December 15, 1998

Paul Kozol
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53590

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

Dear Mr. Kozol:

Attached is the Monthly O&M Report for November, 1998, for the above referenced project. Questions regarding this report should be directed to me at the treatment plant. The treatment plant phone number is (920) 474-3212.

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

Sincerely,

Dean Groleau

Dean Groleau, Plant Supervisor
APL, Inc.

cc: James Chang, APL, Inc.
Mike Boehlar, Black and Veatch
Arne Thomsen, USACE, St. Paul District
David Brodzinski, WDNR, Horicon
Steve Peterson, USACE, Omaha District
Thomas Williams, USEPA

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Wisconsin Dept. of Natural Resources Certificate #241340550

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

2572 Oak Street
ASHIPPUN, WISCONSIN 53003

Prepared for:

U.S. Army Corps Of Engineers
St. Paul District
Hastings, Minnesota
Contract DACW37-98-C-0009

Prepared by:

APL, Inc.
8222 West Calumet Road
Milwaukee, Wisconsin 53223

December 15, 1998

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 November, 1998. 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 October include:

1. Tertiary Filtration System (TF-600) needs daily backwashing.
2. Sulfuric Acid Pumping Station needs rebuilding.
3. Sludge Thickener Drive (TD-401) needed shaft seal replaced.
4. Press Filtrate Tank (PFT-840) access ladder has cracked supports.
5. Sodium Hypochlorite Pump (SCP-252) needs to be sent to the manufacturer for inspection and repair.
6. Motor Operated Valve (MOV-113) needs to be replaced.
7. NPDES Station needed pH probe recalibrated.
8. Diffused Air Stripper (DAS-500) sump has pin holes.
9. Office Personal Computer (Acer) not recognizing CD ROM drive.
10. Metals Package pH & ORP Probes needed cleaning.
11. Metals Package needed sludge removed.
12. Thickened Sludge Pump (TSP-411) has a leak.
13. Sodium Hydroxide Pump (SHP-361) influent line crystallized.
14. Air Stripper Transfer Pump (TP-520) base needs repainting.
15. Diffused Air Stripper (DAS-500) filter element needed cleaning.
16. Metals Package Mixers (CTM-202/212 & RTM-302) needed lubricating.
17. Sodium Hypochlorite Pump (SCP-252) discharge line valve leaked.
18. Floor Sump Trench needed cleaning.
19. Press Filtrate Pumps (PFP-830/831) air-line regulator leaking.
20. Sodium Hydroxide Pumps (SHP-261/262/361) discharge line fittings leaking.
21. Cyanide Reaction Tank Mixer (CTM-202) damaged.
22. NPDES High pH in Effluent Holding Tank (EHT-700).
23. Rapid Tank Mixer (RTM-302) damaged.
24. PH-303 Probe recalibrated.
25. East Safety Shower/ Eyewash Station has broken paddle valve handle.
26. Granulated Activated Carbon Filter (GAC-651) plugged.

27. Overhead Bay Doors' springs needed lubrication.
28. Treatment System Feed Pump (TFP-111) had low flow.
29. Filter Press Feed Pump (FFP-811) leaking.
30. Filter Press (FP-800) needed lubrication.
31. Treatment System Feed Pump (TFP-110) failed.
32. Cyanide Tank Mixer (CTM-212) failed.
33. Air Compressor (AC-950) needed routine maintenance.

2.0 Process Difficulties

Eight process systems experienced difficulties in November, 1998. 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 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. Tertiary Filtration System

The Tertiary Filtration System's (TF-600) needs backwashing with effluent every day due to too much polymer going through the Metals Package. TF-600 started experiencing media binding problems after running the Sludge Filter Press (FP-800) and transferring the filtrate to the Equalization Tank (EQT-100). The Polymer Feed Pumps (PFU-350/351) are at their lowest settings without damaging the pumps. This has been an on-going problem since the initial Treatment Plant's start-up in 1996. The Polymer Process is currently under modification to up-grade and reduce this situation. Two dilute Muriatic Acid washes were performed (on November 6 and 9) to remove the polymer and hardness/build-up from the media and diffuser heads to allow the treated water to flow through the TF-600.

2.0.2. Metals Package

On July 1, it was discovered that the Thickener Drive (TD-401) seal on the clarifier auger was leaking. A garbage can has been put under the leak to contain the liquid and a portable sump pump is used to transfer the water to the sump trench to be retreated. This is a temporary remedy until the seal can be acquired. The leakage has subsided. On September 24, the supplier sent a

special seal and more information on the auger. The part arrived on October 20. The auger drive was disassembled on October 26 and a gear tooth was damaged while attempting to remove the auger drive sprocket. A local welding company was notified and a technician was to be sent out when time permitted. On November 4, the auger shaft seal was changed out. The welder repaired the sprocket on November 10 and the auger shaft seal assembly was reassembled and tested. The leaking problem has been resolved.

On July 1, the plant's influent motor operated valve (MOV-113) would not operate in the Automatic or Manual modes. Technicians from Pieper Electric inspected it and determined that the valve needs to be replaced. A quote was received from the supplier (Bertsch Co.) and sent to the USACE on July 28. On September 14, a replacement valve was ordered by the USACE. The replacement valve was received on October 13. Three 2" x 10" nipples were ordered on October 20, but were placed on back order. On November 13, the 3 nipples arrived at the treatment plant and the valve piping was pre-assembled and painted on November 16.

On November 1, 10, 23, and 27, all of the ORP & pH Probes located in the Metals Package were cleaned and tested. This will be on the semi-monthly preventive maintenance schedule.

On September 23, it was discovered that the Thickened Sludge Pump (TSP-411) would not operate and liquid was leaking from the air exhaust. This indicates a ruptured diaphragm. On October 1, the pump was disassembled and it was discovered that both diaphragms were ruptured. The inner and outer diaphragm plates on both diaphragms were corroded together and were damaged while trying to separate them. Quotes for replacement parts were obtained from 3 suppliers and submitted to the USACE on October 13. The replacement parts were ordered on October 15. On November 2, the replacement parts arrived at the treatment plant but 2 parts had been omitted from the order. The two parts were reordered on November 3. One part was received on November 6 but the other part was placed on back-order. TSP-411 was assembled as much as possible on November 11.

On November 10 and 25, all mixers (CTM-202, 212, RTM-302, & TD-401) that had Zerk fittings in the Metals Package were lubricated. This will be on the monthly preventive maintenance schedule.

On October 30, the first and second stages of the Metals Package (CRT-201/211) were by-passed and drained to ST-820. While draining CRT-201, it was discovered that CTM-202 had been reactivated and its mixing shaft had been damaged. CTM-202 spins at a speed of 1750 RPMs and was coated with 2" of hardness/sludge build-up. The liquid was removed from the mixer while it was still activated and combined with the weight of the hardness/sludge build-up caused

it to go out of balance and bent the shaft. CTM-202 was run only while the operators were on site. On November 2, it was accidentally left on overnight and it had broken loose the tank flange connection and damaged the electrical conduit before tripping the circuit breaker. A replacement shaft had been ordered on November 4. Both tanks were cleaned with a pressure washer and pumped to ST-820. On November 5, the replacement shaft arrived but could not be installed until the tank flange connection had been welded on. On November 5, CTM-202's gear grease was changed out, the electrical conduit was replaced, and the impeller was attached to the new shaft. On November 10, the welder reattached the tank flange connector, the mixer was reinstalled, and the mixer was test run. No further problems have developed. The tank flange connector was repainted to protect it from corrosion.

