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M E M O R A N D U M

TO: Polin Modanlou, MCAS El Toro Local Redevelopment Agency

FROM: Bert Palmer, Ph.D., P.E., GeoSyntec Consultants

DATE: 16 July 1999

SUBJECT: Draft Final Record of Decision for Operable Unit 2B
MCAS El Toro, Landfill Sites 2 and 17
Orange County, California

GeoSyntec Consultants (GeoSyntec) performed a review of the Draft Final Record of Decision (Draft ROD) issued by Department of Navy / United States Marines Corps (DON/USMC) in June 1999 for Sites 2 and 17. While the Draft ROD addresses in greater detail some of the concerns noted by the Local Redevelopment Agency (LRA) regarding the proposed landfill remedy, a number of outstanding technical issues have not been addressed or resolved.

As a general matter, the description of Alternative 3 (the proposed remedy) presented by DON/USMC in the Draft ROD is not sufficiently detailed. DON/USMC proposes to identify many important details of the proposed remedy following finalization of the ROD (i.e., during the remedial design stage of the remediation process) (see Draft ROD at 9-2). GeoSyntec recommends that DON/USMC prepare design details, such as details regarding the cover construction and monitoring of the cover performance, in the immediate near future, prior to finalization of the ROD. Providing such information to interested parties would ensure a full and complete review of the proposed remedy, and would minimize the likelihood of delays or disputes in the implementation of the final remedy.

In addition, a number of technical issues are presented in this memorandum and have been organized in the following sections:

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- Historical Radiological Assessment Issues
- Cover Design Issues
- Cover Cost and Performance Issues
- Gas Control Issues
- Groundwater Quality and Remediation Issues
- Landfill Monitoring Issues

HISTORICAL RADIOLOGICAL ASSESSMENT ISSUES

In May 1999, DON/USMC issued a document titled "Draft Historical Radiological Assessment Marine Corps Air Station, El Toro" (Draft HRA) prepared by Supervisor of Shipbuilding, Portsmouth, Virginia, Environmental Detachment, Vallejo, California for Naval Sea Systems Command Detachment, Radiological Affairs Support Office and Naval Facilities Engineering Command, Southwest Division. The Draft HRA identifies areas at Marine Corps Air Station, (MCAS) El Toro potentially impacted by radiological materials. By letter dated June 21, 1999, the LRA submitted to DON/USMC comments and questions prepared by GeoSyntec concerning the Draft HRA. These comments are incorporated by reference in this memorandum. To date, the LRA has not received any response from DON/USMC to the comments and concerns regarding the Draft HRA. GeoSyntec recommends that DON/USMC address the June 21, 1999 submittal, and the issues set forth below, prior to finalizing the Draft ROD.

The authors of the Draft HRA note that radioactive materials may have been discarded at MCAS El Toro (see Draft HRA at 17). Nonetheless, the authors of the Draft HRA conclude that it is not likely that the intentional disposal of general radioactive materials (G-RAM) in MCAS El Toro landfills occurred, and that the disposal of non-permitted G-RAM at Sites 2 and 17 is unlikely due to the time periods in which Sites 2 and 17 were used (see Draft HRA at 55). The documentation in support of these conclusions, however, appears limited. In addition, the authors of the

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draft HRA do not address scenarios in which permitted G-RAM may have been disposed of in Sites 2 and 17. Nor do the authors address in any detail the possible disposal of equipment and other objects historically coated with paints and other coatings containing radioactive materials. Similarly, the authors do not address in detail various analytical data and analyses indicating the presence of radionuclides in soil and groundwater at and in the vicinity of Sites 2 and 17 (see Draft ROD at Section 5).

In light of these findings, one may conservatively conclude, absent additional information or data, that radioactive materials may have been disposed of in Sites 2 and 17. This conclusion raises a number of questions and concerns, including the following, that should be addressed by DON/USMC prior to finalizing the Draft ROD:

- Results of the personnel interview conducted in 1994 are presented on page 18 of the Draft HRA. The result states in pertinent part: *"Although there was no direct knowledge of radioactive material disposed of into any landfills, interviewees indicated that it is possible that equipment painted with radium paint could have been disposed of into the landfills by the marines."* Based on available information, does DON/USMC believe that radioactive materials are present in Sites 2 and/or 17? Has the proposed remedy for Sites 2 and 17 been designed based upon the assumption that radioactive materials have been disposed of in these sites? If not, why not?
- The authors of the Draft HRA recommend further radiological investigations at MCAS El Toro. Does DON/USMC intend to conduct or authorize such investigations? If so, will the investigations include Sites 2 and 17? If so, on what schedule will the investigations be undertaken? Do they confirm the findings presented in the Draft HRA?

