

**Fort Ord Basewide Cleanup
Comments on
Report of Off-site Groundwater Extraction Pilot Study and Quarterly Monitoring
Operable Unit 1
July to September 2008
Former Fort Ord, California Revision 0
Prepared by
Environmental Stewardship Concepts
On Behalf of
The Fort Ord Environmental Justice Network
17 February 2009**

These comments were prepared at the request of the Fort Ord Environmental Justice Network (FOEJN) to provide technical comment to the Army's prescribed burns. FOEJN represents the affected community in the greater Fort Ord area in the clean-up of contamination and ordnance-related waste.

Summary of Concerns

A. The language in the report is highly confusing. The Army repeatedly uses the words "reinjection" and "discharge" interchangeably. For purposes of water conservation and accomplishing the stated goal of shrinking the TCE plume, the groundwater from OU1 should be reinjected into the aquifer after the TCE is removed. This option is the best one to prevent the plume from spreading and to ensure that saltwater does not fill the void and salinate the City of Marina's freshwater supply.

B. The Army further perpetuated the confusion during the January CIW when two speakers from different engineering firms (Ahtna and Shaw) gave presentations to the public regarding the water treatment system at OU1. One indicated that the water is being re-injected according to the plan, and the other showed that the water was being discharged into the basin. Who is to say what is actually happening out there? The Army has failed in providing straightforward, reliable communication on the cleanup at Fort Ord to the public.

C. The Army told the public at the CIW that the TCE plume was retreating and that concentrations were decreasing. After reading this report, their statement may not be verifiable because they have not accounted for seasonal rates of precipitation and drought that affect the rise and fall of the water table. It may appear that the TCE plume is shrinking when, in reality, it has been affected by decreased water levels overall. Again, the Army is not presenting the whole picture to the public.

D. A figure in the report shows that the piping for the water treatment infrastructure is partly PVC and partly HPDE. PVC piping should not be a feasible medium for piping in this instance because the water is already contaminated with polyvinyl chloride. The Army is exacerbating this problem by introducing more of the carcinogen into the environment.

Document Summary

The purpose of this document is to explain the operation of the Off-Site Groundwater Extraction Pilot Study, which was conducted to determine the extent of the trichloroethylene (TCE) contamination in Operable Unit 1 (OU1). OU1 currently extends from the former Fort Ord boundary through the Armstrong Ranch and into the groundwater beneath the City of Marina. The pilot study consisted of groundwater extraction, subsequent aboveground treatment using Granular Activated Carbon, and supposedly re-injecting the treated groundwater onsite at the Marina Coast Water District plant. The document also reports the results of the first quarterly monitoring for the Groundwater Extraction and Treatment System in place at OU1. The monitoring took place from July to September 2008. The treatment is meant to reduce the highest detected levels of TCE to below the established Aquifer Cleanup Level of 5.0 micrograms per liter (ppb).

General Comments

The sandy substrate beneath the former Fort Ord boundary and developments adjacent to it (including the City of Marina) is highly porous, meaning that groundwater is not bound by underground geological formations and travels with ease. Containing the TCE plume is therefore a difficult, but necessary, step in the remediation process at Ford Ord. ESC would like to stress once more that the Army must work expeditiously to remove the TCE but must also be highly cautious of the rate at which it extracts and re-injects the groundwater. Saltwater intrusion is a common consequence of overdrawing from freshwater aquifers and will leave the water source too salty to drink without further treatment in a desalination plant. The Army should be wary of the rate at which they are extracting water during the treatment process; otherwise, it will undermine any attempt at an expedient cleanup by adding yet another step to the water treatment process before it can be considered suitable for human use. Results from the groundwater monitoring indicate the development of cones of depression at certain extraction wells, which is the first alert that there is not a balance between removal and recharge of the aquifer. This cone development may be the result of deviating from the Army's original intent to re-inject the water by leaving the water above ground in a discharge basin on the Marina Coast Water District property. ESC has specific comments on the Report's results of extraction below.