On November 3, the treatment system was found shut down upon the arrival of the operators. The Granulated Activated Carbon Filter (GAC-651) had plugged up due to a false pH reading in the Rapid Mix Tank (RMT-301). The pH Probe #303 was sitting in sludge a the bottom of the RMT-301 and was reading a pH of 11.8 but the Flocculation Tank (FT-311) had a pH reading of 10.6. The polymer was not floccing the sludge together and it eventually plugged up the GAC-651. RMT-301 was drained to the Sludge Holding Tank (ST-820). The operator neglected to shut off the Rapid Tank Mixer (RTM-301) and its shaft was damaged. A new shaft was ordered. It was received on November 4, but the shipper sent the wrong diameter shaft. It was reordered and received on November 5. On November 4, the gear grease was changed out. On November 5, the impeller was fastened to the new shaft, the mixer was reinstalled in RMT-301, and a test run was performed. No further problems have developed. PH Probe #303 was recalibrated and the flocculation of sludge returned to FT-311.

On October 31, after restarting the Treatment Plant, the system shut down automatically due to high effluent pH in the Effluent Holding Tank (EHT-700). The EHT-700 was recirculated back to the EQT-100 and retreated but the effluent pH would not reduce below 9.0. The Treatment Plant was shut down until the Sunday operator would arrive. On November 1, the Sunday operator could not lower the effluent pH. The Treatment Plant was shut down until Monday. Faxes were sent to APL, WDNR, and USACE.

On November 2, the Treatment Plant was inspected. It was discovered that the PID parameters and pH set points in the pH analyzers had been changed. They were raised to a pH of 11.6 and were constantly calling for more Sodium Hydroxide. The normal set point was 11.2 to 11.3 pH. Also, discovered were 4 pump indicator bulbs had blown out, CTM-202 had been reactivated, and the office p.c. was acting up. It is believed that another power surge had occurred at the Treatment Plant causing all of these problems. The pH set points and the PID controls were placed back to their normal parameters and the Treatment Plant pH returned to normal.

On November 18, it was noticed that the Treatment System flow had reduced. The on-line Treatment System Feed Pump (TFP-111) was rotated out of line and the stand-by pump (TFP-110) was placed on-line. TFP-111 was dismantled, acid cleaned, and inspected. It's impeller was clogged with pieces of plastic, rubber, nylon ties, grass, and other debris. The impeller was cleaned of debris, lubricated, and the pump was reassembled and left in the stand-by position.

On November 27, the Treatment System was found shut down upon the arrival of the operator. After a walk through inspection, it was found that the on-line Treatment System Feed Pump (TFP-110) had failed. The on-line Treatment System Feed Pump (TFP-110) was rotated out of line and the stand-by pump (TFP-111) was placed on-line. The Treatment System was restarted and all parameters returned to normal operations. On November 30, TFP-110 was dismantled, inspected, and acid cleaned. TFP-110 had stopped pumping because of sludge/hardness build-up on the impeller. The pump was lubricated, reassembled, and left in the stand-by position.

On November 30, the circuit breaker to the Cyanide Tank Mixer (CTM-212) was discovered tripped. The circuit breaker was reset and several attempts were made to restart CTM-212. Blue sparks were seen at each attempt and the circuit breaker would re-trip. The control panel circuit breaker was opened and the start switch left off until a more thorough inspection can be made.

2.0.3. Sulfuric Acid System

On July 1, it was discovered that several of the Sulfuric Acid pumping station's fittings were leaking. It appeared that acid had dissolved the pipe's fitting compound and dripped onto the galvanized electrical conduit, causing them to corrode. The repair of the leaks has been put on hold since there is a plan to rebuild the pumping station. The area is under constant observation so that the leakage does not increase. New fittings for the Sulfuric Acid Pumps (SAP-750/751) were ordered on August 28. On September 16, the new pump fittings were received and they were installed on September 17. The problem with the leaking pipe fittings is still a hazard.

2.0.4. Sodium Hypochlorite System

On July 13, Sodium Hypochlorite Pump (SCP-252) was found locked into the Programming mode and would not respond to any changes made on its key pad face. A technician from Liqui-Systems assisted in troubleshooting the problem but the pump would not respond. The pump had been knocked out of its External (Automatic) mode but does respond to the 4 to 20

milliamp programming parameters. The only way to shut the pump off is by the switch on the control panel. Liqui-Systems recommended that the pump be sent back to the factory so that they could get a better look at the problem. The operators are waiting for further instructions from the USACE on this matter.

On October 26, it was discovered that SCP-252 discharge line isolation valve was leaking. On November 10, the SCP-252 discharge isolation valve was removed, cleaned, inspected, and reinstalled. On November 11, the valve was still leaking. It was inspected again and it was discovered that the leaking was coming from the valve flange connection. The adhesive had failed at the point where the flange was connected to the discharge pipe. The flange was removed, cleaned, re-glued, and reinstalled. The leaking has stopped.

2.0.5. Diffused Air Stripping System

On September 4, it was noticed that the DAS-500 had several pin holes that were leaking. These pin holes had been siliconed over before and the silicone had worn away. On September 23, the old silicone had been removed and fresh silicone applied. Some of the fresh silicone had been blown away and the leaks have restarted. A more permanent solution is being investigated. The leaking had stopped on October 15. On October 22, the leaking had resumed. No further action had been taken on this situation during the month of November.

On November 16, the DAS-500 air blower filter element was removed, cleaned, and inspected. This will be on the monthly preventive maintenance schedule.

On November 18, the mounting base for the Diffused Air Stripper Feed Pump (TP-520) was cleaned and primed. This procedure will be used on most of the mounting bases to control the spread of rust and to prolong their life.

2.0.6. Filter Press System

On July 1, it was noticed that the ladder supports for the Press Filtrate Tank (PFT-840) are still cracked and have never been reinforced. This was first noted in 1996. The operators are waiting for further instructions from the USACE on this matter.

On October 22, the Press Filtrate Pumps' (PFP-830/831) air-line regulator started leaking air. On November 11, a technician from Cochrane Compressor Company inspected it. He

disassembled, cleaned, and reassembled it. The leaking stopped and the technician said that it was corroded inside, preventing the parts from reseating. On November 13, the leaking had restarted. APL, Inc. ordered a new regulator on November 16 and it was received on November 18. The leaking starts and stops. A Cochrane Compressor technician was on site on November 24, so he inspected the old regulator and discovered that an O-ring was damaged. He did not have a spare one with him, so he rebuilt the regulator, and ordered a new O-ring.

On November 18, it was discovered that the Filter Press Feed Pump (FFP-811) leaks while the pump is in operation. No further actions were taken on this matter during November, 1998.

On November 25, all Zerk fittings on the Filter Press (FP-800) were lubricated. This will be on the quarterly preventive maintenance schedule.

2.0.7. Sodium Hydroxide System

On October 26, it was discovered that all of the Sodium Hydroxide Pumps (SHP-261/ 262/ 361) discharge lines were leaking. On November 6, it was discovered that the Rapid Mix Tank (RMT-301) had a pH of 9.6 (normal range is 11.0 to 11.3). The Treatment System was inspected to find the cause of the low pH. It was discovered that the Sodium Hydroxide Pump (SHP-361) was air-locked due to cool room temperatures causing the feed line to crystallize and plug the in-line Y-strainer. SHP-261 was put in Manual mode and valved to RMT-301. SHP-361's Y-strainer was removed, cleaned, and reinstalled. The pump was still air-locked, so the line fittings (to and from the pump) were removed, cleaned, and retightened. The line surge suppresser was removed because of flow problems. SHP-261 and 262, also, had their fittings (to and from the pump) removed, cleaned, and retightened. The leaking had stopped, pH in RMT-301 raised to 11.2, and the flocculation of metals returned in FT-311. A portable space heater has been placed in the Sodium Hydroxide Room, pointed at the Sodium Hydroxide Tank (SHT-260) feed line to the SHP's. It is plugged in at the end of each shift.

