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San Francisco City and County
Department of Public Health
Environmental Health Section
Hazardous Waste Program

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October 31, 2007

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Draft Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard, San Francisco, California, prepared by Engineering/Remediation Resources Group and Shaw Environmental, Inc. for the Department of the Navy, dated March 2007

This letter serves as a cover letter to the attached comments which we previously transmitted to you on September 14, 2007.

Sincerely,

Amy D. Brownell

Amy D. Brownell, P.E.
Environmental Engineer

cc: Melanie Kito, Navy
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Treadwell&Rollo

MEMORANDUM

TO: Amy Brownell, SFDPH

FROM: Dorinda Shipman; Glenn Leong; Sigrida Reinis; John Gouchon

DATE: 30 August 2007

PROJECT: Hunters Point Shipyard
San Francisco, California
3848.02

SUBJECT: Comments on the Parcel E-2 Remedial Investigation/Feasibility Study Report

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This memorandum transmits Treadwell & Rollo's comments on the report titled *Draft Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard, San Francisco, California*, prepared by Engineering/Remediation Resources Group and Shaw Environmental, Inc. for the Department of the Navy, dated March 2007.

GENERAL COMMENT

Presumptive Remedy Approach

In view of the extremely high cost associated with the excavation and off-site disposal of the entire landfill contents (Alternative 2) along with the other considerations discussed in this RI/FS, the selection of the CERLA municipal landfill presumptive remedy for the Parcel E-2 landfill (Alternative 3) seems appropriate. However, in light of the uncontrolled nature of the historical landfilling operation (e.g., no containment or monitoring systems); the unique location of the landfill (i.e., high proportion of waste submerged within the A-aquifer); the potential presence of radiological wastes ("Radiological RI/FS" is pending); and community concerns, it is recommended that the Navy adopt a more rigorous approach to evaluating and implementing the presumptive remedy. As currently written, this document over-emphasizes the "capping" portion of the presumptive remedy and underplays the potential benefits of other portions of the presumptive remedy (e.g., hot spot identification and excavation) and other variants of technologies or process options (e.g., excavation and on-site consolidation of landfill waste). Specific comments below address this general comment in greater detail.

SECTION ES – EXECUTIVE SUMMARY

Section ES.2.2 – Landfill Gas

This section only describes the landfill gas data collected in 2002 as part of the non-standard data gaps investigation. Additional sources of landfill gas data include the Navy's original Parcel E RI and select groundwater monitoring reports. This section should be expanded to include all landfill gas data ever collected from any location at Parcel E, including temporary gas monitoring probes (GMPs), permanent GMPs, surface/ambient air locations, and groundwater monitoring wellheads, so that as complete and comprehensive a picture as possible is presented. It might also be worth mentioning that during the 2002 non-standard data gaps investigation a number of soil borings were terminated prior to reaching full

depth when methane was encountered at 100 percent of the lower explosive limit (LEL) within the borehole.

SECTION 7.0 – HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

General Comment

The Parcel E-2 landfill is being evaluated under a presumptive remedy regarding capping. Although the evaluation of the Parcel E-2 area was performed assuming future open space use, portions of Parcel E, as noted in Figure 1-15, are industrial and research and development land use. Since industrial and research and development land use was not evaluated as part of the HHRA, it should be noted that no portion of Parcel E-2 can be used for industrial and research and development land use without a land use-specific HHRA.

The risk assessment evaluated exposure to chemicals in soil, intertidal sediment, and groundwater at Parcel E-2. Section 3.9.2 of the report indicates that monthly landfill gas monitoring is being conducted, primarily along the fenceline of the landfill and the UCSF compound (along the northern perimeter of Parcel E-2). Please explain why the landfill gas monitoring data was not considered in the risk assessment, both in terms of data and associated exposure scenarios. Outdoor air potential risks from methane would be limited to short-term explosion/fire, whereas a construction worker may also be subject to asphyxiation issues due to methane displacement of oxygen under the trench exposure scenario evaluated for groundwater exposure.

Section 7.1.1.1 Exposure Scenarios and Pathways

Receptors included in the HHRA were limited to a recreational user (child and adult) and a construction worker, based upon the designation of the area as open space. Only surface soil (0-2 feet) was evaluated for the recreational user, while the subsurface soil (0-10 feet) was evaluated for the construction worker. For non-VOCs, the evaluation of surface soil for a recreational user is appropriate based upon the likely limited soil intrusion by recreational users. As noted in Table 7.9 and in Section 7.1.2.2, naphthalene was detected in subsurface soil. Although potential exposure pathways to VOCs in surface and subsurface would be limited to outdoor air inhalation exposures, which would likely be attenuated by wind dispersion, VOCs in subsurface soil should be evaluated for the recreational user.

