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ENVIRONMENT

Mr. Steven Scharf
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Remedial Action, Bureau A
Division of Environmental Remediation
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Subject:
Summary of Phase 3 Remedial Investigation (RI) and Interim Remedial Measure (IRM) Pre-Design Investigation Work Plan,
Former Grumman Settling Ponds (Operable Unit 3 – Bethpage Community Park),
Bethpage, New York.

Date:
January 17, 2007

Contact:
David Stern

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Our ref:
NY001464.0807.0003

Dear Steve:

ARCADIS has prepared this Summary of Phase 3 Remedial Investigation (RI) and Interim Remedial Measure (IRM) Pre-Design Investigation Work Plan (Work Plan) on behalf of Northrop Grumman Systems Corporation (NG) for the Former Grumman Settling Ponds (Operable Unit 3 – Bethpage Community Park), Bethpage, New York Site. This Work Plan provides the New York State Department of Environmental Conservation (NYSDEC) with a summarized work scope to complete the OU3 RI and collect key data as part of the pre-design investigation pertaining to the OU3 IRMs that are currently being developed by NG (i.e., soil gas and groundwater).

In accordance with our recent meeting with you, ARCADIS has developed this Work Plan to comply with NYSDEC requests for expeditious completion of the OU3 RI, development of a single work plan to complete the OU3 RI (i.e., stop use of the Work Plan addenda [WPA] approval process currently in place), and the expeditious implementation of the soil gas IRM. Additionally, ARCADIS has prepared this Work Plan based on the understanding that NG desires to coordinate (to the extent possible without causing delay) implementation of both soil gas and groundwater IRMs in a manner that is responsive to the NYSDEC letter of December 22, 2006; please refer to NG's letter of January 12, 2007 for a more detailed discussion of IRM schedule. Accordingly, ARCADIS has prepared this Work Plan, consisting of a summarized form of the proposed Phase 3 RI (soil and groundwater) and IRM Pre-Design (soil gas and groundwater) field programs, for NYSDEC review and approval.

The Work Plan is summarized in Table 1, which lists the various tasks (primary and contingent) that will be performed for both the RI and IRM Pre-Design, along with the estimated schedule, general sequence of activities, and key decision points. As feasible, the tasks will be performed on a concurrent basis (i.e., simultaneous activities and multiple crews). Ultimately, ARCADIS believes that NYSDEC approval of this Work Plan will result in a freer and more dynamic exchange of information, more rapid completion of the required field work and associated decision making, and an expedited, optimal overall RI and IRM schedule. Additionally, as field work progresses and data are generated, ARCADIS expects that the scope and sequence of activities may be modified; ARCADIS believes that periodic updates to this Work Plan, for informational purposes and continued open communications between parties, can achieve an acceptable and controlled execution of the OU3 RI and IRM pre-design field work. Please keep in mind that, consistent with best technical practices, the technical specifications and schedules will continue to be prepared, as needed, by ARCADIS (for internal use and for subcontracting purposes only) to ensure proper work performance and the production of quality work products.

ARCADIS trusts that our long-standing relationship with the NYSDEC on the Bethpage project has instilled a high level of confidence in our technical proficiency such that this approach is agreeable; the current estimated schedule (based on the durations and overlap of the various tasks summarized in Table 1) indicates that the on-site RI (soil and groundwater) will be substantially complete by mid-March 2007. ARCADIS developed this schedule based in part on NYSDEC's November 28, 2006 letter stating, in part, that the Town of Oyster Bay will not interfere with NG's performance of the RI. Based on current data and interpretations, ARCADIS expects that the off-site groundwater RI (i.e., well installation and groundwater sampling activities) will be complete by mid-September 2007. Please be aware that in the interest of expediting the RI work, ARCADIS plans to initiate the work described in Table 1, Perched Water Task 1A on January 17, 2007.

ARCADIS respectfully requests expedited approval of the enclosed Work Plan, on or before January 23, 2007, and as such has sent the Work Plan out electronically, with hardcopy to follow.

Please contact us if you have any questions or comments.

Sincerely,

ARCADIS of New York, Inc.

