

RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT FOCUSED FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 21, VESSEL WASTE OIL RECOVERY AREA; NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA (NOVEMBER 2008, SULT-5104-0144-0007)

This document presents the U.S. Department of the Navy's (Navy) responses to regulatory agency comments on the 'Draft Focused Feasibility Study for Installation Restoration Site 21, Vessel Waste Oil Recovery Area; Naval Station Treasure Island, San Francisco, California,' dated November 2008. The Navy received comments from (1) the Department of Toxic Substances Control (DTSC) on December 19, 2008; (2) the Environmental Protection Agency (EPA) on January 2, 2009; (3) the California Regional Water Quality Control Board (Water Board) on January 30, 2009; and (4) AMEC Geomatrix on behalf of the Treasure Island Development Authority (TIDA) on December 10, 2008.

A large number of regulatory agency comments are related to the potential reuse of Site 21. During the 2006 Focused Feasibility Study (FFS) technical scoping meeting (Navy 2006), the Navy stated it will evaluate Site 21 based on the 1996 "Naval Station Treasure Island Reuse Plan," prepared by the City and County of San Francisco (CCSF) (CCSF 1996). According to the 1996 reuse plan, the reasonably foreseeable future use of the site is for movie production facilities or themed attractions; therefore, the Navy developed remedial action objectives (RAO) in the FFS based on the future recreational or commercial/industrial use of the site. The Navy recognizes that the planned reuse for Treasure Island has evolved and continues to evolve. The Site 21 FFS includes evaluation of an alternative (Alternative 3) designed to meet unrestricted use of the site and developed risk-based concentrations for protection of hypothetical future residents (listed in Table 4-1 of the FFS) for this alternative. If residential reuse is ultimately selected for Site 21, Alternative 3 and the associated risk-based concentrations may be used to evaluate remediation success. Text will be added to the FFS to indicate that the Navy used the 1996 reuse plan as the basis for its technical and risk management decisions.

In addition to the revisions noted in the responses below, the Navy will revise the Site 21 remedial goals to be consistent with the Site 24 remedial goals. Using the same remedial goals for Sites 21 and 24 is appropriate because Sites 21 and 24 have similar geology, hydrogeology, groundwater contaminants, and anticipated land reuse. The remedial goals for Site 24 will be used for Site 21 because the human health risk assessment for Site 24 was based on more recent regulatory agency guidelines (DTSC 2005, VDEQ 2005) for evaluation of health risks associated with exposure to groundwater, including inhalation exposure from vapor intrusion. These updated guidelines (that is, groundwater modeling assumptions, exposure assumptions and toxicity criteria) result in lower (more health-protective) risk-based concentrations for groundwater compared with those that correspond to the guidelines used for the Site 21 human health risk assessment. Therefore, to be health-protective, the risk-based concentrations for Site 24 are used for Site 21.

**RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D., SENIOR HAZARDOUS SUBSTANCES
SCIENTIST, DTSC**

General Comments:

- 1. Comment:** The Navy must develop remedial action objectives using 1E-06 risk and California toxicity criteria and exposure parameters as an initial point of departure. The Navy has selected remedial action objectives and chosen to identify a contaminant of potential concern as a chemical of concern based on a chemical-specific incremental cancer risk level of 1E-05 and federal toxicity factors. The Navy's approach fails to provide an adequate range of remedial action objectives for consideration. While "the reasonable likely reuse of Site 21 is recreational and does not include residential reuse", the risk-based concentration values developed for the hypothetical future resident should serve as the unrestricted use remedial action objectives. The Navy should subsequently use such risk-based concentration values to justify the need to implement the selected remedial alternative in the Draft FFS. The limited remedial action objectives and remedial goals presented in the Draft FFS are inconsistent with what is being done at other military and nonmilitary facilities throughout California.

Response:

As the lead agency, the Navy has the authority to select RAOs based on risk levels within the U.S. EPA's excess lifetime cancer risk range of 1E-04 and 1E-06. According to "Land Use in the CERCLA Remedy Selection Process" (OSWER Directive No. 9355.7-04), RAOs should reflect the reasonably anticipated future land use. The Navy used the 1996 reuse plan to determine the reasonably anticipated future land use. As a result, the RAOs and remedial goals presented in the FFS Report will remain based on a cancer risk level of 1E-05 and a hazard index of 1 for commercial/industrial reuse. The approach taken at Site 21 is consistent with the approach taken at Site 24 and with EPA guidance.

According to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) preamble, the 1E-06 excess lifetime cancer risk for human receptors is the starting point for setting cleanup levels once it has been concluded that remedial action is required. The NCP preamble explains that preliminary remediation goals (PRG) for carcinogens are set at a 1E-06 excess cancer risk as a point of departure, but they may be revised to a different risk level within the risk management range based on consideration of site-specific and remedy-specific factors. The preamble explains that while the 1E-06 starting point expresses EPA's preference for setting cleanup levels at the more protective end of the risk range, not all cleanups are required to attain 1E-06 (55 Fed. Reg. 8717). The

RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D. (CONTINUED)

following factors are considered when evaluating the appropriateness of RAOs:

1. Exposure factors (cumulative effect of multiple chemicals, the potential for human exposure from other pathways at the site, population sensitivities, potential effects of environmental receptors, and cross-media effects of alternatives)
2. Uncertainty factors (reliability of alternatives, the weight of scientific evidence concerning exposures and individual and cumulative health effects, and the reliability of exposure data)
3. Technical factors (detection and quantification limits for chemicals, technical limitations to remediation, the ability to monitor and control movement of chemicals, and ambient concentrations of chemicals)

Exposure and uncertainty factors, as described above, influenced the selection of 1E-05 as the appropriate RAO for Site 21. The potential for human exposure is limited to exposure to volatile organic compounds (VOC) in groundwater via dermal contact and inhalation (vapor intrusion). Site-specific data from the enhanced in situ bioremediation (ISB) treatability studies, site-specific knowledge of current worker exposure, and published ISB case studies prove the reliability of the ISB alternative and limit the impact of uncertainty. Based on the site-specific information that limit exposure and uncertainty factors, remedial goals set at 1E-05 are protective for Site 21.