Groundwater exposure from chemicals in the A-aquifer was limited to hypothetical domestic use of the groundwater for the recreational user and a trench volatilization and dermal contact exposure pathway for the construction worker. The presence of VOCs in the groundwater, including naphthalene and tetrachloroethene, should be considered in the evaluation of potential outdoor air inhalation exposure scenarios for the recreational user. A discussion of VOC distribution near the shoreline, where groundwater mixes with surface water (as noted in Section 7.3) should be provided to allow for evaluation of potential VOC exposures to a recreational user.

If the outdoor air inhalation of VOCs pathway is not quantified, a discussion of the potential underestimate of risk due to exclusion of the pathway should be included in Appendix K, Human Health Risk Assessment, Section K9.0 (Uncertainty Analysis). The exposure pathway should be added to Figure K-1.

SECTION 9.0 – REMEDIAL ACTION OBJECTIVES

Section 9.2 Landfill Gas RAOs

It is true that "methane gas emitted from the landfill may migrate off-site and could accumulate in structures and confined spaces to create an explosive or oxygen-deficient atmosphere." However, it is also possible for methane to be present on-site near the ground surface (i.e., not just in the subsurface or in structures or confined spaces) at explosive concentrations, which presents a risk that needs to be mitigated. Anecdotal evidence indicates that methane may be present above landfills in unconfined conditions at concentrations that exceed the LEL of 5% and have the potential to cause a nuisance or even bodily injury if ignited by a construction worker (case study re. City of San Diego landfill) or a recreational user (Shoreline Amphitheater, Mountain View). Therefore, although CCR Title 27 does not explicitly mandate that methane concentrations in open air (unconfined conditions) immediately above the landfill cover be controlled to 5% or less by volume in air and although the ambient air survey that was conducted by the Navy in 2002 (Final Parcel E Nonstandard Data Gaps Investigation Landfill Gas Characterization, dated 23 December 2003) did not detect combustible gases within the ambient air breathing zone at any surveyed location with the landfill area, this public safety issue is of sufficiently great concern that it should be an RAO (or at least categorized as "to be considered") if future open space recreational land use with public access is envisioned, as stated in Section 11.2.

Section 9.3 Groundwater RAOs

It is understood that "a method for comparing groundwater data to saltwater aquatic criteria, in a manner that accounts for chemical attenuation and the near-shore mixing process" is currently under development, and it is anticipated that the method will be agreed upon by the Navy and the regulatory agencies prior to the finalization of this RI/FS. All comments regarding this and all subsequent sections of the RI/FS are contingent upon this assumption.

SECTION 11.0 – IDENTIFICATION AND SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

The EPA's FS Analysis for CERCLA Municipal Landfill Sites (EPA, 1994), which reviewed the remedy selection process at 30 CERCLA municipal landfill sites, is recapped on p. 11-2 with the statements that it "found that containment was selected at all 30 sites" and that "The remedial technologies that were routinely screened out included excavation/disposal, bioremediation, chemical destruction, thermal treatment, chemical/physical extraction, thermal desorption, and immobilization." That no mention is made of the conclusions reached in the other EPA documents enumerated at the top of the page is misleading, as it presents an incomplete picture of the remedies selected at other landfill sites. The conclusions reached in the other documents are as follows:

- EPA's guidance document, Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites (EPA, 1991a) reviewed 92 such sites (Appendix B-3) and found that although capping was selected as the remedy for soils/landfill contents at 68 sites, for soils/hot spots, excavation was selected for 30 sites; onsite disposal was selected for 5 sites; off-site disposal for 13 sites; thermal treatment for 8 sites; and physical treatment for 12 sites. Thus, hot spot excavation and disposal or treatment was a component of remedial actions at a large number of sites. In addition, for groundwater and leachate, groundwater collection and extraction was selected at 43 sites; leachate collection and extraction was selected at 27 sites; and physical treatment was selected at 29 sites. Thus, collection, extraction, and treatment were a frequent component of remedial action targeted for groundwater and leachate. Furthermore, "no action" was selected for only 6 sites, even though most of the sites reviewed likely did not

have a significant proportion of their solid waste immersed in groundwater, as is the case at Parcel E-2.

- An examination of 31 RODs that document remedial decisions for 51 landfills at military installations (EPA, 1996) revealed that "no action" was chosen for 10 landfills. Of the 41 landfills for which remedial actions were chosen, containment was selected for 23 (56%) sites; institutional controls only were selected for 3 sites; excavation and on-site consolidation were selected at 4 sites; and excavation and off-site disposal were selected for 11 (25%) sites.

