K&A
Kapur & Associates
Oconomowoc Electroplating GWTF ♦ P.O. Box 352 ♦ Ashippun, WI 53003
Phone 414-474-4529 ♦ Fax 414-474-4639

August 30, 1997

Mr. Rick Warrington
P.O. Box 790
Keshena, WI 54135

Re: Monthly O&M Report for the Oconomowoc Groundwater Treatment Facility

Dear Mr. Warrington:

Attached is the Monthly O&M Report for August, 1997, for the above referenced project. Questions regarding this report should be directed to Syed Ihtheshamuddin at the treatment plant. The treatment plant phone number is (414) 474-4529.

Thank you for your continued cooperation and assistance with this project.

Sincerely,

Syed Ihtheshamuddin

Syed Ihtheshamuddin , Project Manager
Kapur & Associates

cc: Arne Thomsen, USACE, St. Paul District
Steve Peterson, USACE, Omaha District
Randy Sitton, USACE
Tom Williams, USEPA
Paul Kozol, WDNR
Mike Boehlar, Black and Veatch

MONTHLY OPERATIONS AND MAINTENANCE REPORT
FOR THE
OCONOMOWOC ELECTROPLATING
GROUNDWATER TREATMENT FACILITY

2572 Oak Street
ASHIPPUN, WISCONSIN

Prepared for:

Warrington Builders, Inc.
P.O. Box 790
Keshena, WI 54135

Prepared by:

Kapur & Associates, Inc.
7711 North Port Washington Road
Milwaukee, Wisconsin 53217

August 1997

1.0 Introduction

This report is submitted to provide information concerning the operations and maintenance (O&M) problems encountered at the Oconomowoc Electroplating Groundwater Treatment Plant during the month of August, 1997. O&M problems that led to a plant shut down are discussed in the *Monthly Monitoring Report for the Oconomowoc Electroplating Groundwater Treatment Facility.*

The O&M difficulties encountered in August include:

1. Cyanide Metals Treatment (CP-440):
   - pH probe pHIC 203 was missing.
   - pHIC 213 was located in reaction tank CRT 201 instead of CRT 211.
   - Flocculation tank mixer (FTM-312) was not working.
   - Main disconnect switch for the control panel does not work.
   - Flocculation tank (RMT-301) is leaking.
2. Polymer pumps (PFU-350 & PFU-351) air locking.
3. Sodium Hypochlorite Feed System:
   - Sodium hypochlorite pump (SCP-251) stopped working.
   - Flanged nozzle at the sodium hypochlorite tank (SCT-250) is corroding and leaking.
4. Sodium Hydroxide pump surge supressors for pumps SHP-361 and SHP-262 are leaking.
5. Clarifier Thickening Drive (TD401) seal leaking and auto mode not working.
6. Level of the filter medium, sand, in the Tertiary Filter (TF-600) is below the recommended level. Sand along the walls of the tank is caked and is not being effective for filtration.
7. Sump Pumps (SP-960A/B): Sump pump 960B was not hooked up. Both sump pumps had operational problems.
8. Granular Activated Carbon (GAC-650 and GAC-651): The activated carbon at the plant was leaching excess amounts of Arsenic into the effluent.
9. Effluent Holding Tank (EHT-700): Sudden drop in the effluent pH.
10. NPDES Station (NMS-740): Measuring probes need to be calibrated.
11. All sampling ports provide evidence of corrosion of the process piping (iron pipes).
12. Sulfuric Acid Feed System: Corrosion of electrical conduits.

2.0.0 Process Difficulties

Four of the process systems experienced difficulties in August, 1997. However, the treatment plant was shut down due to the problems experienced solely with the quality of activated carbon in the Granular Activated Carbon Filters (GAC-650 & 651). All of the difficulties have been resolved either by permanent or temporary solutions, and in other cases, technical assistance from equipment suppliers has been sought whenever possible. For other related information regarding plant shut downs, see the *Monthly Monitoring Report for the Oconomowoc Electroplating Groundwater Treatment Facility.*

2.0.01. Cyanide / Metals Treatment System

pH probe pHIC 203 was missing from the cyanide / metals treatment system reaction tank. In addition, the pHIC 213 probe was located in reaction tank CRT-201 instead of tank CRT-211. This resulted in erroneous signal input to the sodium hydroxide feed pumps (SHP-261 and SHP-262) and inconsistent pH values in the two tanks. A new probe was purchased and installed and on August 22, after reviewing the design documents and shop drawings, the pH probes were installed in the proper locations.

