Brad Musick (Operations Specialist)

Wastewater Solutions, Inc.

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Registrations and Certifications

- Grade V Wastewater Certification, California
- Class IV Wastewater Certification from Indiana, Oregon and Hawaii
- Class D Industrial Wastewater Certification, Indiana

Professional Summary

Brad Musick's 41 years of experience in the wastewater field includes operations, management, and consulting. As a consultant, he specializes in activated sludge treatment, unique process energy and cost reduction audits, complete facility optimization, phosphorus removal, and process changes to reduce solids yield. His expertise in plant operations and facility management is utilized in projects throughout the United States and Canada. Brad is well known for his work on process and energy optimization projects. Brad is also proficient in both the development and delivery of training and has extensive experience in the writing of technical and operations and maintenance (O&M) manuals. Brad also brings the knowledge gleaned from work in 100's of treatment plants to bear on plant design operability reviews.

Relevant consulting experience includes:

Lafayette Wastewater Treatment Plant, Lafayette, Indiana. Performed process energy audit of the large activated sludge facility. The audit focused on both treatment performance enhancements as well as energy, and chemical cost reduction. The audit resulted in an annual reduction of $536,000 in the O&M budget. Part of the savings included $16,500 per month in electricity and $8,000 in natural gas. The project resulted in a reduction of 6 million gallons per year in biosolids reduction.

Resume Proof: **Lafayette Optimization and Process Improvements**

Energy, Chemical and Labor Savings

Savings Area	Amount/yr.	Comments
Chemicals	tbd	Chemical saves have yet to be determined
Electric- Prim meter box	$102,000	25% reduction in kwh used
Electric- Sec meter box	$96,400	20% reduction in kwh used
Natural Gas	$90,000	Winter natural gas savings valued at $10-$20K/month (55% reduc)
Biosolids Hauling	$208,000	6.5 million gallons less biosolids hauled in 2008 vs. 2007.
Labor	$40,150	11 hrs/d less GBT runtime at loaded rate of $40/hr (15 min/hr gbt)
	$536,550	**(per year)**

Capacity Gains

Capacity Gain Process	Capacity Value	Comments
Digester	$1,900,000	24% increase in digester DT=increase in avail. capacity
GBT	$1,650,000	GBT extended life based on 4.5hrs/d vs. 15hrs/d
Secondary Clarifiers	tbd	Process changes resulted in approx. 8 mgd less flow to clarifiers
Aeration	$282,000	Based on 9.4% increase in ammonia treatment capacity
	$3,832,000	**(Value of added process capacity over 15-20 year life)**

Treatment Performance Gains

Treatment Area	Performance Gains
Ammonia removal	10% reduction in effluent ammonia discharged 2007 vs. 2008
Effluent BOD removal	57% reduction in effluent BOD discharged 2007 vs. 2008
Effluent TSS removal	16.4 % reduction in effluent TSS discharged 2007 vs 2008
WAS sludge volume reduction to GBT	64% reduction in WAS to GBT (360K/d to 130K/d)
Aeration system capacity	9.4% secondary based on
Digester capacity	24% increase in detention time available
Primary sludge volume reduction	23,000 gallons less per day pumped to digesters (approx 50%)
Performance stability	Reduced risk of ammonia, BOD and solids violations

Waianae Wastewater Startup Commissioning. Performed startup and commissioning as a sub to the contractor (Hensel Phelps) on the headworks, primary clarifiers, odor control, and plant water systems. WSI developed the startup up plan and was responsible for onsite commissioning phases.

USS Arizona Memorial SBR Startup. Performed startup service on the unique stacked sequencing batch reactor (SBR) treatment plant. This work was performed through a contract with the US National Park Service (NPS). Also performed optimization at the Haleakala Visitor Center Waste Reuse Facility for the NPS.

Lakehaven Water District, Federal Way, Washington.. Developed plant-specific, detailed and complete plant operations manuals for District's two wastewater treatment plants. The Lakota Wastewater Treatment Plant is a 10 MGD, complete mix activated sludge facility, with anaerobic digestion. The Redondo Treatment Plant is a 4 MGD facility with primary treatment, biotowers for secondary treatment and chlorine disinfection.

Austin, Texas Wastewater Treatment Plants. Developed electronic O&M manuals for Austin's two liquid wastewater treatment plants. The Walnut Creek and South Austin Regional are large and complex facilities with a combined treatment capacity of up to 150 MGD.

Hills Canyon Treatment Plant, Thousand Oaks, CA. Performed an energy and process optimization audit of the activated sludge facility. The audit identified energy and chemical savings totaling over $200,000 in annual savings. The audit findings helped staff reduce effluent nitrate. Aeration system design issues hindering operation were also identified. In a different project provided a review of the SCADA system and recommended changes that reduced manual information collection, improved energy monitoring, and improved information usefulness.

Camas Wastewater Treatment Plant, Camas, Washington. Provided troubleshooting and bench-top toxicity testing related to poor ammonia removal. While performing the testing, provided optimization suggestions that helped the facility regain ammonia permit compliance. Other projects for this utility include the optimization of the anoxic selector and plant-specific plant training.

West Lafayette Wastewater Plant, West Lafayette, Indiana. Performed an energy and process optimization audit that identified energy and labor annual potential savings totaling over $450,000. Developed and delivered plant-specific operator training programs for the wastewater treatment facility. Some of the topics covered included activated sludge process control, anaerobic digestion, solids handling, chlorination and dechlorination, and safety. Brad has trained at this facility for twenty-five out of the last twenty-seven years. Brad wrote their O&M manual following their last plant upgrade.

