Dakota Environmental of Wisconsin

Oconomowoc Electroplating GWTF ♦ P.O. Box 352 ♦ Ashippun, WI 53003

Phone 414-474-3024 ♦ Fax 414-474-4319

May 15, 1997

Mr. Kurt Unnerstall, P.E.
Sverdrup Environmental, Inc.
13723 Riverport Drive
Maryland Height, Missouri 63043

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

Dear Mr. Unnerstall:

Attached is the Monthly O&M Report for April, 1997, for the above referenced project. Questions regarding this report should be directed to Dean Groleau at the treatment plant. The treatment plant phone number is (414) 474-3024.

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

Sincerely,

Dean Groleau (FOR ROGER FIELD)

Roger Field, Project Manager
Dakota Environmental, Inc.

cc: Dean Groleau, Dakota Environmental, Inc.
Randy Sitton, USACE
Tom Williams, USEPA

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

2572 Oak Street
ASHIPPUN, WISCONSIN

Prepared for:

Sverdrup Environmental, Inc.
13723 Riverport Drive
Maryland Heights Missouri 63043

Prepared by:

Dakota Environmental, Inc.
S15 W22600 Arcadian Avenue
Waukesha, Wisconsin 53186

May 15, 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 April, 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 April include:

1. Sodium Hydroxide Pump (SHP361) not pumping.
2. Sodium Hypochlorite Pumps (SCP251/252) air locking.
3. Tertiary Filtration System (TF600) needing effluent backwashing.
4. Clarifier (C400) sludge bridging over.
5. Polymer Pump (PFU350) air locking.
6. Gas Fired Unit Heater in Sodium Hydroxide Room (GUH) requiring manual reset .
7. Sump Pumps (SP960A/B) excess sand sticking float and plugging back flow preventers and interfering with level elements.
8. Sulfuric Acid Pumps (SAP751/752) air locking.
9. Piping from Equalization Tank (EQT100) to the Chlorination Reduction Tank (CRT201) reduced flow due to solids build up.
10. Treatment System Feed Pumps (TFP110/111) reduced flow due to solids build up.
11. Chlorination Reaction Tanks (CRT201/211) excess solids build up.
12. Sulfuric Acid Pump (SAP752) line surge suppresser broken.
13. Sump Pump (SP960B) won't start.
14. Auto Dialer --did not call the Emergency Response List when plant shut down automatically.

2.0 Process Difficulties

Four process systems experienced difficulties in April, 1997. The treatment plant was shut down seven times due to the problems experienced with these processes. All of the difficulties have been resolved either by a permanent or temporary solutions. Technical assistance from equipment suppliers was sought whenever possible. For information regarding plant shut downs, see the *Monthly Monitoring Report for the Oconomowoc Electroplating Groundwater Treatment Facility.*

2.0.1. Sodium Hydroxide Feed System

On two occasions in April, air locks were detected in the discharge tubing from the Sodium Hydroxide Pump (SHP361). Air locks prevent the Sodium Hydroxide from being delivered to the Rapid Mix Tank (RMT301), which lowers the pH, and reduces the flocculation in the Flocculation Tank (FT301). A possible cause of the air locks is the Gas Fired Unit Heater (GUH) in the Sodium Hydroxide Room shuts off, requiring manual restarting. This lowers the Sodium Hydroxide temperature causing it to crystallize and clog up the in line strainers and the 1/8" discharge lines. The lower portion of the curtain covering the door and the cardboard covering the vent have been removed to ensure adequate Oxygen for combustion. The GUH still requires manual resetting about every 3-5 days.

2.0.2. Tertiary Filtration System

The media in the Tertiary Filtration System (TF600) continues to plug and needs to be air back washed up to 6 times per day. The TF600 was given three manual back washes with effluent during April. Media was added and cleaned, but the TF600 still requires manual back washing with air. This problem has existed since the initial start-up in October, 1996. According to Skip Herring, of Lighthouse Separations, Inc. (the TF600 supplier), it may be due to Total Suspended Solids (TSS) in excess of the design characteristics.

On April 22, an Enza-Clean solution, provided by Step Kare, Inc., was added to the TF600 to clean the media. It cleaned the media, but because the plant was shut down for an extended time with the solution left in the TF600, all of the scale on the TF600 wall dropped into the media, causing more binding problems. If the Enza-Clean were added during normal plant operations, the media may have remained clean for a longer time period. It is recommended that a backwash using Enza-Clean be scheduled bi-monthly to keep the media from binding.

