Clean Water State Revolving Fund FY12 Green Project Reserve

- Final -

City of Soda Springs FY12 WWTP Upgrade Project

SRF Loan #WW 1201

$5,300,000

Final Green Project Reserve Justification

Categorical GPR Documentation

INSTALLS INNOVATIVE INTEGRATED FIXED FILM ACTIVATED SLUDGE TREATMENT PROCESS IFFAS (Energy Efficiency). Categorical GPR per 3.2-2: *projects that achieve a 20% reduction in energy consumption* ($902,944).

Prepared by the State of Idaho SRF Loan Program

November 2013

Categorical

Treatment Process – Integrated Fixed Film Activated Sludge

Summary

- The Integrated Fixed Film Activated Sludge (IFFAS) treatment process manufactured by WesTech Engineering (STM Aerotor™) is an energy-efficient innovative and advanced process for the treatment of municipal wastewater.
- Estimated loan amount = $5,300,000
- Estimated energy-efficient (green) portion of loan = 18% ($902,944)

Background

- WesTech Engineering introduced the STM Aerator™ IFFAS system in the United States 10 years ago and currently has 61 operational IFFAS systems in the USA. This will be the first IFFAS system in Idaho.
- The main advantage of the IFFAS system over other types of secondary treatment systems is energy efficiency, due to simple means of delivering air and providing mixing.
- This wastewater treatment system has been approved by IDEQ[1] as a cost-effective innovative treatment technology.

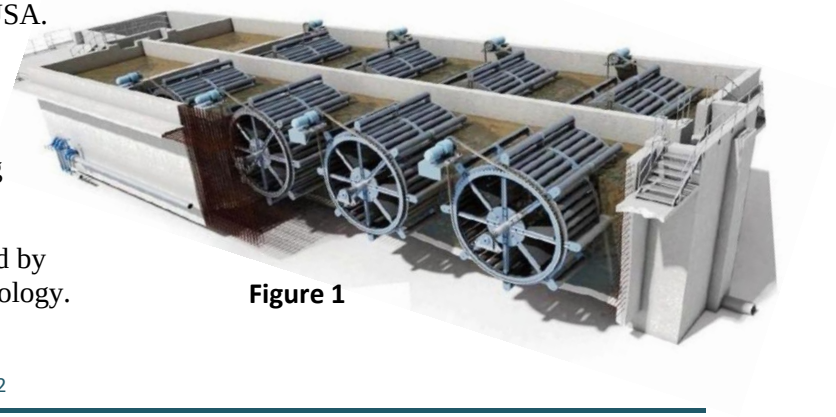
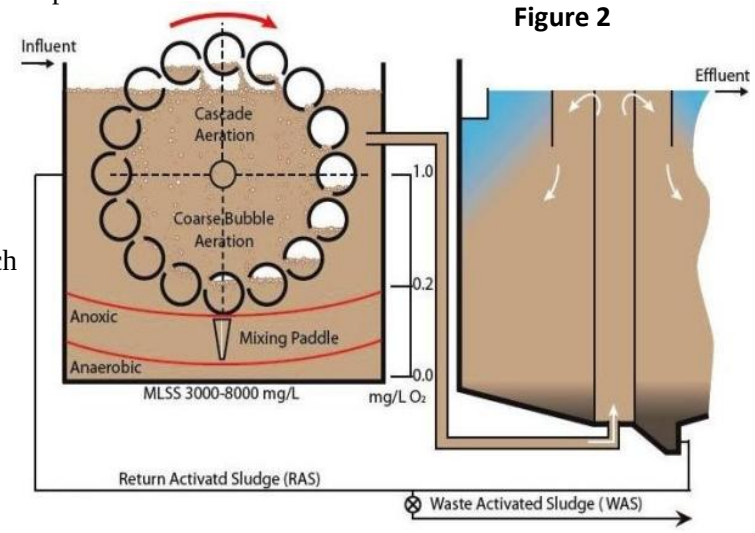


Figure 1

Treatment Process Description[2]

- The IFFAS process selected is manufactured by WesTech Engineering (STM Aerotor™) and combines a rotating fixed film biological contactor (rotor) within a suspended growth mixed liquor biological system.
- Process components include a motor, chain, rotation shaft, aerator oxygen-transfer wheels, and process controls. Low-horsepower chain drives slowly rotate hollow shaft wheels that extend above the water surface of the aeration tank (Figure 1, above).
- As they rotate, openings in the shafts fill with air which is then carried to the bottom of the wheel, with the air being released underwater. The air rises, mixing and aerating the contents of the tank (Figure 2).
- Aerobic and anoxic zones are established within the basin for cost-effective BOD reduction, nitrification, denitrification, and phosphorous removal.

Figure 2



Energy Efficiency

- Energy savings for the IFFAS were calculated by comparing this system to a Baseline Standard Practice (BSP). The BSP was derived from an analysis of the 5 most viable treatment technologies available measured against a broad set of weighted criteria. The BSP for the City of Soda Springs is an Extended Aeration Oxidation Ditch, which scored closest to the chosen IFFAS technology and was the second most energy efficient process considered, and the second in overall scoring.

[1] July 11, 2012 Email: C. Borrenpohl, PRO Idaho Department of Environmental Quality – K. McNeill
[2] Forsgren Associates: March 2010 Technical Memorandum, Evaluation of Wastewater Treatment Alternatives

(CONT.) TREATMENT PROCESS – IFFAS

- IFFAS Average Annual Energy Usage[3]:

Power Component	Quantity (each)	Power	Operating Time (Hrs.)	Annual Operating Time* (Hrs.)	Annual Energy Use (KWH)
Aerotor Drive	4	10.0 HP	24	6,240	186,200
Anaerobic Mixers	2	0.5 HP	24	6,240	4,655
Anoxic Zone Mixers	2	3.6 HP	24	6,240	33,516
Recirculation Pump	2	3.0 HP	24	6,240	27,930
Controls	1	0.3 KW	24	6,240	1,397
Lighting	1	0.3 KW	24	6,240	1,397
				IFFAS Total Calculated Annual Average Energy Use, KWH =	**255,095**

*Based on annual operating time of 260 Days/Year

- BSP (Oxidation Ditch) Average Annual Energy Usage[3]:

Power Component	Quantity (each)	Power	Operating Time (Hrs.)	Annual Operating Time* (Hrs.)	Annual Energy Use (KWH)
Surface Aerators	2	63.0 HP	24	6,240	586,535
Anaerobic Mixers	2	0.9 HP	24	6,240	8,379
Anoxic Zone Mixers	2	6.6 HP	24	6,240	61,447
Controls	1	0.3 KW	24	6,240	1,397
Lighting	1	0.3 KW	24	6,240	1,397
				BSP Total Calculated Annual Average Energy Use, KWH =	**659,155**

*Based on annual operating time of 260 Days/Year

Conclusion

- Energy Efficient Operation = the IFFAS achieves > 60% reduction in energy consumption over the next most energy efficient viable treatment technology.
- **GPR Costs**: IFFAS = $902,944 (final cost).
- **GPR Justification**: The process is GPR-eligible per Section 3.2-2: *projects that achieve a 20% reduction in energy consumption* ($902,944).

STM-AEROTOR FUNCTIONING IN SECONDARY BUILDING

[3] Forsgren Associates: March 2010 Technical Memorandum, Appendix A