It is recommended that this paragraph be rewritten to more accurately and fully describe the conclusions reached by EPA in the various publications cited.

Section 11.5 – Containment (With or Without Removal, Treatment, and/or Disposal) and Section 11.6 – Removal by Excavation and Off-Site Disposal

Neither of these sections discusses remediation of potentially remaining hot-spots. Although the Navy has completed several substantial removal actions on Parcel E-2, notably in the "PCB Hot Spot" and the "Metal Slag Area", further consideration should be given in this document to identifying potential hot spots within Parcel E-2. For example, as discussed below in conjunction with Appendix M, monitoring results at well IR01MW366A may be indicative of a hot spot within the submerged landfill waste.

In addition, neither of these sections discusses excavation and on-site consolidation of waste in a meaningful way. There are several areas within Parcel E-2 that may warrant excavating landfill waste and consolidating it with like material on-site prior to capping. For example, there is landfill waste that extends across the boundary of and onto the UCSF property ("Non-Navy Property within Landfill Area", Figure 1-2). This material is a potential candidate for waste excavation and on-site consolidation. In addition, some of the remedial action alternatives discussed in Section 12 envision excavating landfill waste or debris in conjunction with the construction of a riprap revetment wall (see Figure 12-4). The wastes excavated during these construction activities are strong candidates for waste excavation and on-site consolidation. There may also be other portions of the landfill that are appropriate for this technology/process option. In all cases, the excavated waste/soil would be placed with other landfill material on-site, which would all be (under the presumptive remedy) capped. This is a particularly attractive option because 1) waste characterization, off-site transportation, and disposal costs are avoided, and 2) the waste consolidation can occur in an area that has not yet been capped. Thus, the Navy should give more serious consideration to this technology/process option.

Section 11.5.4.2 – [Landfill Gas] Destruction by Combustion

The first paragraph (p. 11-31) notes that, "A flare... is most cost-effective when landfill gas concentrations are sufficient to facilitate combustion." This statement seems to imply that a landfill flare could be self-sustaining under certain conditions, and it is unclear what is meant by the term "facilitate". For greater clarity, it should be stated that at this site a flare would most likely require an auxiliary fuel supply (e.g., natural gas) in order to operate properly and continuously. This is the case especially at older landfills such as this one, where the rate of and quality of methane generated can be expected to fluctuate over time and decline over the next several decades. As operating conditions change, the flare may require retrofitting or even replacement.

Section 11.5.5 – Groundwater Containment/Leachate Collection

The first paragraph of this section states, "Because the solid waste in the Parcel E-2 Landfill is submerged in the A-aquifer, groundwater containment (adjacent to the landfill) and leachate collection/treatment are functionally the same actions and are evaluated together in this subsection." This grouping is reasonable. However, the next sentence states, "A final cap over the landfill source area would reduce infiltration and associated leachate generation, and could be sufficient in preventing continued contaminant migration in groundwater." This statement is not reasonable in the case of this particular landfill because, as noted in the preceding sentence, much of the waste is submerged in the groundwater. Therefore, 1) infiltration of rainfall across the entire footprint of the landfill (if none of it was capped) is not the sole and possibly not even the most significant source of recharge for the groundwater flowing through the landfill waste and 2) the amount of leachate generated by infiltration (assuming no cap) through the unsubmerged waste is likely a fraction of the leachate generated by the flow of groundwater through the submerged waste. Stated another way, even with a highly effective cap in place, continued contaminant migration in groundwater is likely to occur largely unabated due to the continuous upgradient/off-site recharge of the A-aquifer and the high proportion of landfill waste that is submerged in the groundwater. (Section 6.2.4.1 Landfill Area Groundwater provides a more accurate statement regarding the relative contribution of precipitation infiltration to leaching of contaminants.) Furthermore, the local groundwater gradient is not likely to be significantly changed by fully capping the waste. Therefore, it is can reasonably be anticipated that impacts to groundwater being caused by the (largely submerged) waste and the rate of migration of impacted groundwater toward the Bay will continue largely unchanged solely by the construction of a cap. The sentence should be modified to say, "A final cap over the landfill source area would reduce infiltration and associated leachate generation in the unsubmerged portion of the waste."

