

Health Risk Assessment (BHHRA) to determine the current and future effects of COCs on human health. The BHHRA evaluated only the dominant exposure pathways and contaminants that may significantly contribute to the potential site risk. Dinoseb was selected as the only COC that may significantly contribute to the site risk and incidental ingestion of surface soil was selected as the dominant route of exposure. The exposure assumptions used to develop the BHHRA identified children and young adult trespassers and a construction worker as potential receptors. Dinoseb does not appear to be carcinogenic; however, the calculated noncancer hazards indicate that there may be concern for potential adverse health effects.

#### **IV. Remedial Actions**

In May 1983, the CDHS inspected the Site to determine compliance with hazardous waste laws. At the time of the inspection, several violations involving storage, disposal, and transportation of hazardous waste were noted. Following the inspection, the CDHS directed B&B to correct the violations and conduct a site assessment. Between 1983 and 1988, B&B conducted site investigations under the supervision of CDHS. Limited cleanup work began under the supervision of the CDHS. In 1989, the B&B facility ceased operations. The Site was listed by EPA on the NPL of Superfund sites on October 4, 1989, and in that same year, all operations at the site ceased. Subsequently, various emergency and removal actions were initiated to minimize (or eliminate) immediate threats to human health and the environment (EPA, 1993a).

Additional work was completed by others in support of the Southern Pacific Transportation Company and the Atchison, Topeka and Santa Fe Railway Company (hereinafter referred to as the responsible parties [RPs]). The groundwater and soil investigations at the Site were conducted in response to the EPA Unilateral Administrative Order. These studies were also incorporated into the EPA RI/FS findings.

EPA completed the OU-1 RI/FS in May 1993. The EPA subsequently issued the OU-1 ROD in November of 1993. The selected remedy for OU-1 was consolidation of contaminated soil, installation of a RCRA/basic cap, and extraction and treatment of the A-zone groundwater. The goal of the remedial action was to prevent exposure to soil contaminated above health-based levels and to control the source of contamination to the B-zone groundwater (EPA, 1993d).

A treatability study for the shallow zone groundwater was conducted at the B&B site during December 1998 and was completed on April 6, 1999. An aquifer pump test was performed in May and June 1999 and the finished report completed in August 1999. The report indicated the sustained yield from any of the wells tested to be  $\leq 0.1$  gallons per minute (gpm). A soil vapor extraction (SVE) test was performed in August 1999 and the final report released in October 1999. SVE was not implemented at the site.

From December 28, 1998, to January 5, 1999, contaminated soil piles were consolidated in the area of the proposed RCRA cap. From January 6 to March 18, 1999, all on-site concrete structures and berms were demolished except for the concrete slabs contiguous to the warehouse building. During this period, a section of the existing asphalt pavement

between 2 and 7 inches thick was removed, a plastic lined bermed area used to store stockpiled soil was removed, and a 1,200-gallon UST used in the operations was excavated and removed from the site. Smaller structures (e.g., tank UN-32 ancillary equipment), rails spurs, existing underground utilities, drums and vessels, and previously generated wastes were removed from the Site. Construction of the RCRA cap began on June 15, 1999, and was completed on August 31, 1999. Between July 13 and August 12, 1999, asphaltic concrete was placed over the entire Site to act as the non-RCRA cap (MK, 1999c).

#### IV.A Operable Unit 1 – Soil and A-zone Groundwater

##### IV.A.1 Remedy Selection

On November 8, 1993, EPA signed the ROD for OU-1. The stated objective in the B&B OU-1 ROD is to control migration of the contamination in the A-zone to deeper groundwater, and address the surface soil exposure threat. The cleanup goal is to reduce contamination levels in the A-zone to levels that would protect the B-zone groundwater. The principal threat considered in the ROD is the A-zone groundwater. The ROD selected remedy included a groundwater extraction, treatment and injection system, consolidating dinoseb contaminated surface soil on a 1.2 acre portion of the site and constructing a RCRA Subtitle C cap over it, and placing an asphalt cover over the remainder of the site. In addition to its primary cleanup goal of preventing exposure to contaminated soils, the asphalt containment cap was selected to prevent infiltration of precipitation and protect shallow groundwater from further degradation.

