



July 3, 1996

Mr. Kent Strong
Department of Toxic Substances Control, Region 1
10151 Croydon Way, Suite 3
Sacramento, California 95827-2106

CLEAN Contract Number N62474-94-D-7609
Contract Task Order No. 072

**Subject: Final Long-Term Groundwater Monitoring Plan
Naval Auxiliary Landing Field Crows Landing**

Dear Mr. Strong:

Enclosed with this letter is the Final Long-term Groundwater Monitoring Plan for Naval Auxiliary Landing Field Crows Landing. In addition, responses to comments on the draft long-term groundwater monitoring plan generated by the Regional Water Quality Control Board are attached to this letter (Exhibit 1). The final long-term groundwater monitoring plan incorporates all revisions based on the comment responses.

Please call me at (303) 312-8877 if you have any questions regarding the final long-term groundwater monitoring plan.

Sincerely,

Neil J. Bingert
PRC Installation Coordinator

NJB/rkr

cc: Philip Isorena, Regional Water Quality Control Board
Jim Simpson, Stanislaus County Department of Environmental Resources
Sandy Olliges, National Aeronautics and Space Administration
Hubert Chan, Engineering Field Activity West
Terry Lau, Engineering Field Activity West
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NALF Crows Landing Administrative Record, 2 copies

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CROWS LANDING
SSIC NO. 5090.3

ENCLOSURE 1

FINAL
LONG-TERM GROUNDWATER MONITORING PLAN

DATED 03 JULY 1996

THIS RECORD IS ENTERED IN THE DATABASE AND FILED AS

RECORD NO. N60211_000113

EXHIBIT 1
RESPONSE TO COMMENTS

**RESPONSES TO COMMENTS ON THE
DRAFT LONG-TERM GROUNDWATER MONITORING PLAN
NAVAL AUXILIARY LANDING FIELD CROWS LANDING**

This document presents the Navy's responses to comments from regulatory agencies on the draft long-term groundwater monitoring plan for Naval Auxiliary Landing Field (NALF) Crows Landing, California. The comments addressed below were received from the Central Valley Regional Water Quality Control Board (RWQCB) in a letter dated April 25, 1996.

Comment I: **Introduction.** Some of the objectives of the long-term ground water plan, as listed in the guidance, are to identify the lateral and vertical extent of ground water contamination, track the rate and direction of the horizontal and vertical plume movement, determine the impact on beneficial uses of the ground water, improve the understanding of the site hydrogeology, etc. The proposed plan does not clarify how the above objectives, particularly identification of the lateral and vertical extent of ground water contamination, would be achieved. The plan should include a map for each site indicating the well locations to demonstrate that there are sufficient wells and their placement is appropriate. The plan also should include provisions or descriptions of future actions to be taken for sites which do not have sufficient wells to define the lateral and vertical extent of the contamination.

Response: The draft long-term monitoring plan was written prior to completing the monitoring well system at NALF Crows Landing. The monitoring system is now complete and the final long-term monitoring plan has been updated accordingly. Table 1-1 has been revised to describe the intended use and rationale for placement of all 45 wells comprising the monitoring system. Plate 1 has been updated to show all monitoring well locations and the maximum lateral extent of all contaminant plumes based on available data. Individual site maps have not been created because Plate 1 clearly shows all monitoring well locations relative to the contaminant plumes and every Installation Restoration Program (IRP) and underground storage tank (UST) site. The Navy believes a single map is preferable, especially in the administration area where contaminant plumes from different sources merge and where several wells are used to monitor more than one site.

Provisions for additional monitoring wells, if necessary, have been previously discussed with both the Department of Toxic Substances Control (DTSC) and the RWQCB. It has been agreed that groundwater monitoring data gaps, if any, will be addressed during the remedial design phase at NALF Crows Landing.

It should be noted that DTSC and RWQCB have participated in and agreed with all monitoring well placement decisions. Six of the 45 monitoring wells comprising the monitoring system were constructed as part of previous site investigations (SIs). DTSC and RWQCB reviewed and approved the SI sampling and analysis plans prior to construction of these wells. Twenty-seven monitoring wells were installed between October and December 1995. Placement of these wells, based primarily on HydroPunch groundwater sampling data, was reviewed and approved by DTSC and RWQCB during the NALF Crows Landing Remedial Project Managers (RPM) meeting held on September 26, 1995. The remaining 12 wells comprising the monitoring system were installed in April 1996. Placement of these wells, based on analyses of samples from wells installed between October and December 1995 and expedited analyses of samples from wells installed in early April 1996, was reviewed and approved by DTSC and RWQCB during RPM meetings held on February 16, 1996 and April 25, 1996, and during a conference call held on March 7, 1996.

