ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

October 30, 2009

Mr. Greg Komp
U.S. Army Safety Office
Attn: DACS-SS (Komp)
223 23rd Street Room 980
Arlington, VA 22202

SUBJECT: PROJECT SPECIFIC PLAN - AIR SAMPLING AT POHAKULOA TRAINING AREA (PTA), HAWAII, DOE PROJECT NO. 1109-000107 (FUNDED BY MIPR NUMBER MIPR 9MDAT00005) DOE CONTRACT NO. DE-AC05-06OR23100 DCN 5075-TR-01-Draft

Dear Mr. Komp:

Enclosed is the draft project specific plan to conduct air sampling at the Pohakuloa Training Area (PTA) on the island of Hawaii. The primary objective of the ORISE task is to conduct air sampling activities to measure the airborne concentration (if any) of depleted uranium near the PTA. This document constitutes one of the deliverables required by the subject contract. Comments on this draft document would be most appreciated for incorporation into the final submittal. If you have any questions regarding this document, please contact me at 865.574.0137.

Sincerely,

Roger Moroney, CHP
Manager, Health Physics Group
Independent Environmental
Assessment and Verification

RM:ar

Enclosure

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ORISE AIR SAMPLING PROJECT SPECIFIC PLAN
Pohakuloa Training Area – US Army

Introduction and Objectives

At the request of the U.S. Army (Army), in cooperation with the Nuclear Regulatory Commission (NRC), the Oak Ridge Institute for Science and Education (ORISE) will conduct general air sampling at several locations on the island of Hawaii at the Pohakuloa Training Area (PTA). Air sampling will be performed to detect the potential presence of depleted uranium (DU) resulting from prior use of DU projectiles in this area. Per the task statement of work (SOW), air sampling will be conducted to coincide with periods of high explosive and or aerial bombing. ORISE will provide two individuals certified by the American Board of Health Physics (ABHP) in the comprehensive practice of health physics to coordinate and conduct the air sampling effort.

Equipment

ORISE will utilize four Model DH-804V.2 air samplers manufactured by F&J Specialty Products, purchased by the Army, and provided by the Army specifically for this task. These samplers operate at high collection flow rates (20 to 50 cubic feet per minute) and have an automatic flow rate controller. Air samplers will be operated continuously using portable generators.

Per discussion with the Army, these particular air samplers have been kept in storage since their original purchase (with exceptions for verifying operability and training on the units) and therefore have not been used in a field setting. The manufacturer's original "gooseneck" design with four inch filter housing has not been modified.

Prior to onset of field activities, ORISE will confirm with the Army the storage location of the air samplers and generators and verify their availability at the PTA. ORISE will also verify with the manufacturer whether the "self-calibrating" feature on the samplers precludes a separate calibration. If a separate calibration is required, the Army will be requested to verify proper operation and calibration prior to ORISE arrival.

Field Method and Air Sampling Locations

Air samples will be collected continuously for a minimum of three days and up to five consecutive days using the four designated samplers. The exact length of active air sampling will depend on availability of US Army personnel to support facility access on non-business days. ORISE is prepared to perform instrument setup and tear-down as required to collect five consecutive days of data regardless of the start or end dates falling on non-business days. Samples will be collected daily from four locations–three downwind and one upwind. For safety reasons (refer to separate discussion under "Safety Considerations") all locations will be in the vicinity of –but potentially not directly on–the PTA. In consultation with the Army and NRC, and using professional judgment, ORISE will select appropriate sampling locations that balance achievement of the project objectives with the safety of ORISE personnel.

Due to the potential for dust loading, sampler flow rates and collection filters will be monitored periodically to evaluate the need for change out exceeding one filter per day. Air samples from each

respective location will be composited for later analysis. Refer to the "Laboratory Analysis" section for additional details.

To avoid filter tearing, the use of membrane filters with a support backing are anticipated. ORISE will identify the specific membrane filter type prior to task initiation. For the purpose of this submittal, use of membrane-supported filters having a nominal 5 micron pore size, are anticipated. The choice of a membrane filter (rather than cellulose, glass fiber, and other filter types) was determined based on the radionuclide of interest (depleted uranium), anticipated laboratory analysis methods, a review of the literature - including filter characteristics provided in ANSI N13.1 and prior Army studies at firing ranges - and ORISE air sampling experience.

