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UFP SAP ADDENDUM

WELL INTEGRITY INVESTIGATION AND TESTING PROTOCOL
BETHPAGE
BETHPAGE, NEW YORK

Revision: 0

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UFP SAP Addendum — Protocol for Well Integrity Testing, NWIRP Bethpage

This addendum provides a standard protocol for determining the well integrity of outpost wells that are used to define plume conditions immediately upgradient of public water supply wells. These wells have been installed as part of the OU2 ROD (U.S. Navy, 2003) to provide an early warning of the plume migration towards the public water supply wells. The wells are typically installed with a submersible pump and packer assembly which reduces the purge volume during sampling. During sampling, the packer is inflated to isolate the screen intervals, the well is purged and sampled, and then the packer assembly is deflated until the next sampling. Over time, the pressures exerted on the 4-inch diameter Schedule 80 PVC casing by ambient hydrostatic pressure and by the packer inflation may cause failure of the casing. This protocol is designed to test the integrity of the well casing, the pump and packer assembly; repair or replace the pump and packer assembly; or, if warranted, repair the well.

Steps to follow:

1. Uncap well, allow to equilibrate.

2. Measure water level; depth to top of packer; and total depth of the well.

3. Perform a short duration specific capacity test (until the pumping water level stabilizes or a maximum of 20 minutes).

4. Inflate packer to 0.433 psi per foot of water inside the well to hydrostatically isolate the well above the packer.

5. Perform a second specific capacity test (Step 3); monitor the water level in well above packer; remove the packer and pump assembly.

6. If drawdown is noted above the packer, test the packer and airline to determine if pressure holds; if not, replace the packer and or airline as appropriate.

7. If no drawdown is observed above the packer, perform a tele-inspection of the well to see if any casing damage can be seen; if damage is present, go to Step 12. If not, go to Step 8.

8. Redevelop the well to remove stagnant water, an obstructed well screen, and/or entrained fines in the well and clear the discharge as much as possible.

9. Perform a short duration specific capacity test to determine the increase from redevelopment.

10. Re-install the pump and packer assembly; inflate the packer to 0.433 psi per foot of water in the well; perform a short (10 minutes or less) specific capacity test to ensure that the packer is seated properly (there should be no drawdown in the casing above the packer assembly).

11. Measure the water level in the casing above the packer assembly; add a minimum of 5 gallons of distilled water into the well casing above the inflated packer assembly; monitor the water level inside the casing above the packer for changes for at least one hour; if the depth to water increases over time (i.e., water is seeping through a crack in the casing above the packer); go to Step 12; if not terminate the integrity testing.

12. Install a 2-inch Schedule 80 40 PVC screen and riser inside the existing 4-inch well, using identical slot size and matching the screen length of the original well. Well screens will be 10 slot (0.010 inches) and approximately 40 feet in length. Based on local lithology, alternative screen lengths may be used. After setting the well screen and casing, the gravel pack (W.G. No. 1) will be placed within the boring annulus via a tremie pipe. A fine sand layer (finer than gravel pack) will be placed in the annulus on top of the gravel pack using a tremie pipe in the same manner as the gravel pack. The gravel pack and fine sand thickness may be changed based on subsurface conditions. A 4- to 8- foot thick bentonite seal will be installed above the fine sand layer. A bentonite/cement grout will be installed via a tremie pipe within the annular space above the bentonite seal. Finish surface completion and secure the well.

13. The 2-inch monitoring wells will be developed using a combination of air lift and mechanical surging. Field parameters, including pH, temperature, specific conductivity, and turbidity will be monitored and recorded throughout well development. In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells will be developed until turbidity is less than 50 nephelometric turbidity units (NTU). However, in some instances, the 50 NTU standard may not be attainable. If after a "best well development effort", the 50 NTU standard cannot be attained and turbidity stabilizes (above the 50 NTU standard), the well will be considered acceptable.

14. Sampling of 2-inch monitoring wells will be performed using low-flow procedures as described in the USEPA protocol and in this UFP SAP. The sampling will be performed using a bladder pump equipped with an associated sampling drop tube. The bladder pump will be installed approximately 100 feet below the static water level, and the inlet drop tube will be lowered to the middle of the well screen interval. Discharge will be monitored for field parameter stabilization using a flow-through cell. Upon stabilization, samples will be placed into appropriate containers and shipped to the analytical laboratory.

15. Investigation Derived Waste (IDW) accumulated during drilling activities will be collected, containerized, accumulated at NWIRP Bethpage, and disposed off-site. An alternative for liquid IDW will be to process the waste through a mobile granular activated charcoal treatment unit, followed by discharge of the treated liquid to the municipal sewer system in accordance with an approved Nassau County sewer discharge permit.

16. A centrally located decontamination pad located at NWIRP Bethpage will be used for the collection of all decontamination-generated fluids. All decontamination fluids will be collected and staged for characterization and subsequent disposal.

17. A summary report will be developed to provide documentation of this investigation. Documentation required to support this project will consist of the following items:

    - Field notebook
    - Groundwater sample log sheets
    - Well completion form for each well
    - Well development record

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