

Comments on  
“US EPA, ‘Proposed Plan Brown & Bryant Superfund Site Operable Unit No. 2  
City of Arvin, Kern County, California,’  
United States Environmental Protection Agency Region 9  
San Francisco, CA, June (2007)”

Comments provided by G. Fred Lee, PhD, PE, BCEE, F. ASCE  
Anne Jones-Lee PhD  
G. Fred Lee & Associates  
Gfredlee@aol.com  www.gfredlee.com  
October 30, 2011

The report, “US EPA, ‘Proposed Plan Brown & Bryant Superfund Site Operable Unit No. 2, City of Arvin, Kern County, California,’ US EPA Region 9, San Francisco, CA, June (2007)” [[http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/3dc283e6c5d6056f88257426007417a2/92de59df0fb11131882576e1005df9e4/\\$FILE/B&B%20Site%20final%20PPA%2006-07-07.pdf](http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/3dc283e6c5d6056f88257426007417a2/92de59df0fb11131882576e1005df9e4/$FILE/B&B%20Site%20final%20PPA%2006-07-07.pdf)] (referred to herein as “US EPA Proposed Plan OU-2”) is prefaced with the statement:

*“This document describes how the U.S. Environmental Protection Agency (EPA) proposes to address groundwater contamination at the former Brown & Bryant Pesticide Reformulation Facility (Facility), now known as the Brown & Bryant Superfund Site (B&B Site). EPA describes the cleanup alternatives considered and the one we prefer. Finally, we ask for your thoughts on this proposal.”*

*“The Proposed Plan at a Glance*

*Problem: During past operations at the Facility, contaminants were spilled or released onto Site soils. Some of these contaminants have also migrated into the groundwater beneath the B&B Site. The Environmental Protection Agency (EPA) has already addressed surface soil contamination in a Record of Decision (ROD) dated November 8, 1993. EPA is now proposing a way to clean up remaining contamination.*

*Solution: The EPA proposes to clean up contaminants in the groundwater by extracting and treating the groundwater in the shallower A-zone and allowing monitored natural attenuation to reduce the contaminant concentrations in the deeper B-zone (see Figure 3). In addition, the EPA proposes to relocate the Arvin City Well No. 1 (CW-1) to eliminate any possible risk of community residents drinking potentially contaminated groundwater.”*

*“About the Proposed Plan EPA is seeking public comments on this Proposed Plan to address groundwater contamination at the B&B Site in Arvin, California. The EPA has prepared this Proposed Plan to: (1) inform the community about the history and environmental findings at the B&B Site; (2) describe the cleanup options and EPA’s preferred alternative; (3) solicit public comments on EPA’s cleanup proposal; and (4) describe how the public can become involved.”*

*“This Proposed Plan summarizes the cleanup alternatives that were considered by EPA in the RI/FS, and it describes in detail the alternatives that are available to address the Operable Unit No. 2 (OU-2), contamination in the B-zone groundwater B&B Site. The OU-2 consists of impacted subsurface soil from the base of the first water-bearing unit (A-zone groundwater) located approximately 85 below ground surface (bgs) to the second water-bearing unit (B-zone*

groundwater) at approximately 140 feet bgs, and the B-zone groundwater located below 140 feet bgs. The Operable Unit No. 1 (OU-1) consisted of the surface soil and the subsurface soil to 65 feet (A-zone soils), and the first saturated interval located approximately 65 to 85 bgs (A-zone groundwater). Remedial activities addressing OU-1 soil contamination were completed by EPA in 2000, as discussed in the next section.”

The “Site Background” section states:

*“The initial investigations of the B&B Site OU-1 included soil and groundwater sampling and analysis. Sampling results from surface soils identified Dinoseb as a Contaminant of Concern (COC). Dinoseb was detected at concentrations exceeding 7,000,000 µg/kg (parts per billion) of soil. The peak concentration of dinoseb impact occurred in a former spill area along the east fence-line and beneath a former pond and sump. The impacted surface soil was removed and an asphalt cap was installed over the entire B&B Site. The southern portion of the cap is an engineered RCRA cap. This cap limits or eliminates surface water infiltration. These actions included the off-site disposal of contaminated soil. In 1989, the B&B Site was listed on the National Priorities List (NPL) of Superfund Sites. In 1990, EPA conducted an emergency response site assessment and began the RI and FS for OU-1.*