2.0.8. NPDES Monitoring Station

On November 16 and 25, the NPDES Monitoring Station's pH probe was removed, cleaned, inspected, and recalibrated. This will be on the semi-monthly preventive maintenance schedule.

2.0.9. General Equipment

On July 1, it was noticed that the desk top personal computer (Acer) would not recognize it's CD ROM drive. After many attempts to get it working, it was sent back to the supplier (Best Buy), on July 20, to be tested. Dakota Environmental provided another computer until the treatment plant's computer is repaired. On September 17, the Acer computer was brought back from Best Buy, but there still is problems with re-booting the system and re-installing software. This problem is still under investigation. On October 23, the USACE did not authorized the purchase of a new p.c. but is looking at the possibility of replacing it in the future.

On November 17, the Floor Sump Trench was cleaned and all sand, carbon, and sludge was removed and placed in the sludge hopper. This will be on the monthly preventive maintenance schedule.

On November 9, the East Safety Shower/Eye Wash Station's paddle-type valve handle broke off. A replacement quote was received and a replacement valve handle was ordered. The replacement valve handle was received on November 25 and installed on November 30.

On November 12, the Overhead Bay Door springs were lubricated at the recommendation from the supplier. This will be on the quarterly preventive maintenance schedule.

On November 24, a technician from Cochrane Compressor Company performed routine O & M inspections and maintenance on the Air Compressor (AC-950). This will be on the quarterly preventive maintenance schedule.

3.0 Summary

The following is a list of outstanding maintenance items encountered at the Oconomowoc Groundwater Treatment System in November, 1998.

The Tertiary Filter needs to be backwashed daily to keep it running to its expected performance capabilities. The main problem is still the over polymerization of the Metals Package that causes the media to bind. See Section 2.0.1.

The Extraction Wells pipelines need to be cleaned periodically to increase the flow into the Equalization Tank and to dilute down the pH in the tank coming in from the Tertiary Filter backwash water.

The Sodium Hypochlorite Pump (SCP-252) needs to be returned to the factory to be reprogrammed.

The Sludge Thickener Drive Seal needed replacing.

The plant's influent controlling Motor Operated Valve (MOV-113) needs to be installed.

The Press Filtrate Tank's (PFT-840) access ladder's supports need to be reinforced.

Most of the chemical feed pumps need spare replacement parts to keep them running at expected performance levels.

4.0 Recommendations

In order to reduce the pH in the EQT-100, Backwash from the TF-600 could be redirected to the Press Filtrate Holding Tank (PFT-840) . The flow from the Press Filtrate Holding Tank could also be redirected to the Cyanide/ Metals Treatment Package.

The Sulfuric Acid System could be rearranged so that the electrical connections are not below the acid lines. The electrical conduit should be replaced with acid resistant conduit to prolong the life of the electrical system. The SAP's should 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.

Periodic cleaning of the Metals Package, transfer pumps, Extraction Well piping, and the Floor Sump Trench would reduce the monthly amount of unexpected down time.

Having a spare parts inventory for the chemical feed pumps would also aid in reducing the monthly amount of unexpected down time. There are 6 different models of LMI Chemical Metering Pumps used at this Treatment Plant and very few of their parts are inter-changeable.

Replacing the existing Tertiary Sand Filter (TF-600) with 2 smaller Sand Filters that could be rotated out with a clean unit when one plugs. The plugged Sand Filter would be cleaned and left in the Stand-By position, ready to be put on-line when the Operating filter plugs. This could increase the amount of treated water discharged and reduce the amount of treated water returned to the EQT-100. This would keep the pH in the EQT-100 lower, reduce the amount of polymer

that is reintroduced to the Metals Package, and reduce the amount of premature precipitation of metals in the wrong locations.

5.0 Steps for Plant Self-Automation

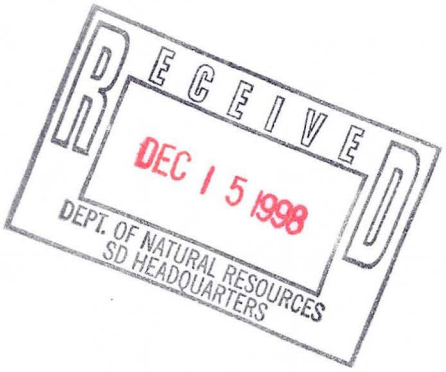
We are in the process of installing the Polymer Dilution System and the Effluent Neutralization Stage between the Clarifier and the Tertiary Sand Filter in the very near future. Once these stages are installed, on-line, and the "bugs" are worked out of them, it will become clearer as to what the next steps to Plant Self-Automation may be.

Some of the problems that I have already seen is the inconsistent flow coming to the Equalization Tank from the Extraction Well Field. The Treatment Plant sends out an alarm if the flow is <19GPM. Extraction Well #4 is a shallow well that loses its level very often and shuts down to re-fill. The low flow alarm was constantly going off.

Semi-hardened chunks of polymer plug the suction end of the Polymer Feed Pumps (PFP-350/351) and prevents polymer to be added to the Flocculation Tank (FT-311) or the precipitation of metals to occur in the Clarifier (C-400). This leads to plugging of the media in the Tertiary Sand Filter (TF-600) and metals exceedences in the effluent.

The crystallization of the Sodium Hydroxide and plugging the in-line Y-strainers for the influent lines to the Sodium Hydroxide Pumps (SHP-261/262/361) prevents the Sodium Hydroxide to reach the Metals Package to increase the pH's adequately to allow the polymer to work or metals to precipitate. This leads to plugging of the media in the Tertiary Sand Filter (TF-600) and metals exceedences in the effluent.

The clogging of the piping from the EQT-100 through out the Metals Package to TF-600. There are no fail safes in place to detect or prevent the piping from clogging.



December 15, 1998

Mr. Paul Kozol
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53590

Re: Monthly Monitoring Report for the Oconomowoc Groundwater Treatment Facility

Dear Mr. Kozol:

Attached is the Monthly Monitoring Report for November, 1998 for the above referenced project. Questions regarding these reports should be directed to James Chang of APL, Inc. at (414) 355-5800.

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

Sincerely,

Dean Groleau

Dean Groleau, Plant Supervisor
APL, Inc.

cc: Arne Thomsen, USACE, St. Paul District
Steve Peterson, USACE, Omaha District
Tom Williams, USEPA
James Chang, APL, Inc.
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Wisconsin Dept. of Natural Resources Certificate #241340550

MONTHLY MONITORING REPORT
FOR THE
OCONOMOWOC ELECTROPLATING
GROUNDWATER TREATMENT FACILITY

ASHIPPUN, WISCONSIN 53003

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT
HASTINGS, MINNESOTA
CONTRACT DACW37-98-C-0009

Prepared by:

APL, Inc.
8222 West Calumet Road
Milwaukee, WI 53223

December 15, 1998

1.0 Introduction

This report summarizes the monthly effluent monitoring results for the Oconomowoc Electroplating Groundwater Treatment Plant (OEGTP) for November, 1998. The OEGTP is located at the site of the former Oconomowoc Electroplating Company, in ASHIPPUN, WI.

