STAFF EXHIBIT 23

RAS 14590

DEPARTMENT OF THE ARMY

INSTALLATION MANAGEMENT AGENCY
HEADQUARTERS, UNITED STATES ARMY GARRISON, ROCK ISLAND ARSENAL
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ROCK ISLAND, ILLINOIS 61299-5000

U.S. NUCLEAR REGULATORY COMMISSION
In the Matter of US Army (Jefferson Proving Gro
Docket No. 40-8838-MLA Official Exhibit No. 23
OFFERED by Applicant/Licensee Intervenor ______
NRC Staff Other ______
IDENTIFIED on ______ Witness/Panel ______
Action Taken: ADMITTED REJECTED WITHDRAW
Reporter/Clerk ______

REPLY TO
ATTENTION OF:

26 October 2005

Office of the Garrison Manager

Dr. Tom McLaughlin
Materials Decommissioning Branch
Division of Waste Management and Environmental Protection
Office of Nuclear Materials Safety and Safeguards
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Dr. McLaughlin:

As agreed to at the meeting held September 8, 2005, and in response to your letter of September 30, 2005, the US Army provides the following responses to the action items identified in your letter of September 30, 2005.

If you have any questions, please contact either Mr. Paul Cloud, US Army Jefferson Proving Ground (JPG), at (410) 436-2381, E-mail address paul.d.cloud@us.army.mil or Mr. John J. Welling, Chief Counsel, US Army Garrison-Rock Island Arsenal, at (309) 782-8433, E-mail address wellingj@ria.army.mil .

Sincerely,

Alan G. Wilson
Garrison Manager

Enclosure

DOCKETED
USNRC

October 25, 2007 (2:00pm)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Docket No. 40-8838-ML

cc:
Paul Cloud
Joyce Kuykendall

TEMPLATE = SECY-027

SECY-02

RESPONSES TO ACTION ITEMS IDENTIFIED AT THE 8 SEPTEMBER 2005 MEETING BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION (NRC) AND U.S. ARMY REGARDING NRC LICENSE SUB-1435, JEFFERSON PROVING GROUND

This document articulates the U.S. Army's responses to Action Items 1 to 9 as presented in NRC's Meeting Report dated 8 September 2005.

NRC ACTION ITEM 1

The Army will examine if the schedules for the Electrical Imaging Survey, stream gauging and precipitation monitoring can be moved forward.

ARMY RESPONSE

The original schedule proposed in the FSP was based on the need to complete some tasks sequentially because the results of some tasks are used to refine and develop some following tasks. Time between implementing tasks is used to evaluate the findings and incorporate relevant information into designing and refining the following tasks and completing the appropriate addendums to the FSP. Secondly, the schedule reflects an attempt to implement a plan that is consistent with the Army's resource constraints.

EI Schedule

The earliest that the Electrical Imaging (EI) survey can be completed in Spring 2006. The final design and layout of the EI survey lines will be defined following the review of the results and findings of the Fracture Trace Analysis, which will be completed in December 2005. The EI survey will be used to further investigate, refine and validate the findings of the Fracture Trace Analysis. This investigation sequence has been used at numerous sites with great success.

Prior to initiating the EI survey, the results of the fracture trace study need to be factored into the EI survey plans and FSP addendums need to be completed and approved. As a result, the window of opportunity for completing the EI survey this fall before adverse weather occurs is too small. Frozen ground poses problems: (1) physical constraints of installing the electrodes (Steel rods must be driven into the ground) into frozen ground and the absence of electrical contact given frozen ground conditions. Without good electrical contact between the electrodes and the soil, the EI survey can not be completed due to excessive electrical contact resistance. A final item relates to the need to resolve possible safety concerns associated with use of the Supersting Earth Resistivity and IP Meter during the survey and possible impacts on because of the electromagnetic field generated. Discussions are ongoing with USACE to determine if operation of this instrument will pose a hazard and are not expected to be resolved for several months.

