

Environmental Resources Management, Inc.

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10 September 1991

Mr. Henry Mitchell
Amphenol Corporation
40-60 Delaware Avenue
Sidney, NY 13838

FILE: 301-40

Dear Mr. Mitchell:

At your request, Environmental Resources Management, Inc. (ERM) has developed a summary report on the remedial activities and ground water monitoring at the Amphenol Plating Building and Supplemental Remedial Program (SRP) for ground water. This remedial action is being performed under the provisions of the Order on Consent between the New York State Department of Environmental Conservation (NYSDEC) and Amphenol Corporation (Amphenol).

Background

Amphenol's production of electrical connectors entails the electroplating of parts with various elemental metals. This is conducted in the Plating Building. Wastewaters from this process are collected in polypropylene-lined concrete floor trenches, which drain to a permitted on-site wastewater treatment facility outside of the building. These wastewaters are acid and contain cyanide and metals in solution.

In the course of inspecting the foundation of the Plating Building, wastewater was detected under the floor. Upon further inspection, leaks were detected in the polypropylene liner. The acidic nature of the wastewater apparently contributed to the degradation of the concrete trench, and a release of the wastewaters under the building.

On 17 November, 1989, Amphenol entered into an Order on Consent (the Order) with the NYSDEC to perform remedial action at the West Well and West Parking Lot areas, defined as the "Site". The defined area of the Site also included the Plating Building. The Order provided for the continuation of ground water removal and treatment by the West Well recovery system and the development of an SRP should additional action be deemed necessary.

As a result of the discovery of released wastewaters under the Plating Building, the NYSDEC directed Amphenol to initiate remedial action on the

shallow ground water at the Plating Building under the (then pending) Order. The NYSDEC requested that Amphenol perform an investigation of the distribution of metals in the ground water, terminate the release, and remediate ground water. In compliance with this direction, Amphenol has conducted certain remedial action. The following sections describe the remedial action taken to date, a summary of quarterly ground water monitoring and a proposed SRP for the Plating Building shallow ground water.

Summary of Remedial Action

Hydrogeologic Investigation

Amphenol retained O'Brien and Gere Engineers, Inc. (OBG) to perform the initial hydrogeologic investigation at the Plating Building. In December of 1988, OBG installed 13 ground water monitoring wells in and around the Plating Building. Ground water elevations were determined and the wells were sampled on a quarterly basis between January, 1989 and February, 1990.

The results of the OBG investigation indicated that the flow of the shallow ground water system is to the east, towards the West Well, which produces process and cooling water for the Amphenol plant. The horizontal gradients of the shallow ground water surface are very flat, ranging from 0.0002 to 0.002 feet per foot.

Upgradient ground water inorganic quality was very stable (as indicated in three upgradient monitoring wells) throughout the OBG investigation. However, elevated concentrations and fluctuations in pH and cadmium, chromium, nickel, zinc and cyanide were found in wells in the northern half of the Plating Building. Two exterior wells exhibited responses similar to the interior wells, but to a lesser degree. No steady trends in ground water quality were identifiable from this investigation.

Remediation of Interior Trenches and Junction Box

In July, 1989, Amphenol repaired the interior collection trenches and the junction box of the waste water collection system in the Plating Building. This repair included the flushing of the trenches with municipal water to prepare the trench surfaces for re-installation of the junction box. This flushing apparently resulted in a temporary decrease in metals concentrations in MW-11, the monitoring well with the highest concentrations of metals.

Yield Test on MW-11 and Interim Ground Water Recovery

An interim ground water recovery program was initiated by pumping from MW-11 beginning in August, 1989. Due to the small diameter of the well and its shallow depth, a low pumping rate of approximately 90 gallons per day was initially performed. A pumping test was performed on Well MW-11 during the June monitoring event, to determine the potential yield of the well as a part of the ground water recovery at the Site. As reported in the June, 1990 quarterly monitoring report (20 September 1990), MW-11 was pumped at a rate of 8 to 10 gpm for two hours with no noticeable drawdown in any of the surrounding wells. Drawdown in MW-11 was on the order of only one foot. Based on this testing, the pumping rate from MW-11 was increased to an average of 6 to 7 gpm, and has ranged as high as 45 gpm. This interim ground water recovery is continuing. Since August, 1989, a total of approximately one million gallons of ground water have been recovered and discharged to the Plating Building wastewater treatment system.

