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MCAS EL TORO
SSIC NO. 5090.3

RESPO(O COMMENTS
Draft Engineering Design R..., Vadose Zone Remediation, Site 24
MCAS EL TORO, CALIFORNIA

15 December 1998

Originator: **Tayseer Mahmoud, Project Manager** **Cal-EPA** **To:** **Joseph Joyce, BRAC Environmental Coordinator** **Navy** **Date:** **13 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0162** **File Code: 0222**
GENERAL COMMENTS	***RESPONSES TO GENERAL COMMENTS***
1. EDR: Overall, the *draft Engineering Design Report* (EDR) is a comprehensive and well-written preliminary design document. It represents preliminary design. A detailed design will be prepared and submitted for review at a later date. The EDR examines and takes into consideration all issues relevant to the development of the Soil Vapor Extraction (SVE) remedial design. The overall design approach of the vapor extraction and treatment system is reasonable, as are the approaches to the SVE well installation, piping, and vapor treatment. The proposed implementation of the system and its operation and maintenance also appear reasonable. However, the specific comments below should be resolved prior to the submittal of the more detailed design package.	Comment acknowledged.
2. O&MM: The *Draft Operation and Maintenance Manual* (O&MM) contains general information on operating procedures, philosophies, and equipment. The O&MM also contains a well-supplied equipment description and specifications section (*O&MM Appendix A*). However, as noted in *Section 1, Introduction*, the O&MM is presently incomplete in that specific operating and maintenance instructions are not included. The O&MM notes that such information will be incorporated into the O&MM following the receipt of SVE operational and maintenance details, history, and experience from the previous operators of the equipment at Norton Air Force Base. Additional specific comments are provided below.	Comment acknowledged. The Operation and Maintenance (O&M) Manual will be finalized by combining the O&M procedures for the extraction and treatment equipment (currently being prepared by a separate Navy contractor), and O&M procedures for operating the well field.
3. QA/QC: The *Construction Quality Assurance/Quality Control Plan* (QA/QC) appears to be a complete and adequate document. See specific comments below.	Comment acknowledged.

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4. **<u>CP</u>: Except the below noted comments, the *Draft Contingency Plan* (CP) appears to be reasonable and complete.**	Comment acknowledged.
<u>SPECIFIC COMMENTS</u> **1.** **<u>EDR, Page 3-3, Figure 3-1, Vadose Zone Cross Section A-A'</u>: The scale shown for the *Index Map* is unclear.**	***<u>RESPONSES TO SPECIFIC COMMENTS</u>*** Figure 3-1 has been revised as requested.
2. **<u>EDR, Page 4-3, Figure 4-1, Site 24 - SVE Equipment Process Flow Diagram</u>: The crossing of process lines for the VGAC system are not shown correctly. The valve upstream of VGAC vessel B shown as closed should be labeled as open instead. The arrow showing the flow of cooling tower blowdown to the sewer should be reversed.**	Figure 4-1 has been revised as requested.
3. **<u>EDR, Page 4-8, Section 4.1.3.6, Instrumentation and Controls, Flow Indicators</u>: I recommend adding instrumentation that allows for both instantaneous flow readings in standard cubic feet per minute (scfm), or in actual cubic feet per minute (acfm) if appropriate instantaneous pressure and temperature indicators are also available at the same location. I also recommend that an accurate flow-totalizer instrumentation is also installed to monitor the cumulative extracted (and emitted) soil gas amount, which is important in terms of air emission and soil pore volume exchange considerations.**	Existing instrumentation and controls are considered adequate. The Norton Air Force Base (AFB) SVE system includes an averaging pitot tube to measure airflow in acfm. Pressure and temperature measuring devices are also present and these data will be recorded. The conversion to scfm will be done manually, and relies on existing monitoring devices for airflow, pressure, and temperature. Totalizer information is also calculated manually as the product of operating time and airflow rate in scfm. Air emissions will be evaluated by collecting and analyzing air samples from the effluent of each carbon vessel.
4. **<u>EDR, Page 4-11, Section 4.2.1.4, Treatment (TCE) System Capacity, and Page 4-12, Section 4.2.4.1, Granular Activated Carbon</u>: The initial rate of vapor-phase granular activated carbon (VGAC) consumption was estimated at approximately 180 pounds/day (lbs/day). This would imply that a vessel containing 20,000 pounds of VGAC would last approximately 15 to 17 weeks before saturation would require its replacement. Such an estimate is incorrect. *Appendix G* contains the supporting calculations for VGAC consumption rates. The *Appendix* also contains a copy of a fax**	Sections 4.2.1.4 and 4.2.4.1 and Appendix G have been revised as requested. The Navy discussed the operating history of the SVE system with the contractor responsible for its operation at Norton AFB. In general, VOC concentrations reduce rapidly after the SVE system is started. This was the case at Norton AFB. The initial VOC concentrations were rapidly reduced and the carbon usage was much lower than estimated. Approximately 6,000 pounds of TCE was removed from Norton AFB using activated carbon as the treatment technology. As at Norton AFB, approximately 6,000 pounds of TCE is estimated to be present in the vadose zone at Site 24. Of that estimated total,

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memorandum from Sandi Marshall of U.S. Filter/Westates to Yakup Nurdogan of Bechtel Corporation, dated June 11, 1998. **Ms. Marshall notes in the first paragraph that the VGAC consumption rate estimate is based on the "*assumption that your concentration units were by volume and not weight.*" This assumption seems to be the source of a rather large calculational error. It appears that U.S Filter/Westates used, for instance, a trichloroethene (TCE) concentration value of 279 parts per billion by volume (ppbv) instead of 279 micrograms per liter (µg/l), as the basis of its calculations. Air concentrations expressed in µg/l (mass per volume) are clearly not equivalent to ppbv (volume per volume).** **The initial influent TCE concentration used in the U.S. Filter/Westates calculations was 0.2790 parts per million by volume (ppmv). The correct value used should have been 51 ppmv which is equivalent to 279 µg/l, the design influent TCE concentration value, as indicated in *Table 4-8*, on *page 4-43*, and in *Table 4-9* on *page 4-45*.** **Similar errors were committed in each of the VGAC adsorption calculations for 1,1-dichloroethene (1,1-DCE), tetrachloroethene (PCE), and Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane).** **Based on a theoretical vapor phase activated carbon adsorption isotherms, We estimated the VGAC consumption rates based on the design influent concentration values. The estimates are shown in the Table below.** **According to the Table, about 2,900 pounds of VGAC will be initially consumed daily. At this rate, a vessel containing 20,000 pounds of VGAC will have to be replaced approximately weekly, as opposed to the proposed 15 to a 17-week cycle.** **Based on this significantly higher VGAC consumption rate, DTSC recommends revisiting, checking, and revising all VGAC calculations and, if warranted, reconsidering the design basis for the number of VGAC vessels. Operation and maintenance (O&M) considerations**	approximately 820 pounds was removed during pilot testing using activated carbon for treatment. Because of the low VOC concentrations at Site 24, activated carbon is considered the best choice for treating the effluent of the SVE system. The estimated influent concentration of TCE at Site 24 is 279 µg/L or 51 ppm/v. At Norton AFB, the initial TCE concentration was about 180 ppm/v. This concentration decreased rapidly after system start-up and the first carbon changeout occurred after 6 weeks of operation. The carbon was exchanged a total of 6 times during 2 years of operation at Norton AFB. Based on the similarity of the two sites and an evaluation of Site 24 pilot test data that shows a rapid decline of TCE concentrations, activated carbon usage at Site 24 is expected to be similar to that of Norton AFB.