Stream Gauging

The stream and cave gauging proposed in the FSP will develop an understanding of the hydrologic cycle or water budget at JPG. Specifically, the responses of the water basin to precipitation, i.e., the proportion of precipitation water that runs off on the surface versus infiltrates the ground surface would be determined. The proposed stage gauging stations would be operated continuously and data recorded by an electronic data logger connected to a pressure transducer. The stations will be calibrated by gauging flow stream/cave stream flows and combined with the stage data to develop a flow curve for each station. The continuous recording of stream stages will be completed through low-, mid-, and high-flow periods. This surface water information will be compared to continuous water level recordings in the wells to be installed after the Electrical Imaging Survey. In this manner, responses of the streams, cave streams, and groundwater to precipitation can be observed, and components of the hydrologic budget can be separated and quantified. Stream gauging stations should not be established prior to installation of the wells, since simultaneous records of precipitation, groundwater levels, and streams are necessary to accomplish the proposed task.

The proposed stream gauging stations are located at existing bridges on the streams in close proximity to the depleted uranium (DU) Impact Area, and at known cave streams within area of study. These are locations where the gauging stations could be established cost effectively.

The type of stream gauging that the NRC recommends was not proposed in the FSP, and would require a much different and additional level of effort than what was proposed. This type of gauging does not involve installation of automatic and continuous stage recording stations, but consists of teams manually collecting flow measurements along the course of the stream and at cave streams and springs using current meters. Information gathered during this type of gauging could be evaluated and possibly assist in the identification or validation of the locations of groundwater discharges to surface water, or losses of surface water to the groundwater, which often occurs at fracture trace intersections. The information gained could be a factor in selecting surface water and sediment sample locations. If the manual stream gauging were to be completed, Fracture Trace Analysis results should be available to better design the manual surface water gauging task (frequency and locations of gauging stations relative to identified fracture trace intersections with creeks). The Army recommends that the need for this type and level of effort of stream and cave gauging be further evaluated following the completion of the Fracture Trace Analysis.

ACTION ITEM 2

The Army will re-evaluate its proposal to use the same screen length for new monitoring wells and whether all wells should be screened at bedrock.

ARMY RESPONSE

The well specifics included in the FSP were based on the limited site-specific subsurface information available and assumptions used to support for cost estimating and schedule preparation. The FSP will be revised to reflect the flexibility and variability of the screen lengths so that they can be matched to the conditions observed in the field. The FSP also will be revised to reflect the possibility for construction of wells above the bedrock surface if sufficient saturated materials are encountered. The Army recognizes that following this round of proposed well installations and the collection of site specific data, additional wells may be required (Discussion Point 5) resulting in more than one phase of well installations. Following the initial round of well installations, the site-specific data gained from the previous studies will be used to design the subsequent well installations, as appropriate.

The appropriate screen length for each proposed well will be evaluated and can be adjusted during drilling and well construction based on observed subsurface conditions. Ten-foot well screens were defined for cost estimating purposes during the development of the FSP. The drilling contractors will be prepared to provide well materials so that well screen lengths can be modified and matched to the observed subsurface conditions.

One purpose of the new well installations is to identify and characterize the most probable flow paths and conduits of groundwater flow that could transport DU from the DU Impact Area. Note that the majority of groundwater flow and the potential for migration of DU to receptors are anticipated to be the greatest within the bedrock conduits. In karst aquifers, such as the one at JPG, bedrock conduits generally act as the underdrain system for the unconsolidated materials above bedrock. Once the conduit system is identified and the degree to which it acts as the underdrain system for the site is determined, there may be a need to further examine the path between the soil surrounding the DU and the bedrock conduits by installing location-specific wells in the unconsolidated material, if saturated.

The subsurface materials will be examined, described, and logged by the rig geologist during borehole advancement prior to well construction. Permeabilities of encountered materials (including unconsolidated materials) will be considered in planning for well installation. If materials of adequate permeability to support significant groundwater flow are encountered, then the appropriateness of well installation in unconsolidated materials will be evaluated.

ACTION ITEM 3

The Army will find out the best time of year to have a meeting open to the public at NRC headquarters to discuss past and proposed sampling/monitoring.