Section 11.6 – Removal by Excavation and Off-Site Disposal

First sentence of first paragraph states, "The removal GRA includes the excavation and off-site disposal of all solid waste and impacted soil...". First sentence of second paragraph states, "For the removal GRA, the only viable process option is off-site disposal. Other process options, including on-site treatment/disposal or consolidation, either do not meet the RAOs or would require resolution of numerous technical and administrative issues that would render these options ineffective, difficult to implement, and cost-prohibitive." The "all or nothing" presentation of the excavation option coupled with the "off-site disposal" restriction is taking an overly narrow view of this technology option. Limited waste/soil excavation coupled with either on-site consolidation prior to capping or off-site disposal should be given more serious consideration. As noted earlier, the landfill waste that is located on the UCSF property as well as any construction-derived waste/soil are candidates for excavation and on-site consolidation. Excavation and off-site disposal of potentially remaining hot spots should similarly be given more serious consideration.

The EPA publication Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills (EPA, 1996) states (p. 5) that, "Consideration of excavation must balance the long-term benefits of lower operation and maintenance costs and unrestricted land use with the initial high capital construction costs and potential risks associated with excavation. Although no set excavation volume limit exists, landfills with a content of more than 100,000 cubic yards (approximately 2 acres, 30 feet deep) would normally not be considered for excavation." Using 100,000 cubic yards as an upper-end boundary on the feasibility of excavation, consideration should be given to strategically contracting the overall footprint of the landfill waste with the goal of decreasing long-term operations and maintenance costs associated with the presumptive remedy of capping, groundwater/leachate control/collection, landfill gas collection and treatment, and IC's.

Section 11.7 – Summary of Screening of Technologies and Process Options

Third paragraph states, "In addition, several groundwater containment and alternative landfill gas treatment/destruction process options were retained as viable options that may be appropriate to implement in the future; however, these were not included in any of the proposed remedial alternatives (presented in Section 12) because the need for their implementation cannot be supported by existing data."... "In the case of landfill gas, additional data are needed regarding the volume and concentrations of gas within the landfill to determine what type of gas treatment or destruction would be most implementable and cost-effective." The first statement is not entirely true in that there is sufficient information to indicate that a landfill gas collection and destruction system is necessary, particularly if this area is to be used as publicly accessible open space. In addition to the information that lead to the installation of the LFG trench/barrier wall along the northern edge of the landfill, previous groundwater monitoring efforts have indicated the presence of methane at concentrations above the upper explosive limit (UEL) within wellheads located inside the footprint of the landfill waste. The second statement is confusing because Section 12 does discuss a remedial action alternative (Alternative 3) that includes a full-scale landfill gas collection system and an enclosed flare (Figure 12-15), which appears to be based on reasonable assumptions for the conceptual design and preliminary cost estimating purposes of this RI/FS. Therefore, these two sentences should be either omitted or appropriately reworded.

SECTION 12.0 – DEVELOPMENT OF REMEDIAL ALTERNATIVES

Section 12.2.3 – Alternative 3: Contain Solid Waste, Soil, and Sediment (including monitoring and institutional controls)

The fifth bullet in the lower portion of page 12-13 states that this alternative would include decommissioning of the existing gas control system and installation and maintenance of an active gas collection system. If the existing LFG control system will in fact be decommissioned, this would be all the more reason to seriously consider excavation (and on-site consolidation) of the landfill waste located on the UCSF property (see comment regarding Section 11.6).

Section 12.2.3.5 – Landfill Gas Control

Last two sentences in first paragraph state, "...it should be noted that wetlands and Bay mud can produce methane, hydrogen sulfide, and other gases similar in composition to landfill gases. These gases would not be subject to gas collection requirements." It is true that a landfill-type active gas collection system would not be required in the adjacent, non-landfill areas. However, certain measures may need to be taken during the remediation, redevelopment, and reuse phases of the property to safeguard human health and property. For example, subsurface enclosed spaces, such as utility vaults, would need to be constructed such that any methane or other vapors that might enter them can readily be (passively) vented into the atmosphere rather than accumulating within these spaces; these spaces would also need to have warning signs placed at entry points.

Figures 12-1 through 12-15

Figure 1-2 correctly shows the location of the Parcel E-2 boundary and highlights (rose background with cross-hatching) "Non-Navy Property within Landfill Area". The figures in Section 12 incorrectly show the Parcel E-2 property line as running parallel to the limits of waste; these figures should be redrawn to show the correct location of the property line.

SECTION 13.0 – DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Section 13.3.9 – Summary of Detailed Analysis for Remedial Alternative 3

This section states, "...similar caps have been constructed throughout the San Francisco Bay Area." Although it is true that the practice of capping/containing landfills is commonplace, the Parcel E-2 landfill is somewhat unusual in that a large proportion of the landfill waste is submerged within the shallow aquifer. In view of this and the other unique aspects of this landfill enumerated in the very first comment above, a more detailed review of the methods of capping/containment (of both soil and groundwater) selected for other landfill closures, with a particular focus on those landfills containing a similarly high proportion/volume of submerged waste, should be performed as part of this RI/FS.