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should also be revised, if warranted. At least initially, it may be prudent to consider leasing two more 20,000-pound VGAC units, should economics support it. In addition, we also recommend reviewing the historical VGAC usage rates of the system during its operational period at Norton AFB to attempt to validate VGAC vendor claims, if possible. The soil gas contaminant-makeup at Norton AFB was comparable to that at MCAS El Toro. **If possible, we recommend consideration of other soil gas treatment technologies, such as catalytic oxidizers with a hydrogen chloride (HCl) scrubbers. An economic comparison of capital- and operation and maintenance costs of VGAC versus other treatment technologies may favor the temporary use of a treatment technology other than VGAC until the influent TCE concentrations decay to lower levels. (Table attached)**	
5. <u>EDR, Page 4-26, Section 4.3.1.4, Preliminary Well Field Layout</u>: This section proposes to increase the design effective radii of influence (EROI) by 150 to 200 percent in areas where the level of contamination is lower than 500 µg/l in soil gas or less than 30 micrograms per kilogram (µg/kg) in soil (of TCE, I assume). While such appears to be a reasonable and valid approach, the 500 µg/l / 30 µg/kg concentration threshold appears rather arbitrary, as are the 150 to 200 percent enlargements of the EROIs. Normally, we generally recommend that EROS be defined as the radial distance from the vacuum well at which distance the vacuum is at least -0.2 inches of water, but preferably higher. **We accept such a modification to the EROIs, but recommend justification of the selected concentration thresholds values and of the selected increase of the EROIs in terms of quantifiable remediation aspects, such as the effect on remediation times, on pore volume exchanges, on SVE well spacing, and on remediation costs.**	Figures 4-2 through 4-4 have been revised as requested to illustrate the area that is proposed for less stringent EROI design criteria. The text has also been modified, as appropriate. To optimize the preliminary SVE well field design, the average calculated EROI spacing was used in areas that have TCE soil gas concentrations greater than 500 µg/L and soil concentrations greater than 30 µg/kg. These contours were used for design purposes because they encompass the potential VOC source areas. Capture ROIs were used in nonsource areas. This optimization provides a higher well field density in areas of high VOC concentrations (near potential source areas) and reduces the overall well field construction and O&M costs by decreasing the well field density at the fringes of the soil gas plume. Based on pilot test data, capture ROIs have advective pore volume exchange rates that are 2 to 3 times smaller than the EROI at the same well. These data are shown in Appendix G. It is anticipated that the time required for remediation will remain a function of the pore volume exchange rate in the more contaminated source areas where the EROI approach is used.

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We also recommend including data or graphics to show what will be the areal extent of this or what fraction of the Site 24 remediation area will fall under such an approach. Perhaps correcting the deficiency noted in the next comment, below, will also satisfy this recommendation.	The intent of the preliminary design well field is to outline a reasonable approach to removing VOCs from the vadose zone such that the remedial action objectives are accomplished. For illustration purposes, the pore volume exchange rate for a low-, medium-, and high-permeability well are presented below. Low-permeability soil is represented by test results from well 24SVE3. At an extraction rate of 22 scfm, the time estimated to exchange one pore volume at a radius of 30 feet is 0.8 days, compared to 1.9 days at 60 feet. Medium-permeability soil is represented by test results from well 24SVE12. At an extraction rate of 68 scfm, the time estimated to exchange one pore volume at a radius of 45 feet is 0.7 days compared to 2.2 days at 90 feet. High-permeability soil is represented by test results from well 24SVE4. At an extraction rate of 180 scfm, the time estimated to exchange one pore volume at a radius of 200 feet is 2.0 days, compared to 4.4 days at 300 feet. In theory, less-contaminated soil should require the exchange of fewer pore volumes of soil gas than more-contaminated soil. The actual progress toward achieving the remedial action objectives will be monitored during operation and the system will be optimized, as necessary.
6. **EDR, Page 4-26, Section 4.3.1.4, Preliminary Well Field Layout: No EROS are shown in *Figures 4-2 through 4-4*.**	Figures 4-2 through 4-4 have been revised as requested.
7. **EDR, Pages 4-29 through 4-35, Table 4-6, Summary of SVE Well Information: Throughout the EDR, the 30% well installation approach is noted. Under this approach, 30% of the initially projected SVE wells are proposed to be installed. Only after the evaluation of the performances of the wells in the 30% phase will a decision be proposed about the installation of additional SVE wells. While I support this approach as reasonable and flexible, I am unable to reconcile the numbers. For example, at this level of design 233**	The draft EDR proposed that the SVE system be operated after installation of approximately 85 SVE wells (it is approximately 30 percent of the total number of proposed wells). Adding the existing 21 SVE wells brings the total to 106 SVE wells, or approximately 40 to 45 percent of total number of SVE wells. Based on comments received by SWDIV, the well field installation approach has been modified. These changes have been incorporated into both the text

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SVE wells are thought to be needed. Thirty percent of 233 is 70 wells. Yet in *Table 4-6*, 106 SVE wells, or 45% are marked as part of the "30% phase." In addition, assuming that the estimated vapor production rates are realized, the 106 wells of the "30% phase" will produce nearly 60% of the total flow, or about 4,200 scfm out of about 7,100 scfm. While I am not particularly concerned about the nomenclature or whether the initial phase is 30% or 45%, the "30%-phase" appears to be a misnomer. I recommend that these loose definitions are tightened or better defined to more closely reflect the intent behind the design and to eliminate misconceptions.	and figures of the draft final EDR. The methodology and testing procedures for well installation have not changed. Instead of installing and testing SVE wells throughout the soil gas plume, the first phase of SVE wells to be installed and connected to the SVE system will be primarily deep zone wells and screened within, or very near to, the 500 µg/L TCE soil gas contour. Additional SVE wells will be drilled and constructed in the shallow and intermediate soil zones for monitoring purposes. These wells will be used to test the SVE system using one blower and will allow evaluation of the well field. The revised approach will concentrate the SVE where TCE concentrations are the highest. The operational data will be evaluated and a decision will be made regarding stepping out and installing subsequent SVE wells. These wells would then be connected to the SVE system.
8. <u>EDR, Page 4-47, Figure 4-9, SVE Well Field and Piping Plan</u>: The moisture trap on the 16-inch vapor line shown on *Bechtel Drawing No. 162-M01*, and generally located between SVE wells 26/26A 28/28A is not shown in *Figure 4-9*.	Figure 4-9 has been revised as requested.
9. <u>EDR, Page 5-1, Section 5, Implementation</u>: The proposed field procedures for the installation of the SVE system appears reasonable. The selected locations of, and the installation and construction of, the SVE wells appear reasonable.	Comment acknowledged.
10. <u>EDR, Page 5-9, Figure 5-2, Proposed SVE Well Construction Groups</u>: It is unclear how monitoring of the radii of influence is proposed to be conducted. The spacing of some of the 30% SVE wells is rather large, implying that their use as monitoring wells may be limited.	The modified approach for well installation should minimize the spacing between wells since the proposed wells will be installed within a much smaller area (the 500 µg/L TCE soil gas contour).

