90-Day Testing Report: December 2004 – March 2005

Off-Site Interim Remedial Measure,
Former Unisys Facility, Great Neck,
New York

NYSDEC Site ID # 130045

William S. Wittek, P.E.
Senior Engineer

Nicholas Valkenburg
Project Director

90-Day Testing Report: December 2004 – March 2005

Off-Site Interim Remedial Measure
Former Unisys Facility, Great Neck, New York
NYSDEC #130045

Prepared for:
Lockheed Martin Corporation

Prepared by:
ARCADIS G&M, Inc.
88 Duryea Road
Melville
New York 11747
Tel 631 249 7600
Fax 631 249 7610

Our Ref.:
NY001227.1905.00001

Date:
31 March 2005

Table of Contents

Tables

Figures

Introduction

This report has been prepared to meet the reporting requirement specified in the Interim Remedial Measure (IRM) Work Plan dated December 9, 2002 for the Off-site Remediation System at the former Unisys Facility in Great Neck, New York and the Site Access and Licensing Agreement between Lockheed Martin Corporation and Great Neck Union Free School District (GNUFSD), dated April 14, 2003. A site location map is provided on Figure 1.

This report is the second testing report prepared for the Off-site Remediation System, and summarizes the 90-day testing activities and associated data collected between December 2004 and March 2005.

System Description

The Off-site Remediation System consists of the following major components:

- One groundwater recovery well (RW-100) located and designed to efficiently capture and contain off-site, volatile organic compound (VOC) impacted groundwater;

- Air stripper system designed to reduce the concentration of VOCs in the recovered groundwater to non-detect performance standards per the approved Off-site IRM Work Plan prior to re-injection back into the Magothy aquifer via diffusion wells.

- Three diffusion wells (DW-100, DW-101, and DW-102) designed and located to assist with the re-injection of treated water and the prevention of further migration of off-site VOC-impacted groundwater; and

- Air stripper off-gas (i.e., vapor emission) treatment system designed such that the effluent vapor will meet non-detect performance standards in the Access Agreement with the Great Neck School District.

During operation, groundwater, impacted by VOCs, is extracted from the subsurface aquifer, pumped to the Off-site Remediation System for treatment, and is then recharged back to the aquifer. Specifically, the extracted groundwater is pumped from one recovery well (RW-100), through two air strippers, which are arranged in a series configuration, to remove the VOCs from the groundwater. The treated groundwater is

then pumped through a subsurface pipeline to three diffusions wells (DW-100 through DW-102) where it is re-injected back into the aquifer.

During the air stripping process, the VOCs are transferred from the water (which enters the air strippers at the top) to the counter-current air stream (which enters the air strippers at the bottom). The air stripper off-gas vapor (i.e., the VOC-laden air stream) is then treated by four emission control units filled with Vapor Phase Granular Activated Carbon (VPGAC) to remove the VOCs prior to discharge to the atmosphere. A site plan of the Off-site Remediation System is shown on Figure 2 and the Process Schematic, showing sampling locations and designations, is provided on Figure 3. Tables 1 through 3 present results of the performance testing activities completed during this period.

Summary of Testing Activities: December 2004 through March 2005

The initial system testing activities, which consisted of a 24-Hour, 5-Day, and 4-Week test, were conducted between July and October 2004; a summary of testing activities performed during the initial testing period along with performance testing results are described in the Initial Testing Report (ARCADIS 2005a). This report describes activities conducted and data collected during the 90-Day Test (conducted between December 2004 and March 2005). The 90-Day Test is described in detail below.

90-Day Test

The 90-Day Test was initiated on December 6, 2004 and was completed on March 10, 2005. The activities conducted during the 90-day test consisted of the following:

- System on-site inspections were performed weekly. The system operation was monitored remotely on a daily basis.

- Weekly compliance vapor and water samples were collected on December 13, 20, 29, 2004; January 3, 10, 17, 24, 31, February 7, 14, 21, 28, and March 7, 2005, at the end of the seventh, fourteenth, twenty-third, twenty-eighth, thirty-fifth, forty-second, forty-ninth, fifty-sixth, sixty-third, seventieth, seventy-seventh, eighty-fourth, and ninety-first days of operation, respectively.

A summary of compliance vapor and water sample results, arranged by sampling location, is provided in Tables 1 through 3. Figure 3 shows the sampling locations and sample designations.