Laboratory results of effluent sampling can be found in the Discharge Monitoring Report Form, sent under separate cover. The effluent sampling was conducted by Scott Harrison, Tony Goodman, and Dave Dugan of APL, Inc. Laboratory analysis was provided by APL, Inc., 8222 W. Calumet Road, Milwaukee WI 53223. All sampling and analyses were conducted in accordance with the Oconomowoc Electroplating Groundwater Treatment System's Chemical Data Acquisition Plan (CDAP). The parameters tested for, frequency of testing, sample type, and limits are set forth in the Final Discharge Limits, Table 1 of the Oconomowoc Electroplating Superfund Site Limits and Requirements for Discharge of Treated Groundwater, issued by the Wisconsin Department of Natural Resources (WDNR) on September 24, 1996. This report is submitted in accordance with the reporting requirements of the WDNR permit.

1.1 Site Background Review

The OEGTP is located at 2572 Oak Street in Ashippun, Wisconsin, in the NW 1/4 of the SE 1/4 of Section 30, Township 30 North, Range 17 East. The site consists of approximately 10 acres, which includes approximately 3.5 acres of the former electroplating facility. The site is bounded by Oak Street (Highway 'O') and Eva Street to the North, and Davey Creek and the Town of Ashippun's garage facilities to the South. The property directly across Oak Street is occupied by Thermogas, Inc. A residential area is located across Eva Street, and a wetlands surrounds Davey Creek.

The contact person is Arne Thomsen of the U.S. Army Corps of Engineers (USACE). Mr. Thomsen's phone number is (612) 438-3076, Fax (612) 438-2464. APL, Inc. is contracted by the USACE to operate and maintain the plant. The phone number for the Treatment Plant is (920) 474-3212, Fax (920) 474-4241. The contact for APL, Inc. is James Chang, who can be reached at (414) 355-5800, Fax (414) 355-3099.

1.2 Project Objectives

The objective of this project is to prevent the spreading of any plume of contamination that may exist at the site. Contaminated groundwater is pumped from five extraction wells, treated for cyanide, metals, suspended solids, and volatile organic compounds (VOC's). The treated water is then transferred to a groundwater effluent gallery, located south of Elm Street, near Davey Creek.

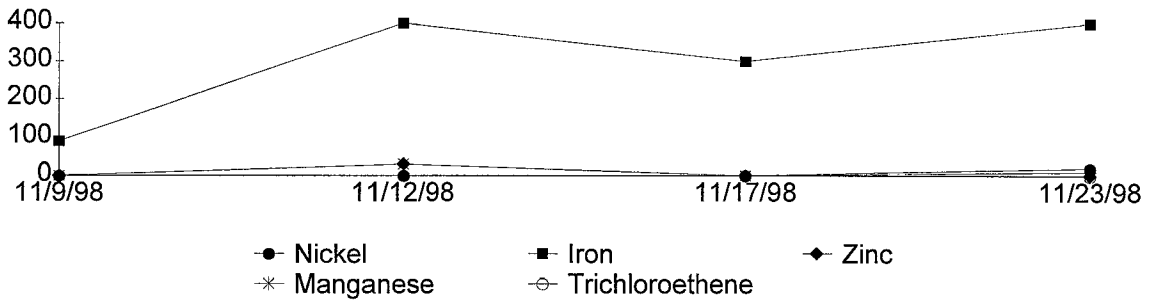
1.3 Effluent Monitoring

Weekly monitoring was conducted on November 9, 12, 17, and 23. The weekly samples for November were tested by APL, Inc. The samples taken on November 9 were all Grab-type samples. Paul Kozol of the WDNR allowed Grab-type samples because of all of the difficulties to keep the Treatment Plant running for 24 hours straight for Composite-type sampling during the week of November 1 to 7. The results of the effluent monitoring tests for the samples taken on November 12 and 17 showed that Trichloroethene equaled the limit of the WDNR effluent discharge permit. The results of the effluent monitoring tests for the samples taken on November 23 showed that Nickel equaled the limit of the WDNR effluent discharge permit. The possible causes of the high levels are discussed in Section 2.0.

1.4 Monitoring Results

Results from weekly effluent monitoring can be found in the Discharge Monitoring Report Form, sent under a separate cover. Chart 1, below, shows the results of effluent monitoring for five important indicator parameters listed in the Monitoring Requirements of the Oconomowoc Electroplating Superfund Site Substantive WPDES Permit Requirements Summary (9/96). The November sampling results showed no exceedences.

Chart 1 - 5 Important Indicator Parameters



1.5 Monitoring Well Sampling

The second round of Monitoring Well sampling was conducted on November 23. Monitoring Wells #03S and #05 were dry, #11B is nonexistent, and #16S is inaccessible. The results of the other 8 Monitoring Wells' analyses are enclosed with this report.

2.0 Plant Permit Exceedences

The possible cause for high level for TCE in the November 12 and 17 samplings may be due to operating only one granulated activated Carbon filter. On November 17, both Granulated Activated Carbon Filters (GAC-650/651) were put on-line. The possible cause for high level for Nickel in the November 23 sampling may be due to too much polymer in the Treatment System that causes inconsistent metals flocculation in the Metals Package. The Treatment System is in the process of modifying the Polymer Addition System in the near future. This modification will allow the polymer addition to be reduced.

2.1 Plant Shut Down

The treatment plant was shut down seven times for a total of 108.75 hours in November, 1998. There was one shut down due to high effluent pH in the EHT-720 caused by the too much Sodium Hydroxide being pumped into the Metals Package. The second shut down was due to the GAC-651 plugging. The third shut down was due to removing sludge from RMT-301 and damaging RTM-302. The fourth shut down was due to low pH in RMT-301. The fifth shut down was due to a high level in the Floor Sump Trench. The sixth shut down was due to

MOV-711 left Manually closed. The seventh shut down was due to TFP-110 failure. Table 1 shows the summary of the plant down time for the month of November, 1998.

Table 1 - Plant Down Time Summary

Date(s)	Number Hours Shut Down	Reason
11/1-2	26.5	High pH in the EHT-700
11/3	3	GAC-651 Plugged Up
11/3-5	52.25	RMT-301 Cleaning & Damaged RTM-302 Mixer
11/6	1	Low pH in RMT-301
11/8	1	High Floor Sump Trench Level
11/15-16	17.5	MOV-711 Left Manually Closed
11/27	7.5	TFP-110 Failed
TOTAL	**108.75**	

2.1.1. Shut Down Due To High pH In The Effluent Holding Tank

At 1:10 P.M. on October 31, the Treatment System shut down due to high pH level in the Effluent Holding Tank (EHT-700). There appeared to be no cause for the high pH after an initial investigation. It is possible that the PID controllers for the Sodium Hydroxide over compensated for the low pH in the Metals Package after refilling the Metals Package. The Treatment System was restarted in the Manual mode and the EHT-700 was recirculated to EQT-100. The Granular Activated Carbon Filter Tanks (GAC-650/651) were drained and backwashed to lower their pH. The EQT-100 was pumped to the ST-820 using the Equalization Tank Solids Pump (ESP-120) to lower its level and to dilute its pH with the 5 EWs and the recirculated effluent water. The USACE, WDNR, and APL were sent faxes and the plant was shut down overnight.

At the beginning of the work day on November 1, the Treatment Plant was started in the Manual mode but the effluent pH would not lower below 9.0. The Sunday operator notified the treatment plant superintendent at the end of his shift. The superintendent told him to shut the plant down until Monday. The Sunday operator faxed notices to the USACE, WDNR, and APL that the plant was shut down overnight.