Laboratory Analysis and MDC Determinations

Sample analysis will include a combination of gravimetric and alpha spectrometry methods at the ORISE Radiochemistry Laboratory in Oak Ridge, TN. For gravimetric analyses, a tare weight and a final weight for each filter will be determined associated with each sampling collection point. Filters will be ashed in the laboratory to determine the final ash weight of material on each filter. The analysis method for depleted uranium (DU) is based on total dissolution of the ashed material, followed by the chemical separation of DU from any possible interferences, and co-precipitation of DU for counting by alpha spectrometry.

Gravimetric analyses will utilize a Mettler/Toledo AG204 analytical balance. Alpha spectrometry will utilize Tennelec/Canberra surface barrier, semiconductor detectors.

A minimum detectable concentration (MDC) was determined *a priori* by ORISE for this task based on several required air sampling input parameters. The MDC assures that environmental concentrations of DU can be detected at levels satisfying data quality objectives and reaching a defensible conclusion regarding the presence or absence of DU in the air at PTA during active use of the range. These parameters include minimum detectable activities (MDA) specified in the ORISE Laboratory Procedures Manual for the anticipated analytical analyses, equipment, counting efficiency, counting times, etc. The MDA was then converted in to an MDC using anticipated air sampler flow rates, field collection times, and filter collection efficiencies.

For this submittal, the ORISE *a priori* MDC was determined using the following assumptions:

- One membrane filter (per sampler) would be collected each day for five days. Therefore, a total of five filters per sampler would be analyzed post-collection by ORISE.

- A nominal air sampler flow rate of 20 cfm. (The lower end of the sampler's flow rate capabilities was used in the calculation)

- A total sample collection time (per sampler) of 120 hours based on five continuous days (24 hours per day).

- A filter collection efficiency of 0.9.

Based on these inputs, MDCs for individual uranium isotopes approximating 2.4E-18 to 4.9E-18 microcuries per milliliter (μCi/ml) were calculated. Changing the number of samples collected from

five to three, to account for the actual number of days sampling, does not appreciably impact the final MDC calculation. Under the stated assumptions, these MDCs provide more than sufficient sensitivity to satisfy Army (and NRC) objectives for this task. MDCs were also evaluated for various situations employing changes in laboratory and air sampling input parameters. An example included a situation where filters are analyzed individually rather than composited over the entire sampling period– thereby increasing the MDA. Nonetheless, the calculated MDCs are well below typical environmental radioactivity concentration levels.

Actual MDCs will be determined *a posteriori* and may differ from the *a priori* MDC for several reasons. These include more frequent filter change out due to dust loading, and changes in flow rates and sampling time (affecting the total volume collected). ORISE does not anticipate the filter collection efficiency, at these high flow rates, will have a significant effect on the MDCs.

Results

Final air sampling results will be reported in air concentration units of µCi/ml. The ORISE laboratory will provide a total activity (by uranium isotope) for each composite batch of filters as a critical input to the resultant air sampling concentrations.

ORISE will prepare draft and final reports incorporating elements of this project specific plan and conclusions. Reports will be submitted to the Army per the reporting requirements in the SOW.

Quality Assurance

ORISE staff will follow quality assurance requirements described in the ORISE Quality Assurance and Laboratory Procedures Manuals. ORISE staff will document daily activities in a logbook dedicated to this task. This will include any problems encountered and steps taken to resolve those issues. Proper operation of the four air samplers will be verified and documented at a minimum prior to and following ORISE arrival and departure each day daily. Additional operational checks will be conducted as warranted. ORISE Laboratory procedures and Quality Assurance Program documentation is available online, and can be provided upon request to the NRC and Army.

Safety Considerations

ORISE will work closely with the Army point of contact to assure the safety of ORISE field staff. ORISE is aware that areas off the main access roads to the PTA, including the PTA field training area, contain unexploded ordnance (UXO). In addition, the terrain (essentially a volcanic lava field with associated fissures and cracks) presents a challenge in traversing this area to access sampling locations.