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11. <u>EDR, Page 5-12, Section 5.3, SVE Well Testing</u>: Each of the SVE wells in the "30% phase" are proposed to be tested after installation to determine the performance of the wells. The proposed tests would essentially be short, condensed, SVE pilot tests to evaluate the vacuum versus flow characteristics of the well, as well as to gather other information about the well, such as its vacuum radius of influence. The proposed duration of the tests is two hours and would include four vacuum steps of 30 minutes each. Soil vapor samples are proposed to be collected for *US EPA Method 8021* analysis during the first vacuum step. **Normally for formal SVE pilot tests, we recommend U.S. EPA's preference which states that SVE pilot tests "*should be conducted for a long enough period to assure that vapor concentrations are representative of extended system operation*," and that the tests "*should be conducted long enough to extract several (probably >5) pore volumes of soil gas*"[1]. Neither of these conditions would be met during the proposed SVE tests, and all data gathered would reflect characteristics of transient conditions. In addition, the observed soil vapor levels would be substantially higher than what would be seen during normal SVE extraction operations. Thus, we are concerned about the validity and thus usefulness of the data gathered during such unusually short SVE extraction tests. I recommend that the proposed SVE well testing be further discussed and the validity of its results and their intended purpose is further examined.**	The test has been expanded as recommended. The main goal of the well testing is to collect airflow and applied vacuum data for each extraction well and remote vacuum at each monitoring well. These data will be used to estimate the EROI of the newly installed wells and help determine the locations of planned adjacent wells. The airflow/vacuum data will also be used to establish a flow/vacuum relationship curve. This curve will be used later, so that the well's airflow can be estimated by measuring the applied vacuum. VOC concentration data will be used to represent initial conditions at the SVE well, and additional soil gas samples will be collected from the SVE wells to document the progress of soil cleanup. This part of the test will have a longer duration, as recommended by U.S. EPA.
12. <u>EDR, Page 5-19, Section 5.4.3, SVE System Start-up and *Page 6-6, Section 6.2.1, Initial Start-up and Testing*</u>: In these sections it is noted that the SVE system will not be started up until about 40-45% of the	The text has been corrected. According to McKennon Engineering, the firm contracted to refurbish the blowers, the minimum required flow to ensure the blower does not exceed normal operating temperatures is 2,000 scfm at 95

[1] US Environmental Protection Agency (US EPA), Solid Waste and Emergency Response (1995), Innovative Site Remediation Technology, Vacuum Vapor Extraction, Volume 8, EPA 542-B-002, page 3.78.

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SVE wells are available. The minimum vapor flow required is estimated to be approximately 3,000 scfm. On *Page 4-5, Section 4.1.2: Design Criteria,* it is noted that the system is capable of stable operation at 2:1 turndown. For a single 4,250 scfm blower, this turndown means operating at about 2,125 scfm, which is substantially lower than the 3,000 scfm noted in *Section 5.4.3*. While I realize that these numbers are approximate, I recommend that the magnitude of these discrepancies be reduced.	inches water gauge measured at the blower inlet. This represents the approximate conditions that will be met when the first-phase SVE wells are connected to the system.
13. <u>EDR, Page 5-19, Section 5.4.3, SVE System Start-up</u>: Reference to *Section 8* for SVE system start-up and operating schedule is not accurate. The correct reference is *Section 6*.	Text has been revised as requested.
14. <u>EDR, Page 6-12, Figure 6-1, Operation and Maintenance Data Form</u>: We recommend adding the following entries to the O&M Data Form: 1) Instantaneous air flow rate in scfm; 2) Cumulative extracted volume in scfm; 3) position of blower air inlet valves; and 4) approximate amounts of condensate removed from each of the condensate sources in the system.	Figure 6-1 will be revised as requested.
15. <u>EDR, Page 6-13, Section 6.3.3.3, Moisture Separator and Condensate Collection System</u>: This section notes that the system must be shut down to access the three condensate traps. I recommend the consideration of valves downstream of the traps that would allow isolation of the traps for purposes of servicing and pumping. This would require shutting off only a few wells upstream of the traps instead of the trap's entire trunk line or the entire SVE system. According to *Bechtel Drawing 162-M01*, the trap on the 6-inch vapor line servicing SVE wells 13, 15, 16, 17, etc., already shows a downstream valve. I recommend adding a similarly located valve for the other trap on the 6-inch line servicing SVE wells 127, 128, 129, etc. While the benefit of such an approach is clearly less for the third	It is not necessary that a line be shut down in order to clean out one of the three condensate traps. As shown in the trap detail on drawing 162-M03, a vacuum pump connected to the trap dip tube can withdraw liquid from the trap while the system remains under vacuum. Further, while no provisions for direct monitoring of pressure drop across a trap are made, it is possible to indirectly note that a trap may be overfilling by observing a decline in vacuum pressure at wells which are located upstream of the trap.

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trap located on the 16-inch vapor line, I recommend its consideration, also. (I assume that the SVE system does not have to be shut down for Condensate Sumps A, B, C, E, F, G, and I to pump condensate to the treatment compound.) **This section also notes that the traps will also be pumped out when vacuum measurements indicate increasing vacuum loss across the traps. *Bechtel Drawing 162-M01* does not indicate any means of measuring directly or indirectly the pressure drop across the traps. I recommend clarifying such a statement or modifying the drawing to include pressure measurements across the traps.** **Expanding upon the above, according to the Norton AFB drawings (by Earth Tech, 4/1995) supplied in *Appendix F* of the EDR, especially *Drawings 26- and 27 of 34*, no provisions are suggested for shutting off individual major trunk lines. Having such provisions would be beneficial if a particular geographical area consisting of a group of wells is necessary to be shut off for servicing or as an operational choice. I recommend the consideration of such provisions.**	
16. <u>EDR, Page 6-14, Section 6.3.3.5, Carbon Adsorbers</u>: See comment # 2 above for *page 4-11*.	The text has been revised as requested.
17. <u>EDR, Page 6-15 through 6-18, Section 6.3.4, Vapor Sampling</u>: It is unclear what is considered the threshold concentration at which the VGAC vessels are rotated from lead to lag, and at what point VGAC change-outs are initiated, if different. Breakthrough of VOCs at the lead vessel does not necessarily require rotation or change out of the vessels. TCE may not be the first VOC to break through, and so VOC readings by a flame ionization detector (FID) or photoionization detector (PID) may not be appropriate to show compliance with air emission limitations, which are based on TCE. Please define the threshold VOC or particular species concentration	Please see Appendix A, page A-4. Only three of the VOCs are listed in Rule 1401 and thus subject to SCAQMD risk assessment requirements (TCE, chloroform, and carbon tetrachloride). The threshold concentration for TCE is 1.5 ppm/v at the outlet of the primary carbon vessel. This concentration is considered above the emission level at which TCE poses an unacceptable risk. The text in Appendix A states that when this level is exceeded, … "the primary adsorber shall be replaced with either fresh adsorbent or adsorbent from the secondary adsorber, and the secondary adsorber shall be replaced with fresh adsorbent."