At the beginning of the work day on November 2, the Treatment Plant was started in the Manual mode and a thorough inspection of all parameters was made. It was discovered that the PID Controllers and pH set points had been raised in the Metals Package. The PID Controllers kept calling for more Sodium Hydroxide even though the pH's were already reading in their normal

ranges. There was too much Sodium Hydroxide added to the Metals Package which resulted in an elevated buffering capacity in the treated water that the Sulfuric Acid Pumps (SAP-751/752) could not control. Also, discovered, was 4 pump indicator bulbs had been blown out, the office p.c. monitor was snowy, and the Cyanide Tank Mixer (CTM-202) had reactivated by itself. It is believed that another power surge had occurred that caused these problems.

2.1.2. Shut Down Due To Plugging of GAC-651

On the morning of November 3, the Treatment Plant was discovered shut down. There were high tank level alarms in the Diffused Air Stripper (DAS-500), Tertiary Filtration Tank (TFT-601), and Equalization Tank (EQT-100). The Granular Activated Carbon Filter (GAC-651) had plugged with polymer and it's transfer pump (GFP-620) had over loaded it's breaker due to the pH probe 302 sitting in sludge at the bottom of the Rapid Mix Tank (RMT-301). PH probe 302 was reading the pH of the sludge (reading 12.4) and not the pH of the treated water (reading 10.4). This was a continuation of November 2's problem (See Section 2.1.1.). The polymer could not flocculate the metals at this low pH reading and the PID Controller was not calling for more Sodium Hydroxide. GAC-651 was rotated out of line with GAC-650 and was backwashed with effluent. All tank levels returned to normal.

2.1.3. Shut Down Due To RMT-301 Cleaning & RTM-302 Being Damaged

The RMT-301 was drained to the Sludge Holding Tank (ST-820) and rinsed out. The Treatment Plant operator forgot to shut off the Rapid Tank Mixer (RTM-302). The weight of the sludge on the impeller rotating at 1750 RPMs and the absence of the liquid surrounding it caused the shaft to become bent beyond use. A replacement shaft was ordered from the manufacturer and the gear grease was changed out of the mixer. The replacement shaft arrived the next morning but the wrong diameter was shipped. The correct replacement shaft arrived on November 5 and the RTM-302 was reinstalled in RMT-301. The mixer was test run and the Treatment Plant was restarted at 11 A.M. The USACE, WDNR, and APL, Inc. were notified.

2.1.4. Shut Down Due To Low pH in RMT-301

On the morning of November 6, the Treatment Plant was discovered shut down upon the arrival for the work day. After a walk-through investigation, it was discovered that RMT-301 had a low pH reading (9.6) and that the polymer could not react to flocculate the sludge. The TF-600

plugged and the EQT-100 had filled up. The cause of the low pH was due to the drop in room temperature in the Sodium Hydroxide Room which caused the Sodium Hydroxide to crystallize and clog the in-line Y-strainer and air-locked the Sodium Hydroxide Pump (SHP-361) to the RMT-301. SHP-261 was valved to RMT-301 and put in Manual mode to help elevate the pH. SHP-361's in-line Y-strainer was disassembled, cleaned, and reassembled. The fittings to and from SHP-361 were removed, cleaned, and Teflon taped. SHP-361 was reprimed and put back on-line. SHP-261 was returned to normal operating parameters. The plant had been shut down for 1 hour. The plant was restarted, the pH level returned to RMT-301 and flocculation returned to FT-311.

2.1.5. Shut Down Due to High Floor Sump Trench Level

Upon the arrival of the Sunday operator on November 8, it was discovered that TF-600 had plugged and filled the EQT-100 and the Floor Sump Trench. The operator performed an effluent backwash, transferred water from EQT-100 to the ST-820, and transferred sludge from C-400 to ST-820. After these steps were completed, the Treatment Plant operations returned to normal.

2.1.6. Shut Down Due to MOV-711 Left Manually Closed

On November 15, the Sunday operator forgot to put the Effluent Holding Tank (EHT-700) Motor Operated Valve (MOV-711) back in Automatic mode after completing an effluent backwashing on the Tertiary Sand Filter (TF-600). The error was discovered on November 16 at the beginning of the work day. The MOV-711 was put in Automatic operation and the Treatment Plant was restarted.

2.1.7. Shut Down Due to Treatment Feed Pump Failure

Upon the arrival of the operator on November 27, it was discovered that the Treatment Plant had shut down at 2:00 A.M. After a walk through inspection, it was discovered that the Treatment System Feed Pump (TFP-110) had failed due to the sludge/hardness build-up on its impeller. The operator switched to the stand-by pump (TFP-111) and restarted the Treatment Plant in Automatic Operation at 9:30 A.M. TFP-110 was disassembled, acid cleaned, inspected, lubricated, and reassembled. This has been an on-going problem since the initial Treatment Plant start-up in 1996.

4.0 Summary

Groundwater treatment plant effluent monitoring was conducted on November 9, 12, 17, and 23 of 1998. The laboratory results of these samples show that all contaminants listed in the Requirements of the Oconomowoc Electroplating Superfund Site Substantive WPDES Permit Requirements Summary (9/96) comply with the permit. See Chart 1, Section 1.4 for important indicator parameters. The second round of Monitoring Well sampling was completed during November, 1998.

During the month of November, 1998, the plant was shut down seven times for a total of 108.75 hours. See Table 1, Section 2.1 for shut down times. All equipment operation and maintenance related issues are detailed in a separate report, entitled "*Monthly Operation and Maintenance Report for the Oconomowoc Electroplating Groundwater Treatment Facility*". That report will be submitted by December 15, 1998.

OCONOMOWOC GROUNDWATER TREATMENT PLANT							
Weekly Sampling Results					Date:	11-9-98	
Parameter	Influent	After Metals Package	After Stripper	Between Carbon Filters	Effluent	WDNR Site Permit ug/l	
pH	7.3	11	N/A	N/A	8.1	Monitor	
TSS	NT	NT	NT	NT	NT	Monitor	mg/l
Arsenic	ND	NT	NT	NT	ND	5	
Barium	200	NT	NT	NT	40	400	
Cadmium	ND	NT	NT	NT	ND	0.5	
Cadmium Total Recoverable	ND	NT	NT	NT	ND	Monitor	
Chromium +6	ND	NT	NT	NT	ND	Monitor	
Chromium Total	10	NT	NT	NT	ND	10	
Copper	ND	NT	NT	NT	ND	Monitor	
Iron	9200	NT	NT	NT	90	Monitor	
Lead	ND	NT	NT	NT	ND	1.5	
Manganese	200	NT	NT	NT	ND	Monitor	
Mercury	ND	NT	NT	NT	ND	0.2	
Nickel	30	NT	NT	NT	ND	20	
Selenium	ND	NT	NT	NT	ND	10	
Silver	ND	NT	NT	NT	ND	10	
Thallium	ND	NT	NT	NT	ND	0.4	
Zinc	20	NT	NT	NT	ND	Monitor	
Cyanide	ND	NT	NT	NT	ND	40	
Cyanide Free	ND	NT	NT	NT	ND	Monitor	
1,1-dichloroethane	2.3	NT	NT	NT	ND	85	
1,2-dichloroethane	ND	NT	NT	NT	ND	0.5	
1,1-dichloroethene	ND	NT	NT	NT	ND	0.7	
1,2-dichloroethene cis	13	NT	NT	NT	ND	7	
1,2-dichloroethene trans	2.5	NT	NT	NT	ND	20	
Ethylbenzene	ND	NT	NT	NT	ND	140	
Methylene Chloride	ND	NT	NT	NT	ND	0.5	
Tetrachloroethene	0.8	NT	NT	NT	ND	0.5	
Toluene	ND	NT	NT	NT	ND	68	
1,1,1-trichloroethane	3.2	NT	NT	NT	ND	40	
1,1,2-trichloroethane	ND	NT	NT	NT	ND	0.5	
TCE	23	NT	NT	NT	0.3	0.5	
Vinyl Chloride	ND	NT	NT	NT	ND	0.2	
Xylene Total	ND	NT	NT	NT	ND	124	
COD	NT	NT	NT	NT	NT	Monitor	mg/l
Phosphorus total	NT	NT	NT	NT	NT	Monitor	mg/l
Nitrate + Nitrite	NT	NT	NT	NT	NT	Monitor	mg/l
Ammonia Nitrogen	NT	NT	NT	NT	NT	Monitor	mg/l