Exterior Trench Remediation

Amphenol continued its rehabilitation of the wastewater collection system in July, 1990 by excavating and repairing the exterior trench leading to the wastewater treatment plant. The exterior trench repairs were performed in the same manner as for the interior trenches; the old polypropylene liner was removed, cracks in the concrete were repaired, and a new liner was installed. Amphenol decided to "hard pipe" the exterior flow through this trench; the lined trench thus now serves as a secondary containment system.

Summary of Quarterly Ground Water Monitoring

ERM assisted Amphenol in performing the quarterly ground water monitoring program at the Plating Building through 1990 and into 1991. Samples from the 13 monitoring wells were analyzed for cadmium, chromium, nickel and zinc. Samples from MW-11, MW-7, MW-8 and MW-9 were also analyzed for volatile organics (VOCs). The West Well was also sampled for the analysis of cadmium, chromium, nickel and zinc in the June monitoring event. Field measurements were made for pH, specific conductance and temperature. Samples for metals analyses were as total (rather than dissolved), at the direction of the NYSDEC.

Shallow Ground Water Flow

The results of the ERM's monitoring have indicated that the flow in the shallow ground water system is to the north to northeast, rather than to the east as described by OBG. The difference in interpreted flow direction is most likely the result of ERM's incorporation of water level data from the adjacent West Well ground water monitoring system.

Ground water flow in this shallow system is influenced by the West Well, which produces process and cooling water for the Amphenol plant. However, recharge from subsurface utilities, and possibly ground water discharge into gravity sewers, appear to influence the flow patterns beneath the building in a non-uniform and complicated manner. This influence has been particularly noticeable in the elevated water levels measured at MW-7, which is located adjacent to a sewer trench. Except for such localized anomalies, the horizontal gradients of the shallow ground water surface continue to be flat, ranging from less than 0.0001 to 0.006 feet per foot. Ground water elevations have historically been at approximately 974.5 feet, with periodic seasonal drops (January to March, 1989 and September, 1990).

Inorganic Analytical Results

Upgradient ground water inorganic quality, as reflected in wells MW-1, MW-2, MW-3, MW-14 and MW-12 has been very stable throughout the OBG and ERM monitoring. The few detections of metals in these wells have been at low concentrations (on the order of 100 µg/L or less per metal). Although detections were more consistent and a slightly higher concentrations, ground water in wells MW-5, MW-6, MW-9 and MW-13 appear to be only moderately impacted by releases from the Plating Building.

Data collected over these two years of monitoring reflect consistently elevated concentrations of cadmium, chromium, nickel, zinc and cyanide beneath the northern half of the Plating Building, at wells MW-11, MW-7 and MW-4. MW-8 has also exhibited elevated metals concentration over this interval. Concentrations of metals in these wells have ranged up to 43,000 µg/L of cadmium (MW-11), 22,000 µg/L of chromium (MW-11), 28,000 µg/L of nickel (MW-11) 11,000 µg/L of zinc (MW-8), and 23,100 µg/L of cyanide (MW-7). Most of these highest concentrations occurred in 1989, having since decreased an order of magnitude. Metals analysis on samples obtained from the West Well in all five quarters (June, 1990 through June, 1991) resulted in no detections.

As noted in previous reports, MW-11 and MW-7 appear to be located adjacent to the main area of wastewater release to shallow ground water. MW-4 may be receiving impacts from this area via the sewer trench that leads from the Plating Building near MW-7 to the manhole near MW-4.

Total Metals and pH

The concentrations of metals have fluctuated over the two years, responding to changes in pH. The trend of total metals concentrations and pH parallel one another in some of the wells with the highest metals concentrations. For instance, pH fluctuations in wells MW-7 and MW-11 are very similar; total metals concentrations in well MW-11 follow the pH pattern while those in MW-7 lag behind by about one quarter.

The fluctuations in pH in MW-11 appear to be related to remedial action taken by Amphenol. An observed increase in pH in February, 1989 was likely in response to the repair to the interior trenches in late 1988. A more consistent influence on pH appears to be the rate of pumping from MW-11, as increases in pH have been observed to coincide with increased pumping rates. MW-11 was pumped at only 90 gallons per day from late 1989 through mid 1990. The pH in this well remained in the low 2 unit range throughout this interval. Upon increasing the pumping rate to 7 gallons per minute in July, 1990, the pH began to increase (ultimately by 2.5 units), most likely as a result of "clean" water being drawn to the well, diluting the ground water impacted by wastewater. When the pumping rate dropped in late 1990 and January of 1991 to about 1 gpm, the pH also dropped, only to again increase when the pumping rate was increased in March, 1991.