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values, which when detected would trigger an appropriate operational action, such as VGAC vessel rotation or change-out. Compliance with the substantive requirements of the South Coast Air Quality Management District (SCAQMD), as detailed in *Appendix A*, must be clearly demonstrated. In addition, speciation of VOC may be necessary to demonstrate compliance with SCAQMD requirements. **As the VGAC initial change-outs will be occurring much more frequently than initially estimated (see comment above for *Page 4-11*), I recommend revising the proposed air sampling frequency to reflect it. The sampling frequency may be decreased with time, as the influent concentrations and carbon loading rates are better characterized. As noted in the comment above for *Page 6-12*, system flow monitoring, both in terms of instantaneous and cumulative, coupled with the concentration data, must be solid enough to clearly document compliance with the substantive requirements of the SCAQMD limitations.**	Section 6.3.4 of the draft EDR states that "...VOC samples will be collected daily using a mobile laboratory for the first 7 days (and possibly longer) to establish baselines for carbon loading rates, system combined influent concentrations and mass removal rates, and correlation of the analytical data with field OVA and PID readings and to verify compliance with the SCAQMD discharge limitations." Routine monitoring will be accomplished using U.S. EPA Method TO-14 for analysis of VOCs. These data will be used to clearly document compliance with the substantive portions of the SCAQMD requirements. Based on experience at Norton AFB and evaluation of Site 24 pilot test data, carbon usage at Site 24 is expected to be similar to that at Norton AFB (please see response to Comment 4).
18. <u>O&MM, Page 1-11, Section 1.4, Site Description</u>: This section indicates that most SVE wellheads will be housed in underground, precast concrete vaults and the gathering system piping will generally be installed underground. Also, piping within Building 296 and 297 will be routed overhead to minimize impact. DTSC agrees with this approach to enable reuse of the area during the ongoing remediation. Should this approach changes, please discuss with the Local Redevelopment Authority (LRA) and provide the outcome of the discussions.	Comment noted.

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19. **<u>O&MM, Page 1-13, Figure 1-5, SVE Well Field and Piping Plan</u>: The moisture trap on the 16-inch vapor line that shown on *Bechtel Drawing No. 162-M01*, and generally located between SVE wells 26/26A 28/28A is not shown in *Figure 1-5.***	Figure 1-5 has been revised as requested.
20. **<u>OM&M, Page 2-3, Figure 2-1, Site 24 - SVE Equipment Process Flow Diagram</u>: The crossing of process lines for the VGAC system are not shown correctly. The valve upstream of VGAC vessel B shown as closed should be labeled as open instead. The arrow showing the flow of cooling tower blowdown to the sewer should be reversed.**	Figure 2-1 will be revised as requested.
21. **<u>O&MM, Page 3-10, Section 3.3.1, Operating Philosophy</u>: The adsorption of VOCs by activated carbon is a reversible equilibrium-based process. If uncontaminated air or air with low VOC contamination is passed through the VGAC vessels containing relatively high saturation of adsorbed contaminants, desorption of adsorbed species and their discharge into the ambient air will occur. Such a situation may occur during system start-ups or under unexpected or unusual system operating circumstances. Having a fresh or nearly fresh lag VGAC vessel should help eliminate the possibility of unwanted air emissions. Nevertheless, I recommend including a cautionary note in the O&MM about such possibilities and process recommendations on how to avoid it.**	The Navy concurs. An additional cautionary note will be added as requested, to describe how unwanted emissions can occur if relatively cleaner air is discharged through carbon with relatively high levels of adsorbed VOCs. Although VOC concentrations are expected to decline with time, the practice of discharging relatively cleaner air through the carbon vessels will be avoided.
22. **<u>O&MM, Page 3-15, Figure 3-1, Operation and Maintenance Data Form</u>: I recommend adding the following entries to the O&M Data Form: 1) instantaneous air flow rate in scfm; 2) cumulative extracted volume in scfm; 3) position of blower air inlet valves; and 4) amount of condensate removed from all condensate sources in the system.**	Figure 3-1 will be revised as requested.

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23. QA/QC Plan, Page 4-2, Figure 4-1 and Page 13-5, Figure 13-1, Design Process and Schedule Summary: According to Figure 4-1, this submittal represents a preliminary design. Please submit the schedule for the detailed design package and revise Figure 13-1 accordingly.	Figure 13-1 has been revised as requested.
24. QA/QC Plan, Page 5-1, Section 5, Operation and Maintenance Contact List: Please update the contact list.	This comment is directed at the draft O&M Manual, not the draft QA/QC Plan. The O&M Contact List will be updated as requested.
25. CP, Page 2-4, Section 2.4, Addressing Potential Rebound: The CP proposes an approximate 4-week shutdown of the SVE system at the perceived completion of remediation to observe rebound of soil vapor concentrations. Rebound of soil vapor concentrations to potentially significant levels can occur after periods longer than 4 weeks. We recommend that, at this stage, no commitment be made to adhere to the "approximate 4-week" rebound period. Instead, we recommend the examination of soil vapor data at the perceived end of the active remediation period and of the soil gas rebound curve characteristics. Only after such data analysis can a decision be made on the status of the vadose zone soil gas equilibrium and the ultimate residual soil gas concentration, and whether such concentration is acceptable.	The Navy concurs with this comment. The text has been modified to allow flexibility for the shutdown period duration.
26. CP, Page 2-10, Section 2.6, Implementing the Contingency Plan: The CP indicates that remedial action progress reports will be prepared and submitted by the DON to the regulatory agencies at regular intervals. Please revise this section to include monthly update reports (Section 9 of the EDR). Also, add California Regional Water Quality Control Board to the list of agencies to receive the reports.	The text has been revised as requested.
27. CP, Page 3-3, Section 3.4.2, Handling Large Spills and Page 3.8, Section 3.8, Notification: As required by Title 22, Section 66265.56, the emergency coordinator, shall notify the State California Office of	The text has been revised as requested.

