M E M O R A N D U M

TO: Polin Modanlou, MCAS El Toro Master Development Program

FROM: Bertrand S. Palmer, Ph.D., P.E., GeoSyntec Consultants

DATE: 8 November 2000

SUBJECT: **Review of**
(1) Final Phase II Remedial Investigation Report
Attachments O, OU-3B Site 7 Drop Tank Drainage Area No. 2,
Attachment P, OU-3B Site 14, Battery Acid Disposal Area: and
(2) Final Proposed Plan for Operable Unit 3B Sites 7 and 14
Marine Corps Air Station, El Toro
Orange County, California

INTRODUCTION

GeoSyntec Consultants (GeoSyntec) performed a preliminary review of two documents related to Sites 7 and 14 prepared by the Department of Navy/United States Marine Corps (DON/USMC). These documents are the "Phase II Remedial Investigation Report, Attachments O and P, Operable Unit-3B, Sites 7 and 14, Marine Corps Air Station (MCAS), El Toro, California" (RI), dated March 2000 and the "Proposed Plan for Operable Unit 3B, Sites 7 and 14 at Marine Corps Air Station El Toro" (Proposed Plan), dated September 2000. The RI provides a summary of the nature and extent of contamination at Operable Unit (OU)-3B, Site 7, Drop Tank Drainage Area No. 2 and Site 14, Battery Acid Disposal Area, and provides fate-and-transport and human-health risk assessment for chemicals of potential concern at these sites. The RI also includes recommendations for future work and potential remediation at these sites. The Proposed Plan is a summary of the work performed in the RI and is designed to be given to the public for comments before publication of the Record of Decision (ROD).

The purpose of this memorandum is to provide a brief review of the information regarding Sites 7 and 14 included in the RI and Proposed Plan and to summarize GeoSyntec's comments, issues, and questions regarding the RI and Proposed Plan.

BACKGROUND

The information presented in this background section is based on the work performed and reported by DON/USMC.

Site 7, Drop Tank Drainage Area No. 2, reportedly was used for aircraft drop tank storage and drainage from approximately 1969 to 1983. Aircraft drop tanks were drained and washed on a concrete apron. The mixture of residual fuel and washwater drained off the edge of concrete apron onto the adjacent grassy areas. In addition, between 1972 and 1983, soil areas near the aircraft hangars (Buildings 296 and 297) are suspected to have been sprayed with lubrication oil and JP-5 jet fuel for dust control. A drainage ditch conveyed surface drainage from the site to the south towards Agua Chinon Wash. Another area of Site 7 served as an unpaved parking lot from 1972 to 1978 and also was sprayed with lubricant oils for dust control.

Site 14, Battery Acid Disposal Area, consists of a former battery acid disposal area associated with Building 245 and a separate catch basin. Building 245 was used as a heavy equipment maintenance shop. An asphalt parking area extends from Building 245 south to the edge of Site 14. From 1977 through 1983, fluids from batteries from facility vehicles, paints, and associated paint wastes were drained onto the unpaved ground surface beyond the edge of the parking area. Suspected contaminants included lead, other metals, waste oils, and solvents from paint products and paint strippers. When the asphalt parking area was washed down, contaminated surface water runoff drained over the edge of the pavement onto an unpaved area. The

unpaved area sloped to a culvert that drains to Marshburn Channel. A separate catch basin near the battery acid disposal area also was investigated.

Based on DON/USMC's analysis, the remedial investigation of Sites 7 and 14 showed that low levels of contaminants were present in shallow soil at each site. Chemicals of potential concern considered by DON/USMC at both Sites 7 and 14 included total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), and metals. Pesticides also were present in shallow soil throughout Site 7. At both sites, PAHs and metals are the most widely distributed classes of chemicals in shallow soil. The highest concentrations of contamination generally were limited to areas very near the surface, usually between 0 to 4 feet bgs. Concentrations of PAHs were reported to a depth of approximately 4 feet bgs. Except for metals, these chemicals generally diminished to trace concentrations at depths greater than 5 feet bgs.