Further support for setting remedial goals at a level other than 1E-06 is provided in DTSC's regulations for corrective action at Cal. Code Regs. tit. 22 Section (§) 69400.16(d)(4). This section states:

An Unified Program Agency (UPA) shall establish a corrective action process that fulfills all the following conditions... A qualified UPA's corrective action process shall provide...(4) specification of corrective action that is protective of human health and the environment. Such corrective action shall attain final cleanup levels determined using a site-wide cumulative carcinogenic risk range of 10^{-4} to 10^{-6} and a site-wide cumulative systemic toxicity, including sensitive subgroups, health hazard index of <1 , unless lower concentrations are necessary to protect ecological receptors or meet applicable water quality objectives.

RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D. (CONTINUED)

2. **Comment:** The Draft FFS as currently written implies that implementation of institutional controls for Site 21 in its current condition are the only requirements remaining at this time. However, groundwater samples collected in 2007 upon conclusion of the Phase 1 treatability study indicate that even the proposed remedial goals have not yet been met. Therefore, the Navy should revise the Draft FFS to include a contingency section pending the results of the currently implemented in-situ bioremediation (ISB) treatability study. If Phase 2 of the treatability study is completed and does not adequately reduce groundwater volatile organic compound (VOC) concentrations to levels consistent with Site 21's cleanup goals, the Navy should propose an alternative path forward by evaluating additional remedial alternatives in a feasibility study amendment for regulatory review and approval. Alternatively, if Phase 2 of the ISB treatability study reduces groundwater and soil gas VOC concentrations to levels suitable for unrestricted land use(s), DTSC may not require institutional controls as the current Draft FFS potentially making Alternative 3 the most viable.

Response: The Navy disagrees that a contingency plan is necessary for the FFS. As stated in Section 1.0, the FFS was developed to address worst-case—in other words, pre-treatability study—contaminant concentrations. Further, Section 1.0 states that sequential increases, followed by decreases, in daughter products are expected as tetrachloroethene (PCE) degrades. The 2007 treatability study data reflect the typical PCE degradation pattern.

Enhanced ISB is expected to effectively remediate VOCs at Site 21. VOC concentrations were reduced during the Phase 1 treatability study, as presented in Table 3-1 of the FFS and described in Section 3.3. VOC concentrations will likely be further reduced after Phase 2 of the treatability study, with additional bioaugmentation and substrate injections to the aquifer. Details of the Phase 1 treatability study results are provided in the Shaw Technical Memorandum (Shaw 2008).

The Navy recommends that the FFS report continue to move forward in parallel with the treatability study activities. EPA's treatability study guidance states that "Treatability studies provide valuable site-specific data necessary to support Superfund remedial actions...Treatability studies conducted during a remedial investigation/feasibility study (RI/FS) indicate whether a given technology can meet the expected cleanup goals for the site and provide important information to aid in remedy selection, whereas treatability studies conducted during remedial design/remedial action (RD/RA) establish the design and operating parameters necessary for optimization of technology performance and implementation of a

RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D. (CONTINUED)

sound, cost-effective remedy” (EPA 1992). The treatability study provides important site-specific data that demonstrate enhanced ISB is effective in treating chlorinated VOCs at Site 21 to levels that will meet the expected remedial goals; therefore, the Navy recommends no changes to the alternatives evaluated in the FFS. The Navy is committed to meeting the remedial goals established for Site 21. In the unlikely event that remedial goals are not met, the Navy will use the flexible Record of Decision policy to take additional action to achieve remedial goals.

3. **Comment:** **Soil gas sampling / monitoring in addition to groundwater monitoring at Site 21 should be conducted after completion of the ISB treatability study Phase 2 in order to determine whether vapor intrusion to indoor air pathway has been adequately addressed. Prior to collecting the requisite soil gas data, the Navy shall draft a soil gas sampling work plan (or sampling plan addendum) and submit to DTSC for review and approval. Please revise Remedial Alternative 3 of the Draft FFS to include this requirement.**

Response: Groundwater data was used to evaluate the vapor intrusion pathway in the human health risk assessment and in developing remedial goals for the FFS. The Navy plans to evaluate the vapor intrusion pathway using groundwater data under Alternative 3, if selected, and Alternative 3 will not be revised.

