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ENSAFE INC. ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

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December 6,1999

N00204.AR.001850
NAS PENSACOLA
5090.3a

U.S. Environmental Protection Agency
Attn: Ms. Gena Townsend
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104

Re: Final Technical Memorandum
Evaluation of Monitored Natural Attenuation
Site 38 (OU 11), NAS Pensacola
Contract # N62467-89-D-0318/059

Dear Ms. Townsend:

On behalf of the Navy, EnSafe Inc. is pleased to submit two copies of the Final Technical Memorandum for the Evaluation of Monitored Natural Attenuation for Site 38 (OU 11) at the Naval Air Station Pensacola in Pensacola, Florida. Responses to USEPA and FDEP comments are also enclosed. This document replaces Appendix D of the ***Final Site 38 Feasibility Study Report,*** November 17, 1999.

If you should have any questions or need any additional information regarding the document, please do not hesitate to call me.

Sincerely,
EnSafe Inc.

Allison Harris

Allison Harris
Task Order Manager

Enclosure

cc: Bill Hill, Code 1851 SOUTHNAVFACENGCOM without enclosure
Ron Joyner, NAS Pensacola - 3 copies
Tom Dillon, NOAA - 1 copy
EnSafe Inc. file - 1 copy
EnSafe Inc. Knoxville - 1 copy
EnSafe Inc. Library - 1 copy
Administrative Record

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IV
RESPONSE TO COMMENTS
DRAFT NATURAL ATTENUATION MEMORANDUM
SITE 38, OPERABLE UNIT 11, NAS PENSACOLA

Comment 1:
Natural attenuation probably will be an appropriate remedial measure for this site, based on the information presented in this report. The scores from the MNA evaluation procedure seem to be high enough. Only two quarters of data had been collected when the report was written, so if the remaining two quarters of analytical results, which are recommended by the MNA guidelines, continue to be favorable, it is likely that MNA will be appropriate remedial measure for this site. [The first year of monitorine can include the four auarterlv samples to support the MNA process.]

One year of quarterly samples for evaluation of seasonal trends is recommended by all MNA guidelines available since **1995.** Once the process is verified and rates are estimated as described in the previous paragraph, the duration of monitoring can be estimated and the frequency of monitoring selected.

Response:
Two more rounds of groundwater samples will be collected during remedial design to complete the evaluation of seasonal effects (four different quarters) on site geochemistry and MNA feasibility. Following sampling, the frequency and duration of long-term monitoring will be decided.

Comment 2:
Page **35** states that performance monitoring will be continued as long as contamination remains above clean up goals. The necessary frequency of monitoring in the future and the duration of monitoring might be estimated better if the data were presented in a more convincing manner than simply summarized in tables. It is mentioned that concentrations decrease with distance down gradient from the source. McAllister and Chiang **(1994)** describe plots of contaminant concentration versus distance from the source which would graphically demonstrate the statements in the text. Also, contaminant concentrations could **be** plotted versus time at selected wells. Degradation rates and clean up times could be estimated by superimposing an estimated initial concentration on the graph at some time before the first samples. This concentration would **be** diminished over time, by assuming that a first-order decay rate is an appropriate simulation of the apparent degradation rate of the contaminants. The initial estimated concentration and the degradation rate are selected so that all concentrations observed in monitoring wells fall on or below the projected line of the degrading concentration. With the data available for this site and the apparent understanding of the MNA process demonstrated, the recommendations in this memo should **be** a small step toward a convincing demonstration of MNA at this site.

Response:
Graphs depicting concentration changes in parent and daughter contaminant compounds over time have been incorporated into this document. In addition, changes in concentration over distance will also be shown graphically to complement the summarized tables. However, we believe that degradation rates and cleanup times are best estimated with real time data. Therefore, the concentration plots are considered to be a developmental process and will be updated as more data are collected. After sufficient real time data are collected, the plots will be examined to determine the feasibility of estimating degradation rates and cleanup times.