ARMY RESPONSE

The Army proposes to schedule these meetings in the third quarter (Oct/Nov/Dec) or first quarter (Jan-March) of the calendar year. Most of the field work proposed is planned for the Spring/Summer/Fall in any given year; therefore, this timing would allow the Army to assess the results of site characterization activities. Some flexibility is recommended to accommodate assessment of results or preparation of upcoming work plans. For instance, after the fracture trace analysis is completed this fall, the locations of electrical imaging lines will be finalized, and the likely distribution of proposed wells and the criteria for selecting well locations will be completed (January/February 2006). At that time, it is recommended that a meeting be held to discuss the proposed plan with NRC.

ACTION ITEM 4

The Army will submit a Statement of Intent which will cover the entire site characterization period.

ARMY RESPONSE

A Statement of Intent was provided to NRC on September 14, 2005.

ACTION ITEM 5

The Army will reconsider the geophysical logging of wells, characterizing hydrogeologic parameters, and using Geographic Information System procedures.

ARMY RESPONSE

Geophysical Logging

The Army does not recommend geophysical borehole logging and/or borehole video at this time. Geophysical and video logging can be useful tools, but with the conditions expected at JPG during placement of the conduit wells, it is not practical.

The Army's contractor, SAIC has used the proposed method of Fracture Trace Analysis, electrical imaging (EI) Survey and the proposed drilling method of continuous casing advancement at numerous sites in karst aquifers to find groundwater flow conduits. In tight bedrock with secondary porosity (i.e. fractures, karst conduits), it is critical to identify the areas of increased permeability for characterization of groundwater flow and contaminant transport. The Army's contractor has demonstrated numerous times at several karst aquifer sites that this method, when properly executed, results in the successful characterization of a site such as at JPG. The Fracture Trace Analysis and EI survey are used to locate these areas of probable secondary porosity (conduits) and identify drilling locations for wells to be constructed within the conduits. An experienced rig geologist is able to accurately log, characterize the drill cuttings, and use drill penetration rates to (1) support interpretation of subsurface conditions and (2) properly direct the construction and design of the wells such that the most connected sections of the well to the aquifer are monitored.

These conduit features, which present very difficult drilling conditions (weathered and fractured rock), often result in unstable subsurface conditions. These conduit features present the most probable locations and pathways for significant and often high volume and velocity groundwater flow; therefore, it is critical that monitoring wells are installed within these features so that they can be monitored and characterized. Because of the difficult drilling conditions, non-typical drilling methods consisting of continuous casing advancement systems (i.e. Odex®, Stadex®, etc.) have been found to be most successful at overcoming and mitigating the unique and highly variable drilling conditions.

Geophysical and video logging of the wells cannot be conducted using these drilling techniques, because logging requires an open borehole. The drilling method proposed in the FSP will have a steel casing advanced in the borehole simultaneously while drilling. To complete the recommended logging method, alternate drilling methods would have to be applied. Previous attempts at advancing boreholes into the identified features using methods other than continuous casing advancement has resulted in lost or broken tooling, unstable boreholes, and borehole collapse/loss. If an alternate method were proposed, borehole collapse and muddy conditions would result in incomplete geophysical/video data. Down hole video and geophysical tooling is very expensive from $1000s to tens of $1000s and most operators would not be willing to risk their equipment in known unstable boreholes. If drilling conditions were found to be more stable, future drilling programs may use a different method, at which time logging of the open hole would be evaluated.

Geographical Information System

Geographic Information System (GIS) procedures and tools are applied to all site characterization projects to support project planning, data management, and reporting. These tools have and will continue to be applied to the JPG DU Impact Area project.

Measuring Hydrogeologic Parameters

Many hydrogeologic parameters will be determined during the course of the investigation. The NRC and Save the Valley (STV) recommended specific tests:

- Slug testing of wells, although often included as part of similar studies, is generally not useful in this hydrogeologic environment. Slug tests measure the permeability of a very small area around the well, and are not appropriate for measurements in karst aquifers.
- Aquifer testing, in the form of a long term (multi-day) pumping test on one or more specially constructed wells may be useful to measure aquifer parameters (transmissivity and storativity) and gain additional information on connectivity, anisotropy and heterogeneity of the aquifer. Long-term pumping testing will be considered, as the site conceptual model is developed, and the important transport mechanisms are determined. This type of testing is not proposed at this time and the level of effort for this type of task would be significant.