According to EPA’s 2002 vapor intrusion guidance (EPA 2002), it is appropriate to use groundwater data when groundwater is the only source of contaminant vapors. EPA’s guidance states: “In order to select the appropriate target media concentrations for comparison, it is important to identify whether a source of vapors in an area occurs in the unsaturated zone (contaminated soil). This allows the site data to be segregated into two categories: a) data representing areas where contaminated groundwater is the only source of contaminant vapors, and b) data representing areas where the underlying unsaturated zone soil contains a source of vapors. In case (a) either the groundwater or soil gas target concentrations...are generally appropriate to use.” Accordingly, the Navy will use the site-specific risk-based remedial goals for groundwater to determine whether vapor intrusion to the indoor air pathway at Site 21 has been adequately addressed. The Site 21 risk-based remedial goals for groundwater are protective of the indoor air pathway.

The Navy will collect soil gas samples as part of the treatability study confirmation sampling, but soil gas samples will not be a component of the FFS alternatives. For any future soil gas sampling, the Navy will prepare a soil gas sampling work plan or sampling plan addendum that will be submitted to DTSC.

RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D. (CONTINUED)

Specific Comments:

1. **Comment:** **Section 2.9 Remedial Investigation Conclusions and Recommendations. DTSC does not concur with the Navy's decision to adopt 1E-05 as the excess lifetime cancer risk as an initial point of departure. Same comment applies to the first paragraph of Section 4.1.1. Please refer to general comment (1) above for additional clarification.**

Response: Please see the response to DTSC General Comment 1.

2. **Comment:** **Section 4.1.1 Determination of Remedial Action Triggers, paragraph one. DTSC does not concur with the statement: "if cancer risks for nonresidential receptors do not exceed 1E-05, then remedial action is not needed." For example, remedial actions in the form of institutional controls may be warranted in order to limit property use(s) to commercial / industrial applications that will be protective of human health and the environment.**

Response: Comment noted. Section 4.1.1 of the FFS will be revised as follows: "...if cancer risks for nonresidential receptors do not exceed 1E-05, remedial actions in the form of institutional controls (IC) may be warranted in order to limit property use(s) to commercial/industrial applications that will be protective of human health."

3. **Comment:** **Section 4.1.3 Remedial Action Objectives.**

• First and last paragraphs. The text states that no remedial action objectives (RAOs) were developed for the hypothetical future resident because the reasonable likely reuse of Site 21 is recreational and does not include residential reuse. However, remedial action objectives for hypothetical future residential use must be established in order to evaluate the unrestricted land use alternative and as justification for the need to implement the selected remedial alternative.

• Third paragraph and Table 4-1. RAOs were developed for groundwater only. However, DTSC requires the Navy to (a) develop RAOs for VOCs in soil gas in addition to RAOs for VOCs in groundwater, since the shallow groundwater has been impacted with VOCs and (b) evaluate and address the vapor intrusion to indoor air exposure pathway as a part of remediation efforts at Site 21.

RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D. (CONTINUED)

• **Groundwater at Site 21 contains elevated VOC concentrations at wells approximately 30 to 90 feet from the San Francisco Bay. The Basin Plan, Chapter 3.4 states: "Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards." DTSC determines that 40 CFR 131.38, also known as the California Toxics Rule (CTR), is a federal chemical-specific Applicable or Relevant and Appropriate Requirement for Site 21. However, in order to keep the Site 21 cleanup project moving forward without protracted discussions on ARAR identification, DTSC offers the same approach that the Navy and regulatory agencies have successfully applied at Hunter's Point regarding the CTR. Therefore, DTSC requests the Navy to revise remedial action objectives at Site 21. DTSC is ready to meet and discuss with the Navy to expedite resolution of this issue.**

Response: First bullet item: Please see the response to General Comment 1. As stated previously, RAOs are developed to address the likely reuse of the site, using the 1996 reuse plan. The Navy does not believe that RAOs should be established for the hypothetical future residential use. Instead, the Navy calculated risk-based concentrations for VOCs in groundwater based on residential use in order to evaluate the unrestricted land use alternative (Alternative 3). The FFS currently contains a complete evaluation of the unrestricted land use alternative in Alternative 3.

Second bullet item: Please see the response to General Comment 1. The Navy does not plan to include RAOs for soil gas as part of the FFS. Vapor intrusion from VOC-contaminated groundwater was evaluated as part of the risk assessment and was incorporated into the development of the RAOs and calculation of remedial goals. Achieving the RAOs for groundwater will be protective of the vapor intrusion pathway.

Third bullet item: The Navy agrees to meet with DTSC to discuss the applicability of including the California Toxics Rule (CTR) requirements to address the discharge of groundwater to the San Francisco Bay.

The remedial investigation (RI) conducted at Site 21 (SulTech 2007) included fate and transport modeling of chemicals of potential ecological concern (COPEC) as part of the screening-level ecological risk assessment. At Site 21, screening limits for the protection of saltwater aquatic life were compiled through comprehensive reviews of published regulatory standards, goals and guidance, including those established by the EPA in the California Toxics Rule, the Regional Water Quality Control Board in the "Water Quality Control Plan, San Francisco Bay

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Basin Region” and “A Compilation of Water Quality Goals”, and the National Recommended Water Quality Criteria, and other sources as appropriate (SulTech 2007). The COPECs were chromium, copper, nickel, mercury, and silver, and trichloroethene (TCE). The screening level used for TCE (the only organic COPEC at Site 21) is the same as that used at Hunters Point. For other organic chemicals at Site 21, the remedial goals established in the FFS are lower than the screening limits established at the point of exposure and are protective of saltwater aquatic life in the Bay. The conclusion of the Site 21 modeling was that the COPECs were not found to be chemicals of ecological concern (COEC) at Site 21. The final modeled concentrations of TCE at the ecological point of exposure were determined to be less than the respective screening criterion and therefore TCE was not considered a COEC at Site 21 (SulTech 2007). The Navy believes revision of RAOs is not warranted since, through a modeling process similar to that employed at Hunters Point, no COECs were identified for Site 21.