2.0.3. Sodium Hypochlorite Feed System

On two occasions in April, air locks were detected in the discharge tubes from the Sodium Hypochlorite Pumps (SCP251/252). Air locks prevent the Sodium Hypochlorite

from being delivered to the CRT201/211. It is possible that the air locks are caused from gases released from the Sodium Hypochlorite as it sits in the 1 1/2 inch supply line from the Sodium Hypochlorite Tank (SCT250). The gas passes through the pump and is trapped at the top of a loop of 5/16 inch tubing between the pump and the 1 inch line to the CRT201/211.

The manufacturer of the metering pumps (LMI) recommends that the lines be aligned and loops removed. This allows any gas in the line to continue to flow with the Sodium Hypochlorite to the CRT201/211. The looped tubes at the suction end of the pumps have been replaced with a straight tube, but the configuration of the pumps and associated pipe work does not allow the installation of a straight tube at the discharge end of the pumps. It is recommended that the LMI pumps be repositioned to allow the loops to be removed.

2.0.4. Gas Fired Unit Heaters System

The GUH in the Sodium Hydroxide Room continues to shut down since the regulator had been relocated and the lower portion of door curtain and vent cover removed. See Section 2.0.1 for further details.

2.0.5. Sump Pump System

Sand and sludge build up in the sump trench was removed two times in April. Build up in the sump trench causes problems with the sump pump level switches. Tertiary Filter backwashing resulted in sand washing into the sump trench. After every sump trench cleaning, both sump pump back flow preventers were dismantled and cleaned out and the sump pump system returned to proper operation.

The stand-by Sump Pump (SP960B) had quit pumping on April 14. The overload breaker was discovered open. The overload breaker was reset and an attempt to restart the pump was made but sparks were seen coming from the overload. The impeller was inspected but the impeller spun freely and no debris was found. The SP960B has been taken out of service until a more thorough investigation can be made.

2.0.6. Clarification System

Nine times during April the Clarifier (C400) bridged over causing sludge to carry over into the TF600, binding the media. When the media binds most of the treated water is returned to the EQT100 through the sump trench system and causes the influent pH to elevate which leads to premature metals precipitation in the entire Metals Package. This problem, and possible solutions, have been discussed in several memos.

2.0.7. Piping System

Three times during April, the piping from the Treatment System Feed Pumps (TFP110/111) was cleaned with a dilute Muriatic Acid solution and one time an auger was used to remove deposits coating the inside of the pipes, which restrict the plant's flow from the EQT100 to the CRT201. The pipe was disconnected at a flange so that Motor Operated Valve (MOV113) could be inspected and cleaned. The deposit is possibly due to high pH water (from TF600 backwash and press filtrate flows) entering the EQT100, elevating the raw water pH and causing solids to precipitate in the piping. This problem, and its possible solutions, have also been discussed in several memos.

2.0.8. Treatment System Feed Pumps

Six times in April, the Treatment System Feed Pumps (TFP110/111) were dismantled and cleaned in a dilute Muriatic Acid solution due to the same problems discussed in 2.0.7. *Piping System.*

2.0.9. Chlorination Reaction Tanks

Once during April, the Chlorination Reaction Tanks (CRT201/211), Rapid Mix Tank (RMT301), and Flocculation Tank (FT311) were drained with the Thickened Sludge Pumps (TSP410/411) to the Sludge Holding Tank (ST820). The remaining sludge build up was removed from the walls, floor, and mixers with a portable pressure washer, sprayed toward the drain valve, and pumped to the ST820. This sludge build up is also a

result of the problems discussed in 2.0.7. *Piping System* and has been discussed in several memos.

2.0.10. Polymer Feed System

Once during April, the Polymer Feed Unit Pump (PFU350) became air locked. This caused a loss of flocculation in the Flocculation Tank (FT311) and led to no settling in the C400. The suspended solids flowed into the TF600, binding the media and caused the treated water to be returned to the EQT100 through the sump trench system and caused the influent pH to elevate which leads to the premature metals precipitation through out the entire Metals Package. See Section 2.0.5, *Sump Pump System*, for further details.

2.0.11. Sulfuric Acid Feed System

Once during April, the Sulfuric Acid Pump (SAP751) became air locked. This led to a plant shut down due to an elevated effluent pH. The air lock was caused by loose tube straighteners, which allowed the strainers to float to the top of the acid barrel and draw in air.

Also during April, a leaky discharge line surge suppresser was discovered. During an attempt to stop the leak, the suppresser broke and an operator was sprayed on the lower face and throat. An Emergency Medical Team transported the operator to the Oconomowoc Memorial Hospital. The operator was released the same day with no lost time and only minor burns. The manufacturer of the surge suppresser replaced it as a warranty item.