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- Should additional investigations indicate that radioactive materials are present at Sites 2 and/or 17, what would be the impact of the presence of these radioactive materials on the remedy selected by DON/USMC for Sites 2 and 17 on the proposed post-remediation reuse of these sites?
- The Draft HRA addresses groundwater pathways. Has DON/USMC completed modeling of the transport of radioactive materials and contaminants from the landfills to the groundwater? Does DON/USMC have any information or expect to receive any information about the ability of the soils beneath the landfills to attenuate or impede the migration of radioactive materials and contaminants from the landfills to the groundwater?
- The Draft HRA includes a description of possible radioactive constituents that may be in the landfills. Does DON/USMC have any documentation of the period over which these constituents may remain active within the landfill. Has DON/USMC given consideration to the decay (daughter/progeny) products and their impact, if any, on the integrity and performance of the remediated landfills (as proposed by DON/USMC)?
- U.S. Nuclear Regulatory Commission procedures for closing a site at which there may be radioactive constituents includes a requirement for a radiological performance assessment. Has DON/USMC conducted such a performance assessment at Sites 2 and 17, or is one planned for Sites 2 and 17? If so, what is the schedule for the completion of such a performance assessment?

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As noted above, GeoSyntec recommends, at a minimum, that the Draft ROD not be finalized until DON/USMC responds to these and other comments regarding the Draft HRA.

COVER DESIGN ISSUES

DON/USMC proposes in the Draft ROD to use the contaminated soil excavated from Sites 8, 11, and 12 as foundation material for the landfill caps at Sites 2 and 17 (see Draft ROD at 7-13). This contaminated soil is not considered hazardous but nonetheless exceed action levels established for Sites 8, 11, and 12. GeoSyntec is not aware that use of contaminated soil from Sites 8, 11, and 12 as foundation material for the cover of Sites 2 and 17 was considered in the Sites 2 and 17 Feasibility Studies and Proposed Plan. While use of contaminated soil as part of the foundation material for the cover of Sites 2 and 17 was mentioned in the Site 2 and 17 Draft ROD, no technical analysis appears to have been provided in support of this proposal.

By letter dated June 7, 1999, the LRA submitted to DON/USMC comments prepared by GeoSyntec concerning the Proposed Plan for Sites 8, 11, and 12. Included in these comments were a number of questions and concerns regarding the use of contaminated soils as foundation material at Sites 2 and 17 (these comments are incorporated by reference into this draft memorandum). GeoSyntec recommends that DON/USMC address the June 7, 1999 submittal, and the additional concerns and issues set forth below, prior to finalizing the Draft ROD.

In addition to the issues raised in the June 7, 1999 submittal by the LRA to DON/USMC, a number of concerns regarding the potential use of contaminated soils as foundation material at Sites 2 and 17 arise, including the following:

- What additional features or modification does DON/USMC contemplate will be included in the remedial design of the proposed remedy for Sites 2 and 17 to protect human health and the

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environment from the contaminants present in soils originating from Site 8, 11, and 12?

- The authors of the Draft HRA conclude that Site 8 is an area potentially impacted by radioactive materials. What additional feature or modifications does DON/USMC contemplate will be included in the remedial design of the proposed remedy for Sites 2 and 17 to protect human health and the environment from such radioactive materials?
- DON/USMC indicates that no increase in risk will occur as a result of the use of contaminated soil at Sites 2 and 17 (see, e.g., Draft ROD at 7-9). What is the basis for this conclusion? Has DON/USMC quantified this risk? If so, could DON/USMC provide this risk assessment to the LRA for review?
- Has DON/USMC considered and quantified any potential impacts to groundwater as a result of the use of contaminated soil at Sites 2 and 17?
- Has DON/USMC considered and quantified potential additional settlements in the landfill waste that could result from the added mass of soil disposed of at Sites 2 and 17? Have the cover and site grades been designed to accommodate such settlements?
- What is the opinion of the regulatory agencies concerning the use of contaminated soils at Sites 2 and 17? Would such use constitute the disposal of a waste? Would such use be distinguished from the consolidation of existing, previously disposed wastes at Sites 2 and 17? What would be the regulatory status of the excavated soils that

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DON/USMC proposes to use at Sites 2 and 17 (e.g., Special waste? Designated waste?)