Resume Proof: **Training**

When the training program was initiated, very few of the 12 operators were certified at the 10 mgd activated sludge facility. After a few years of training, the plant had 7 Class IV operators and all operators were certified. The facility's operational team placed 2nd in the state operator competition – winning the process and safety events.

Benefits seen from training included:

- Increased motivation and professionalism.
- Development of future leaders and managers
- Professional growth opportunities
- Improved operational performance/Reduced risk

Friday Harbor Wastewater Treatment Plant, Friday Harbor, Washington. Brad provided support services for the resort community's overloaded wastewater treatment plant. Services included management and operational assistance, training, design review, laboratory evaluation, and maintenance assistance. Developed and start-up training for the SBR activated sludge facility. Brad also manage the development of the plant O&M manual and wrote the secondary treatment process chapter.

Resume Proof: **Facility Optimization and Process Integrity**

Provided optimization at this wastewater facility. The optimization of the treatment plant was driven by regulatory pressure. Plant modifications were enacted to quickly reduce the SVI from 400 to below 150, allowing solids to be retained in the facility and permit compliance to be achieved.

Benefits:

- Optimization allowed the plant to meet summer permit limits for the first time in five years. The added 17% capacity also allowed the utility to delay design and upgrade for eight years resulting in an estimated savings of $500,000.

Trinity River Authority, Dallas, Texas. Developed and delivered training for the large activated sludge facility (150^{+} mgd) servicing a large segment of Dallas. The training topics covered over multiple visits include activated sludge process control, biological selectors, and biological nutrient removal.

Hyperion Wastewater Treatment Plant Project, City of Los Angeles. Directed the development and delivery of training materials for the Power Restart and Digester Screening facilities at the 450-million gallons per day (mgd) plant. The training covered operations, mechanical maintenance, electrical, instrumentation, and HVAC, for each piece of equipment of each unit process.

Utoy Creek Wastewater Treatment Plant, Atlanta, Georgia. As part of a team, helped evaluate the training and staffing needs at the utility. Developed start-up training materials for the 44 mgd activated sludge plant. Provided QA/QC on training materials developed for other unit processes.

Greater Vancouver Regional District, Vancouver, British Columbia, Canada. Training and Commissioning Services. Responsible for development of start-up training materials for the secondary treatment process and provided QA/QC of other unit process training materials. Sites included Annacis Island (120^{+} mgd) and Lulu Island (20 mgd) WWTPs.

Paul Eisenhardt Group, Contract Operations Performance and Contract Review. Part of team that provided comprehensive performance reviews of various contracted wastewater plants in western US. Hired by the cities, the Eisenhardt Group evaluations were used to determine if contracts were being met and if renewal was warranted. The evaluations covered all areas of maintenance, operations, laboratory, finance, asset management, safety, SOPs, manuals, SCADA, and more. Contract revision input was provided and the Group. The Group also helped write RFP and evaluate and score submitted proposals.

City of Bend, Oregon, WWTP Process Evaluation. Instigated process changes that quickly resulted in a reduction of effluent total suspended solids from 60 mg/L to reliably below 10 mg/L (and dropping). The treatment plant performance had been poor and unstable for approximately 1 year prior to receiving operational input. This project was also reviewed during construction for potential improvements.

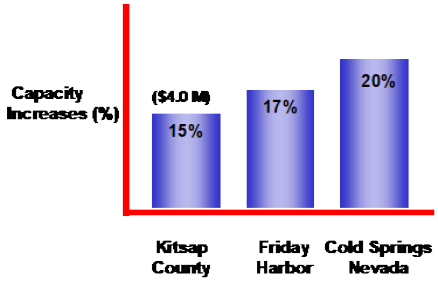
Central Kitsap Wastewater Treatment Plant (WWTP) Re-rating, Kitsap County, Washington. This re-rating/optimization project took a system-wide optimization approach to determine if the capacity of the WWTP could be re-rated.

Resume Proof: **Optimization**

Both Kitsap County, Washington (above) and Bend, Oregon (below) are among the list.

Benefits:

- Increased capacity
- Reduced capital costs



O&M Manual Development

Managed and/or performed technical writing, in the development of O&M manuals for clients including: Austin, Texas; Lakehaven Utility District, Reedsport, Oregon; Crescent City, CA; Tillamook, Oregon; Rainier, Oregon; West Lafayette WWTP, Indiana; Forest Grove WWTP, Clean Water Services, Oregon; Cave Junction WWTP, Oregon; Brookings WWTP, Oregon; Longview Fibre WWTP, Longview, Washington; MacMillan Bloedel WWTP (Harmac Division), Vancouver, BC; Elkhart WWTP, Indiana; Meridian, Idaho; Myrtle Creek, Oregon; Friday Harbor, Washington

Relevant Plant Management Experience

Anderson Water Pollution Control, Anderson, Indiana. Superintendent. Provided management and technical expertise in managing a 27-mgd advanced wastewater treatment plant, 19 lift stations, 450 miles of collection lines and 28 combined sewer overflow sites; actively participated in union contract negotiations and grievance proceedings; coordinated WWTP improvement projects

Muncie Wastewater Treatment Plant, Muncie, Indiana. Plant Superintendent. Administered and managed a 24-mgd advanced treatment plant, 11 lift stations, 28 combined sewer overflow sites; conducted final-step complaint procedures for the district and gave corrective discipline; coordinated and directed federal and state monetary grants and local revenue funds for present and future needs of the facility; prepared and managed the annual O&M budget.

Education

B.S., Natural Resources, Ball State University