Comment II.A.1: Ground Water Monitoring Plan Content. Background Information. The proposed plan does not include a presentation of the working hydrogeologic model. As stated in the guidance, the model is necessary to support ground water sampling and analysis, and should provide the following:

- a. **Site stratigraphy and aquifer designation shown on cross-sections;**
- b. **A site map showing all monitoring wells, water supply wells, and other wells;**
- c. **A table with rationale for monitoring well locations;**
- d. **A site map showing potentiometric contours and ground water flow directions.**

Response:

The introduction to the draft long-term monitoring plan stated that all background information, including descriptions of the facility's hydrogeologic setting, was included in the first annual groundwater monitoring report. The first annual groundwater monitoring report (PRC 1996) was recently revised in response to review comments from RWQCB. In the interest of completing the long-term groundwater monitoring plan as a stand-alone document, descriptions of the working hydrogeologic model have been summarized from the first annual monitoring report and included in the final long-term groundwater monitoring plan.

Comment II.A.2: A narrative history of the facility's ground water monitoring program was provided in the introduction but a table showing the historical data was not included anywhere in the plan. Table 1 summarizes the monitoring well construction details and should include a column for the aquifer zone being monitored.

Response:

The introduction to the draft long-term groundwater monitoring plan stated that all historical groundwater monitoring data was included in the first annual groundwater monitoring report. For completeness, Appendix B has been added to the final long-term groundwater monitoring plan summarizing all historical groundwater monitoring data for wells comprising the current monitoring system. Please note that no sampling has been completed to date on eight of the new wells. Summaries of historical groundwater monitoring data for all dry wells (now abandoned) that are no longer part of the current monitoring system are still referenced to the first annual monitoring report.

A column designating the aquifer zone monitored for each well has been added to Table 1-1. In addition, different symbols illustrating the aquifer zone monitored for each well have been added to Plate 1 in the final long-term groundwater monitoring plan.

Comment II.A.3: The nature and extent of ground water contamination was not provided.

Response: An outline of the approximate maximum lateral extent of each groundwater contaminant plume identified at NALF Crows Landing, based on available data, has been added to Plate 1 in the final long-term groundwater monitoring plan.

Comment II.A.4: The plan did not include an evaluation and discussion of data gaps.

Response: To the best of its ability, the Navy has designed the current groundwater monitoring system to adequately evaluate the lateral and vertical extent of all groundwater contaminant plumes identified at NALF Crows Landing. Data gaps in the current monitoring system, if any, will not be evident until several rounds of base-wide groundwater monitoring are completed. Consequently, the final long-term groundwater monitoring plan does not address data gaps. In addition, as noted in the response to Comment I, DTSC, RWQCB, and the Navy have agreed that groundwater monitoring data gaps, if any, will be addressed during the remedial design phase at NALF Crows Landing.

Comment II.B: Sampling Plan. As specified in the guidance, the plan should describe the rationale for selecting particular monitoring wells for sampling, constituents to be analyzed, and the sampling frequency. Although most of the wells at the facility have gone dry, new wells have been installed and more wells will be added in the future. As I stated in the introduction comment above, the plan should include provisions of descriptions of future actions to be taken for sites which do not have sufficient wells to define the lateral and vertical extent of the contamination.

Response: The final long-term groundwater monitoring plan includes descriptions of the rationale for well placement and a list of analytical parameters by well for quarterly groundwater monitoring. As noted in the response to Comment I, DTSC, RWQCB, and the Navy have agreed that groundwater monitoring data gaps, if any, will be addressed during the remedial design phase at NALF Crows Landing.

Comment II.B.1: Establishing Background Water Quality. I concur with the plan's proposal to continue monitoring the background monitoring wells (BG-MW) for the presence of 1,1,1-trichloroethane (1,1,1-TCA) which was found in BG-MW-2 and BG-MW-3 in 1995. The presence of 1,1,1-TCA, if confirmed, suggests that these wells may not be truly background wells or there may be a source upgradient of the facility. However, it is more likely that 1,1,1-TCA migrated from contaminated sites into the two background wells during ground water flow reversals. It is unlikely that there is an upgradient source because the facility is surrounded by farmland.