4. **Comment:** **Section 5.3.1.2 ISB Treatment System Wells. The Navy should conduct soil gas sampling / monitoring in addition to groundwater monitoring at Site 21 after completion of the ISB treatability study Phase 2 as described in general comment (3).**

Response: Please see the response to DTSC General Comment 3. The Navy does not believe that soil vapor monitoring is required for this site. The Navy will collect soil gas samples as part of the treatability study confirmation samples, but soil gas samples will not be a component of the FFS alternatives. For any future soil gas sampling, the Navy will prepare a soil gas sampling work plan or sampling plan addendum that will be submitted to DTSC.

Editorial Comments:

1. **Comment:** **Signature page. Hazardous substance characterization and remediation work shall be performed under the direction and supervision of a qualified professional engineer or geologist in the State of California, with expertise in hazardous substance site cleanups in accordance with the California Business and Professions Code sections 6735, 7835, and 7835.1, and other applicable law. Therefore, the final RI Report must be approved with signature and stamped by a professional engineer or geologist.**

Response: The final FFS will be signed and stamped by the registered professional geologist that reviewed the document.

RESPONSES TO COMMENTS FROM RYAN MIYA, PH.D. (CONTINUED)

2. Comment: Figure 2-4 Site Features Map and Figure 2-5 Conceptual Site Model. The fencelines do not appear consistent between the figures.

Response: The fence line in Figure 2-5 was revised to match the fence line in Figure 2-4, which was found to be the most current depiction of the site.

RESPONSES TO COMMENTS FROM CHRISTINE KATIN, U.S. EPA REGION 9

1. **Comment:** Several TI documents cite the 1996 Draft Reuse Plan as a useful planning tool but also state likely deviations from the Plan. As it seems that the redevelopment plan has evolved significantly since 1996, an update on the status of this document would be helpful.

Response: As documented in the FFS technical scoping meeting minutes (Navy 2006), the Navy stated it will evaluate Site 21 based on the 1996 Reuse Plan (CCSF 1996). The Navy recognizes that the Reuse Plan has evolved and continues to evolve. The various versions of the reuse plan are maintained on the TIDA website (http://www.sfgov.org/site/treasureisland_page.asp?id=21914).

2. **Comment:** Does the most current reuse plan anticipate any new construction (of enclosed structures) on the site for "recreation, culture, and entertainment" purposes?

Response: As stated above, the Navy based its technical and risk management decisions for the FFS on the 1996 Reuse Plan (CCFS 1996). The 1996 reuse plan indicates there will be construction at Site 21 for the intended purpose of recreational, cultural and/or entertainment use. The various versions of the reuse plan are maintained on the TIDA website (http://www.sfgov.org/site/treasureisland_page.asp?id=21914).

3. **Comment:** If the Navy were unable to reach the risk-based concentrations for hypothetical future residential land use via Alternative 3 or if VOCs were to rebound, would engineering controls (e.g., vapor barriers) or other LUCs be required similar to what is required under Alternative 2? Have target VOC concentrations in groundwater or soil gas been established and accepted by the BCT that trigger a requirement to install vapor barriers at the Treasure Island site?

Response: The Navy intends to remediate Site 21 to be protective of commercial/industrial workers and construction workers under the current and future use of Site 21 and its buildings in their current form. If the land use of the current buildings or of the site changes, the need for vapor barriers will require evaluation. Under Alternative 2, the evaluation and potential installation of vapor barriers is required by the ICs if new buildings are constructed or the land use of existing buildings exceeds an exposure frequency of 8 hours per day for the commercial/industrial receptor. The Navy developed RAOs that result in clean up levels below what would require use of vapor barriers. As a result, concentrations of VOC in groundwater that would require use of vapor barriers were not established.

RESPONSES TO COMMENTS FROM ROSS STEENSON, P.G., WATER BOARD

General Comments:

1. **Comment:** I concur with the DTSC comments. The Water Board considers that the collection of soil-gas samples at Installation Restoration Site 21 is appropriate and necessary to completely evaluate the vapor intrusion pathway. In addition, I support the revision of the *Draft FFS* to include a contingency section that presents a discussion of the alternative actions that may be undertaken pending the results of the groundwater in-situ bioremediation (ISB) treatability study. I also concur with the comments provided on behalf of TIDA, and they should be addressed by the Navy. In particular, it is important to further evaluate and address the comment that expresses technical concerns regarding adequacy of the monitoring well network for assessing the performance of the ISB treatability study.

Response: The Navy will collect soil gas samples as part of the treatability study confirmation sampling. However, monitoring of the treatability study's performance is not a component of the FFS alternatives (see response to DTSC General Comment 3). As stated in the response to DTSC General Comment 2, the Navy disagrees that a contingency plan is necessary for the FFS. The FFS was developed to address pre-treatability study contaminant concentrations, and the Navy's assessment of the likelihood of the success of groundwater remediation is based on the ISB treatability study. The Navy believes the current groundwater monitoring well network is adequate to monitor the changes in VOC concentrations and groundwater chemistry, as described in the response to TIDA General Comment 3.

