2/20/92 Co's John Gould with these changes. He said he would make them and submit a final draft.

KAFB 92

ENTERED

Joe Kennedy

DRAFT

January 30, 1992

Colonel Thomas A. Norris
Director, Environmental Management Division
1606 ABW-RM, Building 20604
Kirtland Air Force Base, NM 87117-5000

RE: WORK PLAN FOR ADDITIONAL INVESTIGATIONS – BATTERY SHOP FRENCH DRAIN CLOSURE PLAN

Dear Col. Norris:

This work plan is submitted in response to the letter from NMED to KAFB dated December 18,1991, stating that additional investigations must be conducted at the Battery Shop before the closure plan for the french drain can be approved. NMED suggested a soil vapor survey followed by a soil boring and sampling program to identify the vertical and horizontal extent of soil contamination in the vicinity of the Battery Shop. This work plan is divided into five main tasks, as described below, with an initial task for development of the work plan.

Task 0 - Work Plan Development

This task covers preparatory work required for the development of the work plan, including meetings with KAFB and NMED personnel. This project will use Accounting Code 54021.12 under KAFB Delivery Order 5026. A cost estimate for the project is attached.

Task 1 - Soil Vapor Survey

After reviewing data from the previous Battery Shop environmental study, it appears that the pattern of soil contamination may be quite complex and that more than one source of contamination may exist in the area. Therefore, it is recommended that a soil vapor survey be conducted, as suggested by NMED, to identify the locations that need further investigation. This soil vapor survey would be used as a screening procedure with which to develop a rationale for the a soil boring and sampling program as required by NMED.

Aid in ing

Soil vapor surveys are very effective in identifying the presence of volatile organics in the soil subsurface and have proved to be a reliable indicator of soil contamination. By using a portable gas chromatograph in the field, soil vapor samples can be promptly analyzed, and this real-time data can be effectively used in guiding subsequent sampling points in the survey, making it a highly effective, self directing program. Our experience has shown that these field results are typically an

order of magnitude higher than the results to be expected from laboratory analyses of soil samples from the same locations. Although the soil vapor sample results will not meet regulatory requirements, they will provide a foundation on which to build a sampling program that will meet the regulatory requirements.

There is reported to be a caliche layer beneath the site that may limit the effectiveness of a soil vapor survey. However, the lithologic logs from previous soil borings at the site (to about 40 feet in depth) do not indicate any features that would seriously inhibit the transmission of soil vapors. The soils indicated in the logs will readily transmit soil vapors, and a soil vapor survey should work well at this site. Also, the levels of contaminants reported from the previous sampling events are sufficient to be detected by the portable gas chromatograph.

Therefore, we recommend that a soil vapor survey be conducted as soon as possible to provide an aid ~~a rationale~~ for the placement of additional soil borings that NMED has requested. We propose to base the survey on a 400-foot grid (200 feet from the pit in all directions), with samples taken at 100-foot intervals where possible. Building, roads and other obstructions would be avoided. Assuming that 20 sampling points would be selected in this manner, an additional 20 points could be selected to better define "hot spots" that may be encountered. We estimate that this soil gas survey of 40 points, conducted by our experienced staff, could be conducted in a maximum of five days. This could easily be the cost of five borings, and would cost less if it is completed in fewer days. By using the soil gas survey to develop a pattern for soil borings, a significant amount of money can be saved by eliminating unnecessary borings in uncontaminated areas. NMED has indicated that they will respect the findings of a soil vapor survey as a tool in ~~selecting~~ to aid in the selection of a sufficient number of soil boring sites to definitively locate the extent of contamination.

Samples or readings (?)

A Photovac Model 10S70 will be used to provide semi-quantitative compositional data for volatile organic compounds in the vapor. Decontaminated, galvanized steel sampling probes with threaded ends will be used to collect subsurface vapor samples. Each probe will be driven into the soil to a depth of four feet (or to the depth of refusal) using a slide hammer, and will be fitted with an evacuation line and adaptor for connection to a vacuum pump.

Each probe will be evacuated for 30 seconds using the vacuum pump to remove atmospheric gases prior to each sampling. Aliquots of vapor will then be drawn from the evacuation lines using gas-tight syringes, injected into the gas chromatograph, and analyzed for the target compounds. The size of the aliquots will vary from ten to five hundred microliters depending on the magnitude of soil contamination at the sampling stations.

Director
January 30, 1992
Page 3

Calibration of the portable gas chromatograph will be performed on-site prior to analysis of actual soil vapor samples. Calibrant gases that contain the target compounds at concentrations of ten parts per million by volume (ppmv) will be used. Field blanks (atmospheric air drawn through vapor probes and adaptors) will be analyzed to confirm the efficacy of our decontamination procedures. Instrument performance will be validated through analysis of the BTEX standard once for each set of five to six soil-vapor analyses. Each chromatogram will be stored on a floppy disk.

