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ENVIRONMENT

Mr. Steven Scharf, P.E.
New York State Department of Environmental Conservation
Remedial Action, Bureau A
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7015

Subject:
Pilot Test Report, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Date:
May 18, 2009

Contact:
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Our ref:
NY001491.0000.00012

Dear Mr. Scharf:

This report summarizes the 1-hr pilot test conducted at Northrop Grumman Systems Corporation's (Northrop Grumman) Operable Unit 3 (OU3) Groundwater Interim Remedial Measure (GW IRM) Facility located in Bethpage, NY, on May 8, 2009. This report is submitted on behalf of Northrop Grumman to satisfy requirements of the New York State Department of Environmental Conservation (NYSDEC).

This report summarizes the following:

- Pilot Test Program
- Work Performed
- Results and Observations
- Conclusions and Recommendations

## PILOT TEST PROGRAM

The NYSDEC required a 1-hr pilot test of the GW IRM treatment plant be successfully completed prior to full-scale GW IRM operation and discharge of treated (water) effluent to the Nassau County Department of Public Works (NCDPW) basins.

A GW IRM System Start-up Work Plan, which included a detailed description of the proposed 1-hr pilot-test program, was submitted to the NYSDEC. The NYSDEC approved the work plan with the following conditions:

1. A Pilot-Test Summary Report will be prepared by, and signed by, the Responsible New York State Professional Engineer for the GW IRM and submitted to the NYSDEC for review and approval.

2. Table 2. Groundwater Monitoring Program will be modified when submitted with the GW IRM OM&M Manual to include a note to the effect that: "The Groundwater Monitoring Program is subject to change".

3. When the system is started up, the GW IRM will operate at full plant capacity, which requires Remedial Wells RW-1, RW-2, RW-3, and RW-4 to be pumped at 40 gallons per minute (gpm), 85 gpm, 85 gpm, and 40 gpm; respectively.

## WORK PERFORMED

The 1-hr pilot test was performed from 10:00AM to 11:05AM Friday May 8, 2009. The pilot test was performed in accordance with the NYSDEC-approved pilot test program presented in the System Start-up Work Plan. A chronology of key pilot test events is provided in Table 1. Additionally, summary of the key operating parameters (such as individual remedial well pumping rates and the air flow rate) are provided in Table 1.

## RESULTS AND OBSERVATIONS

The DRAFT, preliminary analytical data for the water and air samples collected during the 1-hour pilot test are summarized in Tables 2 and 3, respectively.

As shown on Table 2, the concentrations of VOCs in the system influent are significantly less than the design concentrations for the system.

During the pilot test, the plant piping, equipment (e.g. air stripper), and instrumentation were checked for leaks. No leaks were observed.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the data collected and the observations made, ARCADIS has the following conclusions and recommendations:

- The groundwater extraction system (pumps and pipelines) operated as expected. Specifically,

  - Remedial wells and pumps were able to extract groundwater from the wells at the design rate for the duration of the pilot test without problem.

  - No leaks were observed.

- The system influent concentration (Table 2) is significantly less than expected. However, once the system is operated for some time and individual remedial well the capture zone/radius of influence propagates and subsequently, stabilizes much higher concentrations are expected.

  The expected changes in the system influent VOC concentrations will be tracked by the monitoring program proposed (see Table 1 of the System Start-up Workplan) where the influent will be monitored at the following intervals: Day 1, Day 3, and then weekly thereafter, for the first month.

- The groundwater treatment system (air stripper and bag filters) treated the influent groundwater sufficiently. Specifically,

  - The concentrations of site-specific VOCs were reduced below laboratory method detection limits, which are below the system allowable discharge concentrations.

  - The concentrations of metals in the treated (water) effluent also were less than the system allowable discharge concentrations.

- The vapor treatment system (granular activated carbon (GAC) and potassium permanganate impregnated zeolite (PPZ) emission control units) reduced the levels of VOCs before discharge to the atmosphere.

  Overall, while the vapor treatment system reduced levels of VOCs below allowable emission concentrations, ARCADIS believes that some improvement in the system efficiency can be achieved and will troubleshoot potential issues during subsequent system start-up phases.

Based on the results and observations of the pilot test, ARCADIS believes that the system is capable of meeting the required water and air discharge requirements and recommends that system is ready for the next phase of system start-up i.e., the intermittent operation of the GW IRM to allow system alarms, instrumentation, and controls to be further tested to ensure proper operation of the plant during continuous operation.

**Steven Scharf**
**New York State Department of Environmental Conservation**
**May 18, 2009**

If you have any questions or comments, please feel free to contact us.

Sincerely,

ARCADIS

William S. Wittek

William S. Wittek, PE
Senior Engineer

Enclosures

Copies:
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Table 1. Chronology and Key Operating Parameters, Pilot Test Program, Groundwater Interim Remedial Measure, Operable Unit 3 (former Gruman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York. (1)

**PILOT TEST CHRONOLOGY (MAY 8, 2009)**

| TIME | EVENT |
|---|---|
| 9:55 | started blower |
| 10:00 | start-up RW-2 |
| 10:01 | start-up RW-4 |
| 10:02 | start-up RW-3 |
| 10:03 | start-up RW-1 |
| 10:04 | ALL Remedial Wells On-line and pumping at desired pilot test rates |
| 10:10 | blower off - pumps shut off |
| 10:12 | blower on-line; pumps restarted |
| 10:15 | start pumping down AS sump |
| 10:40 | closed one notch on air stripper control valve |
| 10:45 | finish pumping down AS sump (three pump down cycles) |
| 10:52 | collect effluent (air) sample |
| 10:54 | opened up 2-inch diameter discharge line |
| 10:55 | start collecting water samples |
| 11:00 | finish collecting water samples |
| 11:05 | pilot test ended - remedial wells shut off |
| 11:08 | stopped pumping down air stripper sump |
| 11:10 | shut off blower |