Results

There are several VOC compounds that are present in the groundwater extracted from Recovery Well 100 (RW-100). The first group of compounds was anticipated and the treatment plant was designed to reduce their concentrations to meet the Non-Detect Performance Standard (Table 1). These compound are 1,1-dichloroethene (1,1-DCE); 1,1-dichloroethane (1,1-DCA); cis-1,2-dichloroethene (1,2-DCE); trans-1,2-dichloroethene (1,2-DCE); chloroform; 1,2-dichloroethane (1,2-DCA); 1,2-dichloropropane; trichloroethene (TCE); tetrachloroethene (PCE); and trichlorotrifluoroethane (Freon 113). The second group of compounds was not anticipated, and consists of dichlorodifluoromethane (Freon 12); chlorodifluoromethane (Freon 22); and vinyl chloride (Table 1). Except for the vinyl chloride the presence of the VOCs in this second group (i.e., Freon 12 and Freon 22) was not addressed in the Off-site IRM Workplan or the Access Agreement with the School District.

Table 2 shows that all the VOC compounds, including those compounds in both groups, are effectively removed from the water by the air strippers. The water being re-injected into the ground via the diffusion wells contains no detectable concentrations of VOCs, thus it meets the Non-Detect Performance Standard in the Access Agreement with the School District.

Table 3 shows that only five of the 42 compounds being tested for in vapor are being emitted to the air at very low concentrations. Chloromethane and Methylene Chloride have been intermittently detected, although they were not detected in the influent water to the plant. Vinyl chloride has been detected at levels slightly above the Non-Detect Performance Standard, but it was also not detected in the influent water. In addition, both Freon 12 and Freon 22 were detected, but both these compounds are present in the influent water to the plant.

Discussion

Even though chloromethane is present in the air discharge from the system, it is also present, at similar concentrations, in the ambient/background air, as discussed in the Initial System Testing Report (see Tables 4 and 5 in ARCADIS 2005a). Since the ambient levels are higher than the Non-Detect Performance Standard, it is not necessary to meet the Standard since the discharges would then be cleaner than the ambient air. In any event, the discharge of chloromethane is only 5.5×10^{-3} % and 8.2×10^{-4} % of the New York State Department of Environmental Conservation

(NYSDEC) short-term guideline concentrations (SCG) and the annual guideline concentrations (AGC), respectively (Table 4).

Based on available data, all of the Freon 22 being discharged appears to originate in the groundwater being pumped to the plant. The ambient/background level of Freon 12 (see ARCADIS 2005a) appears to be approximately 3 ug/m^3 and the air discharge levels from the plant are typically around 6 ug/m^3, leading to the conclusion that about 50% of the Freon 12 originates in the groundwater and the other 50% is from the ambient air. Regardless, the vapor discharge concentrations of both compounds (Freon 12 and 22) are small fractions ($3.1x10^{-5}$% and $1.1x10^{-4}$%) of the NYSDEC AGCs of 12,000 and 50,000 ug/m^3, respectively (no SGCs have been established for these compounds) (Table 4). In addition, air modeling conducted at the request of the NYSDEC and New York State Department of Health (NYSDOH) (ARCADIS 2005b) indicates that, taking into account air dispersion effects, the concentration of both compounds would be several orders of magnitude below the NYSDEC standards by the time these compounds would reach the school district property and nearby residential area and, therefore, would be undetectable by the analytical method used.

ARCADIS extensively investigated treatment technologies for the Freon compounds at the very low levels being detected. The results of the investigation show that viable, proven treatment technologies do not exist at this time.

Even though the vinyl chloride was not detected in the influent to the plant, all of the mass being discharged appears to originate in the groundwater. The likely reason is that the vinyl chloride concentration in the groundwater is too low to be detected. Regardless, the discharge levels for vinyl chloride are only well below the SGC and only at 0.79% of AGC. Nevertheless, since this compound is above the Non-Detect Performance Standard, it will addressed by modifying the treatment system to reduce its concentration. Lockheed Martin and its consultants are in the process of evaluating various treatment options for vinyl chloride in off-gas vapor emissions.

Even though methylene chloride was detected in the discharged air during the January 10, 2005 sampling event, ARCADIS believes that because it is a common laboratory contaminant and was only detected once during the 90-Day Test, the constituent was not present in the discharged air.

References

ARCADIS 2005a – Initial Testing Report: July – October 2004 Off-Site Interim Remedial Measure, Former Unisys Facility, Great Neck New York. NYSDEC ID #130045.

ARCADIS 2005b – Freon 22 Emission Modeling, Off-Site Remediation System, Former Unisys Corporation, Great Neck, New York, Letter dated 3 March 2005.