The cleanup standards selected in the ROD for the A-zone groundwater were set at 10 – 100 times the respective Maximum Contaminant Levels (MCLs) in order to keep B-zone levels at or below MCLs. The A-zone groundwater is not classified as a potential drinking water source.

<b>Table 2: OU-1 A-zone Aquifer Clean-up Levels</b>		
<b>Chemical</b>	<b>Maximum Contamination Level (ppb)</b>	<b>A-zone Groundwater Clean-up Level Range (ppb)</b>
Chloroform	100	1000 – 10,000
1, 2-Dibromo-3-Chloropropane	0.2	2 – 20
1, 2-Dichloropropane	5	50 – 500
Dinoseb	7	70 – 700
Ethylene Dibromide	0.05	0.5 – 5
1, 2, 3-Trichloropropane	40 <sup>1</sup>	400 - 4000

<sup>1</sup>Chronic (lifetime) Health Advisory

The cleanup level for dinoseb in soil was placed at 80 milligrams per kilogram (mg/kg).

The ROD also provides for implementation of ICs at the B&B site. The ICs will limit excavation in the RCRA capped areas to prevent residential development, and to otherwise avoid contact with contaminated soils. ICs which limit well installation on the B&B property or in areas of known contamination are not directly addressed in the ROD.

There have been no ESDs for the site as of the completion of this FYR.

#### **IV.A.2 Remedy Implementation**

The following activities occurred as a result of enforcement actions, or activities specified in the OU-1 ROD:

- **1987** – Based on soil data collected by Hargis and Associates, Canonic Environmental excavated the shallow impacted soils beneath the former on-site sumps and pond up to a depth of 12 feet bgs. Soil samples collected from the base of the excavations were reported with elevated COC concentrations.
- **1998 and 1999** – As part of the OU-1 remedy tasks were completed by Morrison Knudson Corporation (MK) in the latter part of 1998 and the early part of 1999. At this time, shallow soil samples were collected throughout the site to further assess the extent of impacted soil in areas with known COCs. Existing soil piles comprising approximately 70 cubic yards with elevated COC concentrations resulting from previous activities throughout the site were excavated and consolidated beneath the RCRA cap area. Approximately 570 cubic yards of contaminated asphalt and underlying contaminated soils were moved to the RCRA cap area and compacted. In addition to assessing and consolidating contaminated soil, MK performed the following removals:
  - one 1,200-gallon UST,
  - several small on-site structures,
  - 200 linear feet of on-site railroad tracks,
  - existing underground utilities,
  - remaining drums and tanks remaining on site,
  - residual contamination present on the walls and floor of the warehouse.
- **1998 and 1999** – MK also performed the following site restoration actions:
  - imported clean soil materials
  - site grading and fencing
  - construction of the RCRA and non-RCRA caps over the site.
- **August 1999** – MK presented the results of a series of aquifer tests that were performed on the newly installed extraction wells (EW-1, EW-2, and EW-3) and injection wells (IW-1 and IW-2) (MK, 1999b). The objectives of the aquifer test were to determine the sustainable yield at each of the five test locations and the efficiency, specific capacity, and hydraulic properties of the perched aquifer. Data collected were used to assess the viability of using the pump-and treat method for

remediating the perched aquifer. Test results indicated a relatively low yield for extraction and injection wells, suggesting only a limited success with the pump-and-treat method. The pump and treat portion of the remedy was deferred from the remedy pending further evaluation.

- **2001-2002** – The impacted water within the on-site UN-32 tank was removed, treated and discharged into the city sewer system. The sludge within the tank was removed and transported off-site for disposal.
- **2002** – The groundwater monitoring contractor, Panacea, replaced the dedicated sampling pumps in the A- and B-zone wells with a Bar Cad sampling system.
- **2005-2006** – Soil gas sampling was done west of the site to assess the impacts, if any on nearby homes, businesses, and community facilities. Results are still under evaluation at the time this report was being prepared.

#### **IV.A.3 System Operations/Operation and Maintenance (O&M)**

Operation and Maintenance activities consist primarily of groundwater sampling through a USACE contractor, Panacea that started in July 2000. Sampling frequency has varied at the site over the past 17 years. There have been periods of over two years between sampling events in the past. Through the early 2000s, quarterly sampling was conducted at many wells in the study area. After January 2004, sampling for all but two B-zone monitoring wells terminated. These two wells (WB2-4 and PWB-5) have been sampled monthly through November 2005. Prior to January 2004, most of the available wells on site were sampled, with the exception of several extraction/injection wells and the monitoring points installed to support past testing of those wells.