*The outcome of the OU-1 RI and FS was a Record of Decision (ROD) that was signed on November 8, 1993, by the EPA Deputy Regional Administrator. The COCs identified for OU-1 were chloroform, 1,2 -Dibromo-3 -chloropropane, 1,2- -Dichloropropane, 1,3-Dichloropropane, Dinoseb, Ethylene Dibromide and 1,2,3-Trichloropropane.”*

*“A RCRA cap consisting of a geosynthetic clay liner and protective asphalt covering was constructed in the southeastern part of the site covering an area of approximately 60,000 square feet. A non-RCRA cap consisting of a 3-inch bituminous course on a 6-inch compacted subgrade was constructed on all site areas that were not covered by the RCRA cap. A new 6-foot high chain link fence was constructed around the RCRA-capped area.”*

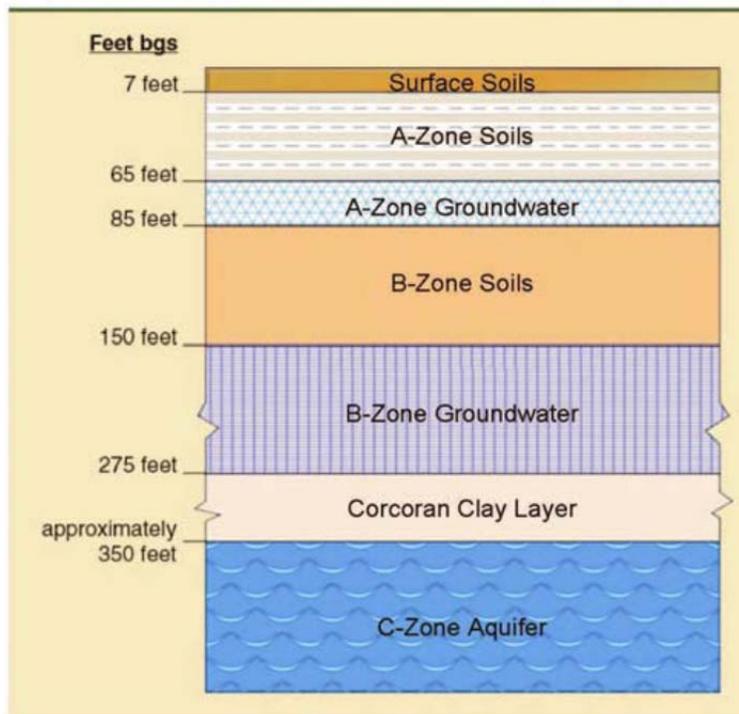
#### *“Site Characteristics*

*The EPA defined the soil and groundwater beneath the A-zone and offsite (down gradient) of the B&B Site as OU-2 (see Figure 3). The RI/FS for OU-2 began in 2000 and consisted of additional investigation of impacted soil and groundwater beneath and south of the B&B Site. The OU-2 RI/FS was completed in September 2005 and includes a RI report, a FS report, a Fate and Transport Modeling Report, a Human Health Risk Assessment, and Ecological Risk Assessment. The B&B Site OU-2 includes the water-bearing zone (the B-zone) below the A-zone. This B-zone water is found beneath the former B&B Site and extends south-southwest. The B-zone aquifer is monitored between the depth intervals of approximately 140 and 180 feet bgs. A clay layer, known as the Corcoran Clay, is present beneath the B-zone. Below this clay is a sandy layer that forms a confined drinking water aquifer (see Figure3), which is used by the City of Arvin.*

*The subsurface investigations of OU-2 also included sampling groundwater in the A-zone, approximately 75 feet bgs. The A-zone consists of perched groundwater, with a saturated zone up to about 10 feet thick, overlying a silty clay zone a few feet thick. The A-zone groundwater is not continuous, extending only several hundred feet east, south, and west of the B&B Site. Wells installed in this zone pumped only about 0.25 gallons per minute (gpm). Because of these*

