# Los Alamos National Laboratory

ENVIRONMENTAL RESTORATION

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HSWA LANL GEN/MISC/6

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Ms. Barbara Driscoll
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**SUBJECT: RESPONSE TO THE ENVIRONMENTAL PROTECTION AGENCY'S LETTER OF APRIL 18, 1995, CONCERNING "USE OF HIGH EXPLOSIVE (HE) SPOT TEST KIT, LOS ALAMOS NATIONAL LABORATORY (NM0890010515)"**

Dear Ms. Driscoll:

Los Alamos National Laboratory (Laboratory) strongly recommends continued use of the HE spot test kit in Phase I Environmental Restoration (ER) Resource Conservation and Recovery Act Facilities Investigation (RFI) activities. This letter explains the rationale for not adopting the alternate field screening methods suggested by the Environmental Protection Agency (EPA).

The Laboratory recognizes that the field screening methods preferred by EPA have lower detection limits than the Laboratory HE spot test. We investigated the use of these methods as well as others during the development of sampling plans. At that time and still today, Laboratory ER personnel believe that the Laboratory HE spot test is the most appropriate method for RFI Phase I investigations. The decision to impose alternate field screening methods on the Laboratory ER Project will have a major impact on Field Units 2, 3, and 5. The discussion below represents a review of the situation by Field Unit 3, comparable impacts are anticipated at Field Units 2 and 5.

## LANL'S USE OF HE FIELD SCREENING IN PHASE I RFI DECISIONS

The EPA-approved Operable Unit (OU) 1082 Work Plan describes the Phase I reconnaissance sampling approach for the Fiscal Year 1995 (FY95) environmental

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characterization campaign. The premise of Phase I reconnaissance sampling is that samples can be taken that represent the maximum contaminant concentration at a potential release site (PRS). Sample locations are biased by either knowledge of the physical process responsible for the potential contaminant distribution in space and time, or by field screening methods in the case of potential HE contamination.

Contained in this approach are the prescribed minimum number of environmental samples to be submitted for laboratory analysis in support of the Phase I decisions for each PRS. For most reconnaissance surveys, the number of samples is based on quantitative statements of error tolerances. These are stated as the desired probability of detecting potential contamination when a certain percent of the site is expected to be contaminated. For example, it may be stated at a given PRS that it is desired to detect contaminants above screening action levels (SALs) at least 90% of the time, if 25% of the site is contaminated. The binomial presence-absence sampling model supplies the number of independent analyses of the PRS that must be taken to meet the error tolerances. For this example, nine independent laboratory analyses are required to meet the performance goal. The locations of these samples will be biased by field screening and do not assume a grid sampling pattern. Use of the HE spot test will, in fact, raise the probability of detecting contaminants above SALs in this example to greater than 90%.

Therefore, the strategy for use of HE field screening during Phase I is to assist in determining the location of the biased samples for laboratory analysis. With this approach, false negative errors from the spot test are controlled because negative HE field screening results will not reduce the number of samples submitted for laboratory analysis (as in the example stated above, nine samples will be taken independent of field screening results). It should be noted, however, positive field screening results may increase the number of laboratory samples depending on the decisions made in the field. EPA approved methods (not field screening data) will be used to ascertain contamination levels for comparison to background and SALs. Since Phase I decisions will be based on laboratory analyses irrespective of field screening results, there is no risk of false negative HE field screening results affecting a decision at a PRS.

## FIELD SCREENING METHOD SELECTION

In order to select among the field screening methodologies available and how they can be used to support decisions in the field, it is important to identify the decisions to be made and how field screening data will be used to support these decisions. It is important to note that in this case we are comparing a qualitative field screening method (the Laboratory HE spot test) with a portable chemical analytical procedure (the Jenkins field analytical method). Several important points should be considered when selecting a methodology for the Phase I decision:

- Based on the Phase I field screening decisions to be made during characterization (i.e., the biasing of sample locations), low detection limits for a limited set of

analytes are not required, and the Laboratory HE spot test kit provides adequate coverage and sensitivity considering the probability of finding significant concentrations of HE.

