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DEPARTMENT OF THE NAVY
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NAS PENSACOLA
5090.3a

PLEASE ADDRESS REPLY TO THE COMMANDING OFFKER. NOT TO THE SIGNER Of THIS LETTER.
REFER TO: 5090
Code 1851
24 Sep 93

Ms. Allison Drew
U.S. EPA
345 Courtland Street, NE
Atlanta, GA 30365

AQUIFER TEST DATA USED IN SITE CHARACTERIZATION AND REMEDIAL DESIGN, NAS PENSACOLA, FL

Dear Ms. Drew,

During the course of RI Work Plan generation, subsequent Response to Comments, and now regulatory comments on the RI field investigation at Operable Unit 10 (OU-10) there have been continued references to the completion of constant rate aquifer tests at the subject RI sites. In an effort to mitigate further comment the Navy would like to clarify their position for all remedial activities at NAS Pensacola including 1) the collection and use of hydrogeologic parameters for site characterization, 2) the use of these parameters for groundwater remediation design, and 3) the necessity for and execution of long-term, full scale pumping tests for remedial design. Moreover, this letter will serve to clarify and summarize further position at NASP on monitoring well development and purging to address supplemental concerns expressed by the FDEP and US EPA in comments on OU-10.

Constant Rate Aquifer Tests

Site characterization requires aquifer permeability data necessary to illustrate aquifer homogeneity (or inhomogeneity) and the nature of groundwater occurrence in the aquifer; This information also provides some measure of groundwater velocity which is important to the advective transport of potential contamination; and, in some cases, the degree of connection between aquifer units. Site characterization does *not* necessarily provide the data required for site remedial design, but it *does* provide data which can be used to design long-term, full-scale pumping tests (which are required for proper remedial design). These types of tests are required *only* when site characterization data indicate groundwater extraction will be necessary to site remediation. Conducting these types of pumping tests prior to confirmation of their necessity, and their proper design based on a conceptual site model, can lead to tremendous unnecessary execution and disposal costs and can significantly reconfigure plume distribution in the host and adjacent aquifers (and can, in fact, induce contaminant migration across aquifer boundaries).

The Navy believes aquifer parameters estimated by using slug tests and/or specific capacity tests are adequate for site characterization. It has been shown specific capacity tests (along with their recovery data), in particular, provide realistic estimates of aquifer transmissivity and the nature of groundwater occurrence with compare favorably to those calculated using pumping test data (Bradbury and Rothschild, 1985; Bradbury and Muldoon, 1990: full references attached to this letter).

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The question concerning the procedure of collecting specific capacity data during well development is reasonable. The equations used to analyze specific capacity data are presented in Bradbury and Rothschild (1985), and offer correction factors for well efficiency. The proper application of these equations, therefore, allow this data to be used for the calculation of representative aquifer characteristics. Furthermore, field testing at NAS Pensacola by the Navy's contractor on wells drilled by mud rotary indicates little to no change in the specific capacity of wells prior to development and after development (well development procedure were conducted in accordance with SOP/QAM procedures). The Navy contends slug test and/or specific capacity test data fulfill the requirements for site characterization, and can be used to anticipate, plan, and design test well locations, discharge volumes, and execution times for full-scale, long-term pumping tests where groundwater extraction is necessary. This approach will prevent the unnecessary duplication (i.e., change in aquifer conditions, or liability to the Remedial Action Contractor) of aquifer tests and provide real time data for RD/RA.

At sites where groundwater remediation is required (as determined by RI analytical data), full-scale, long-term pumping tests will be conducted. If existing wells onsite will sustain discharge rates necessary to adequately stress the aquifer, then these wells will be used. If not, then specific aquifer test wells may have to be installed; these can, however, be designed to double as extraction wells once the extraction system is in place. In addition to production wells, specifically located piezometers may also need to be installed. In order to simulate long-term effects of pumping, discharge rates for these tests (designed using site characterization data) should, as a rule be approximately twice the anticipated extraction rate to be employed in the remediation system or, at a minimum, at the maximum discharge rate that the well will practically sustain. For tests involving unconfined aquifers, execution times will be a minimum of 72 hours (48 hours production, 24 hours recovery), and for confined aquifers will be a minimum of 48 hours (24 hours production, 24 hours recovery).

Importantly, site characterization data (slug and/or specific capacity tests) can be used to effectively evaluate the feasibility of groundwater extraction. This evaluation can be conducted using the information provided in the RI/FS reports. Therefore, it is also the Navy's position that long-term, full-scale pumping test data is not necessary until actual design of an extraction system. This data is a luxury and not a necessity to issuance of a Record of Decision, and can be collected as an integral part of Remedial Design/Remedial Action (RD/RA) or in a predesign phase of RD/RA.

Monitoring Well Development

Monitoring well development will be performed in accordance with Appendix E.7 of the USEPA SOP/QAM. Development can be performed using a variety of techniques, both individually and in combination. Techniques which may be used include:

- Pumping
- Compressed Air (with the appropriate organic filter system)
- Bailing
- Surging
- Backwashing
- Jetting

AQUIFER TEST DATA USED IN SITE CHARACTERIZATION AND REMEDIAL DESIGN, NAS PENSACOLA, FL

The objectives during monitoring well development are to remove any residual materials from monitoring well installation and to re-establish the natural hydraulic flow conditions. Monitoring wells are to be developed until free of visible sediment given the geology of the area, and until pH, temperature, and specific conductivity have stabilized.

Monitoring Well Purging

Monitoring well purging has and will continue to be performed in accordance with Section 4.9.3 of the USEPA SOP/QAM. The objective of monitoring well purging is to remove stagnant water from the monitoring well which is not representative of aquifer conditions. Well purging completed during groundwater sampling for Operable Unit 10 was implemented utilizing either pumping or bailing techniques. A hand pump was used to initiate well purging on three intermediate wells. From these wells approximately 2 well volumes or water were removed and subsequent purging was completed by bailing. All wells were purged of a minimum of 3 to 5 well volumes and pH temperature and conductivity had stabilized. Contrary to regulatory opinion, the Navy feels all samples collected during the RI for OU-10 are representative of groundwater and deemed useable.

In order to mitigate regulatory concern, all future well purging will be achieved by using a peristaltic pump, bailer, bladder pump, or Grundfos pump. Purging will continue until pH, temperature, and specific conductivity have stabilized. At least three but no more than five well volumes will be removed during purging. The CSAP will be revised to specify which types of pumps may be used during monitoring well purging.

In closing, the Navy wishes to point out that it is imperative that it maintain a proactive role in the investigation and remediation of sites at NAS Pensacola. However, it is also imperative that these activities be conducted with a mind towards not only timeliness, but also technical efficiency and correctness, proper sequencing of events, and cost effectiveness.

If you have any questions or comments concerning this position summary, please contact Ms. Linda Martin at (803)743-0574.

Sincerely,

Linda A. Martin

LINDA A. MARTIN
Environmental Engineer
Installation Restoration I Branch