Response: The compound 1,1,1-TCA was detected only during the March 1995 groundwater sampling event in samples from the two background monitoring wells and in IRP Site 17 well 17-MW-01. Background monitoring wells BG-MW-02 and BG-MW-03 are both located more than 4,000 feet upgradient (regionally) from the maximum lateral extent of the carbon tetrachloride contaminant plume emanating from IRP Site 17. Samples analyzed from well 17-MW-01 during four previous groundwater monitoring events did not contain any 1,1,1-TCA. In addition, 1,1,1-TCA has never been detected in groundwater samples from any other IRP or UST site at NALF Crows Landing. Consequently, the conclusion that 1,1,1-TCA has migrated from one of the contaminated IRP or UST sites, and that the background wells may not truly represent background conditions, is not supported. Additional sampling and analysis for 1,1,1-TCA is necessary before drawing any conclusions regarding the representativeness of the background monitoring wells.

Comment II.B.2: IRP Site 11 - Disposal Pits Area. The historical data for Site 11 shows that only extractable total petroleum hydrocarbons (TPH-E) have been detected in the ground water beneath the site. The plan states that since new MWs are being installed at Site 11, samples will be analyzed for volatile organic compounds (VOCs), semi-VOCs (SVOCs), pesticides/PCBs, and metals in addition to TPH-E. Since the new wells will be used to establish the ground water characteristics at Site 11, purgeable TPH (TPH-P) and benzene, toluene, ethylbenzene, and xylenes (BTEX) should be included in the sampling program.

Response: The final long-term groundwater monitoring plan has been revised to include TPH-P analysis for samples from all monitoring wells at NALF Crows Landing. TPH-P analyses were added for samples from all UST Cluster 1 and 2 wells because of the possibility that lighter fuels, such as aviation gasoline or JP-4, may have been stored in these tanks. In addition, high benzene concentrations in groundwater samples collected previously from UST Cluster 1 suggest that TPH-P analyses may be appropriate. TPH-P analyses were added for samples from all IRP Site 17 wells and the well at UST 109 to enhance delineation of commingling carbon tetrachloride and fuel plumes in the administration area. Good rationale is not apparent for TPH-P analyses for samples from wells at IRP Site 11 but were added so TPH-P and TPH-E analyses are paired consistently for all wells at NALF Crows Landing. BTEX compounds are included in the VOC analyses planned for samples from all IRP Site 11 wells.

Comment II.B.3: IRP Site 14 - Fire Training Area. The plan should briefly describe the site's history and the ground water data. The rationale for proposing no additional ground water monitoring also should be provided.

Response: All contaminated soil at IRP Site 14 was excavated and treated in 1991. Soil samples from the base and sidewalls of the excavation confirmed the removal of all contaminated soil. Monitoring well ERM-3 (now abandoned) adjacent to the excavation was sampled twice, confirming that no contamination reached groundwater. All of this information was included in the IRP sites remedial investigation (RI) work plan (PRC 1995a) to support no further investigation at Site 14. The RI work plan was reviewed and approved by DTSC and RWQCB. Recently, DTSC and RWQCB have requested that treated soil stockpiled at the site be resampled to evaluate potential dioxin and metals contamination. However, no rationale exists for replacing well ERM-3 and reevaluating potential groundwater contamination. This information has been summarized from the RI work plan and included in the final long-term groundwater monitoring plan.

Comment II.B.4: IRP Site 16 - Pesticide Rinse Area. The plan should briefly describe the site's history and the ground water data. The rationale for proposing no additional ground water monitoring also should be provided.

Response: Similar to the response to Comment II. B. 3, the site history, historical groundwater monitoring data, and rationale for no additional groundwater monitoring at IRP Site 16 were described in the RI work plan (PRC 1995a), approved by DTSC and RWQCB. This information has been summarized from the RI work plan and included in the final long-term groundwater monitoring plan.

Comment II.B.5: IRP Site 17 - Demolished Hangars Area. As with Site 11, the plan states that since new MWs are being installed at Site 17, samples will be analyzed for VOCs, SVOCs, pesticides/PCBs, metals, and TPH-E. Since the new wells will be used to establish the ground water characteristics, TPH-P and BTEX should be included in the sampling program.

Response: As described in the response to Comment II. B. 2., TPH-P analyses have been added for samples from all IRP Site 17 monitoring wells. BTEX compounds are included in the VOC analyses planned for samples from all IRP Site 17 wells. Please note that pesticides/PCB analyses were not included in the IRP Site 17 groundwater monitoring program.

Comment II.B.6: UST Cluster 1 and UST Cluster 2. The plan should explain why only aromatic VOCs and TPH-E are proposed for UST Cluster 1 and Cluster 2.