- Will disposal of contaminated soil at Sites 2 and 17 change the regulatory status of Sites 2 and 17? (Stated alternatively, would these sites be considered active disposal sites and be subject to permitting, design, construction, monitoring, and closure requirements different from the applicable or relevant and appropriate requirements considered thus far by DON/USMC in the Sites 2 and 17 remediation process?) What regulations and/or requirements would apply if Sites 2 and 17 were considered "active" landfill sites as a result of the placement of uncontaminated soils from Sites 8, 11, and 12? What is the position of the regulatory agencies with respect to this issue?

As noted above, GeoSyntec recommends that these and related concerns be addressed prior to finalization of the Draft ROD. In the alternative, DON/USMC should consider disposing of such contaminated soils off-site, rather than at Sites 2 and 17. If DON/USMC chooses the latter course of action, it should memorialize its decision in the ROD.

COVER COST AND PERFORMANCE ISSUES

DON/USMC indicates that soil used to construct the soil cap at Sites 2 and 17 will be excavated, mixed, and compacted to achieve a minimum hydraulic conductivity of 2×10^{-5} cm/s (see, e.g., Draft ROD at 7-7). DON/USMC also indicates some or all the soil that will be used to construct the soil cap at Sites 2 and 17 may be imported from an off-Station source (see Draft ROD at 7-7). However, DON/USMC states in the Draft ROD that the soil cap material will be constructed using soil obtained from a borrow located between Sites 2 and 17 (see, e.g., Draft ROD at 9-1).

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In previous investigations of the proposed on-site borrow location, DON/USMC determined that the hydraulic conductivity of on-site soils was more than 2×10^{-5} cm/s (see UNSAT-H Infiltration Modeling Report dated October 1999 at 7). On the basis of existing data, soil import and mixing are needed to achieve the target hydraulic conductivity of 2×10^{-5} cm/s. To GeoSyntec's knowledge, these issues and their related costs were not contemplated or analyzed by DON/USMC in the Remedial Investigations, Feasibility Studies, or Proposed Plan for Sites 2 and 17. Thus, the actual construction cost for Alternative 3 will likely be significantly greater than that planned by DON/USMC. Should and/or will DON/USMC reevaluate the feasibility and suitability of Alternative 3 as the preferred alternative based on these new considerations?

GeoSyntec also anticipates that the California Regional Water Quality Control Board (CRWQCB) and California Integrated Waste Management Board (CIWMB) likely will give only a conditional approval of the soil cover (Alternative 3) for Sites 2 and 17. Final approval likely will be granted only following a field demonstration of the equivalence between a soil cover and the so called "Title 27 prescriptive cover" discussed in the Draft ROD. In light of these uncertainties and the field verification testing required for demonstration of the equivalence between Alternative 3 and the Title 27 prescriptive cover, would other alternatives previously rejected by DON/USMC become feasible alternatives for Sites 2 and 17?

LANDFILL GAS GENERATION ISSUES

Based on information provided in the Remedial Investigation/Feasibility Study Reports for Sites 2 and 17, and the information summarized in Sections 5.2.2.2 and 5.3.2.2 of the Draft ROD, methane was detected at Site 2 and (to a lesser extent) at Site 17 at concentrations of up to 2.5% as measured during the air SWAT Investigation at Site 2. The presence of methane indicates that landfill gas likely is being generated at the landfills. Therefore, it is necessary to perform gas monitoring in the vadose zone and through the landfill cover in accordance with a number of requirements including,

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for example, the South Coast Air Quality Management District (SCAQMD) Rule 1150 and California Code of Regulations (CCR) Title 27, Subchapter 4, Article 6. Monitoring shall be performed using a monitoring network, monitoring schedule, and monitoring program adapted to reuse of the land within a 1,000-ft radius around the landfill sites. If necessary, based on monitoring data, a gas extraction system shall be installed to properly control landfill gas migration from the landfills.

In addition to methane, landfill gas contains volatile organic compounds (VOCs). These VOCs have a tendency to migrate in the vadose zone, away from the landfill to groundwater. Such migration could cause impacts to underlying groundwater, such as the elevated concentrations of tetrachloroethene and trichloroethene detected in groundwater Monitoring Wells 02_DGMW61 and 02NEW 8A located downgradient of Site 2 (see Draft ROD at Figure 5-6). Landfill gas modeling was performed by DON/USMC in August 1997 as part of the Site 2 Feasibility Study (see Site 2 FS at Appendix B) and additional gas modeling was performed in October 1998 for Sites 3 and 5 following the close of the public comment period on the Proposed Plan for Sites 2, 3, 5, and 17 (see report titled "Landfill Gas Emission Model -- MCAS El Toro" prepared by Bechtel National, Inc.). By letter dated 23 November, 1998, the LRA submitted to DON/USMC various comments and questions prepared by GeoSyntec concerning DON/USMC's landfill gas modeling. To date, the LRA has not received a detailed response to this submittal.