Aside from these patterns, there have been a few increases in total metals that appear to be unrelated to pH increases. Cadmium and nickel increased in MW-4 as did nickel and zinc in MW-8, without a corresponding drop in pH (both in September, 1989).

Cyanide

Wells MW-7 and MW-11 have also displayed the highest concentrations of cyanide over the past two years. Cyanide concentrations increased significantly in MW-7 in September, 1990 as a result of a 2 unit increase in pH (cyanide is more soluble at higher pH). The concentration of cyanide in MW-7 then decreased the following quarter, to a level of approximately 1,500 µg/L. Overall, concentrations of cyanide have decreased from those observed in early 1989.

Volatile Organic Analytical Results

Four of the Plating Building wells, MW-7, MW-9, MW-11 and MW-12 have been monitored for VOCs over the past four to five quarters (MW-11 was first sampled for VOCs in June, 1990, the others in September, 1990). As observed for the inorganics, MW-11 and MW-7 have had the highest concentrations of VOCs; concentrations in MW-11 have been an order of magnitude higher than those in the other wells. The trends in VOC concentrations over the past year in MW-11 and MW-7 had shown a decline into March, 1991 (possibly in response to increased seasonal recharge or increased pumping from MW-11), but increased in June.

Proposed Supplemental Remedial Program

ERM proposes an SRP, as provided by the Order, to enhance the remediation of shallow ground water at the Plating Building portion of the Site. This SRP entails enhanced recovery of ground water with treatment prior to discharge under the existing SPDES permit for the Plating Building wastewater treatment plant.

Ground Water Recovery from MW-11 and MW-7

Historical data indicate that shallow ground water recovery from under the Plating Building is beneficial in lowering the concentrations of metals in the ground water, and higher pumping rates seem to provide a greater benefit. Testing and operational data on the pumping of MW-11 indicate pumping rates can be increased above the current 7 gpm, if a suitable pump can be found to fit this one and one-quarter inch diameter well. Since MW-7 represents another localized "hot spot" for metals and cyanide, Amphenol also proposes to begin recovery from that well. Amphenol will maintain records of gallons pumped and pH from both recovery wells.

During the ground water recovery, it is recommended that Amphenol continue to evaluate the Plating Building system to determine if there are any continuing leaks that would contribute to the metals concentrations in the shallow ground water. Should any such leaks be identified, Amphenol can repair them.

Treatment of Recovered Ground Water

Recovered ground water will be collected and discharged to the Plating Building wastewater treatment process for the removal of metals and cyanide prior to discharge under Amphenol's SPDES permit No. NY003824. This wastewater treatment consists of chemical precipitation followed by a

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filter press. Based on a review of this process with Amphenol, ERM believes that the addition of the recovered ground water should require no significant modifications to the process to provide metals and cyanide removal on this additional flow.

Sampling of MW-7 and MW-11 During Ground Water Recovery

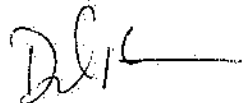
Samples will be obtained from wells MW-7 and MW-11 during pumping from each well to more accurately assess the quality of a combined discharge from these wells to the Plating Building wastewater treatment system. Samples will be analyzed for cadmium, chromium, nickel, zinc and cyanide, as well as volatile organic compounds. This data will be used to evaluate this additional contribution to the Plating Building wastewater treatment process and ensure compliance with SPDES permit requirements.

Ground Water Monitoring

ERM proposes that Amphenol continue to perform quarterly monitoring of the Plating Building wells in conjunction with the West Well monitoring and will provide quarterly monitoring reports to NYSDEC on the progress of this remedial action. In view of the very consistent data from the majority of monitoring wells in the Plating Building network, ERM proposes to reduce the monitoring network to those wells displaying variable and elevated concentrations of metals. Specifically, wells MW-4, MW-7 and MW-11 will be sampled on a quarterly basis, as well as one background monitoring well (e.g., MW-2).

We believe that this approach meets Amphenol's goals in pursuing a remediation at the Plating Building. Please call if you have any questions.

Sincerely,



David P. Steele
Project Manager

/dps

cc: Marilyn Hewitt, ERM
Sam Waldo, LPL