The main disconnect switch for CP-440 panel is shot. Operation of the power control of the panel is currently being done manually. The equipment supplier has been contacted and this problem should be resolved in September 1997.

During plant restart operation, the flocculation tank mixer (FTM-312) could not be operated. Without knowledge of the previous history of the mixer, the problem could not be diagnosed. The I&C designer from Black & Veatch diagnosed the problem as blown fuses. This problem was resolved before the polymer was fed into the system.

2.0.02. Polymer Pumps (PFU 350 & PFU 351)

Three times during August, the polymer Feed Unit Pumps (PFU 350 & 351) became air locked. This caused the loss of flocculation and precipitation and removal of metals. The pumps were disassembled and reassembled to solve the pump priming problem. On August 17, the polymer feed tank was raised on a platform and new priming ports installed. This has resulted in more consistent pumps operation.

2.0.03. Sodium Hypochlorite Feed System

On July 31, the sodium hypochlorite pump (SCP-252) stopped working. On further investigation, the diaphragm of the pump was found to be cracked and had leaked sodium hypochlorite into the pump body. After contacting the pump supplier, CSK Technical Inc., the pump was cleaned and the diaphragm was replaced. When the pump was still not working, the pump was disassembled and was discovered to be extensively corroded on the inside. Local representative of the pump manufacturer recommended a different model pump for the hypochlorite application. The recommended new pump was purchased and installed to resolve this problem. Warranty status of this pump is under negotiation with CSK Technical Inc.

On August 8, the flanged nozzle of the sodium hypochlorite tank (SCT-250) was discovered to be corroding and leaking. The equipment manufacturer has been notified and the warranty status negotiations are underway. This problem does not affect the treatment plant operation immediately, however, if left unattended, will lead to problems in the future.

2.0.04. Sodium Hydroxide Pumps

Surge suppressors for the sodium hydroxide pumps (SHP-361 & SHP-262) are leaking. The equipment supplier has not been contacted yet. This problem does not affect the plant operation at this time. However, the equipment supplier should contacted to remedy the situation as a Warranty issue.

2.0.04. Clarifier Thickening Drive

Since the restart of the treatment system, the Clarifier Thickening Drive (TD401) has been leaking water and sludge. The equipment supplier, Industrial Piping Co., has been contacted and warranty status negotiations are underway. The clarifier thickening drive does not affect the treatment plant operation immediately, however, if left unattended, will lead to problems in the future.

2.0.05. Tertiary Filtration System

The filter media (sand) in the Tertiary Filtration System (TF-600) is well below the recommended level for efficient operation. Sand along the walls of the tank is caked and hardened and will not loosen up during the automatic or manual backwash cycle. This provides reduced surface area and volume for filtration, leading to higher pressure drop across the filter. This in effect requires frequent manual backwash. 1,000 pounds of sand has been ordered from the filter manufacturer to make up for the lost sand. At the time of receipt of this sand, the filter will be emptied, washed and the sand replaced. This procedure is anticipated to resolve the problem with the Tertiary Filtration System.

2.0.06. Sump Pump System

Stand-by sump pump (SP 960B) was installed in the sump pit by the previous operators but was not hooked up to the power. On August 7, the sump pump, SP960A, stopped working. An electrician was called to repair the pumps. He discovered that the transformer in the control panel (CP-960) was blown. The transformer was replaced and sump pump (SP 960B) was also hooked up at this time.

On August 25, both sump pumps were noticed to have stopped working. Bob Anderson of Fluids Control Corporation was contacted. After examining the pumps, he suggested drilling a 1/8" hole above the NPT discharge of both pumps. This released the air lock in each of the two pumps and the pumps have been working well.

2.0.07. Granular Activated Carbon

On July 25, the Granular Activated Carbon Package Units (GAC-650 and GAC-651) were filled with 1,000 pounds each of activated carbon present at the site. On July 31, effluent samples of the water treated through the carbon filters were sent for 24-hour and 3-day turnaround analyses. Both results showed effluent Arsenic concentrations in excess of 25ug/l. The influent water had Arsenic concentration of 3 ug/l and the effluent exceeded 25 ug/l. The carbon manufacturer was contacted for an explanation of this anomaly. Andy McClure of Calgon Corporation noted that the carbon at the plant is a coal based carbon and that it has Arsenic content that would leach into the effluent. He also noted that the carbon would require a minimum of 100 bed volumes of backwash

water in order to reduce the Arsenic levels to meet the effluent discharge limit of 5 ug/l. A total of 48 hours of continuous backwashing was done to reduce the Arsenic concentration in the filter effluent below 5 ug/l. A total of 228 hours of operation were lost due to this problem with the carbon.