2. **Comment:** Section 2.6.2 - Please include a figure in the *Draft FFS* illustrating the January 2007 or more recent groundwater sampling results in addition to citing the *Remedial Investigation Report*.

Response: Groundwater samples were collected as part of the treatability study at Site 21 in January 2007 and June 2008. Analytical results from the January 2007 sampling event are presented in Table 3-1 of the FFS report and on figures in the Shaw Technical Memorandum (Shaw 2008). The June 2008 data were collected for the purpose of optimizing the Phase 2 treatability study design and are unvalidated; therefore, these data will not be presented in the FFS report. Section 3.4 will be updated to discuss the 2007 and 2008 groundwater data. The June 2008 results indicate that the VOC concentrations in plume area groundwater monitoring wells are generally unchanged from January 2007 and that no rebound of PCE or TCE has occurred. No figures will be added to the FFS report.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G., GEOMATRIX ON BEHALF OF TIDA

General Comments:

1. **Comment:** *Future Reuse of Site 21, Remedial Action Objectives and Remedial Goals.* The document acknowledges that the 1996 Reuse Plan includes employee housing as a potential site use, but then states “based on discussions during previous BCT meetings and in transfer meetings with CCSF, the reasonable likely reuse of Site 21 is recreational and does not include residential reuse.” (Section 4.1.3 and bottom of page ES-i of the Executive Summary, note f of Table 41). Based on the assumption that residential reuse is not planned, RAOs and remedial goals were only developed for future commercial/industrial and construction workers.

Contrary to the assumption presented in the document, the 2006 Treasure Island development plan does include a residential building east of Building 3, above the area of currently-impacted groundwater. The building likely will contain a subsurface basement and/or underground parking structure, which will require groundwater de-watering during construction and possibly during use of the building. As such, the document should include a RAO for future residential receptors that prevents exposure via vapor intrusion from groundwater that contains VOCs at concentrations above the residential remedial goals presented in Table 4-12. Furthermore, the document needs to consider the likelihood that pumping of currently affected groundwater is likely to be necessary during future construction de-watering activities. As indicated in EPA’s land-use directive, RAOs should reflect the reasonably anticipated future land use (Section 4.1.1). The reasonably anticipated future land use of Site 21 is residential.

Response: As documented in the FFS technical scoping meeting minutes (Navy 2006), the Navy stated it will evaluate Site 21 based on the 1996 Reuse Plan (CCSF 1996). The Navy recognizes that the Reuse Plan has evolved and continues to evolve. The Site 21 FFS includes evaluation of an alternative (Alternative 3) designed to meet unrestricted use of the site and developed risk-based concentrations for protection of hypothetical future residents (listed in Table 4-1 of the FFS) for this alternative. If residential reuse is ultimately selected for Site 21, Alternative 3 and the associated risk-based concentrations may be used to evaluate remediation success. Text will be added to the FFS to indicate that the Navy used the 1996 reuse plan as the basis for its technical and risk management decisions.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

2. **Comment:** *TIDA's Preferred Alternative.* Alternative 3 (modified as suggested in comments below) is the only alternative that is acceptable to TIDA. The ICs proposed under Alternative 2 would not allow TIDA to proceed with residential development, as envisioned in both the 1996 Reuse Plan and the more recent 2006 development plan. Furthermore, the ICs would prohibit the extraction of groundwater, which will be necessary during future development. These and other restrictions proposed under Alternative 2 are not acceptable to TIDA.

Response: The Navy recognizes TIDA's concerns, however the Navy evaluated Site 21 based on the 1996 reuse plan as stated in the response to TIDA General Comment 1.

3. **Comment:** *Use of Results from Treatability Study as Basis for Performing an FFS.* Based on the apparent results from the first phase of the ISB treatability study, the Navy has opted to complete a focused feasibility study, where ISB is the only active remediation technology that is considered. We have concerns about whether the effectiveness of the treatability study has been adequately assessed at Site 21. The conclusion that ISB has been successful is based primarily on data from monitoring wells 21-MW02A, 21-MW03A, and 21-MW09A. Based on the June 18, 2008 Technical Memorandum, which summarizes the results from the Phase 1 treatability study, the three monitoring wells are very close to injection points. In fact, the text in section 3.3.2 of the FFS states that monitoring well 21-MW02A was actually used for injection of substrate. Were other performance monitoring wells also used for substrate injection? It appears that groundwater that is not immediately adjacent to an injection point generally has not been sampled to assess the effectiveness of ISB at distances greater than a few feet from an injection point. Based on the information in the Technical Memorandum and concerns raised in our March 13, 2008 Comments on the January 2008 Draft Addendum 3 to Final Work Plan, we continue to believe that the existing monitoring well network is not adequate for assessing the performance of the ISB treatability study and further evaluation of groundwater is warranted to support completion of an FFS in lieu of a standard Feasibility Study. Furthermore, if ISB does not successfully achieve the remedial goals established under Alternative 3, other remedial technologies may need to be considered at this site.

Response: Substrate had not been injected in monitoring wells during the treatability study. Section 3.3.2 of the FFS will be revised to state: "Nearly complete dechlorination of PCE occurred in well 21-MW02A

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

120 days after substrate was injected in injection point wells,” instead of “nearly complete dechlorination of PCE occurred 120 days after substrate was injected in well 21-MW02A.”