DON/USMC performed a risk assessment at Sites 7 and 14. The risk assessment showed that excess cancer risks were less than 10^{-4}. Arsenic and PAHs were reportedly the main contributors to cancer risk at these sites. Non-cancer risks exceeded 1 at one of the areas of Site 7. According to DON/USMC, the largest contributors to non-cancer risk were the naturally occurring metals manganese and arsenic. DON/USMC reported that no site-related activities involved use of these metals. According to DON/USMC, PAHs were present at low concentrations and do not have a tendency to move off-site. For these reasons, DON/USMC has recommended no further action at both of these sites.

DISCUSSION

GeoSyntec noted a number of issues in the RI and in the Proposed Plan that need to be addressed by DON/USMC. In addition, GeoSyntec has a number of

questions regarding issues discussed in the RI. Obtaining a response to these questions will help the MCAS El Toro Master Redevelopment Program (MRP) in planning reuse of MCAS El Toro. The following is the description of issues and questions identified by GeoSyntec:

Issue/Concern No. 1

DON/USMC indicates that battery fluids from facility vehicles were drained onto the ground surface at Site 14. DON/USMC further states that the volume of battery acid (sulfuric acid) disposed at the site is estimated at 210 gallons (see RI at page P1-2). Battery acid has a very low pH. Therefore, the soil on which the battery acid was spilled would likely also have a low pH. Did DON/USMC test the soil and the groundwater for pH at Site 14? Did DON/USMC evaluate the impact of potentially low pH in the soil and groundwater on the presence and mobility of other contaminants (such as metals) in the vadose zone and groundwater?

Issue/Concern No. 2

Figures 3-1 and 4-2 (see RI at pages P3-3 and P4-7, respectively) show two arrows labeled "acid disposal and paint waste stain area." It is unclear whether these arrows designate the area delineated by the blue dashed line or simply a smaller localized area at the end of the arrow. If the arrows designate a small-localized area, then, based on the sampling location shown in Figure 4-2 (see RI at page 4-7), no samples were collected specifically in the "acid disposal and paint waste stain area." Does DON/USMC intend to collect and chemically analyze soil samples at the "acid disposal and paint waste stain area" noted on Figures 3-1 and 4-2? In addition, could the soil below the pavement at Sites 7 and 14 and the soil next to the culvert that drains to Marshburn Channel at Site 14 have been chemically impacted. Does DON/USMC intend to collect and analyze soil sample at these locations?

Generally speaking, it does not appear that the soil sampling locations at Sites 7 and 14 were selected based on the anticipated location of releases nor on the location of low topographic points where spilled liquids may have accumulated. Does DON/USMC intend to sample these areas?

In addition, the corresponding risk assessments do not make note of the lack of sample coverage in areas that had been used for waste disposal. This factor should have been a prominent topic in the characterization of uncertainties presented with risk estimates, since it is critical information for risk managers interpreting the significance of estimated risks in the context of a "No-Further-Action" recommendation. While the risk estimates based on sampled locations may be adequate for characterizing overall site risks, the inability to identify localized areas with potentially much higher concentrations (due to the lack of sampling) is a substantial limitation with regard to determining the appropriateness of future land uses in particular locations. As a specific example, in its responses to DTSC and EPA comments on the Draft RI and the final RI, DON/USMC has presented the highest soil lead concentration (931 mg/kg) observed at Site 14 as an outlier and not considered this as an indicator of the need for further evaluation or remediation. Dismissing such levels is premature in light of the uncertainty as to whether the lead concentrations in the specific locations where batteries were drained have been characterized.

Issue/Concern No. 3

Petroleum hydrocarbon was detected in many of the samples collected at Sites 7 and 14. For example, TPH concentrations as high as 32,091 mg/kg (3.2 percent) were detected in surface soil samples at Unit 5 of Site 7. Such TPH concentrations in surface soil typically have required site remediation (for example, typical TPH action levels established by the Orange County Health Care Agency for former oil production sites range from 100 to 1,000 ppm depending on location and site reuse). Does DON/USMC intend to remediate TPH-impacted soil at Sites 7 and 14?

Issue/Concern No. 4

DON/USMC states in the RI that arsenic is responsible for a large part (50 percent at Site 7 and 40 percent at Site 14) of the carcinogenic risks at Sites 7 and 14 (see RI at pages O7-5 and P7-2). DON/USMC adds that the arsenic concentrations at Site 7 are not attributable to known historical site activities and that Sites 7 and 14 may have a higher background concentration than the statistically calculated background concentrations of arsenic for MCAS El Toro. Has DON/USMC evaluated the potential for arsenic to originate from alloy additives used, for example, in battery grids (see Hawley's Condensed Chemical Dictionary, 11th Edition at page 98)? Similarly, has DON/USMC evaluated the potential for presence of arsenic in the pesticides and herbicides used at MCAS El Toro as part of base operations?