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Originator: **Tayseer Mahmoud, Project Manager** **Cal-EPA** **To:** **Joseph Joyce, BRAC Environmental Coordinator** **Navy** **Date:** **13 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0162** **File Code: 0222**
Emergency Services (OES) whenever there is a release, fire, or explosion which could threaten human health, or the environment. OES can be reached at 1-800-852-7550.	
28. <u>CP, Page 3-4, Section 3.9, Record Keeping</u>: The monthly O&M reports (mentioned in *EDR, Section 9.3, Monthly O&M Reports*, and superficially in *CP, Section 2.6, Implementing the Contingency Plan*) a section that includes a brief statement that notes whether unusual events occurred, and if so, a full description of them.	The sections in the EDR and Contingency Plan have been edited to state that unusual events will be noted and described. The O&M Manual will also be revised to reflect this change.

15 December 1998

Table: VGAC consumption rate calculations based on theoretical adsorption isotherms

Constituent	Molecular weight	Design initial conc. (µg/l)[1]	Design initial conc. (ppmv)[2]	Theoretical VGAC loading rate (wt%)[3]	Adjusted VGAC loading rate (wt%)[4]	VGAC consumption rate (lbs/d)[5]
Freon 113	187.4	482	61.7	37	22	1461
TCE	131.4	279	51.0	29	17	1079
1,1-DCE	99.0	15	3.6	5	3	337
PCE	165.8	2	0.3	20	12	11
Total						2888

Notes: [1] As given in *EDR, Table 4-9, page 4-45.*

[2] [ppmv] = [µg/l] * 24 / molecular weight.

[3] From theoretical vapor phase adsorption isotherms. Note that these isotherm values may be somewhat different from those provided by Westates.

[4] 60% conservative adjustment to account for field effects, such as incomplete saturation, competition between species, etc.

[5] VGAC consumption rate in pounds per day based on a 24-hour day and 7,500 scfm volumetric throughput.

15 December 1998

Originator: **Herbert Levine, Hydrogeologist** **U.S. EPA** **To:** **Glenn Kistner, RPM** **U.S. EPA** **Date:** **7 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0162** **File Code: 0222**
COMMENTS	*RESPONSES TO COMMENTS*
1. Section 2.0 Remedial Action Objectives (EDR): Though it is not clear in the text, I assume that performance based goals will be evaluated if the numeric goals are not reached. Even if the numeric goals are reached I recommend an evaluation of rebound effect. This Section should have the same information and detail as presented in Section 2 of Contingency Plan. This information does not need to be reproduced in the Contingency Plan.	The text will be clarified to state that performance-based goals will be evaluated if the numerical goals (soil gas concentration thresholds) are not reached. The text will also be clarified to state that the rebound effect will be evaluated and addressed. Much of the information in Section 2 of the Contingency Plan was included to provide background. This information will be moved to Section 7 of the EDR, Remedial Action Monitoring and Verification of Cleanup.
2. Section 2.4 Addressing Potential Rebound (CP): It is not clear if the Navy will evaluate rebound if the numeric goals are reached. I suggest that this be done and the plan clarified.	The text has been changed to clarify that rebound will be evaluated even if numerical goals are reached.
3. Section 2.6.1 Evaluation of Risk to Groundwater (CP): It is my understanding that the threshold values were developed by considering impacts to groundwater above MCLs. Therefore, why not reference the threshold values?	The soil gas threshold values are a measure of the potential to impact groundwater and will be referenced. Section 2 has been edited to reflect this. To help assess the potential for impact to groundwater, the mobility of vadose zone contamination may also be evaluated.
4. Section 2.6.3 Decision to Continue SVE System Operation (CP): I support the Navy's decision to evaluate and document technical impracticability if the threshold values are not met. However, it would be our expectation that this include an economic evaluation of continuing SVE operations vs capture of remaining soil gas after it has impacted groundwater.	If the soil gas threshold values are not met, a technical and economic feasibility analysis may be completed. The economic analysis will include an evaluation of continuing SVE operations to remove VOCs in the vadose zone that have the potential to impact groundwater versus allowing the VOCs to migrate to groundwater and then capturing them as part of the groundwater remedy.
5. Section 4.3.4 Progress Monitoring Stations (EDR): EPA recommends collecting air flow data from these wells also. EPA also recommends adding monitoring stations to the decision process for well installation (Figure 5-3).	Figure 5-3 has been revised as requested. Induced airflow will be monitored at the Progress Monitoring Stations during system operation using a rotameter or similar device. An average soil gas velocity at the Progress Monitoring Station can then be calculated. The Progress Monitoring Stations will not be evaluated using an applied vacuum, as this would defeat their purpose as remote monitoring stations.

15 December 1998

Originator: **Herbert Levine, Hydrogeologist** **U.S. EPA** **To:** **Glenn Kistner, RPM** **U.S. EPA** **Date:** **7 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0162** **File Code: 0222**
6. Section 7.3 Soil Gas Monitoring Stations (EDR): The locations for the progress monitoring wells appears to be acceptable based on the limited information presented for actual extraction well locations. The comment made above indicates EPA's concern that air flow measurements be made from the probes and that after the wells are installed an evaluation be made to determine if additional probes are necessary. The language on the bottom of page 7-5 should be clarified to identify if rebound evaluation will be done. I assume that the Navy will conduct a rebound evaluation, but it should be clarified here.	The text has been changed to clarify that airflow tests will be performed at the Progress Monitoring Stations and that the Navy intends to conduct a rebound evaluation.

15 December 1998

Originator: **Cynthia Wetmore, U.S. EPA** **To:** **Glenn Kistner, RPM U.S. EPA** **Date:** **13 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0142** **File Code: 0222**
GENERAL COMMENTS	***RESPONSES TO GENERAL COMMENTS***
1. The plan contains the necessary items usually included in CQA/QCP but lacks sufficient details required in the Plan to be useful in determining if the design will be implemented satisfactorily. This may be because the design has yet to be finalized so the details to the construction quality requirements are not all known (e.g. page 7-1 "*A detailed inspection plan for definable features of work shall be provided ... based on the final design drawings and specifications")*. Items such as roles & responsibilities, reporting, and document control are fairly well described. What is missing are specific details as to what QC procedures are going to be done, the frequency of such testing, and pass/fail criteria for the testing.	Specific details will be discussed in a final document and after the SVE system design is ready for construction and the Navy has selected the contractor to construct and operate the SVE system.
SPECIFIC COMMENTS	***RESPONSES TO SPECIFIC COMMENTS***
1. Section 2, Organization Chart: The organization charts do not correspond to the description of each role & responsibility on subsequent pages. For example, the RA project QC engineer reports to the QA manager but the organization chart shows him reporting to the project manager.	Figure 2-2 has been revised as requested.
2. Section 2: At one point prior to construction, specific persons need to be assigned to each role and the names should be included in the CQA/QCP. It is not recommended that the same person be assigned several roles, especially when the roles may conflict.	The Navy concurs with this comment. The text and figure were revised to clarify that one person is not responsible for disparate roles during construction.