The intention of the treatability study was to put the aquifer under the influence of the substrate. The injection strategy was to inject the sodium lactate and microbes one injection interval below the depth of the plume. The locations of the direct injections were spaced about 20 feet apart, based upon the anticipated radius of influence of 10 feet (Shaw 2008). No “short circuiting” of substrate injection pressure was reported; that is, there were no cases where sodium lactate was injected too close to a monitoring well so that substrate entered the monitoring well.

Sodium lactate is known to persist for approximately 6 months. Over the course of post-treatability study groundwater monitoring, changes in the aquifer were caused by the breakdown of the substrate, changes in microbial populations, and movement of the groundwater (Shaw 2008).

Changes to the aquifer were monitored by wells within the plume area. Groundwater samples were collected and evaluated on a regular basis during the Site 21 treatability study to determine substrate migration, the change in contaminant concentrations, and other effects of the bioaugmentation technique in the aquifer (Shaw 2008). Field data such as oxidation reduction potential, dissolved oxygen, and alkalinity were collected to monitor substrate distribution and changes in groundwater chemistry. A discussion of the sampling data is presented in the Shaw Technical Memorandum (Shaw 2008). The technical memorandum presents information demonstrating that concentrations are not artificially lower in monitoring wells located closest to the injection point wells. The Navy asserts that since monitoring wells were not used for substrate injection and did not cause short circuiting during substrate injection due to proximity to injection points, the current monitoring well system is adequate for assessing the performance of the ISB treatability study. Groundwater monitoring was conducted over long periods of time, allowing for stabilization of the aquifer, and the collected field data support adequate distribution of the substrate.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

Specific Comments:

1. **Comment:** *Executive Summary, first paragraph top of page ES-3; Section 2.7 Human Health Risk Assessment.* The text states, "The RAOs and remedial goals will be used as a means to confirm that concentrations of VOCs in groundwater samples collected at the end of Phase 2 of the treatability study do not pose a risk to future commercial/industrial workers and future construction workers." As indicated in our first General Comment, VOCs in groundwater at the end of Phase 2 also should not pose a risk to future residential receptors.

Response: As documented in the FFS technical scoping meeting minutes (Navy 2006), the Navy stated it will evaluate Site 21 based on the 1996 Reuse Plan (CCSF 1996). The Navy recognizes that the Reuse Plan has evolved and continues to evolve. The Site 21 FFS includes evaluation of an alternative (Alternative 3) designed to meet unrestricted use of the site and developed risk-based concentrations for protection of hypothetical future residents (listed in Table 4-1 of the FFS) for this alternative. If residential reuse is ultimately selected for Site 21, Alternative 3 and the associated risk-based concentrations may be used to evaluate remediation success. Text will be added to the FFS to indicate that the Navy used the 1996 reuse plan as the basis for its technical and risk management decisions.

2. **Comment:** *Section 1.0 Introduction; Section 2.7 Human Health Risk Assessment; Section 4.1.1 Determination of Remedial Action Triggers; and Executive Summary, page ES-2.* The document states that in 2007, the Navy made a risk management decision to use an excess lifetime cancer risk of 1×10^{-5} for nonresidential receptors, rather than 1×10^{-6} . Please provide documentation for this decision and regulatory concurrence with the decision. In the absence of documented agency concurrence with such a decision, we cannot support the decision.

Response: Please see the response to DTSC General Comment 1. The risk management decision to use an excess lifetime cancer risk of $1E-05$ (1×10^{-5}) for nonresidential receptors rather than $1E-06$ (1×10^{-6}) was adopted by the Navy as the lead agency, without concurrence from the regulators.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

3. **Comment:** *Section 2.2 Federal Facility Site Remediation Agreement.* The text at the end of this section indicates that the project team includes representatives from the City and County of San Francisco (CCSF). It is more appropriate to indicate that the team includes representatives from TIDA.

Response: Section 2.2 of the FFS will be revised to state: "Other key participants on the project team include Navy remedial project managers, representatives from the Water Board and TIDA, and technical consultants."

4. **Comment:** *Section 2.5.4 Treasure Island Groundwater Quality and Beneficial Uses.* In the last paragraph, a reference should be provided for the Water Board letter that is cited.

Response: The reference for the Water Board letter cited in Section 2.5.4 is Water Board 2001, and will be added to the section. Several documents in Section 2.5.4 were incorrectly referenced. References in the third paragraph should be Water Board 1996 instead of Water Board 2001. The reference at end of the fourth paragraph should be Water Board 2001 instead of SWRCB 1989. The FFS will be revised accordingly.

5. **Comment:** *Section 2.8 Ecological Risk Assessment.* The text should indicate whether the conclusions from the ecological risk assessment that was presented in the RI Report would be different now that concentrations of some VOCs in groundwater have changed since implementing the treatability study.

Response: The evaluation of COPECs in the RI consisted of a comparison of groundwater chemical data to individual aquatic screening criterion. TCE was the only VOC identified in the RI as a COPEC, posing a potential risk to aquatic receptors. Based on fate and transport modeling to estimate the final concentration at the ecological point of exposure where groundwater meets the Bay, TCE was found to be significantly less than the respective screening criterion and therefore TCE was not considered a COEC at Site 21 (SulTech 2007).