Response: All groundwater samples collected from UST Cluster 1 and 2 monitoring wells will be analyzed for TPH-P (plus BTEX compounds) and TPH-E. These analyses exceed those recommended by RWQCB for groundwater investigations at jet fuel sites (RWQCB 1990). This information has been added to the final long-term monitoring plan.

Comment II.B.7: UST 109. The plan should explain why one monitoring well is adequate to monitor UST 109 and why the samples are being analyzed only for TPH-E and VOCs.

Response: As described in the first annual groundwater monitoring report, groundwater contamination was detected once at UST 109 in samples from well ERM-2 installed immediately adjacent to the tank excavation. Subsequent sampling of six monitoring wells (all now abandoned) detected sporadic occurrences of BTEX compounds either just above or estimated below analytical detection limits.

In November 1995, the Navy installed well 109-MW-01 through the tank excavation to replace well ERM-2. Soil contamination was observed in the well borehole between depths of 13 and 38 feet below ground surface (bgs). The water table surface was found at approximately 48 feet bgs. No groundwater contamination was detected in the sample analyzed from well 109-MW-01. Well 109-MW-01 will continue to be sampled as part of the quarterly monitoring program. However, additional monitoring wells are not warranted if groundwater contamination continues to be undetected in well 109-MW-01. All groundwater samples collected from well 109-MW-01 will be analyzed for TPH-P, VOCs, and TPH-E. These analyses exceed those recommended by RWQCB for groundwater investigations at diesel and jet fuel sites (RWQCB 1990). This information has been added to the final long-term monitoring plan.

Comment II.B.8: UST 117. The plan should provide the rationale for not including TPH-E in the sampling program.

Response: All groundwater samples collected from UST 117 monitoring wells will be analyzed for TPH-P, VOCs, organic lead, and TPH-E. These analyses exceed those recommended by RWQCB for groundwater investigations at gasoline sites (RWQCB 1990). This information has been added to the long-term monitoring plan.

Comment III: Data Management Plan. Currently, the data at the facility are not organized making their review difficult. The historical data at the facility should be organized and tabulated to that they are easily discernible. Attachment 2 shows an example of how the data at the facility should be reported. Electronic and hard copies of the data should be provided to the State.

Response: Historical groundwater monitoring data have been compiled by site, organized chronologically, and submitted twice to RWQCB: once in the RI work plan (PRC 1995a) and UST sites field sampling plan (PRC 1995b), and once in the first annual groundwater monitoring report (PRC 1996). Unfortunately, the Navy has been unable to import the electronic data deliverables received from the analytical laboratories into the spreadsheet format suggested by RWQCB. However, the Navy will manually input a subset of analytical results crucial to monitoring

groundwater contaminant plumes at NALF Crows Landing into the suggested spreadsheet format. The beginning of this analytical summary spreadsheet is shown in Appendix B in the final long-term groundwater monitoring plan. Each quarter, the Navy will update this table for inclusion in the quarterly monitoring reports and provide the update electronically to RWQCB. Complete analytical reports will continue to be provided in hard copy in appendices to the quarterly monitoring reports.

Comment IV: **Statistical Analysis.** The flow chart on Figure 1 clearly defines the procedures which will be used to perform the statistical analyses needed to determine if the metal concentrations at Sites 11 and 17 pose a threat to ground water quality.

The plan states that all statistical tests will be performed at p-value of 0.05 which corresponds to a 95% confidence level. The plan should provide the justification for using this level of significance.

Response: A p-value of 0.05 is standard for statistical applications of the type (for example, see EPA 1989) and corresponds to acceptable Type I error rates as specified in Title 23, California Code of Regulations, Part 2550.7(e)(9)(B). This information has been added to the final long-term monitoring plan.

Comment V: **Reporting.** As stated in the Item III above, the data should be reported in a format similar to Attachment 2. If the CBCEC reporting requirements are followed as proposed in the plan, reporting will be adequate.

Response: As stated in the response to Comment III, The Navy has been unsuccessful at importing data into the suggested spreadsheet format. However, the Navy will provide an analytical summary table in the suggested format in the quarterly monitoring reports.

REFERENCES

- PRC Environmental Management, Inc. 1995a. Naval Auxiliary Landing Field Crows Landing Installation Restoration Program Sites Remedial Investigation Work Plan. July 18.
- PRC Environmental Management, Inc. 1995b. Naval Auxiliary Landing Field Crows Landing Underground Storage Tank Sites Field Sampling Plan. July 19.
- PRC Environmental Management, Inc. 1996. Naval Auxiliary Landing Field Crows Landing First Annual Groundwater Monitoring Report. March 29.
- Regional Water Quality Control Board. 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites. August 10.
- U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). December.