PRC Env
1099 18t
Suite 196
Denver, CO 80202
303-295-1101
Fax 303-295-2818

N00296.003071
MOFFETT FIELD
SSIC NO. 5090.3

July 9, 1997

Mr. Stephen Chao and Mr. Hubert Chan
Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive, Building 210
San Bruno, California 94066-5006

Subject: **Response to Regulatory Agency Comments, Operable Unit (OU1) Field Investigation Draft Final Technical Memorandum, Moffett Federal Airfield CLEAN II Contract No. N62474-94-D-7609, Contract Task Order 003**

Dear Messrs. Chao and Chan:

Enclosed are two copies of the above referenced responses to comments. Please call (303) 312-8884 (Schuller) or (303) 312-8805 (Werle) if you have any questions or comments.

Sincerely,

Brian Schuller
Project Geologist

Brian Werle
Project Manager

Enclosures

cc: Distribution List (attached)

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Operable Unit One (OU1)
Draft Final Field Investigation Technical Memorandum
Response to Comments

Moffett Federal Airfield

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RESPONSE TO COMMENTS

RESPONSE TO REGULATORY AGENCY COMMENTS ON THE DRAFT FINAL OU1 FIELD INVESTIGATION TECHNICAL MEMORANDUM MOFFETT FEDERAL AIRFIELD

1.0 INTRODUCTION

This document presents the Navy's responses to comments from the U.S. Environmental Protection Agency (EPA) and the California (EPA) Department of Toxic Substances Control (DTSC) regarding the Moffett Federal Airfield draft final OU1 technical memorandum dated April 9, 1997. EPA comments were submitted May 9, 1997 via electronic mail. The DTSC submitted comments written by the Department of Health Services (DHS) and the California Integrated Waste Management Board (CIWMB) in a letter dated May 30, 1997. The following comments and responses to the draft final technical memorandum were also reviewed by the Naval Sea Systems Command Detachment, Radiological Affairs Support Office (RASO 1997) in Yorktown, Virginia.

2.0 RESPONSE TO COMMENTS FROM THE EPA

Comment 1: Section 1.2.2, page 5, para 1. Please update the last two sentences in this paragraph that discuss the estimated amount of waste at Site 2 to be consistent with the OU1 Proposed Plan and Record of Decision.

Response: *The referenced text will be updated.*

Comment 2: Section 2.7.3, page 18, 19. Please include a summary of the trenching at Site 2 that occurred in September 1996.

Response: *A summary of the September 1996 Site 2 trenching will be included in the final technical memorandum. This summary was provided by the Navy's environmental coordinator, Mr. Don Chuck. However, this additional trenching was completed by International Technology Corporation (IT) during preliminary construction activities at the request of the Navy, and as such was not part of the original work plan for this technical memorandum.*

Comment 3: Section 2.8.1.2, page 20, last para. The text states: "Gross gamma counts were recorded for 1 minute count times at 1 meter above the ground surface." For future reference, the best method to measure gamma counts is both at 1 meter and at the ground surface. Due to the inverse square law, which gamma emissions follow, much data can be gathered at the ground surface. By taking both measurements, a more complete picture of gamma emissions is shown. But no further measurement is required for this site.

Response: *For future reference and development of field work plans involving gamma surveys, this comment will be considered. As stated in the work plan, holding the detector 1 meter above ground surface follows Nuclear Regulatory Commission and U.S. EPA guidance; this is a standard detector configuration widely used for environmental surveys. At this time, no additional gamma surveys are planned for OU1.*

Comment 4: Section 2.8.1.2, page 21, para 1. Please provide some detail in the text on the linear regression model used to approximate the relationship between the count rates and the exposure rates.

Response: *A simple linear regression model was generated using a Microsoft Excel spreadsheet. Six exposure rates measured with the pressurized ion chamber (PIC) and six data points (counts per minute) collected using the rate meter were plotted on a graph. It generated the equation y = 0.0138x + 3.382, where y represents exposure rate in microRoentgen per hour (uR/hr) and x represents counts per minute.*

Additional information regarding the linear regression model used to approximate exposure rates from the count rate will be added to the text, including the count and exposure rate data, the plot of these data, and the equation of the resulting line.

Comment 5: Section 2.8.2, page 24, para 1. The text states that the gamma count that exceeded the action level "... is believed not to be associated with the disposal of radioluminescent equipment containing radium-226." Was there any attempt to identify the gamma emitting radionuclide? We suggest that the Navy use portable gamma spectroscopy instrumentation to verify this claim. The results need to be more scientifically defensible than presented here and at the bottom of page 26.