The RCRA and containment caps, and security fencing were completed in 1999. Condition of the cap varies, as does the fence. There are numerous cracks in both caps that have been monitored by the USACE and in all cases are getting larger. There are areas of the non-RCRA cap where water is ponding and is in need of regrading. Limited burrowing is evident at multiple locations around the perimeter of the cap, but does not appear to have damaged the caps.

Current operational costs are included in Table 2. The annual cost identified in the OU-1 ROD for monitoring and cap maintenance was \$66,000. Cost of the pump and treat system operation (not installed) was expected to cost approximately \$808,000 annually for up to 10 years. Costs indicated below are estimated based on negotiated contracts with the monitoring contractor.

**Table 3: Annual OU-1 System Operation Costs**

Dates		Total Cost rounded to nearest \$1,000
From	To	
March 2003	March 2004	\$386,000
April 2004	May 2005*	\$81,000
May 2005	May 2006*	\$65,000

\*Note: Sampling consisted of only Arvin Well CW-1, WB2-4, and PWB-5.

**IV.B Operable Unit 2 – Regional Aquifer Groundwater**

No ROD has been signed for OU-2, the deeper, regional (B-zone) aquifer impacted by site contaminants. The OU-1 ROD envisioned that the risks posed by this deeper groundwater contamination would be addressed in a subsequent ROD:

“After the remedial investigation of the B-zone is complete and the extraction system in the A-zone is in operation, the final remediation levels for this B-zone will be determined within the ... stated range that takes into account the cost-effectiveness of the meeting the strictest goals in the A-zone groundwater clean-up range. The final remediation levels will be set in the final ROD (EPA, 1993)”

Based on the apparent infeasibility of the groundwater extraction from the A-zone, a new decision regarding any treatment of the A-zone required by the ROD for OU-1 has been deferred to OU-2, the final remedy. EPA Region 9 is currently considering options for OU-2 and an ESD will be prepared to document the transfer of the shallow groundwater remediation from OU-1 to OU-2.

**V. Progress Since the Last Review**

Although formal protectiveness statements as identified in the 2001 *EPA Guidance, OSWER No. 9355.7-03B-P* were not made in the First Five-Year review, the following statement was included which indicates the remedies in place were considered to be protective:

“The remedy is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed. ... EPA has confirmed by ongoing groundwater monitoring during the current remedial investigation (RI) that the existing supply of water is not impacted. Additional groundwater monitoring wells will be added under the current RI to fully characterize the off-site groundwater at the B&B Superfund site. Based on the expected continuing presence of contamination at this site at levels which preclude unlimited use and unrestricted exposure, the next Five-Year Review will be written by five years from the date of signature of this review.”

The recommendations in the 2001 five-year review suggested:

- Additional wells be installed in the A- and B-zones to delineate the extent of the impacted groundwater.
- Quarterly groundwater sampling of the new and existing wells.

Routine inspection and maintenance of the site cap and access control measures, though not specifically identified, were also implied.

Additional wells were installed by Panacea in several mobilizations since late 2001. Table 4 indicates the dates the additional wells were initially sampled.

**Table 4: First Sampling Round for New Panacea Wells**

Well Identification	Year First Sampled
PWA-1	2002
PWA-2	2002
PWA-3	2002
PWA-4	2002
PWA-6	2003
PWA-7	2002
PWB-1	2002
PWB-2	2002
PWB-3	2002
PWB-4	2002
PWB-5	2002
PWB-6	2003
PWB-7	2003
PWB-8	2003
PWB-9	2003
PWB-10	2003
PWB-11	2003

These wells, and a number of pre-existing wells, were sampled on a quarterly basis until January 2004. After that time, only two wells, B-zone wells PWB-5 and WB2-4, were sampled on a monthly basis until November 2005 as sentinel wells for the nearby municipal well, CW-1. It appears that the additional wells have succeeded in adequately defining the extent of the groundwater contamination at the site. The only possible exception is the extent of B-zone contamination southeast of PWB-7. This well has been recently replaced, and recent sampling results are still being assessed. The original well was abandoned in accordance with applicable state requirements.