Secondly, quarterly sampling is a common practice, characterized by consistent sampling every three months; the Army's schedule of February, July, and September (indicated in Table 2 Operable Unit 1 Off-Site Groundwater Extraction Pilot Study Chronology) is erratic and does not follow a quarterly sampling schedule as previously described. In addition to regularizing its "quarterly" groundwater monitoring, ESC recommends that the Army should sample more

frequently, perhaps twice a quarter (every 6 weeks), at the front boundary of the plume to give a better idea of how ambient conditions (especially seasonal precipitation rates) are affecting the progression or regression of the TCE plume.

Issue-Specific Comments

Discharge versus reinjection

“Discharge” and “injection” (or “reinjection”) are not synonymous, but the Army has consistently used the two interchangeably throughout this Report, resulting in great confusion and doubt about the end result of the water treatment process. On page 2-1, the first sentence of Section 2.0 Off-Site Groundwater Extraction Pilot Study states: “This pilot study includes groundwater extraction from the A-Aquifer, aboveground treatment using GAC, and *reinjection of the treated groundwater*” (emphasis added). However, the Report states on the same page: “TCE is removed from the groundwater by the GAC; and the treated groundwater is *discharged to a discharge basin* located within the Marina Coast water District Property” (emphasis added), which is not consistent with the first sentence.

The language is confusing for readers because reinjection and discharging are two separate actions with very different impacts on aquifer recharge. Reinjection fills the aquifer like a swimming pool. Discharged water contained in an aboveground basin is subject to runoff directly to the sea and evaporation to the atmosphere because the water is not returned underground directly. As a result, large amounts of treated water are wasted because it never reaches the A-Aquifer, as the plan intends. A more serious consequence is the reduction of the hydrostatic boundary of the aquifer by not replacing the water at the same rate at which it is extracted. Liquids are only bound by their surroundings; in other words, the more water there is in the A-Aquifer, the less space there is for the water to travel. The basis of the hydrostatic boundary is this containment- the TCE plume will expand its boundaries if there is not enough water to “push back” and contain it in its current location. A third result of unbalanced extraction and removal is salt water intrusion. When water is removed from freshwater aquifers like A-aquifer, saltwater in nearby aquifers can flow into the void, known as a cone of depression, resulting in salinated freshwater unsuitable for drinking. The Report states on page 3-4 that: “The cone of depression in the vicinity of EW-OU1-92-A continues to develop; and despite only cyclic operation of EW-OU1-93-A, a cone of depression appears to be developing there.” Additionally, Figure 6 depicts the cone of depression at extraction well 92-A. The conspicuous impacts of the Army’s groundwater extraction activities indicate the serious need for reinjection following treatment of the TCE, rather than discharge into a basin. Otherwise, the treatment work will be meaningless when the groundwater becomes saline to the point of being nonpotable or the TCE plume continues to grow because there is not enough water to prevent its spread through the porous geological formation underground.

On page 2-2, the second paragraph states “...the injection well was replaced by using a discharge basin within the MCWD property for discharge of treated groundwater. No injection well was installed.” The Army needs to substantiate this reasoning – why is a discharge pond being accepted as a method of aquifer recharge? Secondly, if the purpose of re-injected water is to repel the TCE plume and prevent its spread toward the City of Marina, then the placement of the discharge pond (as indicated in Figure 2 Operable Unit 1 Off-Site Groundwater Extraction Pilot Study Well Location Map) is questionable. If the discharge pond is in fact recharging the aquifer (ESC doubts that it is), then the recharge is not hitting the TCE plume head on, which would be the most effective and sensible way to repel it. A reinjection well should be installed at the front boundary of the TCE plume as the most effective means of combating its spread.

Under Section 2.2 Treatment System Installation on page 2-3, there are also references to a discharge basin. Again, there is confusion about whether or not the water is actually being re-injected according the stated final step of the Pilot Study (see page 2-1).