Comment 3:
The figures in the report indicate that Pensacola Bay is the discharge for contaminated groundwater at this site. If there is no human or other ecological receptors impacted by the groundwater plumes, then MNA does appear to be an appropriate remedial measure for the site. Once the recommendations in the subsequent paragraphs are addressed, it seems likely that MNA could be approved as a remedial measure for this site.

Response:
The area of Pensacola Bay south of Site 38 is being investigated separately as Site 2 (Operable Unit 3). A baseline risk assessment has been completed for Site 2 indicating no excess risk to humans. The Site 2 ecological risk assessment is still being conducted. At Site 38, there are no current human receptors for groundwater, and future use of groundwater will be restricted using institutional controls.

Comment 4:
The groundwater contours on Figure 4-2 show a hydraulic gradient in Pensacola Bay toward the dock which protrudes into the bay. The groundwater contours in the vicinity of 38GS03 and 38GS13 probably trend to the west, parallel to the shore line and should not extend into the surface water of the bay as shown on the figure.

Response:
Agreed. The contours extending into Pensacola Bay have been deleted.

Comment 5:
Table 5.3 indicates that well 38GS12 is one of the contaminated wells, but this well is not sampled during each sampling event. All monitoring wells, particularly those with a history of contamination should be sampled during the quarterly monitoring event to verify contaminant trends in these wells.

Response:
Agreed. All wells critically impacted by contamination should be sampled to obtain geochemistry and contamination trends.

Comment 6:
Only one analysis result is shown for 38GS05 on Table 5.3. Were all other results ND for this well. The notes on the table do not explain the data selection criteria.

Response:
Well 38GS05 should have read 38GS10 in the table. Data selection criteria will be incorporated in the text of this final MNA memorandum to explain the significance of Table 5.3.

Comment 7:
The source areas are not shown on Figure 4-2 or on any other figure in the report, and a map of the groundwater plume is not presented, so an interpretation of the data in Table 5.3 cannot be made. Contamination seems to be present consistently in well 38SG02 near the discharge area at the bay, and also in well 38GS12, which is somewhat further from the discharge area, but not apparently on the same flow path as well 38GS02.

Well 38GS03 has detects for CVOCs in some sample events and not others. From Figure 4-2, well 38GS03 appears to be down gradient from a different source area than the other wells. The water level contours on Figure 4-2 must be drawn to show groundwater discharge to Pensacola Bay. A groundwater plume cannot be constructed from the data in Table 5.3 and Figure 4-2, so it is not apparent that the wells are properly located to monitor conditions down gradient from the source areas. McAllister and Chiang (1994) and EPA MNA Seminar Notes (EPA/625/K-98/001 http://www.epa.gov/ttbnrmrl/attgw.htm) describe proper location of monitoring wells in a contaminated plume. A figure showing the sources, plumes and monitoring wells should be included in the report. The consultant must demonstrate that the monitoring wells are properly located in the plume between the source and natural discharge area in order to insure that the process of MNA will be characterized and monitored properly.

Response:
EnSafe agrees with EPA's concept **(EPA/625/K-98/00)** of locating MNA monitoring wells with reference to a source and a delineated contaminant plume. However, in the absence of a definite source/s, and no clear plume delineation, it was decided to focus on wells which had the highest contamination, and wells which were "relatively" upgradient and downgradient of the highly contaminated wells. Therefore, the discussions on historical trends are more qualitative in nature and are being examined to add to the considerable geochemical data already available to show MNA is occurring. The revised memorandum will incorporate figures which depict concentration changes over time and distance which should add to the "overall favorability" of MNA feasibility. When more data become available from long-term monitoring during remedial design and implementation, they will be incorporated to update these graphical plots and further strengthen the occurrence of MNA at the site.

References:
McAllister, P.M., and C.Y. Chiang, 1994, A Practical Approach to Evaluating Natural Attenuation of Contaminants in Groundwater, Ground Water Monitoring and Remediation, Spring, 1994, pp. 161-173.