Response: *No attempt was made to identify the gamma emitting radionuclides. The purpose of this survey was not to determine the soil activity. No historical information indicated that radioactive materials have been disposed of at these landfills. This walkover gamma survey was conducted as a health and safety measure and was designed to determine the presence of near-surface gamma radiation sources. Additionally, the distribution of gamma counts observed is consistent with fill and construction-type materials.*

Gamma counts exceeding the action level at Sites 1 and 2 can be attributed to sources other than radioluminescent equipment. The background distribution used to determine the action level does not account for the greater variation of fill material at Sites 1 and 2. Furthermore, the count data were normally distributed, which would not be characteristic of fill material that included point sources of radioactive objects. These rationale are discussed further below.

The action level was established as the background mean plus two standard deviations to distinguish areas of higher rate counts; the locations of which were to be noted in the field notes. Once noted, locations exceeding the action criteria and probable causes of the exceedance were to be further evaluated in the technical memorandum. An action level exceedance does not necessarily indicate a gamma emitting source such as radioluminescent equipment, but may be a result of differences in the composition of fill material in the landfills and material at the location of the background survey, or may represent upper end counts within a normal distribution of data.

In landfills such as Sites 1 and 2, variable soil types (for example, sand or silt) and disposed construction materials (for example, bricks which are composed of clay) all contain naturally occurring radioactive elements at different concentrations yielding different gamma counts. These landfill survey count rates were compared to background survey count rates collected from an area with consistent soil types. In

addition, only 10 background counts were collected, but 151 counts at Site 1 and 116 counts at Site 2 were collected. The greater number of site counts allows for greater variability.

The Site 1 and 2 data are normally distributed. This distribution indicates that a significant point source of gamma radiation was not present. However, a landfill, due to the variation of fill and construction material, characteristically exhibits greater variation in the resulting gamma counts. A Wilk-Shapiro/Rankit plot was generated for each site - this plot depicts that the data are normal above a Wilk-Shapiro number of 0.75. The data for Site 1 had a Wilk-Shapiro number of 0.9915 and the number for Site 2 was 0.9305.

Additional gamma surveys are not necessary at OU1 and will not be conducted based on these results.

3.0 RESPONSE TO DEPARTMENT OF HEALTH SERVICES COMMENTS

GENERAL COMMENTS

Comment 1: The survey performed does not show that no buried radioactive waste was present in the landfill.

Response: *The purpose of the survey (as stated in the field work plan) was to screen the OU1 landfills as a precautionary measure to evaluate whether radiation levels at either landfill's surface exceed background levels. It was also to confirm (as determined from site history) that sources of radioactive material were not present in either landfill. This survey was conducted in accordance with the DTSC-approved work plan. As described in the work plan, detector response and exposure rate data were collected on a grid at the OU1 landfills to compare these results with responses from outside the landfills. No near surface discrete sources were identified during the survey. In addition, there is no history of radioactive material disposal at Moffett Field.*

Comment 2: The results of the survey showing reading that are higher than the "action levels" could be buried radioactive waste.

Response: *The action level was established as the background mean plus two standard deviations to distinguish areas of higher rate counts; the locations of which were to be noted in the field notes. Once noted, locations exceeding the action criteria and probable causes of the exceedance were to be further evaluated in the technical memorandum. An action level exceedance can be a result of a variety of sources. The slight increases observed during the OU1 surveys could be caused by a small near surface radioactive material source; a larger deeply-buried source, that is, buried at depths which would result in similar count readings as normally-distributed shallow gamma-emitting sources; variability in radioactive content of native material; variability and elevated radioactivity (above native material) of ordinary fill materials, such as construction debris (for example, ceramic tile or bricks) or sand piles; or variation in instrument*

measurements (that is, instrument precision based on the statistics of radiation counting). There is no history of radioactive waste disposal at Moffett Field.

Comment 3: The results of the survey showing readings that are lower than the "action levels" could be from buried radioactive waste.

Response: *It is agreed that readings below the action level may be from buried radioactive wastes. Such readings are within the limits of the field methodology and hypothesis testing (that is, a false negative error is possible while comparing background and site survey data). See response to general comment 2, above.*

Comment 4: DHS does not understand the proposed "action" to be taken when an action level is exceeded. The action level was exceeded at several locations, but other than a visual "inspection" of the area no samples were collected to determine if the sand or soil covering the areas having elevated reading were naturally elevated.

Response: *The actions to be taken when an action level is exceeded, as defined in the work plan, were to mark and note the location. These data were then presented and evaluated in the technical memorandum. The results indicate that the gamma counts are normal for this type of survey and no further radiological surveys are necessary. Some of the elevated readings were associated with piles of arkosic sand, which has potassium feldspar as a major constituent. No evidence of surficial or near surface sources was identified. Although the radiological surveys do not conclusively determine that radioactive waste was not disposed of, the site surveys and site history indicate that radioactive wastes are not present at the landfills, and that no further surveys, sampling, or actions are necessary for radiological control at OU1.*

SPECIFIC COMMENTS

Comment 1: Page 19, Sections 2.8 and 2.8.1. The surveys performed and presented in this technical memorandum appear to have exceeded background and would not rule out the presence of buried radiological waste including radium-226-containing-sources.