The site cap has been routinely inspected for cracking, animal burrows, settlement, and drainage. Site security has also generally been maintained and site fencing and gates inspected. The on-site warehouse building has also been maintained in a secure condition.

## **VI. Five-Year Review Process**

### **VI.A Administrative Components, Community Notification, Document Review**

This FYR consisted of the following activities: public notification by EPA Region 9, in prominent Bakersfield area newspapers that a FYR was under way; a review of relevant documents as listed in Attachment C; interviews with local residents and businesses; discussions with the operation and maintenance contractor, EPA RPM, Arvin Water District Representatives and USACE project personnel; and a site inspection. The remedial action objectives (RAOs), applicable, relevant and appropriate requirements (ARARs), and cleanup levels were obtained from the ROD. A copy of this completed report and an updated fact sheet is available through the EPA Region 9 Superfund Record Center located in San Francisco or from the information repository at the Beale Library, Kern County, Bakersfield, CA. Notice of the completion of this report has also been announced in the local newspaper.

### **VI.B Data Review**

The available monitoring data for the site spans the period from September 1988 to November 2005. Though the entire dataset was qualitatively reviewed, the sampling results from July 2000 to November 2005 were quantitatively analyzed to identify trends in contaminant concentrations in both the A- and B-zones. These trends in the concentrations are a line of evidence regarding the performance of the site remedy installed to date. Data were analyzed for five of the most common site-related compounds representative of the mobility and toxicity of the suite of site contaminants. The analysis was conducted using the Mann-Kendall test for trend as implemented in version 2.2 of the Monitoring and Remediation Optimization System (MAROS) software (Groundwater Services Inc., 2006). A detailed discussion of the analyses is provided in Attachment D.

#### **VI.B.1 Relevant Trends**

In general, most wells showed stable to decreasing concentrations of the five compounds assessed, where they were detected above the method detection limit. This is consistent with the limited transport velocities and mobility of the site contaminants. However, specific wells in both the A- and B-zones displayed increasing concentration trends. These wells were generally located in the western portion of the study area and southwest of the main source areas. Other A-zone wells near or under the capped portion of the site also displayed increasing concentrations over the past five years. These results suggest contamination is still mobile, and that continued impacts on the B-zone due to leakage from the highly contaminated A-zone are still occurring in places. However, off-site wells located on flow lines from the site to the nearby municipal well do not show statistically significant (at the 90% level) increasing concentrations, and no impacts have been identified in the municipal well itself. Please refer to Attachment D for more information.

## **VI.B.2 Recommended Changes to Monitoring Programs**

The current monitoring program does not include routine sampling of any but two of the available monitoring wells. Routine sampling of a subset of the available monitoring wells should be reinstated to provide data for the next five-year review. A suggested monitoring program (well locations and frequency) is discussed in section 8.3 and presented in more detail in Attachment D.

## **VI.C Site Inspection**

The USACE team conducted the site inspection on March 15-16, 2006. The site inspection consisted of an inspection of the asphalt and RCRA capped areas, fencing, on-site warehouse, and all monitoring points. The EPA RPM, local USACE inspector, and sampling and design contractor participated in a site inspection. The inspection included a question-and-answer session concerning site conditions and cap and well maintenance issues. The site visit also included a visit to the information repository in Bakersfield. The list of site visit attendees and complete details of the inspection findings are provided as Attachment I.

### **VI.C.1 OU-1 Summary**

The asphalt non-RCRA cap at the site has shown evidence of cracking in spots, particularly on the northern and western edges, and there has been cracking along the southern and eastern edge of the RCRA-capped area. These cracks have been shown to enlarge over time. There is also significant ponding that occurs in the southeastern and western (west of the warehouse) portion of the non-RCRA asphalt cap. Drainage of the southeastern portion of the non-RCRA cap has been limited by off-site grading. The ponding on the cap represent potential infiltration, should cracks appear in these areas. Animal burrows were also noted along (but not under) the edge of the asphalt cap.