2.0.12. Emergency Automatic Dialing System

Once during April, the Emergency Automatic Dialing system malfunctioned and did not call the emergency response list. The treatment plant had been shut down for 13 hours before it was discovered that the SAP751 had air locked. The Programmable Logic Controller (PLC) had to be reset in order for the Emergency Automatic Dialing system to respond. See Section 2.1.1. *Sulfuric Acid Feed System* for further details.

3.0 Summary

The Sodium Hydroxide area may experience temperatures below its freezing point (55 F). This problem is being investigated; a temporary solution is in place to maintain proper temperature in the Sodium Hydroxide Area. The Sodium Hydroxide room unit heater needs to be reset occasionally, an indication that the gas service pipe may still be too small. See Sections 2.0.1. and 2.0.4 for further details.

The Tertiary Filter needs to be thoroughly cleaned in order to operate close to expected performance capabilities. It is not known how often this procedure will have to be repeated to maintain the proper operation of the Tertiary Filter. See Section 2.0.2. for further details.

The sump pump trenches required cleaning two times during April and it may become a weekly maintenance item. If the Tertiary Filter operates properly, the sump trench may only need to be cleaned monthly. The investigation into SP960B malfunctioning is still ongoing. See Section 2.0.5. for further details.

Treatment system feed pumps were dismantled and acid cleaned six times during April. Hardened deposits form on the impeller and in the lines, reducing the plant flow below the required average flow of 30 gpm. See Section 2.0.8. for further details.

The metals package was cleaned out once in April. This maintenance item will have to be performed at least 2 times a month. As long as pH 11 water is returned to the equalization tank from the tertiary filter's continuous backwash (5 gpm) and from the press filtrate holding tank, high pH water in the equalization tank will cause metals precipitation prior to the clarifier. See Section 2.0.9. for further details.

The Sodium Hypochlorite Pumps air locked twice in April. The air locking occurrences have reduced since the intake lines were straightened but the air locks still occur after a plant shut down. The SCP's are being carefully monitored. See Section 2.0.3 for further details.

The Clarifier bridged over nine times in April. The cause of the bridging is still being investigated. Several tests have been conducted, or are to be conducted in the near future. Meanwhile, the Clarifier is being drained to the Sludge Holding Tank (ST820) every 3-5

days, depending on the sludge depth in the clarifier, to prevent the sludge from flowing into the TF600. See Section 2.0.6. for further details.

The Polymer Feed Unit Pump air locked once during April. The pumps are being monitored closely to prevent air from entering the pumps. See Section 2.0.10. for further details.

The Sulfuric Acid Pumps air locked once during April. The SAP's will be checked thoroughly after acid barrel change outs to ensure all connectors are tight and that the air is removed from the pumps. The new surge suppresser has been received and will be installed when the valves are installed.

The Emergency Automatic Dialer system had malfunctioned once during April. This problem has happened before and the only way to resolve it is to reset the PLC. There is no warning before the Auto-Dialer malfunctions until it doesn't respond when needed. Further investigation will be needed to prevent this from happening in the future. Peiper Electric had been notified and a technician will be on site on May 16.

4.0 Recommendations

It is recommended that action be taken to prevent the Sodium Hydroxide from approaching its freezing point. Some type of door could be installed, and/or the Sodium Hydroxide unload heat trace could be extended to, and around the bottom of the Sodium Hydroxide storage tank. Installing a mechanical louver would prevent wind from blowing into the Sodium Hydroxide Area.

Investigations should be made to determine whether the Cyanide/Metals Treatment Package and the TF600 can handle the observed solids loading at the plant influent.

In order to reduce the pH in the EQT100, backwash from the TF600 could be redirected to the Cyanide/Metals Treatment Package. Flow from the Press Filtrate Holding Tank (PFT840) could also be redirected to the Cyanide/Metals Treatment Package. For further information, see memos to Kurt Unnerstall dated March 5, and April 1, 1997.

The Sodium Hypochlorite pumps (SCP251/252) could be repositioned to eliminate the discharge line loop and prevent or reduce air locking the pumps.

The C400 Sludge bridging may be eliminated by cutting larger openings in the Clarifier bottom to allow direct sludge to auger contact, which could result in more sludge being drawn from the Clarifier to the ST820. When the ST820 reaches alarm level, the TSP's will not operate. The sludge fills the Clarifier and spills into the TF600, binding the media. I would prefer that this fail safe is eliminated. It is recommended that this fail safe be eliminated. If the ST820 overflows, the resulting flow is directed to the EQT100 by way of the sump trench.

The Sulfuric Acid System could be rearranged so that the electrical connections are not below the acid lines. The electrical conduit could be replaced with acid resistant conduit to prolong the life of the electrical system. The SAP's could be lowered to reduce the pumping head to the pumps. Installing an acid tank would reduce the number of barrel changes and reduce the risks to the operators while handling the acid barrels.