At this time, the carbon has been backwashed and does not leach Arsenic into the effluent. So no immediate action is required. However, the carbon manufacturer has recommended use of acid washed carbon for reduced metals concentration. Hence, at the time of reordering new carbon, acid washed carbon as recommended by the manufacturer should be ordered to prevent any further lost time in operation.

2.0.08. Effluent Holding Tank

On August 12, the pH of the effluent from the Effluent Holding Tank (EHT-700) showed a sudden drop from about 8.0 to 2.8. The effluent pH was verified at the NPDES station and with pH paper. Upon closer inspection, the contents of the tank were noticed to have had yellowish brown color and strong chlorine odor. There was no logical explanation for this phenomenon. The tank contents were emptied and recycled through the treatment process. The tank was washed and cleaned. The brown precipitate at the tank bottom could not be completely cleaned out of the tank. Over a period of time the precipitate has been washed out of the tank. There have been no other such incidences with tank.

2.0.09. NPDES Station

The temperature and conductivity measuring probes for the effluent at the NPDES Station (NMS-740) are out of calibration. The equipment supplier has been notified to calibrate the system. This matter will be further pursued and resolved during the month of September.

2.0.10. Iron Pipes

Laboratory analysis of the influent and effluent samples have had consistently high concentration of iron in the effluent. A typical sample analysis shows about 100ug/l of iron in the influent and about 600 ug/l in the Air Stripper (DAS-500) effluent. This is due

to corrosion of the iron piping. Corrosion of iron process piping is further evidenced at the sampling ports. The sampling ports have had iron particles and iron filings when opened after a few hours of process operation. The chemicals in the system appear to be corroding the pipes. This is causing high concentrations of iron in the effluent, and if left unattended, will cause deterioration and further damage to the piping. This issue should be resolved as soon as possible by replacing the iron piping with noncorrosive material such as fiber glass, PVC, or lined pipes. A suitable time for this replacement could be at the time of modifications to the Air Stripper Unit (DAS-500) as discussed in Other Recommendations below.

2.0.11. Sulfuric Acid Feed System

Due to the corrosive nature of the chemical, the area surrounding the sulfuric acid feed system is exposed to corrosive fumes. Over the past year's operation, this has caused severe corrosion of the electrical conduits. This is a potentially dangerous situation and should be corrected by replacing the conduits with noncorrosive material. In addition, the feed pumps pressure relief system which has been disconnected should be installed.

3.0. Other Recommendations

3.0.01 Air Stripper Package Modifications

Mr. Arne Thomsen of the U.S. Army Corps of Engineers (USACE) has initiated study for modification to the Air Stripper Package (DAS-500). The modification under study includes addition of 4 trays to the existing system. This would reduce the volatile organic compounds in the effluent to concentrations below the WDNR stipulated limits. Activated carbon treatment following the air stripper would polish the effluent and safeguard the effluent concentrations. Addition of extra trays to the Air Stripper Package would also provide safeguard against a bad batch of carbon.

At the time of modification to the Air Stripper Package, it may be prudent to change the iron piping to a non-corrosive material.

3.0.02. Polymer Feed System

At the present time, concentrated polymer is pumped at very low flow rates to the flocculation tank. The polymer is mixed with potable water in the feed piping to convey polymer to the flocculation basin. Typical flow rate of the potable water is about 90 gallons per hour. Due to the high specific gravity and low feed rates of polymer, the polymer feed pipes are susceptible to plugging. This causes a series of problems with processes following the flocculation basin. In addition, potable water at a rate of about 1.5 gpm is fed to the process.

A polymer feed tank, placed above the pump intake valve would considerably reduce pump priming problems. In addition, pumping premixed polymer at higher flow rates would lead to more control of polymer feed rates and reduce the feed line plugging problems.

3.0.03. Sump Pump Discharge Settling Tank

At the present time, the sump pump discharge consists mainly of the tertiary filtration backwash water. This water essentially consists of floc particles from the continuous backwash filter system. A settling tank with decant ports is recommended for the sump pump discharge. The decant ports would recycle the decant water to either the cyanide metals package or equalization basin. This would reduce the amount of solids recycling into the influent pumps. The sludge from the settling tank bottom would be pumped to the Sludge Holding Tank (ST-820). The existing influent ports for sludge and water at the Equalization Tank are very close to one another, thereby allowing the solids to be pumped into the liquid treatment process causing plugging of the influent pumps and precipitation in the cyanide metals treatment system. Provision of a settling tank will eliminate this problem.