15 December 1998

Originator: **Cynthia Wetmore, U.S. EPA** **To:** **Glenn Kistner, RPM U.S. EPA** **Date:** **13 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0142** **File Code: 0222**
3. **<u>Section 3</u>: This section does not include the details on what qualifications are necessary to meet project needs.**	The installation and testing of SVE wells, VOC monitoring, evaluation of data, and system optimization will be performed under the supervision of a California Registered Geologist and/or Professional Engineer. Piping installation will be performed by an experienced contractor under the supervision of a California Professional Engineer. Specific training will be addressed by the contractor performing the task. For example, the Remedial Design Contractor requires that all personnel responsible for a given task read and understand the applicable SOPs.
4. **<u>Section 6</u>: The SOPs are great starting points for establishing the QC procedures for this project. After final design, these SOPs should be reviewed for applicability and additional detail be included, as needed.**	The Navy concurs with this comment.
5. **<u>Section 6.2</u>: The QA procedures for construction elements not covered by the SOPs should be included in this document. Again, it should discuss the type of procedure to be followed if there is a failure.**	The text will be revised to state that SVE wells will be installed under the supervision of a California Registered Geologist in accordance with California Well Standards Bulletins 74-81 and 74-90. Procedures for estimating vapor extraction radius of influence and effective radius of influence are included in Appendix C (Soil Permeability and Soil Gas Velocity Calculation Form). The text will be revised to state that VOC monitoring and system optimization will be performed under the supervision of a California Registered Geologist or Professional Engineer. System optimization will be performed based on the professional judgment and experience of the supervising professional. The text will be modified to state that a decision has not been made whether to use trenchless piping or pneumatic soil fracturing. If used, trenchless piping and pneumatic soil fracturing QA procedures will be developed based on site-specific conditions (such as the presence of structures or underground utilities), the project objectives, and input from the contractor providing the specialized services.

Originator: **Cynthia Wetmore, U.S. EPA** **To:** **Glenn Kistner, RPM U.S. EPA** **Date:** **13 October 1998**	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0142** **File Code: 0222**
6. <u>Section 6.2, last paragraph</u>: **What is the documentation that will be maintained?**	It will be documented that SVE well installation, vapor extraction radius of influence testing and evaluation, estimation of effective radius of influence, and VOC monitoring and system optimization are performed under the supervision of a California Registered Geologist or Professional Engineer. Documentation to guide specialized services such as trenchless pipe installation and pneumatic fracturing will be provided by the contractor providing the specialized service.
7. <u>Section 7.1</u>: **This section states that the Remedial Action contractor should develop the inspection plan. Shouldn't the remedial design team develop the inspection plan to ensure that the important features in the design are constructed as intended?**	The Remedial Action Contractor will base the inspection plan on the final design drawing and specifications. This will assure that the design is constructed as intended.
8. <u>Section 8</u>: **Shouldn't the remedial design team develop the calibration/service specifications and use instructions?**	Usually the contractor responsible for the operation of the equipment that requires calibration is also responsible for the calibration. The Remedial Action Contractor will be responsible for the measuring and testing equipment described in Section 8.

RESPO[illegible]) COMMENTS
Draft Engineering Design Re[illegible]t, Vadose Zone Remediation, Site 24
MCAS EL TORO, CALIFORNIA

15 December 1998

Originator: Patricia A. Hannon, CRWQCB **To:** Joseph Joyce, BRAC Environmental Coordinator, MCAS El Toro **Date:** 14 October 1998	**CLEAN II Program** **Contract No. N68711-92-D-4670** **CTO-0162** **File Code: 0222**
COMMENTS	***RESPONSES TO COMMENTS***
1. Page 2-1 Section 2.1 paragraph 2: The 1995 Santa Ana River Basin Water Quality Control Plan does not make a distinction between the shallow and the regional aquifer. Therefore, the beneficial use designation applies to the entire Irvine Forebay subbasin.	The text has been revised as requested.
2. Figure 3-1, Index Map: Please designate the units on the map scale.	Figure 3-1 has been revised as requested.
3. 5.2.3 SVE Well Construction Sequencing, 2nd paragraph: It is noted here on Figure 5-2, the well locations for *the "30 percent well installation"* are in bolded red. On Figure 5-2 the well locations are either black or green.	The figure and text have been revised. Based on SWDIV comments, the initial phase of SVE wells will be installed in the deep zone within the 500 µg/L soil gas contour for TCE. These wells will be connected to the SVE system and their operation will be evaluated. SVE wells installed in the shallow and intermediate soil zones will be monitored to assess the degree that airflow can be induced from extraction in the deep zone only. Additional SVE wells will be installed, if necessary, after evaluating the operation of the first phase of SVE wells.
4. Page 7-3 Section 7.2 Soil Gas Monitoring at the Wellhead: Please indicate if the initial and final soil gas samples will be analyzed at a certified laboratory or in the field.	The text has been revised as requested. Soil gas samples will be analyzed for VOCs at a certified laboratory using U.S. EPA Method 8021.
5. Page 7-5, last sentence: Please add Santa Ana Regional Water Quality Control Board to the list of agencies who will review the Department of Navy's request for concurrence of no further remedial action after shut down of the SVE treatment system.	The text has been revised as requested.

Table 4
Travel Time Calculations at wells 24SVE2 and 24SVE2A
One-day Pilot Testing

Well No.	Vacuum inches H_2O	Q cfm	K cm^2	P_w atm	P_{atm} atm	R_w ft	R_i ft	r ft	e -	U_g cm/s	delta R ft	delta R cm	Travel Time days	Cumul. Travel Time days
24SVE2	60	18.5	1.29E-08	0.8430592	0.9904081	0.086125	50	20	0.165	-0.015748038	20	609.6	0.44802758	0.448027579
	60		1.29E-08	0.8430592	0.9904081	0.086125	50	30	0.165	-0.01040407	10	304.8	0.33907669	0.787104273
	60		1.29E-08	0.8430592	0.9904081	0.086125	50	35	0.165	-0.00888751	5	152.4	0.19846828	0.985572551
	60		1.29E-08	0.8430592	0.9904081	0.086125	50	40	0.165	-0.007753849	5	152.4	0.22748558	1.21305813
	60		1.287E-08	0.8430592	0.9904081	0.086125	50	50	0.165	-0.006173055	10	304.8	0.57148007	1.784538198