All Effluent Samples Were Grab Samples Authorized By Paul Kozol, WDNR.

OCONOMOWOC GROUNDWATER TREATMENT PLANT							
Weekly Sampling Results					Date:	11-12-98	
Parameter	Influent	After Metals Package	After Stripper	Between Carbon Filters	Effluent	WDNR Site Permit ug/l	
pH	6.9	11	N/A	N/A	NT	Monitor	
TSS	3.5	NT	NT	NT	ND	Monitor	mg/l
Arsenic	14	NT	NT	NT	ND	5	
Barium	100	NT	NT	NT	40	400	
Cadmium	ND	NT	NT	NT	ND	0.5	
Cadmium Total Recoverable	ND	NT	NT	NT	ND	Monitor	
Chromium +6	ND	NT	NT	NT	ND	Monitor	
Chromium Total	10	NT	NT	NT	ND	10	
Copper	ND	NT	NT	NT	ND	Monitor	
Iron	800	NT	NT	NT	400	Monitor	
Lead	ND	NT	NT	NT	ND	1.5	
Manganese	200	NT	NT	NT	30	Monitor	
Mercury	ND	NT	NT	NT	ND	0.2	
Nickel	50	NT	NT	NT	ND	20	
Selenium	ND	NT	NT	NT	ND	10	
Silver	ND	NT	NT	NT	ND	10	
Thallium	ND	NT	NT	NT	ND	0.4	
Zinc	ND	NT	NT	NT	30	Monitor	
Cyanide	ND	NT	NT	NT	ND	40	
Cyanide Free	ND	NT	NT	NT	ND	Monitor	
1,1-dichloroethane	43	NT	ND	NT	ND	85	
1,2-dichloroethane	ND	NT	ND	NT	ND	0.5	
1,1-dichloroethene	24	NT	ND	NT	ND	0.7	
1,2-dichloroethene cis	84	NT	0.4	NT	ND	7	
1,2-dichloroethene trans	23	NT	ND	NT	ND	20	
Ethylbenzene	2.9	NT	0.2	NT	ND	140	
Methylene Chloride	ND	NT	ND	NT	ND	0.5	
Tetrachloroethene	16	NT	ND	NT	ND	0.5	
Toluene	3.3	NT	0.3	NT	ND	68	
1,1,1-trichloroethane	366	NT	0.5	NT	ND	40	
1,1,2-trichloroethane	ND	NT	ND	NT	ND	0.5	
TCE	952	NT	2.1	NT	0.5	0.5	
Vinyl Chloride	ND	NT	ND	NT	ND	0.2	
Xylene Total	8.7	NT	0.6	NT	ND	124	
COD	29	NT	NT	NT	16	Monitor	mg/l
Phosphorus total	NT	NT	NT	NT	0.04	Monitor	mg/l
Nitrate + Nitrite	NT	NT	NT	NT	0.18	Monitor	mg/l
Ammonia Nitrogen	NT	NT	NT	NT	ND	Monitor	mg/l

OCONOMOWOC GROUNDWATER TREATMENT PLANT							
Weekly Sampling Results					Date:	11-17-98	
Parameter	Influent	After Metals Package	After Stripper	Between Carbon Filters	Effluent	WDNR Site Permit ug/l	
pH	6.9	11	N/A	N/A	7.8	Monitor	
TSS	NT	NT	NT	NT	NT	Monitor	mg/l
Arsenic	ND	NT	NT	NT	ND	5	
Barium	100	NT	NT	NT	20	400	
Cadmium	ND	NT	NT	NT	ND	0.5	
Cadmium Total Recoverable	ND	NT	NT	NT	ND	Monitor	
Chromium +6	ND	NT	NT	NT	ND	Monitor	
Chromium Total	ND	NT	NT	NT	ND	10	
Copper	ND	NT	NT	NT	ND	Monitor	
Iron	800	NT	NT	NT	300	Monitor	
Lead	ND	NT	NT	NT	ND	1.5	
Manganese	100	NT	NT	NT	ND	Monitor	
Mercury	ND	NT	NT	NT	ND	0.2	
Nickel	30	NT	NT	NT	ND	20	
Selenium	24	NT	NT	NT	ND	10	
Silver	ND	NT	NT	NT	ND	10	
Thallium	ND	NT	NT	NT	ND	0.4	
Zinc	ND	NT	NT	NT	ND	Monitor	
Cyanide	ND	NT	NT	NT	ND	40	
Cyanide Free	ND	NT	NT	NT	ND	Monitor	
1,1-dichloroethane	50	NT	NT	NT	ND	85	
1,2-dichloroethane	ND	NT	NT	NT	ND	0.5	
1,1-dichloroethene	20	NT	NT	NT	ND	0.7	
1,2-dichloroethene cis	80	NT	NT	NT	ND	7	
1,2-dichloroethene trans	19	NT	NT	NT	ND	20	
Ethylbenzene	ND	NT	NT	NT	ND	140	
Methylene Chloride	ND	NT	NT	NT	ND	0.5	
Tetrachloroethene	13	NT	NT	NT	ND	0.5	
Toluene	ND	NT	NT	NT	ND	68	
1,1,1-trichloroethane	470	NT	NT	NT	ND	40	
1,1,2-trichloroethane	ND	NT	NT	NT	ND	0.5	
TCE	949	NT	NT	NT	0.5	0.5	
Vinyl Chloride	ND	NT	NT	NT	ND	0.2	
Xylene Total	ND	NT	NT	NT	ND	124	
COD	NT	NT	NT	NT	NT	Monitor	mg/l
Phosphorus total	NT	NT	NT	NT	NT	Monitor	mg/l
Nitrate + Nitrite	NT	NT	NT	NT	NT	Monitor	mg/l
Ammonia Nitrogen	NT	NT	NT	NT	NT	Monitor	mg/l