David E. Stern
Senior Scientist/Hydrogeologist

Carlo San Giovanni
Project Manager

Michael F. Wolfert
Project Director

Enclosure

Copies:
John Cofman, Northrop Grumman
Larry Leskovjan, Northrop Grumman

Table 1. Summary of Phase 3 Remedial Investigation and Interim Remedial Measure Pre-Design Investigation Work Plan, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Task Number	Task Description	Expected Task Duration [1]	Additional Details and Rationale
Soil			
1	On-Site Soil Borings	2 to 3 weeks	**Phase 3 RI:** Soil borings to complete on-site soil characterization/delineation will be drilled, sampled, and abandoned with the goal of meeting OU3 RI objectives for on-site soil. Final number, locations, and sampling specifications are be determined and will be provided to NYSDEC under separate cover. Following receipt of the soil data, the preliminary screening of alternatives for the purpose of developing the FS will be performed.
Soil Gas			
1	On- and Off-Site Soil Gas Sampling	2 weeks	**Soil Gas IRM Pre-Design:** Collect additional soil gas and selected groundwater grab samples to refine the scope of the soil gas IRM under consideration. Soil gas sampling methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Scope of work to be included in IRM Work Plan, to be prepared and provided to NYSDEC under separate cover.
2	On-Site Ambient Air Study	1 week	**Phase 3 RI:** Assess VOCs (if any) in Park ambient air. Work to be specified in the IRM Work Plan and performed following conclusion of Town of Oyster Bay IRM and redevelopment activities. Ambient air sampling methods will be consistent with the NYSDEC-approved RI/FS Work Plan.
3	On-Site SVE Pilot Tests	1 week	**Soil Gas IRM Pre-Design:** Conduct pilot tests (2 tests are assumed; One test for the zone above and one test for the zone below the deeper low permability zone identified at the site) to determine the viability of the SVE technology, radius of influence, and other parameters needed to support the design of the Soil Gas IRM. Detailed scope will be described in the Soil Gas IRM Work Plan.

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Task Number	Task Description	Expected Task Duration [1]	Additional Details and Rationale
Perched Water			
1A	On- and Off-Site Cone Penetrometer Borings (southern area)	1 week	**Phase 3 RI:** Analytical results of perched water in the Park identified total VOC concentrations >100 mg/L. Based on these data, it is possible that perched water may be contributing to VOCs in soil gas due to the presence of a zone of low-permeability soil / perched water. The proposed transects of CPT borings in and south of the Park will help define the lateral extent of the zone of low-permeability soil / perched water, if present. If present, then follow-up work may include drilling and sampling of perched water piezometers (Task 3) to determine if site COCs are present. Initially, three east-west transects in the southwest Park area and off-site are proposed, with target drilling depth of 60 ft bls.
1B	Off-Site Cone Penetrometer Borings (western/northern area)	1 week	**Phase 3 RI:** CPT borings will be drilled west and north of the Park to assess soil properties and perched water (if any) in these areas and evaluate remedial options. Initially, three north-south transects northwest of the site and one east-west transect north of the site will be drilled, with a target depth of 60 ft bls. CPT drilling method will be consistent with the NYSDEC-approved RI/FS Work Plan. Number and depths of CPT borings will be determined based on field observations.

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Task Number	Task Description	Expected Task Duration [1]	Additional Details and Rationale
Perched Water, continued			
2	Perched Water Piezometer Drilling, Installation, and Survey (Southern area)	1 week	**Phase 3 RI:** This work will be performed contingent on Perched Water Task 1A results. If perched water is present south of the site, additional piezometers will be installed to monitor the presence of perched water and determine perched water quality. Additional piezometers may be installed as observation points to be monitored during on-site piezometer hydraulic testing (Task 4). Piezometer drilling and installation methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Number and specifications of piezometers have not been determined.
3	Perched Water Sampling (Southern area)	1 week	**Phase 3 RI:** Contingent on the results of Task 2. If perched water is present south of the site, additional perched water sampling will be conducted to determine if site-related COCs are present. Perched water sampling methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Number of sampling events and sampling analytes have not been determined.
4	Perched Water Piezometer Hydraulic Test	TBD	**Groundwater IRM Pre-Design:** The scope of the hydraulic test will be contingent on the results of Task 2. One or more piezometers containing perched water will be tested to preliminarily estimate the rate of perched water recovery and hydraulic rebound. Additional piezometers may be installed as observation points, as needed. Hydraulic test specifications will be determined at a later date.
Groundwater			
1	On- and Off-Site Permanent Groundwater Monitoring Well Drilling, Installation, Development, Survey	3 to 6 months	**Phase 3 RI:** Monitoring wells/clusters will be drilled/installed on- and off-site to meet the OU3 RI objectives for groundwater on and off-site. Well drilling and installation methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Completion of permanent well drilling contingent on results of off-site VPBs to be drilled pursuant to Work Plan Addendum No. 7. Number and specifications of wells will be determined.

