

October 28, 2009

George M. McCann
U.S. NRC Region III
2443 Warrenville Road
Suite 210
Lisle, Illinois 60532-4352

RE: Sigma-Aldrich Phase 2 Soil Sampling Plan at the Fort Mims Facility

Dear Mr. McCann,

Attached with this letter is the Fort Mims Phase 2 Soil Sampling Technical Proposal, prepared by Philotechnics, Ltd., who will perform the work under contract with Sigma-Aldrich. This proposal serves as our Phase 2 Soil Sampling Plan.

The work is scheduled to begin Monday, November 2, 2009, and may require up to five days to complete.

During your recent on-site visit of October 19, 2009, and in a subsequent phone conference yesterday, you asked if the fences surrounding our property are on the property lines. Today we verified through measurements that the fences are either on, or within one foot, of the property line. The exception is the fence on the south-most part of the property, which has a 20-foot easement to the south. Note that this is not the south fence that is directly south of the building, close to the concrete pad.

Please contact me if you have any questions or concerns regarding this matter.

Sincerely,



Thomas K Spencer
Radiation Safety Officer

Attachment –Fort Mims Facility Phase 2 Soil Sampling Proposal



Technical Proposal

**Sigma-Aldrich Chemical Co.
Fort Mims Facility Phase 2 Soil Sampling
MA-10-011**

Prepared by:

**Philotechnics, Ltd.
25 Mall Road, Suite 301
Burlington, MA 01803**

1. Introduction

Philotechnics Ltd., a provider of professional health physics and radioactive material management services for more than 20 years, is submitting this technical proposal for performing a Site Survey and Phase 2 soil sampling at the Fort Mims Facility in Maryland Heights, Missouri. These project phases will have to be performed separately in order to formulate a comprehensive approach to the Phase 2 soil sampling. We will perform a site wide survey using ground penetrating radar (GPR) and time domain electromagnetic induction metal detection (EM) in an effort to identify subsurface features of interest. Phase 2 soil sampling will include the mobilization, coring, sampling, and analysis of target sampling locations to further define the extent of ^{14}C and ^3H in soils. The goal of this proposal is to determine if a septic system and leachate field are present onsite and quantify subsurface levels of nuclides in target soils.

Project activities will be performed under Philotechnics radioactive material license via reciprocity and in compliance with site radiation protection requirements. This proposal does not include the cost of disposal of any hazardous material (other than radioactive) based on chemical composition or other unknown hazards.

2. Technical Approach

The following sections detail Philotechnics' approach to performing the GPR/EM survey and soil sampling activities associated with this scope of work. The scope of work will require mobilization of a two (2) person team for the GPR/EM survey and a three (3) person team for the soil sampling.

All project work will be performed in compliance with the Occupational Safety and Health Administration (OSHA) Title 29 Code of Federal Regulation (CFR) 1926 and 1910, as applicable.

2.1 Finalize Work Plan and Schedule

Philotechnics proposes to subcontract the GPR/EM and will provide one (1) field person to assist in the onsite work. The site survey will require a single day of field work to collect the necessary data and two days offsite to interpret the data. The soil sampling will be performed by a project manager (1) and one (1) senior health physics technician, and two (2) decontamination technicians. We estimate the scope of work will take five (5) working days to complete. The proposed schedule is based on the field crew working ten hours per day.

2.2 GPR/EM Survey

The objectives of the survey are to identify the location of the sewer line in relation to the building foundation and determine if an abandoned septic system and leachate field exists at the site. Two complementary methods of ground penetrating radar (GPR) and time domain electromagnetic induction metal detection (EM) will be used to map the facility grounds. GPR data will be collected by traversing the site in sweeps of not more than five (5) feet apart in two mutually perpendicular directions. EM data will be collected along lines spaced not more than five (5) feet apart. The data will be captured electronically and target areas identified on a site map.

Obvious subsurface features will be marked at the site using paint and/or flags during the survey. The collected data will be analyzed back at the contractor's office to assure accuracy and the completeness. A hard copy and electronic copy of the report will be assembled showing the locations of the geophysical survey and interpretations of results. If suspect areas are identified by the

survey a characterization plan will be assembled for the area(s) to assess the potential for subsurface contamination.

2.3 Soil Sampling Operations

The soil sampling strategy focuses on the further investigation of nuclide concentrations identified in Survey Unit 029 during Phase 1. The same protocols and quality assurance requirements will be followed as defined in the previous soil sampling plan. We have targeted those sample locations which had increased nuclide concentrations. Nuclide levels from the upper six-inches of soils were generally highest near the perimeter of the facility with concentrations decreasing with distance. We propose to collect additional soil samples in three distinct groups as depicted in the survey map provided in Attachment A.

The original sample locations with results exceeding ten times unity will have two additional samples collected. These samples will be collected at intervals of 1 and 2 meters respectively. Original sample locations that exceeded five times unity will have one additional interval collected at the 1 meter interval. Approximately 29 individual samples will be collected from these sample groups.

The third set of soil samples to be collected during Phase 2 will be from beneath the foundation of the facility and adjacent to the original sample locations exceeding five times unity. These locations will require the concrete foundation to be cored to allow access to the soils beneath. We propose to collect samples from three intervals at each new location. These include samples from the first 0.2 meters of soil under the concrete foundation, at 1 meter and 2 meter depths. Approximately 30 individual samples will be collected from this sample group. Also, 3 duplicate soil samples will be collected for quality assurance purposes.

