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M E M O R A N D U M

TO: December 13, 1994 LANL Meeting Participants

FROM: bcs Bruce Swanton, Program Manager
DOE EM Oversight Program
LANL AIP P.O.C.

DATE: December 1, 1994

SUBJECT: RFI Phase Report Guidance Development

In September EPA Region VI provided LANL with draft guidance for the contents and format for LANL's RFI reports (previously called 'phase reports'). In subsequent discussions with Barbara Driscoll it was agreed that it would be helpful to include specific guidelines for the standard contents and format for Sampling and Analysis Plans (SAPs). I took on the task of assembling the basics for this guidance.

The purpose of the attached document was to compile a listing and description of the components of an adequate SAP as well as the format of presentation for SAPs in future RFI reports. The document was prepared by NMED/LANL AIP with input from AIP technical staff, LANL technical staff and other environmental professionals. It has been suggested that this document be used to provide the basis for a technical discussion to be held between EPA, NMED/AIP and NMED regulatory staff and DOE/LANL on what the specific content and format should be for the many RFI report SAPs which will be produced over the next several years.

This discussion is currently scheduled for Tuesday afternoon, December 13, 1994 (location at LANL yet to be decided). Barbara Driscoll from EPA Region VI will be present and may be providing us with further discussion material on standardized SAPs or comments on the attachment prior to the meeting date. Tracy Glatzmaier is organizing the meeting but please contact Bonnie Koch (505 665-7202) or Bruce Swanton (505 672-0447) with comments or suggestions regarding the attached document.

The two essential characteristics of an acceptable S&A plan are 1) that it should be third party executable; i.e., the plan should be clear and specific enough regarding the actions described that a third party given the plan would execute it with essentially the same results as would have been obtained had the LANL project leader been the implementer; 2) the plan should be explicit regarding the objectives/rationale for every set of samples it includes.

1. **Site Description**

   Include the following in the description:

   o Depth of soil to soil/tuff interface generally over the site and areas of soil known to be shallower or deeper than is typical for the site;

   o Known historical soil disturbances: areas of soil stockpiling, fill, trenching berming, or soil added to cover previous contamination;

   o Site map showing drainages, areas of seasonal ponding, soil benches where some ponding may occur, areas of disturbed soil, currently existing structures as well as best-guess locations for existence of removed structures, known or suspected disposal areas, drain lines, outfalls, septic systems, monitoring or production wells, transportation routes, fixed air samplers;

   o Source terms known or suspected and their waste streams including the physical state of waste streams (massive solid, powdered solid, liquid, sludge, etc.).

2. **Historical sample analytical information**

   A plan view map depicting this information should indicate locations of previously taken samples, each location identified with sample i.d. number which would also appear in a tabular listing of all hits above background (for metals) or above practical quantitation limits (for organics). The table would include the sample i.d., the depth of the sample, the concentration of the hit, the lab's PQL for that constituent and the 10^{-6} SAL for that constituent. The map should be of sufficiently fine scale that sample point locations are clearly discernable.

3. **Proposed sample locations**

   Include a plan view map with proposed sampling points coded by color or by symbol in groups corresponding to sets of samples proposed to be taken to achieve specific sampling objectives. See sampling objectives, below.

Expert judgement samples should be approximately located on the map and should be flagged in the field for site visit technical evaluations.

4. Sampling objectives

Each sample set delineated on the proposed sample map is keyed to a one-paragraph narrative that includes the sample-set objectives as well as the decisions which the data will enable the project leader to make.

- determination of the vertical and horizontal extent of contamination;
- determination of whether the contamination is homogeneous or heterogeneous, and if heterogeneous whether a pattern exists;
- proposals to determine whether contaminants are moving offsite and if moving whether this movement represents a threat to downstream populations or ecologies;
- determining which contaminants or combinations of contaminants are those of greatest concern as the basis for proposing which will be used as the targets of the remediation;
- determination of the necessity for interim actions;
- determination of the necessity for remediation;
- data collected to support a specific remediation strategy, or taken to support NFA or for post remediation verification.