APPENDIX K – PARCEL E-2 HUMAN HEALTH RISK ASSESSMENT

Section K5.1.3 – Exposure Point Concentrations for Media Not Sampled

The first sentence of the second paragraph indicates that "samples were not collected for outdoor air or indoor air at Parcel E-2." Section 3.7, Outdoor Air Monitoring, indicates that several sets of outdoor air data were developed as part of the landfill-related work. This data should be discussed in previous sections of the human health risk assessment and rationale for not considering this data for the HHRA should be provided (i.e., concentrations were within ambient levels or samples were collected during unique events).

APPENDIX M – EVALUATION OF GROUNDWATER CHEMICAL MIGRATION TO THE AQUATIC ENVIRONMENT

Section M2.4 – Data Evaluation

The bullet-item list in the last paragraph (p. 2-3) provides four semi-quantitative criteria that are applied in subsequent subsections when determining whether a compound "warrants further monitoring and evaluation to assess the potential impact to the Bay". For greater clarity and consistency in the evaluation of these four criteria, a brief summary of how well/poorly the data for each constituent meet these criteria should be provided prior to the last sentence of each subsection. For example, in the case of TCE (Figure M-20) there is only one well (IR01MW48A) at which the aquatic criterion for TCE is exceeded (by a factor of 1.1), and during five subsequent rounds of monitoring spanning nearly three years, TCE concentrations were below detectable levels. Therefore, in regards to the four criteria listed in this subsection, the TCE data could be summarized as follows: "The single recorded exceedance has been followed by non-detections in at least four subsequent sampling rounds; has thus clearly decreased over time; is present in only one location; and the one exceedance was only slightly greater than the aquatic criterion". Then it is clear why TCE is not retained as a COPC.

For certain constituents (e.g., heptachlor epoxide) it appears that the only reason they are retained as COPCs is that less than four "non-detect" rounds of sampling have occurred since the most recent exceedance. For those particular constituents, it may be worthwhile "unlocking" the database and examining more recent (after March 2005) rounds of data, so that the list of COPCs (or COCs) might be further reduced.

Section M3.1 – Anions

Page 3-2, final sentence of first paragraph states, "Because un-ionized ammonia concentrations are calculated using field parameters, the potential exists for error to be introduced into these results."

Please discuss the nature of these "errors". Are they instrument errors, calculation errors, or other types of errors? Or is it more accurate to use the term "uncertainty" or "variability" instead of "error"? Strictly speaking, errors should be eliminated to the greatest extent practicable through appropriate QC measures, such as equipment calibration and checking of calculations. On the other hand, a computed quantity that is highly sensitive to data inputs that may fluctuate temporally or spatially could have a high degree of uncertainty or variability associated with it. Therefore, this statement should be either rephrased (for accuracy) or elaborated upon (for clarity).

Section M4 – Conclusions and Recommendations

Although well IR01MW366A lies beyond the tidally influenced zone (TIZ) and elevated concentrations of COPCs at that location may therefore pose a lesser potential risk to aquatic receptors than similarly elevated concentrations at locations within the TIZ, the groundwater data evaluation's focus on impacts to aquatic receptors may be overly narrow at the RI/FS stage. Specifically, clusters of elevated concentrations of COPCs should be identified and further evaluated. For instance, well IR01MW366A exhibits elevated concentrations of unionized ammonia, sufide, cadmium, copper, lead, mercury, nickel, zinc, 4,4-DDT, alpha chlordane, and endosulfan I. In some cases, IR01MW366A is the only well within Parcel E-2 where the compound exceeds the screening criterion; in other cases, the criterion for a particular compound has been exceeded during multiple successive rounds of sampling. Thus, this particular well may be indicative of a localized "hot spot" within the landfill waste and therefore warrants further evaluation. At a minimum, this potential "hot spot" should be evaluated in accordance with EPA guidance (EPA, 1993a).

APPENDIX Q – QUALITATIVE SLOPE STABILITY EVALUATION

A shear strength value for the Bay Mud of 1,000 pounds per square foot (psf) was used in the slope stability analysis (as shown on the various slope profiles). This is not a typical value for Bay Mud. Typical values would be more on the order of 300 to 600 psf for normally consolidated clay. The appropriateness of the 1,000 psf value utilized should be double-checked and verified, and any appropriate revisions to the analysis should be made.