CASE STUDY

NASA Parachute Refurbishment Facility

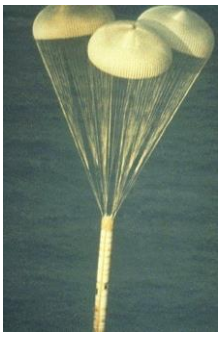
Dragonfly Wastewater Treatment System

Part of the NASA Space Shuttle program included the retrieving and refurbishing of components for reuse. One such component was the Solid Rocket Booster (SRB) parachutes. The parachutes deployed during descent of the SRB's and helped the booster land in the ocean off the coast of Cape Canaveral, Florida. The boosters and other components were retrieved by Special Ocean-Going Vessels and returned to Cape Canaveral Air Force Station (CCAFS) near Kennedy Space Center (KSC) for processing. This effort included the processing of the parachutes, the largest parachutes in the world. The parachutes were transported to a specialized facility that cleaned, inspected/repaired, and repacked the parachutes to support following missions. An important step in the process was the washing of the parachutes to remove salts from the ocean as well as algae and other contaminants.

The Parachute Refurbishment Facility was located within the confines of KSC, in an area rich with wildlife and wetlands. As a result, the water used to wash and rinse the parachutes was not to be discharged to the environment at the facility. United Space Boosters, Inc. (USBI) a division of Pratt and Whitney contracted with Water Energy Technologies, Inc. to research and recommend a method of cleaning or recycling the water. One of the options at the time was to install a long distance connection to the sewage treatment facility; due to time and cost consideration the recycle/reuse option was recommended.

Water Energy embarked in detailed assessment of existing technologies in the market at the time (Circa 1994). Many of the requirements of the parachutes demanded very high levels of purity of the water. At the conclusion of the study, Water Energy recommended a water treatment system concept that eventually allowed the Space Program to reuse the water on the parachutes.

Solution: Utilizing innovative methods of dissolving ozone into the wastewater of the Parachute Refurbishment Facility (PRF) allowed the wastewater to be treated and reused. Other treatment steps were developed, including a special filter to remove silicone without fouling. Research was also conducted concerning the possibility of using ozonated water in the actual laundering of the parachutes. After exhaustive research, ozone was employed in washing the parachutes and in treating the wastewater for reuse. The final step from Water Energy was to deliver a complete design to NASA for construction.



Results: The final project allowed the 30,000 gallons of water used for the washing of the parachutes to be treated and reused in follow-on launches. The treatment and reuse was demonstrated and successfully employed allowing the facility at its present location to continue operations. Additionally, the testing that was prompted by this project led to the development of advanced 'mass-transfer' technology that was later used in a multitude of applications, such as wastewater remediation and commercial laundry applications.

NASA has recognized Water Energy Technologies, Inc. and the engineering and scientific efforts achieved during the development and implementation of this project as a NASA Spin-Off project.