Response: *Although the survey does not rule out buried radioactive sources, the facts that the site survey data are normally distributed across the sites and that there has been no history of radiological waste disposal at Moffett Field are satisfactory to determine that buried radioactive wastes at OU1 are unlikely.*

There is a normal distribution with any given set of gamma count data. Though the Navy conservatively used a limit of two standard deviations, the exceedances were minor and can easily be attributed to a normal distribution. The background mean plus two standard deviations action level corresponds to 95 percent of the background population. This implies that 5 percent of the background population will exceed 824 counts per minute (cpm). Similarly, using the background mean plus three standard deviations action level was 876 cpm and implies that 1 percent of the background population will exceed 876 cpm. At Site 1, none of the readings exceeded 876 cpm. At Site 2, three numbers exceeded this - 886 cpm (E-8), 950 cpm (F-8), and 1,066 cpm (J-6). When compared to natural radiation sources, these numbers do not reflect the presence of contamination. In fact, the gamma count at background location B was 1,008 cpm. The gamma count at J-6 (1,066 cpm) is easily explained by the presence of a

sand pile at that location; it is well known that arkosic sands contain feldspars, a source of gamma-emitting potassium-40 and other components of granitic rock.

Exceedances of the background survey's count rate mean plus two standard deviations have been attributed to other naturally occurring gamma emitting sources within the landfills (please see above responses).

Comment 2: Pages 19 and 20, Section2.8.1. DHS was unable to locate calibration data (i.e., efficiencies, geometry of the source to the detector, minimum detector, minimum detectable activities, dates of calibration, etc.) related to any of the instruments reported used in this memorandum. These should be provided with the data.

Response: *This information, as provided by the instrument manufacturer, will be provided in the final technical memorandum. The manufacturer efficiency for the 2x2 sodium iodide detector is 900 counts per minute per microRoentgen per hour.*

Comment 3: Page 21, Section 2.8.1.2. The PIC data (including the background equivalent, calibration information, PIC readings with locations identified, calculations, etc.) used for correlation of the count rate data should have been presented in this technical memorandum.

Response: *PIC calibration sheets as provided by the instrument manufacturer will be included.*

Comment 4: Pages 22 -24, Section 2.8.1.3. The data for each of the transects should be provided in this technical memorandum rather than a summary of the maximum and minimum results of each site. This would help fill in the missing data from the grid node survey.

Response: *Transect data will be provided in the final technical memorandum.*

Comment 5: Page 26, Section 3.0 Conclusions. DHS policy requires the removal of discreet radioactive sources (i.e., Ra-226 gauges and dials) for unrestricted release of property for the State of California . From the survey performed and presented in this memorandum, DHS cannot determine whether radiological waste is contained in either of the landfills. If there is reason to believe that radiological waste may be buried in these landfills then further sampling and analysis of these sites would be necessary to determine whether the site would require licensure by the State of California.

Response: *There is no indication that radioactive wastes were disposed of in either landfill. The Site 2 landfill contents will be consolidated under the Site 1 landfill cap. The Navy has no reason to believe this landfill meets any specific regulatory criteria that would trigger further OU1 closure requirements.*

Comment 6: Pages 40 and 43, Figures 2-9 and 2-12, refer to Exposure Rates in mR/hr (milliRoentgens per hour). Please confirm that this is an error and that the correct units are μR/hr (microRoentgens per hour).

Response: *The units should be microRoentgens per hour. This will be corrected in the document.*

RESPONSE TO CIWMB COMMENTS

Comment 1: 2.1.2. Site Utility Location. Were utilities located using non-intrusive, electromagnetic (EM) survey methods? If so, prior to excavation of Site 2, the 36-inch PG&E gas main should be physically located through careful potholing & probing every 100 feet and clearly surveyed with a "no excavation" easement. The pipe's exact depth and location needs to be clearly defined for heavy equipment excavating material in the vicinity of the pipe. The same should be performed for the other utilities, however, the gas main is of primary importance. Also, an engineering analysis should be performed to determine proper shoring or slopes required in the vicinity of the pipe such that excavation activities do not undermine the pipe's integrity. Further, emergency response procedures should be detailed in the Site Specific Health & Safety plan should any release from the pipe occur.

