. The pump station currently uses approximately 27,000 KWH/year. At least one pump runs continuously in order to maintain minimum system pressure.
- Current and future capacity deficiencies were identified in the Association's existing water system. The capacity of Well #1, the capacity of the main reservoir, and the capacity of the main booster pump station have to be increased in order to meet current/projected water demands.
- Multiple alternatives were identified to reduce operational costs and improve system capacity. The Association chose the most energy-efficient alternative of relocating the main reservoir to a location which negated the need for the main booster pump station.

Results[2]

- The new reservoir and transmission system will cost $61,000 less in capital costs to construct as compared to the next most attractive alternative (expanding the water storage capacity at the current site as well as upgrading the existing booster pump station).
- The new system will also result in an annual energy and maintenance cost savings of $6,000.
- The project selected is most cost-effective alternative from a capital cost perspective, and is also the most energy-efficient alternative i.e. resulting in the complete elimination of the booster pump station.

Conclusion

- The project addresses the current and future water system requirements of the Hauser Lake Water Association while eliminating the main booster pumping station. This is the most cost-effective and energy-efficient option considered for the water system upgrade project.
- **GPR Costs**: Storage Reservoir and Transmission Main = $844,737
- **GPR Justification**:
  The project is Business Case GPR-eligible (Energy Efficiency) per Section 3.5-4[3]: *projects that cost effectively eliminate pumps or pumping stations.*

[1] Hauser Lake Water Association Water System Facility Plan, November 2011
[2] Final GRP Costs, Welch Comer, 5-11-2015, email Maiani - McNeill
[3] Attachment 2. 2012 EPA Guidance for Determining Project Eligibility. p.10

2. NEW PREMIUM ENERGY EFFICIENT PUMP/VFD

Summary

- The pump at Well No. 1 will be replaced with a larger capacity pump equipped with a variable frequency drive (VFD).
- Loan amount = $1,974,700
- Energy savings (green) portion of loan = 6% ($115,561)
- Simple pay-back period = 9.18 years (motor) and 10.6 years (VFD)

Background

- Well No.1 will be upsized and upgraded in order to cost-effectively meet current and projected water demands of the Association.
- One of the requisite improvements is to replace the existing 75-HP pump with a new 150-HP pump. Replacing the pump in well No. 1 will increase production from 600 gpm to 1,000 gpm. Pump controls will include a VFD.

Calculated Cost Effectiveness of Improvements[4]

Motor Analysis[5]

- Well No. 1 pump is a Fairbanks 10J with a US Motors premium energy-efficient 150-HP motor; the motor efficiency will be at least 95%[6].
- A similar EPAct motor would have a motor efficiency of approximately 93.5%[7].
- Energy savings of the Premium Energy-Efficient motor over the EPAct motor = 5444kWh/yr = $544/yr[3].
- EPAct motor cost = $10,000; Premium motor cost = $15,000. Simple pay-back period for the Premium motor = **9.18 years**[3].

VFD Analysis[8]:

- Well No. 1 without a VFD: New 150-HP pump without a VFD has a motor efficiency = 95%[5]. Overall efficiency = 71%. Annual KWH utilized for this new system = 152,800; energy cost approximately = $14,800.
- Well No. 1 with a VFD: New 150-HP pump with a VFD has a motor efficiency = 96%; VFD efficiency = 97%. Overall efficiency = 75%. Annual KWH utilized for this new system is = 144,500; energy cost approximately = $11,500.
- Therefore, using an Altivar 61 VFD for the new well pump provides a decrease in energy consumption of 8,300 KWH for a savings = $3,300 annually. At a typical VFD cost of $35,000 the pay-back period = **10.6 years**.

Conclusion

- The premium energy-efficient pump/VFD is categorically GPR-eligible as they are cost effective i.e. 9.18 years and 10.6 year payback periods.
- **GRP Costs Identified** :
  VFDs + Pump = **$115,561**
- **GPR Justification**: The Pump/VFD system is Categorically GPR eligible (Energy Efficiency) per Section 3.2-2: *Use of premium efficiency motors and VFD pumps in a new project where they are cost effective*.

[4] WEG Electric Motor Payback Tool, energy cost @ $0.10/kWh.
[5] Note: This interim analysis is based on a design pump specification.
[6] NEMA Table 12-12 Full Loan Efficiencies for 60 HZ NEMA PREMIUM Efficiency Electric Motors
[7] NEMA MG-1 Table 12-11 Full Load Efficiencies of EPAct Efficient Electric Motors
[8] Interim GPR Analysis, Welch Comer, 6-10-2013 email attachment; and Final GPR, 5-11-2015 email; Maiani – McNeill