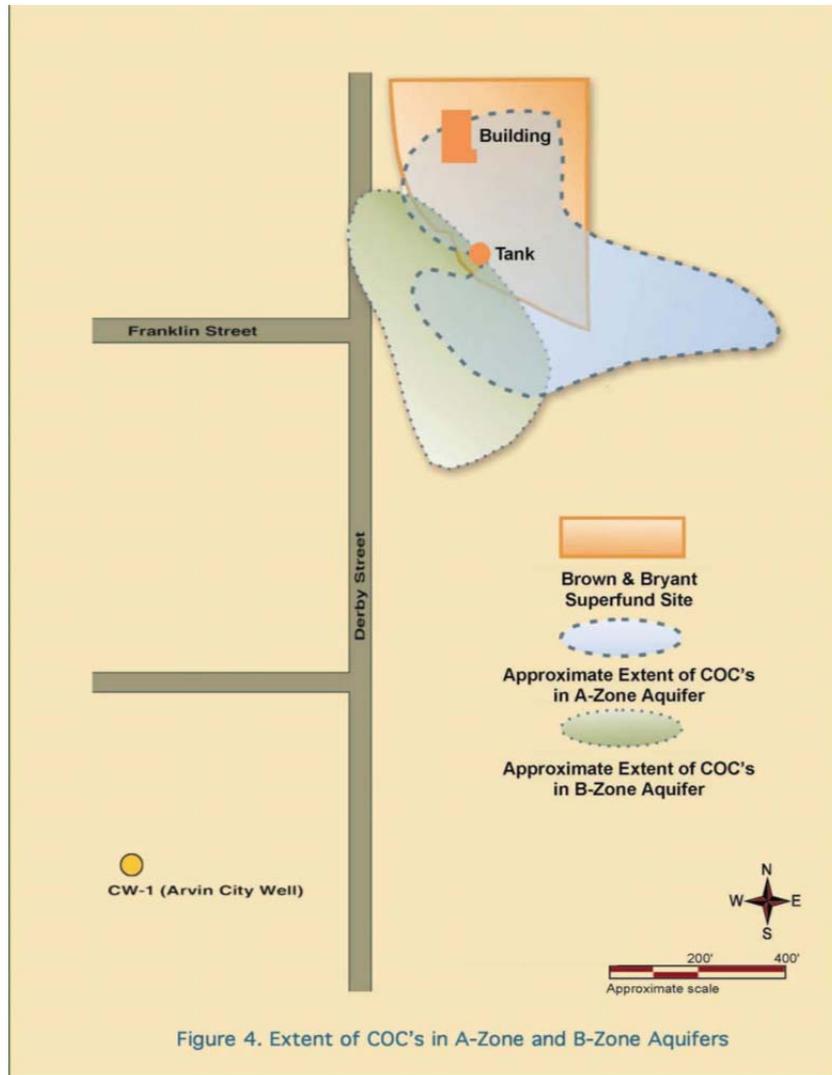
subsurface characteristics, it is difficult to extract groundwater from the A-zone. The A-zone groundwater is impacted by COCs.

**Figure 3. Designation of the Soil Layering System**



The B-zone aquifer comprises a series of water bearing units from approximately 150 to 275 feet bgs. However, the primary B-zone groundwater monitoring well completion zone is between 140 and 180 feet bgs. Flow direction in this zone is generally to the southwest but varies locally to the northeast, north and west. Because of these characteristics, groundwater can be pumped at a rate of 7 gpm for an extended period. The B-zone groundwater is not a current human exposure route, as it is not being used as a drinking water source. However, it is classified by the Central Valley Regional Water Quality Control Board (CVRWQCB) as a potential drinking water source. Percolation of impacted groundwater from the A-zone has impacted the B-zone aquifer, and is expected to continue under the current Site conditions.

The C-zone groundwater is not impacted, and is not expected to be impacted through percolation because the clay layer beneath the B-zone restricts the migration of B-zone impacted groundwater to the C-zone. However, the B-zone impacted groundwater may migrate to C-zone through the annular space of any well that has not been constructed to seal off the B-zone shallow groundwater. Figure 4 depicts the estimated extent of Dinoseb, Dibromochloropropane and 1,2-DCA concentrations above the drinking water maximum contaminant levels (MCLs) in the A- zone groundwater and in the B-zone aquifer.”