Also, was the 36-inch gas main installed in a trench and backfilled with sand for cathodic protection? If so, what are the dimensions of the trench? This may be important to know during the excavation around the line. Steel pipe systems are sometimes installed with active (impressed current) or passive cathodic protection systems (buried sacrificial anodes - two metallic anomalies?) PG&E should be consulted for any special requirements needing to be met by the remediation contractor for excavation activities near the line.

Response: *For the technical memorandum, this utility location survey was completed using nonintrusive methods. The purpose of this utility survey was to locate underground obstructions to prevent encountering underground utilities during drilling, cone penetrometer testing, and trenching activities. In addition, the located utilities were surveyed so they could be presented on design drawings. The pipeline was also located by additional trenching completed by the Navy's remedial action contractor. This line has been clearly defined. Details of engineering measures for excavation near the gas main during Site 2 excavation activities are provided in the design specifications (PRC 1997a), the design basis report (PRC 1997b), and the design drawings (PRC 1997c). A Pacific Gas and Electric (PG&E) representative will be on site during excavation activities near the gas pipeline.*

Comment 2: 2.5.1. Monitoring Well and Piezometer Installation and Locations. During drilling activities, were the boreholes screened for the presence of methane gas using an Organic Vapor analyzer (OVA) or Combustible Gas Indicator (CGI)? If so, what were the combustible gas concentrations in the hole? The boring logs indicate that a hydrogen-sulfide odor was present in the boreholes.

Response: *Methane monitoring was not conducted during drilling. The hydrogen sulfide odor is attributed to naturally occurring organic material (peat) encountered at shallow depths during drilling.*

Comment 3: 2.7.2. Site 1.

1) During Trenching activities at site 1 was any screening for landfill gas performed using either an OVA or CGI? If so, what were the concentration detected and were any low-oxygen measurements noted? The report states that Trench S1T3 emitted a noticeable petroleum odor.

2) What was the maximum depth of the refuse encountered during trenching activities? This information along with the surrounding lithologic data is important in determining location, depth and screening lengths of gas monitoring probes.

3) Were any trenching logs kept to document information from each trench?

Response: *No OVA or CGI screening was conducted during trenching. A noticeable petroleum odor was present at Trench S1T3*

The purpose of the trenching activities were to identify the lateral extent of the landfills. Information regarding depth of refuse was not always collected. However, additional trenching was completed under a separate project subsequent to the trenching described in the technical memorandum. The findings of this additional trenching, including depth of refuse where identified, will be summarized in the final technical memorandum. A gas vent trench on the western side of the landfill is to be constructed to address the single detection of methane gas using field instrumentation during IR activities performed by IT . The details of this gas vent trench will be in the Site 1 landfill cover preliminary design drawings that are scheduled to be submitted July 11, 1997.

Once the extent of the fill was identified during trenching, stakes were driven and there locations were subsequently surveyed. This fulfilled the purpose of the trenching activities (to identify lateral extent of the landfills). Field notes regarding the type of waste or fill in the trenches were recorded and are summarized in the final OU1 technical memorandum.

Comment 4: 2.7.3. Site 2.

1) The trenching activities performed indicate that although landfill debris was found in the trenches, the extent of Site 2 was based on the nature of the debris versus a delineation between waste area and undisturbed native soils. Was the fill area relatively shallow (2-5 ft) in the areas explored? It does not appear that the exploratory trenching at Site 2 has clearly defined the limits of the fill area. Was the material excavated in any of the trenches saturated?

2) At any point did any of the exploratory trenches backfill with water? If so, at what depth did this occur and what was the maximum depth before native soil was encountered? This information is important to determine if waste will require dewatering before transportation to Site 1.

Response: *Trenching activities uncovered a range of materials from household-type refuse to fill material with occasional construction debris (for example, a brick or a nail). The physical boundary (perimeter) of Site 2 included this range of materials. The extent of Site 2 materials to be excavated and consolidated at Site 1 is described in the design specifications (PRC 1997a), the design basis report (PRC 1997b), and on the design drawings (PRC 1997c).*

Saturated waste was encountered during trenching by the Navy's remedial action contractor. A summary of this trenching activity and findings will be included in the final technical memorandum. Dewatering is planned as part of the Site 2 landfill consolidation.

REFERENCES

PRC. 1997a. Site 2 Landfill Consolidation Design, Construction Specifications, Definitive Design. Moffett Federal Airfield, Mountain View, California. May 19.

PRC. 1997b. Site 2 Landfill Consolidation Design, Design Basis Report (Definitive Design). Moffett Federal Airfield, Mountain View, California. May 19.

PRC. 1997c. Site 2 Landfill Consolidation Design, Design Drawings, Definitive Design. Moffett Federal Airfield, Mountain View, California. May 20.

Radiological Affairs Support Office (RASO) 1997. Teleconference communication between PRC and RASO. July 8.