Conflicting Results Presented to Public both at the CIW and in this Report

At the January CIW, the Army presented conclusions to the public that the groundwater plume was “shrinking steadily” and TCE concentrations were “decreasing or stable” (Environmental Cleanup Update OU1 PowerPoint); the public requested more details and the Army confirmed that this was a result of the groundwater treatment process described in this Report. Members of the public were pleased with that result; however, results presented in this Report give a more complicated and complex picture suggesting that the groundwater contamination plume is affected by ambient drought conditions *as well as* the withdrawal and treatment process. The Army appears to have misled the public during the January CIW and is not fully accounting for ambient conditions that are impacting the groundwater treatment.

The Army has further confused the issue by presenting conflicting information to the public at the January Community Involvement Workshop (CIW) in two different PowerPoint presentations. The first, given by Derek S. Lieberman of Ahtna Engineering, indicates injection wells are the final phase in the pump and treat schematic. In his presentation, the “Engineering Controls: Fort Ord Groundwater Treatment Systems” slide shows Fort Ord’s groundwater treatment system as a process that extracts, treats, and re-injects the water from the TCE plume. The second, given by David Kelly of Shaw Environmental, illustrates the final phase of OU1 water treatment as containment in a discharge basin on a slide called “Groundwater Extraction and Treatment System.” Both those presentations and this Report do not clearly present information that is crucial to the public’s understanding of remediation at Fort Ord and confuses an issue of extreme importance for the future wellbeing of the community. The Army’s methods are in direct contradiction of each other and call into question the effectiveness of this treatment system.

Seasonal Conditions

Sensibly, the Army should operate under the assumption that the water table rises and falls during the rainy season and dry season that characterizes the Monterey Bay climate. Measurements from July 14 and September 15, 2008 indicate that the water table dropped as much as two feet between each testing (Table 6 Groundwater Elevations, A-Aquifer...). This drop may be the result of both drought and pumping. Whichever the cause, the Army needs to account for changes in the ambient conditions by setting extraction rates according to the amount of water that is available during any particular season. The extent of the groundwater plume increases as the water table rises and the up-gradient flow presses westward towards Monterey Bay (as the evidence indicates in Figures 8 and 9 from July to September). ESC contends that a monitoring well is necessary to monitor the ebb and flow of the plume into residential areas of the City of Marina. The current results are not sufficient to convince ESC that the TCE plume is retreating solely as a result of the groundwater extraction and treatment system put into place by the Army.

PVC Piping

Figure 3, the Piping and Instrumentation Diagram, depicts PVC pipelines connected to HDPE pipelines, rather than a consistent usage of one type or the other throughout the piping infrastructure. The Army should explain why it is using PVC to pipe water that has been documented as contaminated with PVC, instead of comprehensively utilizing HDPE. Studies are being released with growing frequency indicating the health hazards associated with polyvinyl chloride in household products, and the EPA has identified PVC as a carcinogen. In 2005, the City of Seattle replaced large amounts of PVC piping with high density polyethylene (HDPE) pipes, the same choice used by the Army for the transfer of OU1 groundwater from the extraction well to the process area. HDPE is a safer alternative to PVC because it releases fewer persistent bioaccumulative toxins (PBTs) over the course of its production, usage, and disposal than PVC. At the very least, there needs to be an explanation for the usage of both types of piping, and the Army should err on the side of caution by rejecting the use of PVC piping during the water treatment process.

Conclusions

The Army must clarify the process of off-site water treatment of the TCE plume at OU1. Choosing to store treated water in a discharge basin rather than re-injecting it into the substrate will exacerbate the water quality issues associated with California's drought, the TCE plume, and access to clean drinking water for the City of Marina and surrounding communities. The citizens affected by the former Fort Ord environmental cleanup are owed a logical, straightforward, and beneficial cleanup process by the Army. This Report and the conflicting

PowerPoint presentations given at the CIW are concrete examples of the Army's failure to consider the citizens of Marina as partners of the cleanup process. The citizens are partners who will be affected by the decisions made during Fort Ord cleanup long after the project's conclusion, and it is the Army's duty to account for human wellbeing before, during, and after the remediation at Fort Ord. Furthermore, the citizens deserve to know every effort is being made to keep them aware and informed of Army actions that impact their health and wellbeing on an everyday basis. A revision of this document, perhaps warranting different remedial actions at OU1, is absolutely necessary before the cleanup continues as currently planned.

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