OCONOMOWOC GROUNDWATER TREATMENT PLANT							
Weekly Sampling Results					Date:	11-23-98	
Parameter	Influent	After Metals Package	After Stripper	Between Carbon Filters	Effluent	WDNR Site Permit ug/l	
pH	7.2	11	N/A	N/A	8	Monitor	
TSS	NT	NT	NT	NT	NT	Monitor	mg/l
Arsenic	ND	NT	NT	NT	ND	5	
Barium	100	NT	NT	NT	20	400	
Cadmium	ND	NT	NT	NT	ND	0.5	
Cadmium Total Recoverable	ND	NT	NT	NT	ND	Monitor	
Chromium +6	ND	NT	NT	NT	ND	Monitor	
Chromium Total	ND	NT	NT	NT	ND	10	
Copper	ND	NT	NT	NT	ND	Monitor	
Iron	900	NT	NT	NT	400	Monitor	
Lead	ND	NT	NT	NT	ND	1.5	
Manganese	200	NT	NT	NT	10	Monitor	
Mercury	ND	NT	NT	NT	ND	0.2	
Nickel	50	NT	NT	NT	20	20	
Selenium	17	NT	NT	NT	ND	10	
Silver	ND	NT	NT	NT	ND	10	
Thallium	ND	NT	NT	NT	ND	0.4	
Zinc	ND	NT	NT	NT	ND	Monitor	
Cyanide	ND	NT	NT	NT	ND	40	
Cyanide Free	ND	NT	NT	NT	ND	Monitor	
1,1-dichloroethane	45	NT	NT	NT	ND	85	
1,2-dichloroethane	ND	NT	NT	NT	ND	0.5	
1,1-dichloroethene	ND	NT	NT	NT	ND	0.7	
1,2-dichloroethene cis	84	NT	NT	NT	ND	7	
1,2-dichloroethene trans	24	NT	NT	NT	ND	20	
Ethylbenzene	ND	NT	NT	NT	ND	140	
Methylene Chloride	ND	NT	NT	NT	ND	0.5	
Tetrachloroethene	12	NT	NT	NT	ND	0.5	
Toluene	ND	NT	NT	NT	ND	68	
1,1,1-trichloroethane	346	NT	NT	NT	ND	40	
1,1,2-trichloroethane	ND	NT	NT	NT	ND	0.5	
TCE	936	NT	NT	NT	ND	0.5	
Vinyl Chloride	ND	NT	NT	NT	ND	0.2	
Xylene Total	ND	NT	NT	NT	ND	124	
COD	NT	NT	NT	NT	NT	Monitor	mg/l
Phosphorus total	NT	NT	NT	NT	NT	Monitor	mg/l
Nitrate + Nitrite	NT	NT	NT	NT	NT	Monitor	mg/l
Ammonia Nitrogen	NT	NT	NT	NT	NT	Monitor	mg/l

FLOW FROM EXTRACTION WELLS

YEAR: 1998

MONTH: NOV. DAY	FE-100 FLOW TOTALIZER	TOTAL DAY'S FLOW (GAL.)	DAILY FLOW MGD	
1	49,049.21	3,562.93	0.004	SHUT DOWN
2	52,612.14	11,876.88	0.012	
3	64,489.02	10,584.84	0.011	
4	0.00	0.00	0.000	SHUT DOWN
5	0.00	0.00	0.000	SHUT DOWN
6	75,073.86	19,630.23	0.020	
7	94,704.09	9,747.34	0.010	
8	104,451.43	9,747.34	0.010	
9	114,198.77	19,864.29	0.020	
10	134,063.06	21,062.25	0.021	
11	155,125.31	18,128.16	0.018	
12	173,253.47	19,298.11	0.019	
13	192,551.58	17,627.76	0.018	
14	210,179.34	14,165.96	0.014	
15	224,345.30	8,000.79	0.008	SHUT DOWN
16	232,346.09	18,713.24	0.019	
17	251,059.33	18,999.36	0.019	
18	270,058.69	23,271.09	0.023	
19	293,329.78	28,137.75	0.028	
20	321,467.53	22,348.75	0.022	
21	343,816.28	26,769.47	0.027	
22	370,585.75	27,212.22	0.027	
23	397,797.97	20,574.66	0.021	
24	418,372.63	22,930.84	0.023	
25	441,303.47	25,286.66	0.025	
26	466,590.13	21,916.50	0.022	
27	488,506.63	9,492.68	0.009	SHUT DOWN
28	497,999.31	23,597.28	0.024	
29	521,596.59	25,317.54	0.025	
30	546,914.13	24,494.31	0.024	
DEC. 1	571,408.44			
		TOTAL	0.522	
		AVERAGE	0.019	

FLOW FROM EQT-100

YEAR: 1998				
MONTH: NOV. DAY	FE-112 FLOW TOTALIZER	TOTAL DAY'S FLOW (GAL.)	DAILY FLOW MGD	
1	3,268,082.00	12,531.75	0.013	SHUT DOWN
2	3,280,613.75	25,560.25	0.026	
3	3,306,174.00	42,573.00	0.043	
4	0.00	0.00	0.000	SHUT DOWN
5	0.00	0.00	0.000	SHUT DOWN
6	3,348,747.00	35,483.25	0.035	
7	3,384,230.25	41,862.12	0.042	
8	3,426,092.37	41,862.13	0.042	
9	3,467,954.50	31,467.56	0.031	
10	3,499,422.06	43,093.19	0.043	
11	3,542,515.25	38,172.00	0.038	
12	3,580,687.25	39,052.25	0.039	
13	3,619,739.50	32,923.75	0.033	
14	3,652,663.25	35,498.00	0.035	
15	3,688,161.25	13,008.75	0.013	SHUT DOWN
16	3,701,170.00	33,289.75	0.033	
17	3,734,459.75	33,477.75	0.033	
18	3,767,937.50	42,428.50	0.042	
19	3,810,366.00	46,054.50	0.046	
20	3,856,420.50	37,164.50	0.037	
21	3,893,585.00	45,230.75	0.045	
22	3,938,815.75	46,518.25	0.047	
23	3,985,334.00	32,981.25	0.033	
24	4,018,315.25	36,034.00	0.036	
25	4,054,349.25	40,452.50	0.040	
26	4,094,801.75	28,533.50	0.029	
27	4,123,335.25	38,196.50	0.038	SHUT DOWN
28	4,161,531.75	37,063.25	0.037	
29	4,198,595.00	39,551.00	0.040	
30	4,238,146.00	39,327.50	0.039	
DEC. 1	4,277,473.50			
		TOTAL	1.009	
		AVERAGE	0.036	

EFFLUENT FLOW FROM PLANT

YEAR: 1998

MONTH: NOV. DAY	NPDES STATION TOTALIZER	TOTAL DAY'S FLOW (GAL.)	X2	DAILY FLOW MGD	
1	750,991.44	1,348.00	2,696.00	0.003	SHUT DOWN
2	752,339.44	5,486.88	10,973.76	0.011	
3	757,826.32	5,486.87	10,973.74	0.011	
4	0.00	0.00	0.00	0.000	SHUT DOWN
5	0.00	0.00	0.00	0.000	SHUT DOWN
6	763,313.19	16,507.50	33,015.00	0.033	
7	779,820.69	3,269.93	6,539.86	0.007	
8	783,090.62	3,269.93	6,539.86	0.007	
9	786,360.55	13,574.89	27,149.78	0.027	
10	799,935.44	8,198.31	16,396.62	0.016	
11	808,133.75	10,031.56	20,063.12	0.020	
12	818,165.31	9,990.57	19,981.14	0.020	
13	828,155.88	8,166.62	16,333.24	0.016	
14	836,322.50	10,383.44	20,766.88	0.021	
15	846,705.94	1,906.19	3,812.38	0.004	SHUT DOWN
16	848,612.13	10,171.22	20,342.44	0.020	
17	858,783.35	10,171.21	20,342.42	0.020	
18	868,954.56	13,008.82	26,017.64	0.026	
19	881,963.38	15,347.12	30,694.24	0.031	
20	897,310.50	12,596.44	25,192.88	0.025	
21	909,906.94	14,192.47	28,384.94	0.028	
22	924,099.41	14,192.47	28,384.94	0.028	
23	938,291.88	10,027.68	20,055.36	0.020	
24	948,319.56	12,349.50	24,699.00	0.025	
25	960,669.06	12,538.75	25,077.50	0.025	
26	973,207.81	9,180.69	18,361.38	0.018	
27	982,388.50	11,071.63	22,143.26	0.022	SHUT DOWN
28	993,460.13	12,712.31	25,424.62	0.025	
29	1,006,172.44	14,023.06	28,046.12	0.028	
30	1,020,195.50	10,997.69	21,995.38	0.022	
DEC. 1	1,031,193.19				
			TOTAL	0.560	
			AVERAGE	0.020	