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Task Number	Task Description	Expected Task Duration [1]	Additional Details and Rationale
Groundwater, continued			
2	Permanent Monitoring Well Groundwater Sampling	2 weeks per event	**Phase 3 RI:** Two rounds of groundwater samples will be collected from new and existing monitoring wells on- and off-site to meet the OU3 RI objectives for groundwater on and off-site. Groundwater sampling methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Specifications for the groundwater sampling program, including the time between sampling events, will be determined.
3	Extraction and Observation Well Drilling, Installation, Development, and Survey	3 to 4 weeks	**Groundwater IRM Pre-Design:** One or more extraction wells will be drilled/installed to assist in the design of the groundwater IRM under consideration. The extraction well(s) will help quantify aquifer properties via collection of hydrostratigraphic data and implementation of a pumping test (Task 4). Observation wells will be drilled for use during the pumping test. Extraction/observation well drilling and installation methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Number,location, and specifications of these wells will be determined.
4	Extraction Well Pump Test	Approx. 1 week	**Groundwater IRM Pre-Design:** The extraction well(s) will be pumped and the extraction/ observation wells will be monitored for a specified period of time to meet the goals of IRM design. Pump test specifications will be determined.

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Task Number	Task Description	Expected Task Duration [1]	Additional Details and Rationale
Groundwater, continued			
5	Diffusion and Observation Well Drilling, Installation, Development, and Survey	2 to 4 weeks	**Groundwater IRM Pre-Design:** Contingent on the results of Perched Water Task 1B. If CPT borings indicate a recharge basin is not a feasible method for disposal of treated effluent, then one or more diffusion/ observation wells will be installed to quantify aquifer properties and assist in the design of the groundwater IRM under consideration. Observation wells will be drilled for use during the injection test. Diffusion/observation well drilling and installation methods will be consistent with the NYSDEC-approved RI/FS Work Plan. Number and specifications of wells will be determined.
6	Diffusion Well Injection Test	Approx. 1 week	**Groundwater IRM Pre-Design:** Potable water will be injected into the diffusion well(s) and the diffusion/ observation wells will be monitored for a specified period of time to meet the goals of the groundwater IRM under consideration. Injection test specifications will be determined.

see footnote and definitions on last page

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Footnote:

(1) Subject to the terms of the Administrative Consent Order of July 4, 2005, Phase 3 RI Tasks (with the exception of "On- and Off-Site Permanent Groundwater Monitoring Well Drilling, Installation, Development, Survey" and "Permanent Monitoring Well Groundwater Sampling") will be completed by mid-March 2007, assuming NYSDEC provides approval of this document by mid-January 2007. The remaining two RI tasks will be completed as expeditiously as possible, using multiple drilling rigs/crews whenever possible. Assuming NYSDEC approval date of this document is provided on 1/23/2007, a total of 4-1/2 months are required to complete monitoring well installation and development, and two rounds of groundwater monitoring (hydraulic and groundwater quality) are performed three months apart, then these RI tasks can be expected to be completed by mid-September 2007. The schedule for the IRM Pre-Design tasks will be provided in a forthcoming IRM Work Plans (soil gas and groundwater).

Definitions:

NYSDEC	New York State Department of Environmental Conservation
IRM	Interim Remedial Measure
OU3 RI	Operable Unit 3 Remedial Investigation
TBD	To Be Determined
ft bls	feet below land surface
VOCs	volatile organic compounds
mg/L	milligrams per liter
CPT	Cone Penetrometer
VPB	Verticle Profile Boring
FS	Feasibility Study