ENVIRONMENTAL HISTORY

I. Industrial Wastewater Treatment and National Pollutant Discharge Elimination System (NPDES) Support

A. Workload/Description of Industrial Wastewater Treatment Facility (IWTF)

General. The Industrial Wastewater Treatment Facility (Building 4761) treats 50,000 gallons per day of metal finishing waste containing cyanide, chrome and heavy metals from Buildings 4760 and 4705, and 5000 gallons per day of paint booth and water blast wastewater. The new IWTF includes two 77,000 gallon effluent tanks, two 77,000 gallon influent tanks, two cyanide reaction tanks, lime silo and slurry feed system, sulfuric acid storage tank, chloride gas feed system, SO_2 gas feed system, chemical treatment tank, diatomaceous earth slurry tank, paint waste holding tank, metal finishing wastewater flocculator, clarifier, sludge holding tanks, filter press, dryer, and miscellaneous pumps, mixers, etc.

TREATMENT OF METAL FINISHING WASTEWATER

General industrial waste waters, general metal finishing waste waters, and waste waters containing hexavalent chromium, from Building 4760 and Building 4705, are transferred by underground piping to the influent pumping station on the west side of the IWTF. Wastewater generated locally at the IWTF from the cyanide treatment process, filter press, return flow from the sand filter, and rainwater collected in the containment areas are also combined in the pumping station.

The pumping station consists of a concrete sump with two submersible pumps, which convey wastewater to two influent holding tanks located on the northwest side of the building. Level switches located in the well automatically activate the pumps when a set level is reached, and the pumps operate until a low level switch is activated, which shuts off the pumps.

The treatment of metal finishing wastewater occurs in an elevated, four-compartment, flow-through tank. In the first compartment, the pH of the wastewater is lowered to a value of 2 to 3 standard units by the addition of sulfuric acid. A sulfur dioxide solution is injected into the second compartment, which reduces the hexavalent chromium present in the wastewater to trivalent chromium. The sulfur dioxide solution addition is controlled to a value of +300mv by the oxidation-reduction potential (ORP) in the compartment, in order to achieve complete reaction.

In the third and fourth compartments, the pH is raised to approximately 9.5 standard units in two increments, by the addition of lime slurry to form metal hydroxide precipitates.

After chemical treatment, the treated wastewater flows by gravity to the clarifier, where polymer flocculant is added. The clarifier separates the metal hydroxide precipitates from the treated wastewater. The insoluble metal hydroxides precipitate settles to the bottom of the clarifier, where it is pumped to the sludge holding tank and subsequently to the filter press for removal of excess water. The treated wastewater flows up through the clarifier and onto the sand filter.

The sand filter is used as a final step in the separation process, as a "polisher", to remove any remaining suspended metal hydroxide particles from the treated wastewater which were not removed by the clarifier. The wastewater flows into the bottom of the filter, up through the sand bed and out through the top, and then to one of the effluent holding tanks located on the northeast side of the building. The sand filter has a continuous backwash system that cleans the sand bed of any metal hydroxide precipitate, and returns the precipitate back to the influent holding tanks for re-treatment.

The final pH adjustment of the treated wastewater from the northeast exterior holding tank(s) occurs in a two-compartment, flow-through tank located on the ground elevation in the main floor area. In the first compartment, the pH is lowered from 9.5 to a neutral range of 6.5 to 8.0, by the addition of sulfuric acid. In the event that the pH is lowered below 6.5, lime slurry is automatically added in the second compartment to adjust the pH to the neutral range.

After pH adjustment, the treated wastewater flows by gravity to the effluent monitor tank. Flow composite samples are withdrawn by the effluent sampler at prescribed intervals determined by the Environmental Engineering and Management Office (AE01). The composite samples are provided to the MSFC Analytical Contractor for analysis. Daily discharge amounts and pH readings are recorded in the operational log book, maintained in the Control Room.

Sludge Dewatering and Drying

Suspended metal hydroxide precipitates and conditioned paint waste particles are collected in the Sludge Holding Tank prior to dewatering and drying.

Sludge dewatering is accomplished using a plate filter press. The sludge is pumped through the filter press, with the suspended solids being

captured on the filter media, and the filter water is recycled back to the influent pumping station for transfer to the influent holding tanks. After filtering, the dewatered sludge is processed through a dryer system and containerized for off site disposal.

CYANIDE WASTEWATER TREATMENT

Segregated cyanide wastewater from Building 4760 is pumped via a force main to cyanide reaction tanks at Building 4761. When the reaction tanks indicate a high level, a sensor will automatically close the valve in the force main, preventing additional cyanide wastewater from being pumped. A hardwired alarm signal will be activated in Building 4760 to alert the operators in the building to stop the discharge of the cyanide wastewater.

