

Clean Water State Revolving Fund Green Project Reserve  
- Final -



**Idaho Falls Wastewater Facility Renovation and Upgrade**  
**SRF Loan #WW 1102 (pop. 95,000)**  
**\$18,150,000**

**Final Green Project Reserve Justification**  
**Categorical GPR Documentation**

- REPLACEMENT OF AN ABF TOWER/SURFACE TURBINE AERATION SYSTEM WITH A FINE BUBBLE DIFFUSION AERATION SYSTEM (Energy Efficiency). Categorical GPR per Section 3.2-2: *projects that achieve a 20% reduction in energy consumption; retrofits to compare existing system to that proposed (\$2,873,078).*

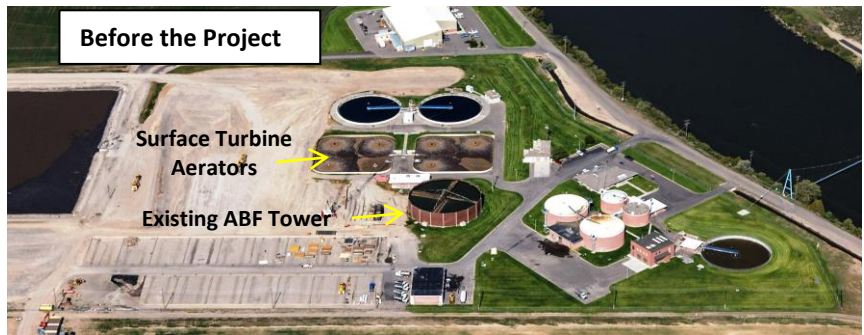
# TREATMENT PROCESS – FINE BUBBLE AERATION

## Summary

- Large-scale wastewater plant renovation project includes replacement of an ABF tower/surface turbine aeration system with fine bubble diffuser aeration & RAS system to ensure compliance with ammonia standards<sup>1</sup>.
- Total Loan amount = \$18,150,000
- Estimated Categorical energy efficient (green) portion of loan = 15.8% (\$2,873,078)
- Annual Energy savings = 43%

## Background<sup>2</sup>

- The City of Idaho Falls Wastewater Facility services the communities of Idaho Falls, Ucon, and Iona-Bonneville Sewer District. The total population served is 70,000 people.
- The existing ABF tower/surface turbine aeration system currently used to treat the City's wastewater is inadequate in meeting effluent regulatory standards for ammonia and the anticipated permit renewal requirements for phosphorus.
- The Facility Plan proposed replacement of the existing system with a new activated sludge system utilizing fine bubble diffusers to allow the City to drastically reduce energy requirements, replace outdated equipment, and meet NPDES permit limits.
- The existing treatment system is 40 years old with a total secondary treatment system HP requirement of 1,120 HP.
- The estimated energy consumed by the existing secondary treatment system is 7,314,600 kW-hr/yr.



## Results<sup>3</sup>

- The HP requirements of the new system will be 634 HP.
- The estimated energy consumed by the proposed system will be 4,143,800 kW-hr/yr.

## Energy Efficiency Improvements

- The resulting reduction in energy requirements with the new system =  $1 - (4,143,800 \div 7,314,600) = .43 = 43\%$
- The total system oxygenation efficiency of the existing system is 1.10 lbs. O<sub>2</sub>/HP-hr.
- The total system oxygenation efficiency of the proposed system is 2.97 lbs. O<sub>2</sub>/HP-hr.
- Pumping power requirements will also be substantially reduced by the new system.

## Conclusion

- By replacing the current system with a fine bubble diffusion aeration system, the City will approximately triple the oxygen transfer efficiency in the activated sludge basins while reducing energy requirements by 43%.
- **GPR Costs:** RAS System + Fine Bubble Diffusion = \$1,025,000 + \$1,848,078 = \$2,873,078<sup>4</sup>
- **GPR Justification:** Categorically GPR-eligible (Energy Efficiency) per Section 3.2-2<sup>5</sup>: *projects that achieve a 20% reduction in energy consumption.*

<sup>1</sup> 2/1/11 Discussion with Chris Fredrickson, P.E., Staff Engineer, City of Idaho Falls

<sup>2</sup> 2011 Facility Wastewater Plan, City of Idaho Falls

<sup>3</sup> 2/9/11 & 9/23/13 Correspondence with Shawn Kohtz, P.E., Murray Smith & Associates

<sup>4</sup> 6-16-15 Correspondence with Craig Anderson, P.E., Murray Smith & Associates

<sup>5</sup> Attachment 2. April 2010 EPA Guidance for Determining Project Eligibility.