Task 2 - Soil Borings

The number and locations of the soil borings will be determined by analyzing the results of the soil vapor survey. It is estimated that a maximum of 12 borings will be required, with each boring extending to a maximum of 100 feet. If contamination is found to be deeper than 100 feet, then two borings will be extended to 250 feet. If contamination is found at this depth, one of these borings will be extended to ground water. ~~approximately 500 feet.~~

Soil borings will be drilled using a hollow stem auger, with soil samples collected with a continuous core sampler. Borings will initially be drilled in the areas of highest contamination, as determined by the soil vapor survey, in order to evaluate the vertical extent of contamination. Borings will next be drilled at locations that are expected to be outside of the contaminated zones. Then final borings will be drilled as deemed appropriate, based on field observations of the previous borings. In each case, borings will be monitored with an HNu photoionization meter in order to obtain an indication of the presence of volatile contaminants in the soil. This screening tool will be used to determine the final depth of the borings. If no volatiles are detected from an individual borehole at a depth of 50 feet, samples will be taken as described in Task 3 and boring at that location will cease. If volatiles are detected, then soil samples will be taken as described in Task 3 throughout the depth of the bore hole. It is expected that 100 feet will be the practical limit of the hollow stem auger at this site and, therefore, deeper auger borings will not be attempted. If 100 feet cannot be attained in an individual bore hole, the boring will be advanced as far as possible, until auger refusal occurs. These initial borings will be filled with bentonite and cement grout immediately after sampling is completed.

If soil contamination is found to exist at the full depth of any of the borings, then two selected sites will be drilled to 250 feet. Likewise, if contamination is found in any of these 250-foot holes, then one of them will be drilled to ground water (approximately 500 feet). This last boring, if it is required, will be completed as 4-inch PVC ground water monitor well. These wells will be drilled with a mud rotary drilling rig and samples will be taken with a continuous core sampler. The 250-foot

borings will be filled with bentonite and cement grout immediately after sampling is completed.

Task 3 - Soil Sampling

The soil vapor survey and the Hnu photoionization meter readings will provide real-time indications of the existence of volatile contaminants in the soil, but they will be used only as screening devices to aid in the selection of locations for the collection of samples for qualified laboratory analysis. Samples for laboratory analysis will be collected with a continuous core sampler in order to obtain undisturbed soil samples.

At least three samples will be collected from each bore hole. Samples will be collected from the initial bore holes ~~as soon as~~ when volatiles are detected by the Hnu meter and will continue to be taken every 10 feet to the final depth of the bore hole as described in the Task 2. If no volatiles are detected from the surface down to 50 feet, then samples will be taken at the 10-foot, 30-foot and 50-foot levels, and the bore hole will be plugged and abandoned. For the 250-foot and 500-foot holes, samples will be collected every 20 feet, beginning at the 100-foot depth and ending at the final depth of the hole, ~~or until the Hnu meter indicates no volatiles for at least two consecutive 10-foot intervals.~~ STET All soil samples will be analyzed for volatile organics by EPA Method 8021 and selected samples will be analyzed for total ICAP lead. ~~EF~~

→ Samples will be sent to lab and analyzed.

→ If samples show No contamination above MDL for at least the bottom 20' of hole, then No further drilling of the hole is required

We anticipate taking 10 samples for volatile organic analysis from each bore hole in which volatiles are detected and 5 samples from each bore hole in which none are detected by the Hnu meter. Assuming that half of the bore holes will be clean, the total number of samples expected to be taken will be about 80. Approximately 40 additional samples will be collected from the 250-foot and 500-foot deep holes, if they are drilled. Another 10 samples will be taken for quality control purposes, making a total of 130 samples for volatile organic analysis. Three samples for total lead analysis will be collected from each bore hole and 5 will be collected for quality control, making a total of about 50 samples. A judicious sampling protocol will be used to limit the number of samples actually analyzed to the minimum number that will be sufficient to accurately define the extent of contamination at the site.

Appx ~~IX~~ in at least for intervals when HNu readings are high

Change accordingly

Task 4: Risk Assessment

A risk analysis of the contaminants of concern will be conducted to determine if in-place closure will be adequate. Previously detected contaminants at the site are methylene chloride (MeCl), 1,2-trans Dichloroethene (DCE), toluene and ethylbenzene. A risk assessment value will to be established for each chemical, and

calculations for the risk assessment will establish the level of contaminants that can remain in the soil at the sites. If the limits established by the risk assessment are exceeded, then the contaminants must be removed, or clean closure ~~cannot take~~ will not be granted.

Task 5: Report Production

The initial closure plan will be modified to include all new information gathered from the additional investigations and the risk analysis. It will be prepared in a format that is compatible with the Base Wide and Unit Closure Plans previously submitted and approved. Draft copies will be provided to KAFB for a quick review prior to production of a final document. This task includes internal quality assurance review and technical editing. Five copies of the final closure plan will be provided.

We can begin the soil gas survey as soon as February 10, and will make preparations as soon as we receive notice to proceed. After completion of the soil gas survey, by February 17, we will provide a report of the findings and will prepare a final soil boring and sampling plan. Planning and contracting for the soil boring and sampling program can be completed prior to February 28, 1992. However, the well driller that we recommend to perform the soil borings will not be available for this work until mid-March. We trust that, by securing the funding prior to February 28, it will be allowable to complete the work in March. Please call us if you have any questions concerning this work plan.

Sincerely,

Claude A. J. Schleyer
Principal Engineer

Robert D. Enz
General Manager
Albuquerque Office Manager

CAJS/0508/BATSHPWP.PRO

cc: Carol Mueller
Lt. Col. Pratt
John Gould
Cathryn Alarid