DON/USMC states in the RI (see RI at page O7-6) that manganese is responsible for the hazard index (HI) being greater than 1 at Unit 1, Site 14. DON/USMC states that manganese is present in background and is not attributable to MCAS El Toro activities. Has DON/USMC considered that presence of manganese could be associated with aviation activities because manganese is used in many metal alloys used in aviation and in welding and cutting torches used in repair or maintenance shops?

Issue/Concern No. 5

DON/USMC calculated the excess cancer risk and the HI for Sites 7 and 14. The maximum cancer risk calculated by DON/USMC is 4.4×10^{-5} at Unit 1 of Site 14 for a future resident and the maximum HI is 1.4 for Unit 1 of Site 7 for a future resident. In previous documents, DON/USMC indicated that the acceptable excess cancer risk was 10^{-6} following site remediation (see Responsiveness Summary to Proposed Plan,

Sites 8, 11, and 12, dated July 1999, at pages 3 and 4). Has DON/USMC modified the acceptable risk level to be used for remediation at MCAS El Toro? If so, why?

Issue/Concern No. 6

It is not clear from the proposed plan whether DON/USMC will require institutional controls for Sites 7 and 14. Does DON/USMC intend to release Sites 7 and 14 for unrestricted use?

This issue is important to consider in evaluating the appropriateness of the submitted risk assessment for supporting risk management decisions. The current risk assessment specifically omits calculation of risks associated with groundwater-associated chemicals. Thus, in order for the subsequent risk assessment results to be used to document the overall lack of risks requiring remediation, the underlying exposure assumption (i.e., no groundwater-related risks) must be maintained. So, the risk assessment results may be appropriate if groundwater exposure is definitely controlled through institutional or engineering controls. Conversely, if the risk assessment was updated to consider potential groundwater risks, it would be suitable for supporting the appropriateness of unrestricted future uses.

Issue/Concern No. 7

Given that some of the calculated risks for Sites 7 & 14 exceed standard threshold for non-cancer risks and reach to within approximately a factor of two (i.e., 0.44×10^{-4}) of the least conservative end of the "risk management" range for excess cancer risk (10^{-6} to 10^{-4}), the approach of using a single media (soil) risk assessment gives rise to significant uncertainties with regard to supporting a recommendation of no further action. In previous reviews of the RI, DTSC has pointed out that risks from all pathways should be accumulated to present an overall estimate of potential site risks. This would include potential risks from groundwater. DON/USMC has responded that

groundwater risks are evaluated under a separate assessment. Under this approach, however, overall risks at Sites 7 and 14 are not disclosed to decision-makers evaluating these particular locations for future uses. The relative "closeness" of the overall soil risk estimates to the least conservative "risk management" criterion indicates that it would not take much additional contribution from omitted pathways to potentially change risk management recommendations. Does DON/USMC intend to evaluate total risk (i.e. risks including all potential pathways) for Sites 7 and 14?

Issue/Concern No. 8

Other factors in the risk assessments noted to create uncertainties leading to underestimates of potential risks have been pointed out earlier by DTSC. This review provides additional questions/concerns related to other similar uncertainties.

The handling of indications of elevated lead concentrations was mentioned above. In addition to such questions about localization of lead impacts, the issue of the protectiveness of other measured concentrations still has not been clearly resolved. The results of CAL-EPA LeadSpread model presented by DON/USMC indicate that a remedial goal of 290 mg/kg would be needed to maintain 99% confidence that children's blood lead would not exceed regulatory criteria. It is not just one potential outlier, but 3 of 10 (30%) of the measured values that exceed this remedial goal. Thus, children's exposures at 30% of the locations evaluated could lead to unacceptable blood lead levels. So, while from the perspective of overall site risks, measured lead levels may not be expected to result in significant risks, the picture at a substantial proportion of individual locations may be much different. Indeed, with uncertainties regarding the characterization of specific waste disposal locations, the areas with the highest risks may not even be identified. These area-specific issues are important from the perspective of evaluating future uses for particular areas.