Well No.	Vacuum inches H_2O	Q cfm	K cm^2	P_w atm	P_{atm} atm	R_w ft	R_i ft	r ft	e -	U_g cm/s	delta R ft	delta R cm	Travel Time days	Cumul. Travel Time days
24SVE2A	60	59	3.42E-08	0.8430592	0.9904081	0.086125	50	20	0.165	-0.04185402	20	609.6	0.16857534	0.168575339
	60		3.42E-08	0.8430592	0.9904081	0.086125	50	30	0.165	-0.0276512	10	304.8	0.12758136	0.2961567
	60		3.42E-08	0.8430592	0.9904081	0.086125	50	35	0.165	-0.023620595	5	152.4	0.07467589	0.370832588
	60		3.42E-08	0.8430592	0.9904081	0.086125	50	40	0.165	-0.020607631	5	152.4	0.08559397	0.456426557
	60		3.42E-08	0.8430592	0.9904081	0.086125	50	50	0.165	-0.016406307	10	304.8	0.21502571	0.671452262

[box] - represents critical velocity and EROI

Table 5
Travel Time Calculations at well 24SVE3
One-day Pilot Test

Well No.	Vacuum inches H_2O	Q cfm	K cm^2	P_w atm	P_{atm} atm	R_w ft	R_i ft	r ft	e -	U_g cm/s	delta R ft	delta R cm	Travel Time days	Cumul. Travel Time days
24SVE3	108	22	7.81E-09	0.72518	0.9904081	0.086125	50	20	0.165	-0.016331891	20	609.6	0.43201095	0.432010948
	108		7.81E-09	0.72518	0.9904081	0.086125	50	30	0.165	-0.010719506	10	304.8	0.3290989	0.761109853
	108		7.81E-09	0.72518	0.9904081	0.086125	50	35	0.165	-0.009134997	5	152.4	0.19309136	0.954201211
	108		7.81E-09	0.72518	0.9904081	0.086125	50	40	0.165	-0.007953481	5	152.4	0.22177571	1.175976923
	108		7.81E-09	0.72518	0.9904081	0.086125	50	50	0.165	-0.006310827	10	304.8	0.55900408	1.513205289
	108		7.81E-09	0.72518	0.9904081	0.086125	50	60	0.165	-0.005224421	10	304.8	0.67524756	1.851224485

[box] - represents critical velocity and EROI

Table 14
Travel Time Calculations at well 24SVE12
One-day Pilot Test

Well No.	Vacuum inches H_2O	Q cfm	K cm^2	P_w atm	P_{atm} atm	R_w ft	R_i ft	r ft	e -	U_g cm/s	delta R ft	delta R cm	Travel Time days	Cumul. Travel Time days
24SVE12	60	68	3.75E-08	0.84305916	0.9904081	0.086125	275	20	0.165	-0.037154804	20	609.6	0.18989619	0.189896186
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	40	0.165	-0.018340643	20	609.6	0.38469511	0.574591291
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	45	0.165	-0.016267826	5	152.4	0.10842806	0.683019355
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	60	0.165	-0.012137517	15	457.2	0.43597605	1.010567343
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	80	0.165	-0.009056356	20	609.6	0.77907228	1.789639619
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	90	0.165	-0.008033253	10	304.8	0.43914688	2.2287865
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	100	0.165	-0.007216449	10	304.8	0.48885231	2.278491933
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	120	0.165	-0.005994419	20	609.6	1.17702081	3.455512747
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	140	0.165	-0.005124218	20	609.6	1.37690388	4.832416629
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	160	0.165	-0.004473268	20	609.6	1.57727097	6.409687596
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	180	0.165	-0.003968119	20	609.6	1.77806027	8.187747865
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	200	0.165	-0.003564809	20	609.6	1.97922392	10.16697179
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	220	0.165	-0.003235419	20	609.6	2.18072377	12.34769555
	60		3.75E-08	0.84305916	0.9904081	0.086125	275	240	0.165	-0.002961373	20	609.6	2.38252866	14.73022421
	60		3.748E-08	0.84305916	0.9904081	0.086125	275	275	0.165	-0.002578459	35	1066.8	4.78860496	19.51882917

[box] - represents critical velocity and EROI

Table 15
Travel Time Calculations at wells 24SVE14
One-day Pilot Testing

Well No.	Vacuum inches H_2O	Q cfm	K cm^2	P_w atm	P_{atm} atm	R_w ft	R_i ft	r ft	e -	U_g cm/s	delta R ft	delta R cm	Travel Time days	Cumul. Travel Time days
24SVE14	140	13	2.77E-09	0.64659395	0.9904081	0.086125	50	10	0.165	-0.014992731	10	304.8	0.23529921	0.23529921
	140		2.77E-09	0.64659395	0.9904081	0.086125	50	16	0.165	-0.009146509	7	213.36	0.26998764	0.505286849
	140		2.77E-09	0.64659395	0.9904081	0.086125	50	30	0.165	-0.00473101	13	396.24	0.96937257	1.47465942
	140		2.77E-09	0.64659395	0.9904081	0.086125	50	40	0.165	-0.003500981	10	304.8	1.00765406	2.48231348
	140		2.774E-09	0.64659395	0.9904081	0.086125	50	50	0.165	-0.002772468	10	304.8	1.27243246	3.754745943

[ ] - represents critical velocity and EROI

U.S.FILTER

U.S. FILTER/WESTATES
5375 SOUTH BOYLE AVENUE
LOS ANGELES, CA 90058

TELEPHONE 213-277-1500
FACSIMILE 213-277-4184

October 19, 1998

Deborah Topper
Bechtel Corporation
San Diego, CA.

Tel: 619-744-3040 Fax: 619-687-8787 3 Pgs.

Project: MCAS – El Toro, CA
Budget Proposal No: SM101998BE

Dear Deborah:

Attached hereto is the revised isotherm report based on the Table received from your office. We apologize for the oversight of "units" of concentrations previously run in error.

Our isotherm reports indicate the following estimated carbon usage in #GAC/day at "Saturation" of a primary adsorber, assuming (2) two or more adsorbers on line. The numbers below "remove" the 1.75 "breakthrough factor.

Contaminant	Concentrations	Units	Estimated #GAC/day at "SATURATION"	
Freon 113	61.7	ppmv	1,870	
TCE	51.0	ppmv	1,057	
1,1, DCE	3.6	ppmv	544	
PCE	0.3	ppmv	15	
TOTAL ESTIMATED GAC USAGE AT 'SATURATION"			**3,486**	

The Norton AFB concentrations reduced "drastically in a matter of 2 weeks. The project originally (1994 and 1995) estimated to changeout 20,000 lbs of GAC every 5-7 days for the first two months. Westates guaranteed and covered 250,000 lbs of GAC in stock for this "assumed" usage. Fortunately for the Air Force, the concentrations dropped off drastically after startup and the site used a minimal amount of activated carbon/services compared to estimates.

If the El Toro soil and contamination/area conditions are similar to Norton AFB, then results should be similar in early reduction of concentrations. This data is available from the AF or Earth Tech.