*“Remedial Action Objectives*

*The Remedial Action Objectives (RAOs) for the B&B Site OU-2 are to:*

- *Remove or control groundwater contamination source from the A-zone to reduce further contamination of B-zone groundwater.*
- *Restore the B-zone groundwater to drinking water standards within a reasonable time frame.*
- *Prevent potential exposure to contaminated groundwater.*

*The primary concern for B&B Site OU-2 is the quality of the groundwater in the B-zone aquifer and in the city well and any other wells that may be installed in the vicinity of CW-1 in the future, and thus to limit potential human exposure to the COCs. Although, A-zone groundwater is a part of the OU-1, it is carried over and considered as a part of the OU-2 remedial strategy because the COCs contaminated A-zone groundwater percolation to the B-zone aquifer is continuing and is expected to continue under current Site conditions. This proposed action would protect human health and the environment from conditions in subsurface that have been*

identified in the RI. The groundwater contamination source will be removed by reducing the A-zone groundwater COC concentrations to their cleanup goals set at ten and one hundred times their respective MCLs in order to keep contamination levels in the B-Zone at or below MCLs. The MCLs and cleanup goals for A-zone groundwater, which were specified in the November 1993 OU-1 ROD, are presented in Table 1. The cleanup levels for COCs in the B-zone groundwater are federal or state MCLs and are presented in Table 2.

Potential exposure to impacted groundwater in the B-zone will be prevented by decommissioning and relocating the Arvin City well CW-1, and implementing appropriate institutional controls consisting of deed and zoning restrictions. These actions, along with supporting information, are described in this Proposed Plan.”

Table 1. Brown & Bryant Site A-zone Groundwater Cleanup Goals

Chemical	Maximum Contamination Level (ug/L) <sup>1</sup>	A-zone Groundwater Clean-up Level Range (ppb)
Chloroform	100	1000 – 10,000
1, 2-Dibromo-3-chloropropane (DBCP)	0.2	2 – 20
1, 2-Dichloropropane (1,2-DCP)	5	50 – 500
1, 3-Dichloropropane (1,3-DCP)	0.5	5 – 50
Dinoseb	7	70 – 700
Ethylene Dibromide (EDB)	0.05	0.5 – 5
1, 2, 3-Trichloropropane (1,2,3-TCP)	40 <sup>2</sup>	400 – 4000

<sup>1</sup>Microgram per liter

<sup>2</sup>Chronic (lifetime) Health Advisory

Table 2. Contaminants of Concern and Cleanup Goals for B-zone Groundwater

Contaminant of Concern	Chemical Characteristic and Use at B&B Site	Federal MCL <sup>1</sup> (ug/L)	State MCL <sup>2</sup> (ug/L)
Chloroform	Highly reactive, non-flammable, heavy, very volatile, sweet tasting liquid with a characteristic odor. Used as a cleaning agent, fumigant, and insecticide	80 <sup>3</sup>	80 <sup>3</sup>
1, 2-Dibromo-3-chloropropane (DBCP)	Dibromochloropropane is a dense yellow organic liquid with a pungent odor. It is used primarily as an unclassified nematocide for soil fumigation of cucumbers, summer squash, cabbage, cauliflower carrots, snap beans, okra, aster Shasta, daisy, lawn grasses, and ornamental shrubs.	0.2	0.2
1, 2-Dichloropropane (1,2-DCP)	1,2-DCP is colorless organic liquid with chloroform like odor. The greatest use of 1,2-DCP is in making other organic chemicals. It is used as a soil fumigant for nematodes and as an insecticide for stored grain	5	5
1, 3-Dichloropropane (1,3-DCP)	1,3-DCP is similar to 1,2-DCP and is mainly used to kill nematodes. It is often sprayed undiluted directly on the soils of vegetable and tobacco crops.	None	0.5
Dinoseb	Dinoseb is an organic solid –yellowish crystal with a pungent odor. Its greatest use is as a contact herbicide for post-emergence weed control in cereals, under sown cereals, seedling Lucerne and peas. Dinoseb is also used as a corn yield enhancer and as insecticide and miticide.	7	7
Ethylene Dibromide (EDB)	EDB is a colorless, heavy organic liquid with mildly sweet chloroform like odor. EDB is used as a pesticide for grains and fruit.	0.05	0.05
1, 2, 3-Trichloropropane (1,2,3-TCP)	1,2,3-TCP is a colorless, heavy liquid with a sweet but strong odor. It evaporates very quickly and small amounts dissolve in water. It is mainly used to make other chemicals.	40 <sup>4</sup>	None