In the SLERA, PCE and TCE degradation products in groundwater were also compared to the screening criteria. None of the TCE degradation products were identified as COPECs because their groundwater concentrations did not exceed the screening criteria, which are applicable at the point of exposure at the groundwater and Bay interface. A review of the post treatability study groundwater data, including the most recent groundwater data collected in June 2008, indicates that organic VOC

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

concentrations, including TCE, are lower than the screening criteria for the protection of saltwater aquatic life in the Bay applicable at the point of exposure.

Text will be added to Section 2.8 of the FFS to state: “The conclusions of the ERA are not affected by the change in VOC concentrations as a result of the treatability study.”

6. **Comment:** *Section 3.3 Phase I Treatability Study Results.* The text states “The results from the most recent sampling in January 2007 represent the current status of the VOC plume at Site 21”. Given the fact that this sampling was conducted nearly two years ago, it appears appropriate to indicate that the 2007 sample results are assumed to represent current conditions.

Response: The above referenced text will be deleted from the FFS.

7. **Comment:** *Section 4.1.4 Proposed Remedial Goals.* Because vapor intrusion is the primary pathway of concern for future commercial/industrial workers and residents, we believe it is appropriate to develop remedial goals for soil vapor for these receptors.

Response: Please see the response to DTSC General Comment 3. The Navy does not believe that soil vapor monitoring is required for this site.

8. **Comment:** *Section 4.3.2.1 Legal Mechanisms.* The text indicates that a covenant is an agreement between one landowner and another made during conveyance of property. We note that a covenant can be between other parties as well, such as regulatory agencies.

Response: The text will be revised to indicate that a covenant may be between a landowner and a regulatory agency such as DTSC.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

9. **Comment:** *Table 4-1 Site 21 Risk-based Concentrations and Proposed Remedial Goals for Groundwater.* Footnote “e” of the table indicates that drinking water Maximum Contaminant Levels (MCLs) were used for the remedial goal for the residential scenario in cases when the risk-based concentration goal for vapor intrusion was below the MCL. We will defer to regulatory agencies to determine whether use of the MCL as a default goal is appropriate for these cases. Additionally, we note that the federal MCL cited for vinyl chloride (2 micrograms per liter [$\mu\text{g/L}$]) is higher than the California MCL (0.5 $\mu\text{g/L}$).

Response: Comment noted. According to EPA’s 2002 vapor intrusion guidance (EPA 2002), “if the risk-based concentration calculated for groundwater falls below the chemical’s maximum contaminant limit (MCL), the MCL is recommended as the target concentration.”

10. **Comment:** *Section 5.2 Alternative 2: Institutional Controls.* The text in this section indicates that VOC concentrations in groundwater are decreasing since implementation of Phase 1 of the treatability study. However, we note that in some cases, concentrations of breakdown products have increased since implementation of the treatability study.

Response: Concentrations of intermediate breakdown products increase and decrease over time, following the degradation pathways for the anaerobic degradation of chlorinated ethenes. Data from the 2007 sampling event indicate that the vinyl chloride concentrations increased over time since the original injection in late 2005. Anaerobic degradation of vinyl chloride is known as the “rate-limiting step” in the dechlorination of PCE. This step results in a buildup of vinyl chloride, which degrades at a slower rate than its chlorinated predecessors degrade. Results of the Phase 1 treatability study presented in the Shaw Technical Memorandum (Shaw 2008) indicate that both vinyl chloride and ethene were present in wells 21-MW02A, 21-MW03A, and 21-MW09A, and that concentrations of ethene show an increasing trend. This finding suggests that, though the degradation of vinyl chloride to ethene is a rate-limiting step, chlorinated ethenes fully degrade to ethene gas at Site 21.

The results from a June 2008 monitoring event indicate that the VOC concentrations in plume area groundwater monitoring wells are generally unchanged from the 2007 data, which indicate that no rebound of PCE or TCE has occurred.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

11. **Comment:** *Section 5.3.1 Enhanced Anaerobic In Situ Bioremediation.* The text includes a description of the anticipated requirements of the ISB remedy, including specific assumptions about the amount and frequency of injections for the permeable reactive barrier wells and ISB wells. The technical basis for the assumptions is not provided. We acknowledge that it is necessary to make certain assumptions in order to develop cost estimates for an alternative being considered in a feasibility study. However, the document should acknowledge that a technical evaluation will be conducted during the design stage to establish the injection parameters, if this alternative were to be implemented.

Response: The technical basis for the design of the permeable reactive barrier (PRB) wells and ISB treatment system wells is the data presented in the Shaw Technical Memorandum (Shaw 2008), as also referenced in the first paragraph in Section 5.3.1 of the FFS. The Shaw Technical Memorandum provides information on electron donor selection, substrate dosage, and degradation rate data among other system parameters that form the basis for the design of Alternative 3. Further technical design assumptions are provided as part of the cost estimate in Appendix B. The FFS will not be revised to include additional design details or acknowledgment that a technical evaluation will be conducted, since Phase 2 of the treatability study is currently being performed.

12. **Comment:** *Section 5.3.2 Groundwater Monitoring.* The document proposes to use groundwater monitoring during a five-year period after implementation of the remedy, to assess whether the remedial goals have been achieved. We believe that groundwater monitoring should be supplemented with soil vapor monitoring to confirm that concentrations in soil vapor are below risk-based levels for residential use (see Specific Comment 7).