Excluding potential carcinogenic risks from chromium also leads to unaddressed uncertainties and would lead to underestimates of potential risk. In the risk assessment, DON/USMC uses the justification that samples analyzed from other sites have not contained a significant proportion of the carcinogenic (hexavalent) form of chromium. Absent site-specific information on chromium speciation, the default requirement for risk assessment is to treat the entire concentration as the more toxic, carcinogenic form. The use of sampling results from other sites to support an alternative assumption that none of the chromium is in the hexavalent form is subject to considerable uncertainty for sites where metals were directly disposed. There is clear potential for the chromium found at battery acid disposal sites and tank washout sites to differ from other types of sites and natural background with regard to the proportion of chromium in the hexavalent form. This is the reason that site-specific measurement is typically required to support reducing the fraction considered carcinogenic in risk assessment. Since the risk assessments considered none of the chromium to be carcinogenic, there was no discussion of the potential risks or the uncertainty of the approach that was used.

The potential uncertainties associated with using a depth interval from 0 to10 feet, inclusive, for estimating potential residential risks were raised by DTSC. The risk assessments used all of the results obtained from various depths down to 10 feet in estimating the average (mean) and subsequent 95% upper confidence limit of the mean used to represent potential exposure. Since the RI points out that the highest concentrations were measured near the soil surface, including results from deeper samples (0 to 10 feet) tends to "average out" the concentrations used for residential exposures. Some comparisons between the exposure point concentrations (EPCs) calculated for 0 to 2 foot soils at Site 7 Unit 1 (See RI at Table I1-6) versus those for 0 to 10 feet soils (See RI at Table I1-7) are illustrative as shown below:

Chemical	Shallow EPC	Deep EPC
Arsenic	6.98 mg/kg	4.99 mg/kg
Benzo(a)pyrene	1.39 mg/kg	0.36 mg/kg
Benzo(a)anthracene	1.09 mg/kg	0.26 mg/kg
Dibenz(a,h)anthracene	0.62 mg/kg	0.35 mg/kg

Note that the corresponding risk estimates for 0 to 2 feet soil would have been higher than those presented for future residents by approximately 30% for arsenic, approximately four-fold for benzo(a)pyrene, and approximately two-fold for benzo(a,h) anthracene.

In response to DTSC's comment on the RI on this issue, DON/USMC points out that an approved workplan stipulated that future residential exposures would assume exposure to soil mixed over the 0 to 10 foot depth interval. While this is a standard assumption with regard to soils that may be excavated, turned, and mixed in the process of installing a building with a basement, the applicability of this scenario to future land uses is not clear. Unless activities involving such soil mixing are necessary (or mandated), it is difficult to ensure that future users would not be exposed to the surficial concentrations. Failing to estimate such surficial soil risks for potential future residents limits the information available to decision-makers with regard to the suitability of certain future uses.

CONCLUSION

The ultimate conclusion of the RI (see RI at pages O7-9 and P7-8) and the Proposed Plan (see Proposed Plan at page 5) is that no further action is required at either Site 7 or 14. This conclusion appears to be based, in part, on the following assumptions by DON/USMC:

- The excess cancer risk is less than 10^{-4}.

- Arsenic and manganese are naturally occurring.

However, an excess cancer risk of 1×10^{-6} historically has been used as the standard for residential risk at the MCAS El Toro. A no-further-action approach at Sites 7 and 14 would leave a residential excess cancer risk greater than 10^{-6}. In addition, one of the risk drivers, arsenic, in fact, may not be naturally occurring at Sites 7 and 14 as assured by DON/USMC. Further, non-cancer risks were above the threshold HI of 1 that is typically the trigger for further evaluation or remediation. And, there were clearly areas of lead contamination substantially exceeding both the default CAL-EPA residential criterion and the remedial goals calculated in the site-specific risk assessment. The limitations and readily identifiable factors that may result in the reported risk estimates underestimating potential risks for these sites under certain future uses means that risk management decisions should make use of the risk assessment finding conservatively. Finally, it appears that concentrations of TPH well in excess of typical action levels are present at Sites 7 and 14. In light of these factors, DON/USMC's conclusion that no remediation of Sites 7 and 14 is required does not appear to be valid and, therefore, must be re-evaluated.

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