<sup>1</sup> Federal standards, current U.S. Environmental Protection Agency (EPA) drinking water standards

<sup>2</sup> California Code of Regulations, Title 22, Chapter 15 (Section 64444) & 15.5 (Section 64533), February 2007

<sup>3</sup> Total Trihalomethanes (sum of bromodichloromethane, dibromochloromethane, bromoform and chloroform), EPA MCL effective 01/01/04, Cal/EPA MCL effective 6/17/06

<sup>4</sup> EPA Chronic (lifetime) Health Advisory Level

The section of the report entitled, “Evaluation of Alternatives” is introduced with the statements: *“This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to other alternatives under consideration. The Most Likely Total Costs for the alternatives assume a 10-year operating life and 10 years of monitoring at the site, and are based on subjective identification of variables.”*

*“An evaluation of remedial alternatives for the B&B OU-2 is summarized (see Table 3) and discussed below with respect to achieving the remedial action objectives.”*

In the subsection that followed, “Decommission Arvin City Well CW-1 and Relocate in Non-impacted Area” it is stated:

*“This action will occur along with any and all other remedial alternatives selected. It consists of properly abandoning the existing CW-1 and installing it in an alternative location at a suitable distance from the known B&B Site plume.”*

- *Capital and Periodic Costs: \$985,000*
- *Annual Operation and Maintenance (O&M) Costs: None*
- *Most Likely Total Costs: \$985,000*

*“Alternative 2 – Monitored Natural Attenuation*

*Monitored natural attenuation refers to the reliance on natural attenuation processes (physical, chemical or biological) to achieve site specific remediation objectives within a reasonable time frame. This alternative is to monitor the groundwater to observe the progress of natural attenuation resulting from relatively fast B-zone aquifer flow and transport in mitigating COCs concentrations based on the site fate and transport modeling. This periodic groundwater monitoring is a continuation of the on going monitoring that has been part of site work since 1987. The monitoring would observe the natural reduction of the COC concentrations in the groundwater.*

*This alternative would also include additional institutional controls to address potential health risks. These controls may include deed and zoning (short-term or long term), permit requirements, and public education. This alternative will result in the achievement of compliance with the RAO of limiting potential human exposure to COCs through the natural reduction in the COC concentrations in groundwater.”*

*“Alternative 3 – Source Reduction in the A-zone and No Action in the B-zone In this alternative, the groundwater of the A-zone that feeds contaminants to the B-zone is remediated by extraction and treatment. The treated groundwater is then discharged to the City sewer system. For this alternative, up to four large diameter sump wells are installed at selected locations to intercept the A-zone contaminated groundwater.”*

*“An ultra violet light/oxidation (UV/Oxidation) system will be used for treatment of the extracted water. The treatment plant will be constructed onsite for this purpose. This treatment system breaks down the COCs into harmless components, thus reducing human exposure to the COCs.*

*Alternatively, a service contract might be utilized for offsite treatment and disposal of the water if such an approach is found to be cost advantageous.”*

The US EPA discussed several other alternatives for site remediation that it has decided not to use.

*“EPA’s Preferred Alternative*

*EPA prefers the implementation of a combination of alternatives 2 and 3, along with the relocation of the Arvin city well CW-1 to achieve the long-term goal of preventing current and future exposure to the public from contaminated groundwater.”*

Each of those “preferred alternatives” is discussed in other reports; information is provided on potential problems with the effectiveness of the preferred alternative for remediating the polluted groundwater associated with the B&B Superfund site. Some of the information provided to the public in this Proposed Plan for remediation of this site is not reliable. For example, it inaccurately characterized the cap placed on a portion of the area containing contaminated soils/wastes have been compiled as a “RCRA cap.” The cap that was installed would not be accepted as a true RCRA cap for management of hazardous chemicals. Also, the statement that the Corcoran clay prevents the pollution of the C-zone groundwater is inaccurate. In its response to public comments, the US EPA revealed that the C-zone groundwater had, by then, already been contaminated by B&B site pollutants. This matter is discussed further in our comments on other documents produced by the US EPA for the OU-2 remediation.