



# 179th Airlift Wing Finds a New Way to Reduce Waste

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- 1 The 179th Airlift Wing (179AW) located in Mansfield, Ohio served as a test site for the installation of a wastewater treatment system to treat C-130 engine compressor wash water and aqueous based parts washer water. This treatment system conserves water and significantly reduces a unit's hazardous waste generation.
- 2 In 1993 it was discovered that C-130 engine compressor wash water was testing high in Cadmium, which was coming from the Cadmium plated compressor blades within the turbine engines. Guard units around the nation were then faced with the problem of managing this contaminated wash water, from collection through final disposal (a process known in EPA terms as "cradle to grave").
- 3 Originally this wastewater treatment system was designed for treating dirty water generated from the aqueous based parts washers that so many ANG bases have switched to. These parts washers are taking the place of solvent tanks which were presenting both an environmental as well as a health problem for the AF and ANG. With a little modification and reengineering the Mansfield unit was able to develop a "mini-wastewater treatment system" to eliminate engine wash water and aqueous based parts washer water from the unit's hazardous waste generation. To date the Mansfield unit has seen over a 50% reduction in their hazardous waste generation. When implemented by the ANG other C-130 bases will see a similar waste reduction.
- 4 ANG units have the potential to experience huge cost savings with the purchase of a wastewater treatment system. The treatment system will cost approximately \$8,000 initially, with an annual operations and maintenance cost of several hundred dollars (for replacement chemicals and filters). Units should start to see a profit after 2 1/2 to 3 years from the avoided hazardous waste disposal costs. But more importantly they will be reducing or nearly eliminating the quantity and toxicity of waste that is generated. The 179AW, as well as other ANG bases have established a goal to reduce their hazardous waste generation by 50% by the end of 1999 from the baseline year in 1993.
- 5 The wastewater treatment system located at the 179AW is equipped with two 125 gallon tanks. The upper tank (operating tank) is where the untreated "dirty" water is pumped and where the treatment chemical is added. Within this reservoir the untreated water is thoroughly mixed with the treatment chemical by the use of a chemical mixer. After the water is thoroughly mixed the mixer is turned off and the encapsulated material is allowed to settle to the bottom of the top operating tank. The water is then allowed to drain into the bottom tank by the means of two separate ball valves that are operated manually. All the treated water is allowed to pass through a 10 micron filter media that collects the treatment chemical with the encapsulated Cadmium, Oil & Grease, and other impurities that may be present. To treat 100 gallons of contaminated water typically takes between 20-30 minutes and requires approximately 6 lbs of chemical.
- 6 This is a very simple chemical process that operates on the principle of ion exchange. Cadmium and other heavy metal impurities are replaced or exchanged with Sodium, a harmless compound that can be safely discharged into the sanitary sewer. As many chemists know Sodium (Na), when combined with chlorinated water has the potential to create "saltwater." This may only present a problem if the treated water is recycled back into the aqueous based parts washers. The treatment system at the 179AW has not been operating long enough to see any negative effects, such as excessive rusting. If the rust inhibitor that is provided by the manufacturer with their detergent is used properly, rusting should be kept to a minimum.
- 7 The primary stage of this treatment process is capable of removing over 95% of the Cadmium that is present in the untreated water. It may be necessary to add on a secondary treatment stage if a base desires to discharge the treated water into the sanitary sewer. The 179AW had this secondary treatment stage added for an additional cost of \$1,000.00. This treatment stage is referred to as the Final Polish System (FPS) and includes a granular activated carbon filter along with a poly resin chamber. After the FPS Cadmium and other heavy metals are all non-detectable and Oil & Grease is reduced to nearly non-detectable. Note: The material that is encapsulated in the 10-micron filter is testing as a **HAZARDOUS WASTE** for Cadmium at a level of approximately 15 -20 mg/l. Below is summary of the analytical results:

8

	Untreated Wastewater	Primary Treatment	Secondary Treatment
<b>Cadmium</b>	11 ppm	.5 - 1.0 ppm	<.05 ppm
<b>Oil &amp; Grease</b>	2500 ppm	180 - 200 ppm	10 - 25 ppm
<b>TSS</b>	N/A	N/A	<1.0 ppm
<b>pH</b>	7.1	Not Tested	7.4
<b>Sodium</b>	23	310 ppm	310 ppm

ine compressor wash water was not discovered as a hazardous waste until after the 1993 baseline year. With this discovery C-130 ANG units were no longer in a position to meet their 1999 goal. The 179AW has know put themselves back in the driver seat to meet their waste reduction goal.



MSgt Randall Johnson makes the final connections for the compressor wash collection system, prior to starting the engine wash. Currently C-130 aircraft engines must be cleaned twice a year.

MSgt Randall Johnson of the Engine Propulsion Section prepares one of the C-130 engines for its scheduled compressor wash. TSgt Mark Heacock also of the Propulsion Section is busy preparing the wash system that will be used to clean the C-130 engines.



MSgt Randall Johnson prepares the treatment system while TSgt Mark Heacock makes final adjustments on the C-130 engine compressor wash collection system.

The wastewater treatment system currently being used by the 179th Airlift Wing in Mansfield, Ohio to treat C-130 engine compressor wash water and aqueous based parts washer water.

- 9 The 179AW is currently using the Mart EQ-1 wastewater treatment system. There are several other vendors available that manufacture a similar treatment system such as (1) Water Smart Environmental, (2) AEI, (3) Landa Corporation, and (4) RGF Corporation. For additional information on any of these five vendors please contact Mr. Munther Jabbur or anyone on the P2 at ANG/CEV at DSN: 278-8293.
- 10 The wastewater treatment is fully permitted under the Clean Water Act, and the 179AW has a letter from the Ohio EPA Central District Office stating that this form of treatment does not require a RCRA Part B permit.
- 11 If you have any questions regarding the above mentioned information or would like additional information please contact 1Lt Troy Cramer in the Environmental Management Office at DSN: 696-6323 or COMM: (419) 520-6323. EMAIL: troy.cramer@OHMANS.ANG.AF.MIL.

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