ITT Flygt Jet Aerators save GVRD $$$$

and reduced operating digester volume by 60%.

The beautiful Fraser River flows down the British Columbia Rocky Mountains to the Pacific Ocean. Shortly before it reaches Vancouver, it passes the Township of Langley, where you will find the Langley WWTP, a secondary treatment plant operated by the Greater Vancouver Regional District (GVRD) that handles an average daily wastewater flow of approximately 9 MLD from a population of 28,000 people.

Note freeboard. Low levels were maintained in an effort to contain overspray from surface aerators. This was not always successful.

The Challenge

The current configuration of the Langley WWTP, which was expanded in 1998, was reconfigured as a trickling filter/activated sludge plant to handle a maximum flow of 17 MLD. It has two aerobic digester cells of equal size, operating in series.

The digesters are rectangular with a volume of 1820 m3 each and handle sludge thickened to approximately 4 to 6%. A minimal amount of polymer is added. The flow was fed from drum thickeners through digester no. 2 to digester no. 1. Digester no. 2 was continuously fed, whereas digester no. 1 was batch operated. It is to be noted that there is no primary sludge in this process.

One of the surface aerators removed from Digester No. 1

The digestion system was at its maximum capacity. In addition, the digesters had to be operated at reduced levels because of the overspray generated by the surface aerators. The overspray raised obvious health concerns forcing the operation of the digesters at lower levels to reduce the amount of overspray. During cold weather, the aerators were shut down due to icing conditions.

The Solution

Plant management needed to improve the operating conditions and had the following objectives in mind.

- Switch out the surface aerators with submerged aerators to achieve the following:
  - Eliminate overspray;
  - Increase digester capacity by approximately 20%.

The increase in capacity would be easy to achieve since the elimination of overspray would mean that the digesters could be filled to their design levels, an increase from their actual operating levels.

Al Racine, the local ITT Flygt representative, met with Brent Galick, plant foreman and Brian Hystad, GVRD WWTP process supervisor to discuss their requirements and current operating conditions. After consulting with some of his colleagues, he proposed to install two ITT Flygt FgN117-74 Flo-Get (currently called Jet Aerators) units, each with a 20 HP N3152 pump. This would allow the plant personnel to familiarize themselves with the concept and operation of the Jet Aerator. Digester no. 1 was designated as the test cell. This permitted the plant personnel to see the jet aerator concept in operation. The quietness of operation and lack of overspray was especially noted.

Air bubbles rising from Jet Aerator.

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Engineered for life

After seeing how the units worked, the plant personnel were ready to go to the next phase. Plant personnel wanted to try a set of jet aerators that would provide the 500 l/s of air at 0.5 m from the digester floor. This would be the level at which the introduction of the air would be most beneficial for their operation.

The plant personnel were impressed with the ease of installation. The units could be installed without draining the digester. This simplicity saved a considerable amount of time and money. After a 90 day evaluation period, the GVRD purchased the three 35 HP units.

The use of these jet aerators has significantly improved the process efficiency of the digesters at very reasonable cost.

Three FgN 217-74 were offered for evaluation by ITT Flygt.

With these jet aerators, the plant has achieved the following:

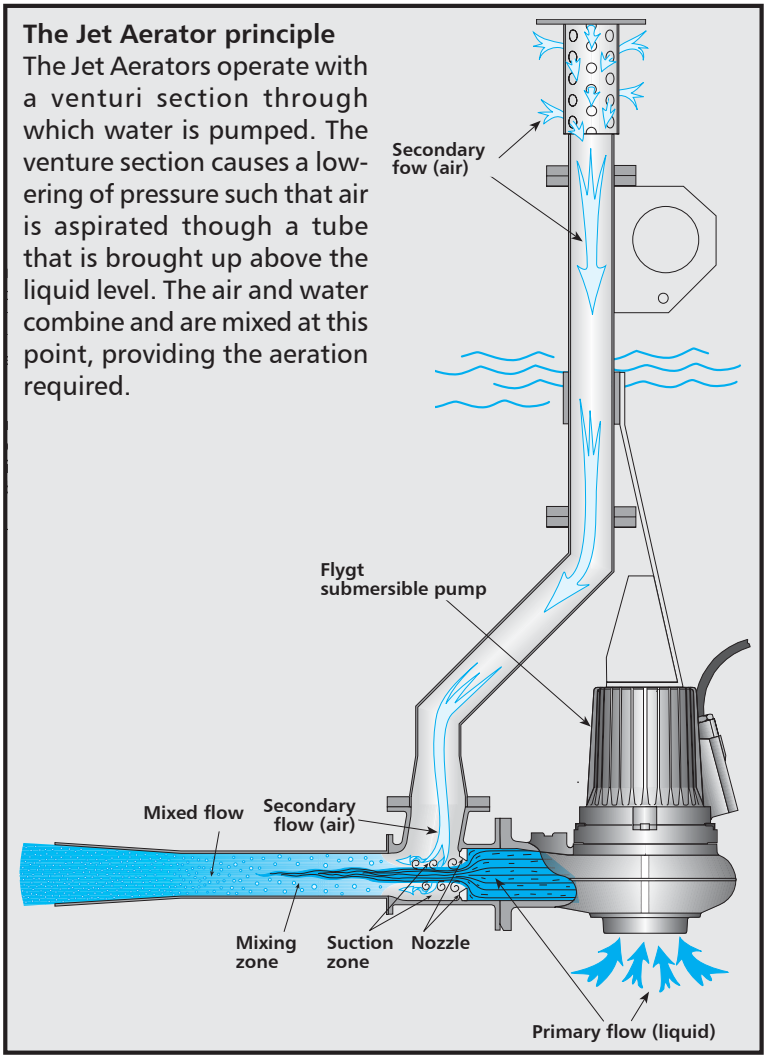
- The reduction of volatile matter exceeds regulatory requirements;
- Eliminated overspray;
- Reduced operating digester volume by 60% without affecting process.
  - Now able to run with only one digester in a continuous process;
  - Now operating digester at design level;
  - Deactivated one digester.
- Can now meet the Organic Matter Recycling Regulation with fecal coliform levels well below regulatory requirements;
- Removed 5 surface aerators @ 40 HP each – total 200 HP;
- Installed 3 jet aerators @ 35 HP each, usually running only one or two units at a time;
- Net saving of 125 HP resulting in annual savings of approximately $40,000.

During more than four years of operation, the plant has saved hundreds of thousands of dollars in operating costs. They have also avoided going through a costly redesign of the plant to meet current capacity and regulatory requirements.

Units being lowered into the digester.

The Jet Aerator principle

The Jet Aerators operate with a venturi section through which water is pumped. The venture section causes a lowering of pressure such that air is aspirated though a tube that is brought up above the liquid level. The air and water combine and are mixed at this point, providing the aeration required.



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