**SUMMARY OF KEY OPERATING PARAMETERS**

| Well | Pumping Rate (range in gallons per minute (gpm) during pilot test) |
|---|---|
| RW-1 | 30 - 32 |
| RW-2 | 75 - 78 |
| RW-3 | 75 - 78 |
| RW-4 | 30 - 32 |

Air Flow Rate: ranged from 1,800 to 2,100 Cubic Feet per Minute (CFM) during pilot test

Total Quantity of Groundwater Pumped: 13,000 gallons

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Table 2. Summary of Analytical Data (water), Pilot Test Program, Groundwater Interim Remedial Measure, Operable Unit 3 (former Gruman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York. (1, 2)

| PARAMETER<br>Sample Date: | Discharge Limit (3) | Influent 5/8/2009 | AS EFF 5/8/2009 | Effluent 5/8/2009 |
|---|---|---|---|---|
| VOCs (ug/L) (4) | | | | |
| 1,1, Dichloroethane | 5 | 0.86 J | NA | ND |
| 2- Butanone (MEK) | --- | 61 | NA | 1.7 J |
| Acetone | --- | 1.8 J | NA | 1.5 J |
| Chloroform | --- | 4.2 J | NA | ND |
| Tetrachloroethene | 5 | 0.37 J | NA | ND |
| Trichloroethene | 5 | 13 | NA | ND |
| cis 1,2 Dichloroethene | 5 | 81 | NA | ND |
| trans 1,2 Dichloroethene | 5 | 0.34 J | NA | ND |
| Freon 22 | --- | 1.5 J | NA | ND |
| Metals - total (mg/L) | | | | |
| Cadmium | --- | ND | NA | ND |
| Chormium | --- | ND | NA | ND |
| Iron | 0.6 | ND | 0.14 | 0.13 |
| Manganese | --- | 0.075 | 0.095 | 0.093 |
| Mercury | 0.25 | ND | NA | ND |
| Metals - dissolved (mg/L) | | | | |
| Cadmium | --- | ND | NA | ND |
| Chormium | --- | ND | NA | ND |
| Iron | --- | ND | 0.11 | 0.11 |
| Manganese | --- | 0.076 | 0.093 | 0.095 |
| Mercury | --- | ND | NA | ND |
| pH (S.U.) | 5.5 - 8.5 | 6.2 | 6.3 | 6.7 |

| | |
|---|---|
| "J" | denotes compound was detected but a concentration below the method detection limit. |
| NA | denotes that the sample was not analyzed for this analyte/compound. |
| ND | denotes that this compound was not detect at, or above, it's detection limit per the analytical method used. |
| --- | denotes no limit specified on interim SPDES permit equivalency |
| S.U. | standard units |
| GW IRM | Groundwater Interim Remedial Measure |
| Influent | GWIRM system influent. |
| ASEFF | GWIRM air stripper effluent. |
| Effluent | GWIRM system effluent (post bag filter). |

Notes:

1. Water samples collected by ARCADIS personnel and submitted to Columbia Analytical Services, Inc. for Volatile Organic Compound (VOC) and metals analyses per NYSDEC ASP 2000, Method OLM 4.2 w/Freon 12 and Freon 22, and USEPA Method ILM 4.1, repsectively. pH analyses were performed by ARCADIS personnel in the field.
2. All data shown is DRAFT and Preliminary. Data is not final until the data can be validated.
3. Discharge limites per Interim SPDES limits provieded by NYSDEC.
4. Only those VOCs that were detected in any of the samples are listed.

Table 3: Summary of Analytical Data (air), Pilot Test Program, Groundwater Interim Remedial Measure, Operable Unit 3 (former Gruman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York. (1,2)

| PARAMETER | Dishcarge Limits (3) | Effluent |
|---|---|---|
| Sample Date: | SGCs | 5/8/2009 |
| VOCs (ug/m$^3$) (4) | | |
| Freon 12 | NS | 2.5 |
| Acetone | 180,000 | 55 |
| Freon 113 | 960,000 | 0.59 J |
| 1,1, Dichloroethane | NS | 9.3 |
| 2- Butanone (MEK) | 59,000 | 14 |
| cis 1,2 Dichloroethene | 190,000 | 100 |
| Chloroform | 150 | 47 |
| Benzene | 1,300 | 4.6 |
| Carbon Tetrachloride | 1,900 | 0.5 J |
| Trichloroethene | 14,000 | 38 |
| Toluene | 37,000 | 1.3 J |
| Tetrachloroethene | 1,000 | 3.1 J |

"J" denotes compound was detected but a concentration below the method detection limit of 0.5 ppbV.
NS No standard.

Notes:
1. Air sample collected by ARCADIS personnel and submitted to Columbia Analytical Services, Inc. for Volatile Organic Compound (VOC) analyses per Modified Method TO-15 w/Freon 12 and Freon 22.
2. All data shown is DRAFT and Preliminary. Data is not final until the data can be validated.
3. Refers to the compound-specific Short-term Guidance Concentration (SGC) per the NYSDEC DAR-1 AGC/SGC tables revised December 22, 2003. Since the system operated for only 1-hour no comparisons to an Annual Guidance Concentration (AGC) is provided.
4. Only those VOCs that were detected in any of the samples are listed.