Response: Please see the response to DTSC General Comment 3. The Navy does not believe that soil vapor monitoring is required for this site. The Navy will collect soil gas samples as part of the treatability study confirmation samples, but soil gas samples will not be a component of the FFS alternatives. For any future soil gas sampling, the Navy will prepare a soil gas sampling work plan or sampling plan addendum that will be submitted to DTSC.

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

13. **Comment:** *Sections 6.0 (Detailed Analysis of Remedial Alternatives) and 7.0 (Comparative Analysis of Remedial Alternatives).* The relative ranking of the alternatives described in these two sections and summarized on Table 7-2 is somewhat subjective and small changes in some of the rankings would result in a different outcome for the alternative with the highest score (currently Alternative 2). We believe that different scores could be justified as follows:

--Under the first criterion (overall protection of human health and the environment), we do not believe that Alternative 2 is equally protective of human health and the environment as Alternative 3. Alternative 2 could have a score of 3 rather than 5.

--Under the third criterion (long-term effectiveness and permanence), Alternative 2 could have a score of 3 rather than 4. Consistent with Table 7-2, the text in Section 6.2.3.3 should rate Alternative 3 as "highly effective" under this criterion (not "very effective").

--Under the fifth criterion (short-term effectiveness), Alternative 3 could have a score of 4 because risks during implementation can be easily managed as demonstrated during the treatability study (i.e., only Level D personal protective equipment required).

--Under the sixth criterion (implementability), the report states that Alternative 3 would be moderately effective despite conflicting statements that the construction methods, materials and labor are readily available.

--Under the seventh criterion (cost), Alternative 3 was given a score of "1" because it is the most expensive of the three alternatives considered in this FF5. However, other alternatives that were not considered could have been more expensive. If a complete feasibility study had been conducted for this site, Alternative 3 might have had a higher score under this criterion. Alternatively, if the cost for Alternative 3 is going to be considered to be "high" relative to the other alternatives considered, then the cost for Alternative 2 should be considered "moderate" rather than "low" compared to the other two alternatives.

Response: Overall Protection of Human Health and the Environment is a threshold criterion, along with Compliance with ARARs, that must be met for an alternative to be eligible for selection. Each alternative either passes or

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

fails the threshold criteria in the ranking system. For this reason, each alternative is scored either 5 or 1 for passing or failing the criterion. A modification of the score for Alternative 2 is not appropriate in this ranking system because Alternative 2 passes the first threshold criterion.

Alternative 2 was ranked as being very effective in Long-Term Effectiveness and Permanence because the land-use control (LUC) utilized to limit future use of the site is a legal mechanism spanning in perpetuity. Consequently, any changes in site usage would require a modification to the "Covenant to Restrict Use of Property, Environmental Restriction." A review of the ranking for Alternative 2 under this criterion concludes that the ranking of very effective is appropriate. The text in Section 6.2.3.3 will be modified to reflect the ranking of alternatives in Table 7-2, as mentioned in the comment.

The short-term effectiveness criterion assesses the effects of each alternative during the construction and implementation phase until remedial objectives are met. In accordance with the "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," factors such as protection of the community, protection of workers, potential adverse environmental impacts, and time until remedial objectives are achieved were taken into consideration when evaluating each alternative under this criterion. Alternative 3 was evaluated as moderately effective due to the amount of construction required to complete remedial actions, potential exposure to contaminated groundwater, and the time required for ISB to degrade VOCs for unrestricted use. The ranking of Alternative 3 as moderately effective in this criterion is appropriate.

In evaluating implementability, the technical feasibility (construction, reliability, ease of undertaking additional remedial action, monitoring considerations), administrative feasibility, and availability of services and materials of each alternative were considered. Alternative 3 was ranked as moderately effective and Alternative 2 was ranked as very effective because of the relative amount of effort required to implement each alternative to successfully achieve remediation. Review of the ranking of the alternatives under this criterion concludes that the ranking is appropriate.

The Site 21 FFS is a streamlined FFS consistent with EPA management principles defined in the NCP. The FFS does not include the detailed development of general response actions or detailed screening of technologies and process options. As a result, the report cannot rank the

RESPONSES TO COMMENTS FROM GARY FOOTE, P.G. (CONTINUED)

alternatives relative to other technologies and process options that were not considered in the report. Considering the likely future use of the site and the remedial action objectives developed in the FFS, Alternative 2 is very effective in cost because it is the most efficient in its expenditure. The ranking of the cost is also justified based on the fact that Alternative 3 is over 4 times the cost of Alternative 2.

14. **Comment:** *Appendix B, Table B-1A, page 2 of 2. There are no costs included for groundwater monitoring/sampling in association with the 5 year review.*

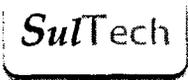
Response: Pre-treatability study groundwater analytical data meet the remedial goals developed for Site 21. Under Alternative 2, ICs for Site 21 are only to restrict future land use and prohibit groundwater extraction and use; therefore, groundwater monitoring is not necessary as part of the 5-year review for Alternative 2.

15. **Comment:** *Appendix B, Table B-1B, page 1 of 2. The number of "RCRA landfills, drummed non-hazardous waste" is listed as 42. The table only costs 36 DOT steel drums.*

Response: The quantity of drums for nonhazardous waste disposal was calculated as the sum of 36 drums of soil cuttings resulting from the drilling of 71 injection point wells plus 6 drums of soil cuttings from the installation of PRB wells. The cost of drums for PRB well installation is included in the lump sum for the field implementation of the PRB system.

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1220 Pacific Highway, Bldg 127
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