In light of the above, GeoSyntec recommends that final action on the Draft ROD be deferred until DON/USMC responds the questions and concerns raised by the LRA concerning this issue. In the alternative, GeoSyntec recommends that DON/USMC consider installing, as a part of the final remedy, a cost-effective infrastructure designed to support a gas control system. GeoSyntec would be pleased to discuss these landfill gas generation issues with DON/USMC in the near future.

GROUNDWATER QUALITY AND REMEDIATION RESULTS

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DON/USMC appears to have revised its position regarding the contribution of the landfills to groundwater contamination. DON/USMC indicates that in the Draft ROD that metals are not contributing to groundwater contamination at Sites 2 and 17 based on a recently-completed study (see Draft ROD at 5-12). As VOC were not detected at Site 17, DON/USMC has determined that groundwater need not be remediated at this landfill. However, as VOCs were detected at Site 2, DON/USMC has determined that impacts to groundwater at this site will be addressed in a separate Record of Decision or in an amendment to the ROD for Sites 2 and 17 (see ROD at 7-14).

DON/USMC provided the LRA a copy of the report titled "Draft Final CERCLA Groundwater Monitoring Plan -- MCAS El Toro" (June 1999). GeoSyntec, on behalf of the LRA, currently is reviewing this document and will provide detailed comments to the LRA in the near future. GeoSyntec recommends that the Draft ROD not be finalized until the parties are able to discuss these issues in detail.

In addition, due to uncertainties associated with the potential presence of radionuclides and perchlorate in groundwater (as reflected in DON/USMC's reports titled "Draft Evaluation of Perchlorate in Groundwater," dated April 1999, and "Draft Final CERCLA Groundwater Monitoring Plan," dated June 1999), GeoSyntec recommends that DON/USMC consider issuing a Record of Decision for groundwater for both Sites 2 and 17. This would provide DON/USMC additional time to monitor the landfill sites, augment its groundwater quality database, and develop a more appropriate remedy for groundwater.

LANDFILL MONITORING ISSUES

In the Draft ROD, DON/USMC proposes a monitoring plan for Sites 2 and 17 (see, e.g., Draft ROD at Tables 9-3 and 9-4). The monitoring plan includes landfill gas monitoring, leachate monitoring, and groundwater monitoring. DON/USMC also describes sampling locations, frequency of sampling, and list of analyses. However, as

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radionuclides, metals, and organic compounds were detected in surface water (see Draft ROD at Section 5), the proposed monitoring program should be modified to include surface water sampling and analysis for these compounds. Generally consistent with recommendations and comments made by DTSC, GeoSyntec recommends that the proposed monitoring frequency be revised in the following manner:

- Landfill Gas Monthly
- Vadose Zone Gas Monthly
- Groundwater Quarterly
- Surface Water Quarterly
- Leachate Semi-Annually
- Landfill Cap Quarterly
- Grading Quarterly, and
- Vegetation Quarterly

The proposed monitoring frequencies will better enable DON/USMC to identify and evaluate site conditions. Following completion of monitoring activities for a five-year period, monitoring frequencies may be re-evaluated and modified, following review and approval of relevant regulatory agencies.

In the proposed monitoring plan, DON/USMC does not provide a detailed description of the methodology that will be used to analyze the data and to determine whether additional remedial action is necessary. Such methodology should be based on the requirements of Title 27 for landfill monitoring, should be included in the monitoring plan and should be approved by the regulatory agencies. This would streamline the data analysis process and facilitate the decision-making process pursuant to which an evaluation monitoring program or corrective action program would be initiated.

GeoSyntec also recommends that DON/USMC develop a preliminary response plan as part of the ROD, which would be implemented if a corrective action

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program becomes necessary (i.e., gas recovery and treatment system or groundwater treatment system installation). Such a preliminary response plan would integrate the corrective action program with the preferred alternative, site reuse plan, and surrounding site reuse plan. The ease of integrating the potentially needed corrective action with the remedy should be considered in the remedy evaluation and selection process.

CONCLUSION

We look forward to working with you on these issues and to receiving responses to these comments from DON/USMC.