MONITOR WELL DEPTHS

OCONOMOWOC GROUNDWATER TREATMENT PLANT						
MONITORING WELLS		WATER LEVEL		FEET		
DATE	MW02DP	MW03SP	MW05P	MW05DP	MW06P	MW11BP
July 31, 1998	6.64	DRY	3.74	4.26	8.00	COVERED
Aug. 31, 1998	7.70	DRY	DRY	5.34	8.70	COVERED
Sept. 17, 1998	7.50	DRY	DRY	5.00	8.66	COVERED
Oct. 7, 1998	6.50	DRY	3.75	4.10	8.34	COVERED
Nov.23, 1998	6.66	DRY	DRY	4.37	8.17	COVERED

MONITOR WELL DEPTHS

OCONOMOWOC GROUNDWATER TREATMENT PLANT						
MONITORING WELLS		WATER LEVE	FEET			
DATE	MW12BP	MW12DP	MW13SP	MW14DP	MW15DP	MW16SP
July 31, 1998	4.75	3.78	5.75	4.80	10.49	UNACCESS.
Aug. 31, 1998	5.64	4.48	6.38	4.80	11.64	UNACCESS.
Sept. 17, 1998	5.35	3.20	6.31	4.86	11.10	UNACCESS.
Oct. 7, 1998	4.75	3.65	5.79	4.75	10.60	UNACCESS.
Nov. 23, 1998	4.73	3.70	5.82	4.56	10.46	UNACCESS.

OCONOMOWOC GROUNDWATER TREATMENT PLANT

MONITORING WELL					Date:	(ug/l) 2ND QTR.1998	
Parameter	MW02DP	MW03SP	MW05P	MW05DP	MW06P	MW11BP	
pH	7.3	DRY	7.85	7.7	7.3	COVERED	
Conductivity	1200	NT	796	631	796	NT	uMHOS/CM
Arsenic	ND	NT	NT	ND	ND	NT	
Barium	70	NT	NT	80	90	NT	
Cadmium	ND	NT	NT	ND	ND	NT	
Cadmium Total Recoverable	ND	NT	NT	ND	ND	NT	
Chromium +6	ND	NT	NT	ND	60000	NT	
Chromium Total	ND	NT	NT	10	20	NT	
Copper	ND	NT	NT	ND	30	NT	
Iron	1200	NT	NT	2200	20000	NT	
Lead	2.3	NT	NT	ND	1.7	NT	
Manganese	70	NT	NT	100	5800	NT	
Mercury	ND	NT	NT	ND	ND	NT	
Nickel	20	NT	NT	ND	ND	NT	
Selenium	ND	NT	NT	53	27	NT	
Silver	ND	NT	NT	ND	ND	NT	
Thallium	ND	NT	NT	ND	ND	NT	
Zinc	20	NT	NT	ND	50	NT	
Cyanide	ND	NT	NT	ND	ND	NT	
Cyanide Free	ND	NT	NT	ND	ND	NT	
Chlorobenzene	ND	NT	NT	ND	ND	NT	
Chloroethane	ND	NT	NT	ND	ND	NT	
1,1-dichloroethane	ND	NT	NT	71	ND	NT	
1,2-dichloroethane	ND	NT	NT	ND	ND	NT	
1,1-dichloroethene	ND	NT	NT	ND	ND	NT	
1,2-dichloroethene cis	1.6	NT	NT	28	ND	NT	
1,2-dichloroethene trans	ND	NT	NT	ND	ND	NT	
Ethylbenzene	ND	NT	NT	ND	ND	NT	
4 Isopropyltoluene	ND	NT	NT	ND	ND	NT	
Methylene Chloride	ND	NT	NT	ND	ND	NT	
Tetrachloroethene	ND	NT	NT	ND	ND	NT	
Toluene	ND	NT	NT	ND	ND	NT	
1,1,1-trichloroethane	ND	NT	NT	ND	ND	NT	
1,1,2-trichloroethane	ND	NT	NT	ND	ND	NT	
TCE	0.6	NT	NT	827	ND	NT	
Vinyl Chloride	ND	NT	NT	ND	ND	NT	
Xylene Total	ND	NT	NT	ND	ND	NT	

MW05P Was Too Dry To Sample.

OCONOMOWOC GROUNDWATER TREATMENT PLANT

MONITORING WELL					Date:	(ug/l) 2ND QTR.1998	
Parameter	MW12BP	MW12DP	MW13SP	MW14DP	MW15DP	MW16SP	
pH	9.7	7.7	8.1	7.5	7.4	UNACCESS.	
Conductivity	742	1150	762	488	927	NT	uMHOS/CM
Arsenic	ND	ND	ND	ND	ND	NT	
Barium	70	70	60	30	90	NT	
Cadmium	ND	ND	ND	ND	ND	NT	
Cadmium Total Recoverable	ND	ND	ND	ND	ND	NT	
Chromium +6	13000	29000	25000	ND	ND	NT	
Chromium Total	ND	10	200	ND	ND	NT	
Copper	ND	1300	20	ND	ND	NT	
Iron	900	2800	13000	ND	ND	NT	
Lead	7.6	ND	ND	ND	ND	NT	
Manganese	50	60	1500	60	200	NT	
Mercury	ND	ND	ND	ND	ND	NT	
Nickel	ND	40	100	ND	10	NT	
Selenium	ND	68	ND	47	ND	NT	
Silver	ND	ND	ND	ND	ND	NT	
Thallium	ND	ND	ND	ND	ND	NT	
Zinc	ND	ND	30	ND	ND	NT	
Cyanide	ND	40	ND	ND	ND	NT	
Cyanide Free	ND	ND	ND	ND	ND	NT	
Chlorobenzene	ND	ND	ND	ND	5.4	NT	
Chloroethane	ND	ND	ND	ND	ND	NT	
1,1-dichloroethane	ND	119	ND	ND	ND	NT	
1,2-dichloroethane	ND	ND	ND	ND	ND	NT	
1,1-dichloroethene	ND	76	ND	ND	ND	NT	
1,2-dichloroethene cis	ND	27	ND	ND	3.4	NT	
1,2-dichloroethene trans	ND	ND	ND	ND	ND	NT	
Ethylbenzene	ND	ND	ND	ND	ND	NT	
4-Isopropyltoluene	ND	ND	ND	ND	ND	NT	
Methylene Chloride	ND	ND	ND	ND	ND	NT	
Tetrachloroethene	ND	ND	ND	ND	ND	NT	
Toluene	ND	ND	ND	ND	ND	NT	
1,1,1-trichloroethane	ND	ND	ND	ND	ND	NT	
1,1,2-trichloroethane	ND	ND	ND	ND	ND	NT	
TCE	ND	9.3	ND	ND	30	NT	
Vinyl Chloride	ND	ND	ND	ND	ND	NT	
Xylene Total	ND	ND	ND	ND	ND	NT	