Hand or powered augering will be used to collect subsurface samples. Typically, 4-inch auger-buckets with cutting heads are twisted into the ground and removed as the buckets are filled. The auger holes are advanced one bucket at a time. At locations where multiple interval sampling is required, one auger-bucket is used to advance the hole to the first desired sampling depth. If the sample is a vertical composite, the sample bucket may be used to advance the hole, as well as to collect subsequent aliquots in the same hole. A clean sampling bucket will be used at each sample interval.

A soil core sampler, or push tube, may also be used to collect soil samples. This is a thin-walled tube, constructed of stainless steel and has a beveled leading edge. The tube is twisted and pushed or hammered directly into the soil.

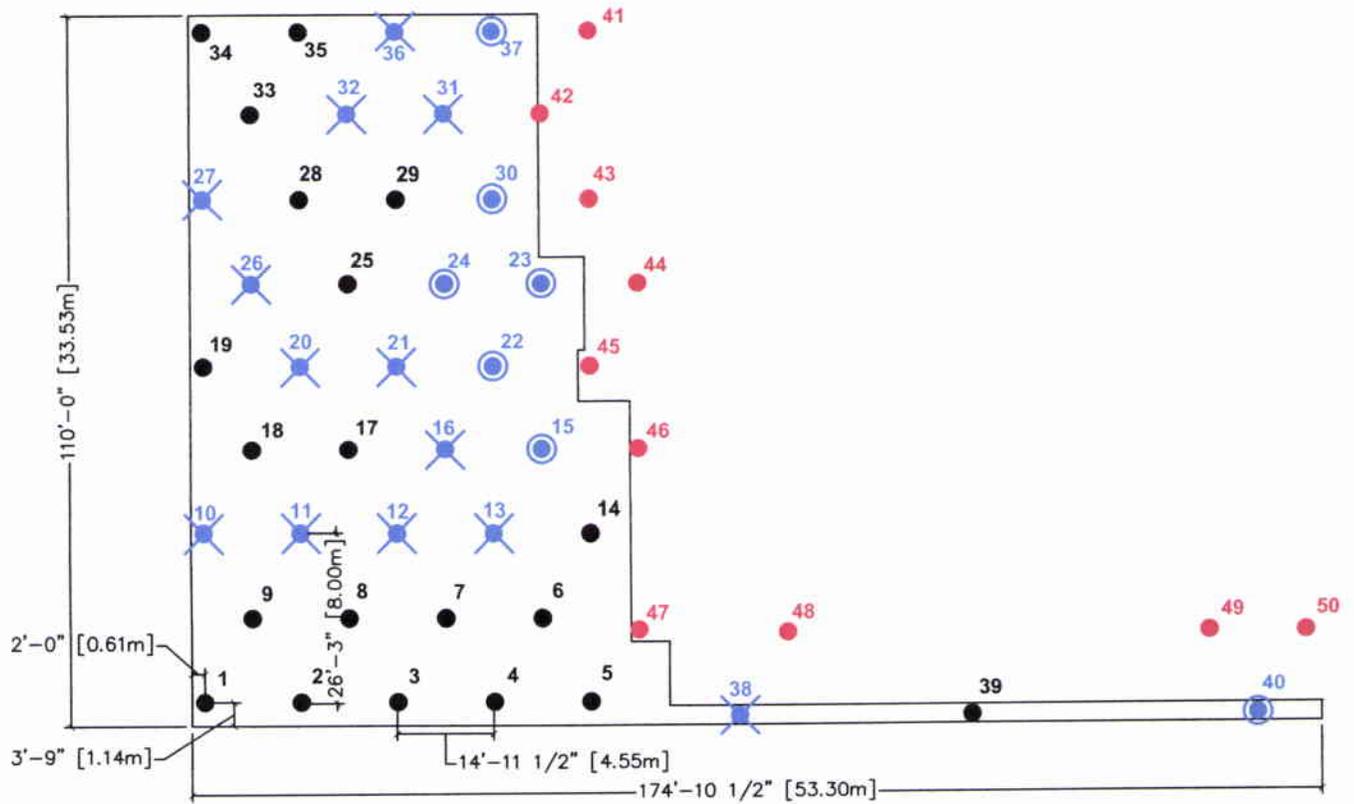
Soils from a six inch interval above and below the specified depth will be homogenized to obtain a representative sample. Soil samples shall be placed directly in individual sampling containers and marked using the nomenclature defined in Phase 1. The samples will be consolidated and packaged for shipment to the designated laboratory.

Teledyne Brown Engineering in Knoxville, TN will be used for radiochemical analysis of the samples. Selected analyses for ^3H and ^{14}C will be performed on all samples using oxidization analysis to maintain consistency with the previous sampling methodology.

Philotechnics, Ltd.
October 20, 2009

SIGMA-ALDRICH CHEMICAL COMPANY
Fort Mims Facility Decommissioning
Appendix A - Survey Map

Survey Map



Typical Spacing – 14' 11" or 4.55 m

- ⊙ Sample at 1 and 2 meter depths
- ✕ Sample at 1 meter depth
- New Location – Sample at the Surface, 1 and 2 meter depths

SURVEY MAP

BUILDING: Sigma	SURVEY UNIT NUMBER: 029	PAGE OF
SURVEY TYPE (CHECK ONE): <input type="checkbox"/> Characterization Survey <input checked="" type="checkbox"/> Final Status Survey		
COMMENTS:		
SURVEY COMPLETED BY:		DATE COMPLETED:
RADIOLOGICAL CONTROLS SUPERVISOR REVIEW:		DATE: