Waste Containment Structure Characterization/Gamma Radiation Walkover Survey Work Plan For Continued RI Activities Gamma Walkover Survey And Geophysical Survey

Addendum 1

Lewiston-Porter School Property Gamma Walkover Survey Plan

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Lewiston-Porter School Property Gamma Walkover Survey Work Plan

1.0 Project Description

This gamma walkover survey (GWS) plan describes the parameters for a gamma background activity study of Lewiston-Porter School Property (4061 Creek Road - Youngstown, NY).

The GWS will measure gamma-emitting radionuclides (e.g., radium-226) on various surfaces of School property. This background study will be used as a reference point for the Niagara Falls Storage Site (NFSS) GWS, which was performed in the summer of 2001. Lewiston-Porter School Property is approximately 2,000 meters due west of NFSS.

Science Applications International Corporation (SAIC) will conduct this GWS under the direction of the U.S. Army Corps of Engineers (USACE), Buffalo District, in cooperation with the New York State Department of Environmental Conservation (NYSDEC)

Except where differently specified herein, this GWS will be performed in accordance with the applicable provisions of the *Waste Containment Structure Characterization/Gamma Radiation Walkover Survey - Work Plan For Continued RI Activities Gamma Walkover Survey and Geophysical Survey* (SAIC 2000).

Following the survey, school property GWS data will be compared with existing NFSS background data.

2.0 Survey Methodology

The general approach of this survey is to measure gamma radiation levels using gamma radiation detectors linked to global positioning system (GPS) instruments. The radiation instruments will indicate relative levels of gamma emitting radionuclides, while the GPS instruments provide coordinate (and time) information for each radiation measurement.

The survey will be performed with a 2-inch by 2-inch sodium iodide (NaI) detector (Ludlum 44-10), coupled with a ratemeter (Ludlum 2221).

The detector/ratemeter will be linked via cable to a Trimble 4000 Series Geographical Information System (GIS) Surveyor System and a TDC1 data collector in a portable configuration. The GPS equipment will provide time and coordinate information that will be electronically recorded with detector readings by the data logger. Data files will be downloaded from each data logger to a site computer for processing.

The survey will be performed at a rate not to exceed 0.5 meters/sec. The NaI detector will be maintained approximately 10 cm above the surface being surveyed. Position data will be collected using a GPS unit. During the walkover, the position of the GPS unit and the time of each measurement will be integrated with the survey meter output in the data logger. GPS data will undergo differential correction from a Continuously Operating Reference Station.

Although the majority of school property is free from overhead GPS interference, some gamma activity data may be collected without positional information. Overhead interference is expected by structures, under the football field grandstand, and potentially within wooded areas. Data collected in this manner will be summed with all other site data for surface specific mean activity determination, and will be illustrated on the site map in a text box as an NaI count-rate (CPM) range.

3.0 Quality Parameters

GWS survey personnel will be qualified on referenced SAIC instrumentation procedures (as applicable for authorized duties), and SAIC-EEMG St. Louis Health Physics Instructions HPI-001, "Performance of a GPS Gamma Walkover Survey". Prior to the survey, survey personnel will receive site-specific training on; this survey plan, data file naming conventions, and data transfer methods.

Civil surveyors at the Niagara Falls Storage Site (NFSS) have previously determined the position of a GPS reference monument, which represents a known coordinate with a high level of certainty This monument data will assist data processors in making error corrections, if necessary. Technicians will measure the position of this monument with each GPS unit (daily) prior to, and following use.

Each detector/ratemeter will have a current annual calibration. Each detector/ratemeter will be evaluated against source-check acceptance criteria (daily) prior to, and following use. This QC evaluation will be conducted using a gamma emitting check source in a reproducible geometry. Instrument response will be verified as ± 20% of mean values established for the instrument. Response checks will be performed in accordance with SAIC-EEMG Procedure HP-004 "Quality Control of Radiation Monitoring Equipment", and will be documented on HP-004, (Appendix B), "Count Rate Meter Source Test Log", or equivalent.

Detector/ratemeter background reading will be evaluated against background acceptance criteria (daily) prior to, and following use. Background will be verified on soil one meter west east of the NFSS site flagpole. Verifying background on soil accounts for variation in background caused by meteorological conditions. Prior to the start of field activities, an instrument specific background acceptance criterion will be calculated for each instrument as ± three standard deviations from the mean background value.

4.0 Area Coverage

Approximately five percent of the school property will be surveyed. Surveys will not be conducted inside buildings, or at areas considered inaccessible for purposes of personal safety (e.g. rubble piles). Rather than spending time rigidly defining survey paths, emphasis will be placed on maximizing the amount of data collected. Survey coverage of accessible areas will consist of:

1) General area soil coverage at parallel survey transects (paths) every 20 meters in a north-south direction.

2) Surface specific background measurements of; concrete sidewalks, tennis courts (surface type unknown at time of plan), baseball fields, and asphalt roadways/parking lots.

3) Additionally, the following areas will receive preferred survey coverage:
   A) Fire drill assembly areas
   B) Athletic facilities (Baseball fields, football field, soccer fields, tennis courts)
   C) The shoulder of Route 18
   D) Ditches and low lying areas

Preferred Survey Coverage Area "C" was selected because Route 18 was a potential waste haul route. Preferred Survey Coverage Area "D" was selected because surficial radioactive contamination concentrates in ditches and low lying areas (rainwater runoff). The absence of elevated concentrations of radioactive material in preferred survey coverage areas will qualify the balance of the school data as "background" gamma activity (unaffected by former NFSS operations).

Because this is a survey of school property, access for the GWS is limited to weekends. The coverage provided in preferred survey areas will be defined by the time available following general area and surface specific surveys, as determined by the USACE. As a minimum, ten-percent coverage will be provided in preferred survey areas.

5.0 Post Processing

All GPS gamma walkover data will be entered into Arcview® software for data analysis, and for processing to generate a map depicting survey results. A base map in NY State Plane coordinate system will be used to illustrate GWS data. Only GPS data with a Positional Dilution of Precision (PDOP) of eight or less will be plotted.

Following the GWS, all data collected will be transferred to a spreadsheet for surface background determination. Any unusually low (e.g. <4,000 CPM) count-rate information

will be discarded as errant data. Any unusually high data (>16,000 CPM without field map notation) will be re-investigated, as practical (due to time constraints).

The count-rate mean, range, and standard deviation will be calculated for each surface type. Results will be compared to gamma activity background values at NFSS.