When the high tank level set point is reached, the cyanide destruction sequence will begin. If the pH of the wastewater is less than 9.0, lime slurry is automatically added until the pH reaches 9.0. Then chlorine solution is added to the reaction tank until the oxidation-reduction-potential (ORP) indicator reaches +400mv. When the ORP is reached, the chlorine solution valve automatically closes. The contents of the tank are reacted for 30 minutes to produce cyanates (CNO). After the reaction time, additional chlorine solution is added to the tank automatically, until an ORP of +600mv is achieved. The contents of the tank are reacted for an additional 60 minutes. At this point, the cyanide destruction process is complete.

A sample of the solution is taken by the Industrial Waste Treatment Operator and provided to the MSFC Analytical Contractor for analysis. The results of the test will be logged in the cyanide treatment logbook located in the Control Room. If the cyanide concentration is above 0.65 ppm, the treatment process will be repeated.

Once analytical results indicate the cyanide destruction reaction is complete, the treated wastewater is transferred by gravity to the west pumping station through the process drain, and then pumped to the MFW Influent Tanks.

PAINT SPRAY BOOTH WASTEWATER TREATMENT

Paint booth wastewater from Building 4760 is pumped directly to the paint wastewater holding tank on the south side exterior of Building 4761. A high level sensor in the tank activates an alarm at Building 4760, to alert the operators to stop the paint waste sump pumps. Paint wastewater is collected in the tank until the level reaches 11 feet, as indicated on the PLC. Diatomaceous Earth (DE) slurry is added, mixed, and the paint

wastewater is transferred to the sludge holding tank in Room 101 for dewatering.

SID Permit IU084500027 Conditions that are monitored for Permit compliance for the Industrial Wastewater Treatment Facility (Discharge at the IWTF). SID Permit is shown in Attachment L-20-A.

SID Permit DSN001	EFFLUENT CHARACTERISTIC	DAILY MAXIMUM	UNITS	FREQUENCY	SAMPLE TYPE
	Flow	Monitor	MGD	1/discharge	Total
	PH	6-9	s.u.	1/discharge	grab
	Cadmium, Total	0.69	mg/l	2/week	batch composite
	Chromium, Total	2.77	mg/l	2/week	batch composite
	Chromium, Hexavalent	monitor	mg/l	2/week	grab
	Copper, Total	3.38	mg/l	2/week	batch composite
	Lead, Total	0.69	mg/l	1/month	batch composite
	Nickel, Total	3.98	mg/l	2/week	batch composite
	Silver, Total	0.43	mg/l	1/6 months	batch composite
	Zinc, Total	2.61	mg/l	2/week	batch composite
	Cyanide, Total	1.20	mg/l	2/week	grab
	Total Toxic Organics	2.13	mg/l	1/6 months	grab

B. Workload SID Support

Samples collected for NPDES Permit, Discharge Monitoring Reports, and flows at discharge points by month. (Analyses of samples is by Lab Service Contractor)

SID DSN001	Samples Collected	1000	Annually
	Discharge Report for DSN001 and DSN003 to AS10	1	Month
	Discharged wastewater for CY 2006 at SID		

	DSN001. Building 4761 is industrial wastewater treatment facility.		
	Jan 2006	308000	gal/month
	Feb 2006	308000	gal/month
	March 2006	385000	gal/month
	April 2006	308000	gal/month
	May 2006	308000	gal/month
	June 2006	385000	gal/month
	July 2006	308000	gal/month
	Aug 2006	385000	gal/month
	Sept 2006	308000	gal/month
	Oct 2006	308000	gal/month
	Nov 2006	385000	gal/month
	Dec 2006	308000	gal/month

II. Other Related Work

A. Preparing and maintaining standard operating procedures for operation of the IWTF (Building 4761

B. Spill Response Supplies

Typical Spill Response Supplies and Materials kept on hand is included as an Appendix to AS10-OWI-001, Consolidated Environmental Response Plan.

C. Workload for CY 2005/2006

Date	Spill type	Quantity	Efforts
12/11/06	Bldg 8023, While being loaded for transport, an electrical transformer leaked oil onto asphalt-paved staging area.	5 gal	Biodegradeable absorbent was placed on the oil. Recovered material placed into (55) drums foer disposal.
7/31/06	Bldg 4707, SOFI area, Seal on pressurized-spray line failed causing release of urethane foam component (polyol)	10 gal	Resin material absorbed with clay absorbent. Removed from work area for disposal.
12/16/05	Corner of Martin and Dodd Road, Tractor-tanker load of LN2 overturned in grassy area off roadway allowing some fuel to leak from vehicle fuel tank(s).	10 gal	Placed enretech on soil. Approx (6) cu. yds. of soil removed for disposal.