Samples must be taken to support an action decision, not purely to supply descriptive data. The decisions which the data are proposed to enable the project leader to make should be clearly stated.

The following examples of sampling objectives are not intended to be applicable to specific sites but are designed to set a standard for the level of detail expected of sampling objectives as well as to illustrate the attempt in each case to select a sampling strategy that will maximize the usefulness of the data which results. Each example below is a sampling objective paragraph which pertains to one set of samples on a plan view map. The tables cited in the example paragraphs which follow would be found in the historical sample analytical information sections of the RFI reports (see item 2, above).

a. "The open circles represent locations of sediment samples taken in drainages to determine whether constituents are migrating from the site and if so whether they constitute an unacceptable risk to downgradient populations or ecologies."

b. "Triangles indicate deep core locations proposed to be taken in the area which phase I data indicated was the location of the leechfield (see table 1.1). The deep cores will

determine the extent of vertical contamination unless the plume has reached the alluvial aquifer. Together with the shallow cores (located by black squares) the data will define the vertical and horizontal extent of contamination. The deep core data will also be used to determine whether interim actions should be instituted to prevent or mitigate contamination of the alluvial aquifer."

c. "Open circles are locations for six-foot cores in the debris berms. These will be approximately horizontal to the land surface. Field screening data indicate that radiological contamination of the berms is pervasive, but is greatest in the areas inside the dotted circles (see table 2.1). The cores are proposed to determine 1) whether contaminants are present at unacceptable levels, 2) whether the spatial distribution of existing contaminants is consistent with field-screening data, 3) whether the contamination in the berm is great enough to require remediation, and 4) if remediation is required, which sections of the berms must be removed and which (if any) may be left in place."

d. "Sample locations indicated by the black circles are within the zone of highest contamination. They are proposed as representative of the SWMU in its entirety following the assumption that the outfall was immediately upgradient of the zone indicated. This assumption is supported by the data in table 3.2. The data will be used to select those contaminants which will be the objectives of the future remediation."

e. This example pertains to an RFI for a firing site: "The circles indicate samples to be taken to determine contaminant particle size distributions in order to support the remediation strategy for the site. 1) Yellow circles are surface samples taken to determine if aerosol deposition of contaminants has accumulated down-wind. 2) Each red circle indicates a serially screened sample taken to determine if a radiological screening paired with visible debris removal would result in an adequate remediation in the area in which that sample was taken. See section 2.3.2 for the methods involved in taking this set of samples and section 3.5 for the criteria to be used in selecting the remediation strategy in each potential outcome."

5. **Sampling and screening techniques**

These should be briefly but clearly described without undo reliance on cited SOPs. Field screening instrument use in particular needs to be specifically explained. For example, radiological screening technique descriptions should define and

support the logic of 1) the trigger-level reading which will result in sampling or other clearly defined, additional actions, 2) the Region of Interest for radiological contaminants[1], and 3) the characteristics of the screening device that makes it the instrument of choice for this specific application. The narrative explanation for the field technique should be precise enough that it could be given to two technicians and result in each executing the directions with essentially the same outcome.

6. **Selection of the target analyte list**

"Knowledge of Process" is the term used by the regulatory community to describe information of sufficient strength to allow the use of a less than comprehensive list of site investigation target analytes. The NMED has been accepting the listing given in Appendix VIII of 40CFR, Section 261 as complete in lieu of additional information which would enable a less comprehensive list to be used. In many cases evaluations for semi-volatiles, volatiles, metals and radiological contaminants have been accepted by EPA as adequately comprehensive.

7. **Analytical Methods**

In general, EPA SW-846 methods are used. Where specific methods are chosen for specific purposes, e.g., extractable contaminant load (TCLP) rather than total contaminant load, these purposes should be clearly stated. Where selected methods have higher PQL's than SW 846 methods 8240, 8270, 8080, 8015, 8150, 8280, and 7000-series metals, the rationale for the selection should be strong.

[1] 17 keV for ^{249}Pu, 32 keV for ^{137}Cs, 60 keV for ^{241}Am