As you already know, this is the rationality for using activated carbon in applications where concentration reductions are known to occur in concentrations quickly. Other technologies that require "outside" energy to perform are less economical when the contaminant concentrations are reduced.

Regarding the paragraph 21. O&MM, Page 3-10, Section 3.3.1, Operating Philosophy:

When installing activated carbon adsorbers, (2) adsorbers should be installed in series, with rotational lead/lag operation. The "saturated" or "near saturated" vessel will always be the primary (lead) adsorber with the secondary (lag) adsorber as backup with a cleaner or fresher area of mass transfer zone to prevent or minimize the possibility of "premature breakthrough" under unusual conditions.

ALL O&M procedures should include the instructions to contact the Activated Carbon System Supplier and Services Company if a "shut down" occurs or unusual conditions exist.

We, U.S. Filter/Westates, would review your *operational conditions since last change-out to determine the necessary requirements to prevent "premature breakthrough" on startup, or other conditions that could possibly occur in the system, such as bio-growth (if conditions exist). At that time we would provide recommendations to Bechtel and the client.

*This would include, but may not be limited to, hours of run time, inlet concentrations, Outlet exhaust concentrations of all GAC units, Air temperature, R/H, etc. (and perhaps sampling of carbon from units, which we would provide).

Please do not hesitate to page me at 800-690-6588 if you have any further questions or to contact me through my office at 800-659-1771 (ext 4162).

Sincerely,
U.S. Filter/Westates

Sandi Marshall

Sandi Marshall
Sales Account Manager

encl
cc: file

US FILTER/WESTATES
5375 SOUTH BOYLE AVENUE
LOS ANGELES, CALIFORNIA 90058
TEL: 800 659 1771
FAX: 323 277 4184

OFFICE COPY ***OFFICE COPY***

Vapor Isotherm report created on 10/19/98 at 15:57 by S. Marshall @ 323-.

VAPOR PHASE ISOTHERM DESIGN PARAMETERS

System Temperature	38.00000 °C
Air Flow Rate	7500.00000 SCFM
System Pressure	14.70000 psi
Relative Humidity	50.0000 %

VAPOR PHASE DESIGN

Component Name	*Concentration*	*Q [Wt %]*	*#GAC/day at Saturation*
FREON 113	61.7000 ppmv	16.3101	1870.3683
ETHENE,TRICHLORO- (TCE)	51.0000 ppmv	16.7327	1056.6743
ETHENE,1,1-DICHLORO-	3.6000 ppmv	1.6943	543.8394
PCE	0.3000 ppmv	8.8877	14.7697

Total Carbon Usage Estimated at Breakthrough
* 6099.8907 #GAC/day

(Total has been multiplied by a * factor of 1.75)

* Remove when installing (2) in Series -

** EST. GAC usage @ Saturation = 3486 LBS a day @ Above parameters

* indicates that Relative Humidity was calculated
~ indicates that Relative Humidity was approximated

The above carbon usage estimates are based on both experimental data as well as predictive models. Actual carbon usage rates observed at various stages of breakthrough depend on many factors, and may t differ from the above estimates. Please contact Westates Carbon Products for further assist

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, telephone service, water, and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, and water control.

C. Construction Facilities: Parking, progress cleaning, project signage, and temporary buildings if necessary.

1.02 RELATED SECTIONS

A. Section 01700 - Contract Closeout: Final cleaning.

1.03 STATION REGULATIONS

The Contractor and its employees and Subcontractors shall become familiar with and obey all Station regulations, including fire, traffic, and security regulations. All personnel employed on the Station shall keep within the limits of the work (and avenues of ingress and egress) and shall not enter any restricted areas unless required to do so and cleared for such entry. Contractor's equipment shall be marked for identification.

1.04 WORKING HOURS

Regular working hours shall be established during the pre-construction meeting.

1.05 WORK OUTSIDE REGULAR HOURS

The Contractor shall request in writing to the Navy RPM and Technical Representative for approval at least seven days prior to conducting work outside of the agreed upon hours of operation, including weekend or holiday work.

1.06 ORDER OF WORK

The Contractor shall schedule its work so as to cause the least amount of interference with Station operations. Work schedules shall be subject to approval of the Navy RPM and Contracting Officer. Permission to interrupt any Station roads or utility service shall be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

1.07 PERMITS

A. Remedial actions taken under CERCLA ♣♣ 104, 106, or 122 that are conducted entirely on-site do not require federal, state, or local permits.

B. The Contractor shall contact the Navy Technical Representative prior to initiating earthwork and shall not begin this work until the Navy Technical Representative issues a notice to proceed.

1.08 TEMPORARY ELECTRICITY

The Contractor shall be responsible for providing electricity during excavation, backfilling, and compacting operations conducted at the work site.

1.09 TELEPHONE SERVICE

The Contractor is responsible for providing its telephone service necessary for the efficient performance of work and emergency communications.

1.10 TEMPORARY WATER SERVICE

A. The Contractor shall provide and maintain adequate drinking water facilities during the life of the Contract as may be required by the work force employed.

B. Reasonable amounts of water (30-50 gpm) will be obtained from Station fire hydrants after obtaining concurrence from the Navy Technical Representative and approval of the MCAS El Toro operating authority. The Contractor shall exercise measures to conserve water.

1.11 TEMPORARY SANITARY FACILITIES

The Contractor shall provide and maintain required sanitary facilities for the duration of field work. Sanitary facilities should be provided as

E. Piping elevation requirements shall be maintained during boring. Buried piping must be free draining either to wells, traps, or to collection vaults. Low points (sags) in piping which can fill with condensate and occlude the pipe are not permitted. Elevation requirements during boring must be maintained accordingly. If a condition is encountered such that condensate will pool in the conveyance piping due to an underground obstruction, a condensate collection sump will be designed and installed that is capable of maintaining an open conveyance line.

F. HDPE piping shall be pulled in the bored passages, and flanged for connection to PVC piping in the well boxes or collection vaults.

3.03 COMPLETION

A. After completion of pulling at any location, all spoils shall be removed, the surrounding area shall be cleaned, and access pits shall be covered, cordoned or otherwise rendered safe from accidental falls.

3.04 TESTING

A. After installation, piping shall be tested in accordance with Section 15410.

END OF SECTION 02584

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BECHTEL NATIONAL INC.

CLEAN II TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N-68711-92-D-4670 **Document Control No.:** CTO-0162/0102

File Code: 0222

TO: Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Mr. Richard Selby, Code 02R.RS
Building 127, Room 112
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: December 14, 1998
CTO #: 0162
LOCATION: MCAS El Toro

FROM: [signature]
D. J. Tedaldi, Ph.D., P.E., Project Manager

DESCRIPTION: Response to Comments – Draft Engineering Design Report, Vadoze Zone Remediation, Site 24 - U.S. EPA, Cal-EPA, RWQCB-Santa Ana Region Various Dates

TYPE: ____ Contract Deliverable (Cost) X CTO Deliverable (Technical) ____ Other

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