- The Jenkins method cannot discriminate between aromatic and non-aromatic HE, nor can it detect TATB.

- The Laboratory HE spot test kit is easy to use, is very reliable, can detect more analytes in a shorter period of time, and costs less than the Jenkins portable bench-type quantitative methods.

- The Jenkins analytical procedure works on the same principal and is almost identical to Solution 1 of the Laboratory HE spot test. It has the same active ingredient, which produces the complex that is purple for TNT. However, the solvent system used by the Laboratory spot test kit (DMSO and water) is superior to the acetone-based system used by the Jenkins method. Therefore, the Labortory spot test is more sensitive to a broader range of HE analytes.

The Laboratory recognizes that for decisions related to Phase II investigations (i.e., risk assessment) and cleanup (i.e., delineation of extent of excavation) where low detection limits for specific analytes are of a concern, then the Jenkins method, LIBS, immuno-assay methods, and mobile laboratory techniques will need to be evaluated for use. However, for the Phase I decisions described above, low detection limits specific to an HE analyte are not required. Rather, the detection of the location of a broad spectrum of potential HE contaminants is desired. Therefore, for Phase I decisions, use of the Laboratory HE spot test provides the results required for the best cost and time considerations.

## CONSEQUENCES OF IMPLEMENTING ALTERNATE HE FIELD SCREENING METHODS

Several important consequences result should the Laboratory be required to implement alternate field screening methods at this time.

1. The field screening methods preferred by EPA are not sensitive to TATB, an important HE contaminant at many Laboratory potential release sites (PRSs). Therefore, if the Laboratory implemented the alternate methods, the HE spot test would still be required because there are no other known screening methods which can detect TATB.

2. The alternative field screening methods would add material costs to each field screening sample (approximately 800 samples for the Field Unit 3 FY95 campaign). Furthermore, the field sampling strategy is dependent on the use of the Laboratory spot test in terms of the approved safety plan, shipping authorization, logistics, sample turnaround time, etc. Requiring the use of alternative methods would delay the start of the field campaign and slip the sampling schedule. The field campaign start would be delayed in order to:

implement standard operating procedures for the alternative-test methods, acquire equipment, train personnel, approve equipment and chemicals for on-site use in the exclusion area, etc. The time required for each field screening event will be increased to accommodate the extraction and analysis time required by the proposed methods. The Laboratory HE spot test requires less than 2 minutes per sample, based on previous field experience. The available literature on the EPA proposed screening tests suggests an optimized turnaround time of 10 minutes per test, we assume a minimum time of 15 minutes in consideration of our remote sample locations. The additional time and cost associated with the EPA recommended methods would reduce numbers and locations of screening. It is estimated that the use of these alternate methods would reduce the number of laboratory samples that could be taken within the present FY95 budget by 20-25%. Therefore, fewer high priority PRSs could be characterized this fiscal year.

**CLOSING**

Based on the above example for Field Unit 3, the Laboratory believes that EPA's decision to approve sampling plans in the OU 1082 Work Plan is sound, and we recommend that EPA remain flexible on the selection of HE field screening methods during Phase I characterization.

If you have questions concerning these points, please contact Brad Martin at (505) 667-6080 or Everett Trollinger (505-667-5801). Because our FY95 fieldwork began on April 24, 1995, the Laboratory would appreciate your decisions on these requests at your earliest convenience. Thank-you for considering these requests.

Sincerely,

Brad Martin

FOR Jorg Jansen, Project Manager
Environmental Restoration

Sincerely,

Eugene Colton for

Theodore J. Taylor, Program Manager
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JJ/TT/bp

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# CERTIFICATION

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Document Title:

Response To The Environmental Protection Agency's Letter Of April 18, 1995, Concerning "Use Of High Explosive (HE) Spot Test Kit, Los Alamos National Laboratory (NM0890010515)"

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