ACTION ITEM 6

The Army will coordinate the collection of all field parameter data, including groundwater, surface water, and cave water.

ARMY RESPONSE

The FSP indicates that the collection of field parameter data would all be coordinated, including the quarterly monitoring and collection of media samples. The data and samples to be collected include quarterly sampling of groundwater, surface water (streams and cave streams), and sediment, along with continuous monitoring of precipitation, groundwater stage (monitoring wells), cave stream stage, and stream stages. The stage monitoring (wells and surface water) as a continuous activity would collect stage data during low-, mid- and high-flow periods.

The Army proposes to add two to three stream stage gauging stations up stream of the DU Impact Area. These stations may include one station on Middle Fork Creek and one to two stations on Big Creek. These would be installed in conjunction with the previously proposed stations and calibrated and monitored in the same manner and frequency.

ACTION ITEM 7

The Army will include the study of recharge to water bearing units.

ARMY RESPONSE

The Army intends to evaluate the recharge to water bearing units. That is the purpose of measuring groundwater stage, surface water and cave stream flows, and precipitation data.

ACTION ITEM 8

The Army will clarify what is meant by "conduit wells" and how they will be installed.

ARMY RESPONSE

The bedrock aquifer underlying the DU Impact Area and surrounding areas generally consists of carbonate rocks (limestone and dolomite). The primary porosity and permeability of the bedrock aquifer appears to be low. There is evidence of significant secondary porosity, and therefore, areas of higher permeability within the bedrock aquifer derived from fractures and jointing and enhancement of these features by solution (karst development). It is widely recognized that the majority of flow through an aquifer with secondary porosity of this nature is within these features (groundwater flow conduits) and that to properly characterize the groundwater flow; these features need to be monitored. Therefore the Army proposes to locate the "groundwater flow conduits" with a proven sequence of location methods (i.e., the Fracture Trace Analysis and Electrical Imaging Survey) to identify probable drilling locations to intersect the "conduits" and install "conduit wells."

The general well installation and construction details proposed for the conduit wells are presented in the Section 6.2 of the FSP. Prior to the initiation of the well drilling and installation tasks, addenda will be completed detailing the selected drilling and construction methods and materials. Results of the EI survey will assist the project team in the selection of the drilling and construction methods and well materials.

The following is a general description of the anticipated drilling and well construction approach based on past experience and current information on the DU Impact Area. These methods and assumptions were used to estimate the cost and schedule of associated activities:

- The boreholes will be advanced using a continuous casing advancement system (i.e. Odex®) for advancement through overburden (unconsolidated materials), bedrock. This method was selected based on the experience of encountering very difficult drilling conditions at targeted groundwater "conduits" and its ability to mitigate these difficult conditions.

- The well pairs are estimated for costing and scheduling purposes to have maximum total depths of approximately 50 and 120 feet deep. These depths will be further defined following the completion of the EI survey. Final depths of the wells will be evaluated during drilling and will be based upon observations by the rig geologist as relayed to and discussed with the project hydro-geologist.

- Temporary steel casing is anticipated to be advanced to the total depth of the well to provide a stable borehole for well construction. As well materials are installed, the temporary casing will be extracted incrementally. Based on encountered conditions, some portion of the temporary casing may be grouted in place above the water bearing zone and bentonite seal.

- The well pipe materials are anticipated to consist of polyvinyl chloride (PVC) and depending on conditions encountered will consist of a conventional well screen, pipe and sand pack, or a pre- or U-packed screen. Based on past experiences with installing "conduit" wells and conditions encountered, the preferred method and materials will consist of the pre- or U-packed screen. This type of screen enables a screen to be placed in areas of the aquifer that are highly fractured, voided or unstable and maintain a proper sand pack to enable proper development and collection of sediment free groundwater samples.