The site fencing consists of chain link topped by three strands of barbed wire. Though the chain link was found to be intact, the barbed wire on the fence sections along the northern and western portions of the site was found to be broken in numerous places. The gate for site access at the northern site perimeter was secure, as was the gate to the RCRA-capped area.

The on-site warehouse was found to generally be secure. The on-site AST was also in good shape. It is understood that the tank has been emptied and cleaned. Monitoring wells were generally found to be functional, but a number of wells were unsecured (though all but two were on-site inside the fence), many were unlabelled, and some above-ground completions require painting. Additional descriptions of the conditions of the monitoring wells are provided in Attachment I.

## **VI.C.2 Information Repository**

The site inspection included a visit to the site document repository. The repository has been moved from the Arvin library to the City of Bakersfield Beale library. The entire administrative records for the early removal action and for the OU-1 through the Record of Decision were available on microfilm. A few hard copies of site-related documents were also found shelved in a different portion of the library. The most recent monitoring reports or the 2004 Panacea OU-2 RI/FS were available either on microfilm or on the shelves. It is recommended the document repository be updated by the EPA.

## **VI.D Interviews**

The USACE team interviewed several people regarding the progress at the site. These interviewees included:

A resident (tenant) at 101 Langford Street

A resident at 216 Langford Street

The manager of Wolfpack Cold Storage (located south of the site), Mr. Greg Garbenhire

The EPA RPM, Travis Cain

The Panacea PM (contractor to the USACE for work at the site), Mohammad Estiri

The Los Angeles District USACE Construction Representative, Richard Lainhart

The Albuquerque District Technical Lead, Cecilia Horner

Two representatives of the Arvin Community Water District, Mr. Kincy and Mr. Williams.

Completed interview forms are available as Attachment H.

The local residents and business operator interviewed during the site visit did not have significant concerns about the site, had not observed unusual activities at the site, and had not heard news or information about the site, other than contacts with personnel sampling some of the wells in the neighborhood. No one was aware of the document repository at the library in Bakersfield, CA. There were some concerns about the safety of the drinking water on the part of the residents.

The project team, including EPA and USACE staff and their contractor, Panacea, are generally satisfied with the project, but wish that progress on the project would be realized faster than it has been. There is a sense that there is good communication between the Federal entities and the contractor. All of the Federal project team expressed concerns about the current ponding of water on the cap, the developing cracks in the cap, and the actions of burrowing animals at the edge of the cap. The team was aware of the plans to optimize the sampling program at the site. The team intends to implement land-use controls for the site, but there are discussions about what agency will implement the controls.

The local water authority continues to sample CW-1, and receives information on the results of sampling conducted by Panacea. They would like to have more frequent contact

with EPA. There are limited processes in place to prevent the placement of new wells within the footprint of the contaminant plume. Though there are legal resolutions in place to prevent well installation within the water district, there is not a clear process to flag a proposed well location as potentially within the plume. Either Kern County or the State Dept. of Health may issue a permit, depending on the use of the well. Coordination with those agencies is sporadic.

## **VII. Technical Assessment**

### **VII.A Question A: Is the remedy functioning as intended by the decision documents?**

#### **VII.A.1 Remedial Action Performance and Operations**

For the most part the 1.2 acre RCRA cap, and asphalt cover over the remaining portion of the site are functioning as expected. The cap was designed primarily to seal the surface without adequate strength to function as a parking facility. Areas of the non-RCRA capped portion of the site have been subjected to cracking and ponding, and several locations have evidence of rodent tunnels around the perimeter of the cap which, may extend under the asphalt cap.

The shallow groundwater source treatment portion of the remedy was not installed. A-zone pump testing during the pilot testing phase did not yield an adequate volume of water to be an effective remediation solution. That portion of the remedy was eliminated from the remedial action and is scheduled to be addressed in OU-2.

In general, the monitoring system has shown the contaminant plume is stable with the exception of specific wells in both the A- and B-zones that displayed increasing concentration trends. These wells were generally located in the western portion of the study area and southwest of the main source areas. Other A-zone wells near or under the capped portion of the site also displayed increasing concentrations over the past five years.

#### **VII.A.2 Opportunities for Optimization**

As there are no active treatment processes on-going at the site, the primary optimization opportunity relates to the long-term monitoring program at the site. As discussed in section VI.B.2., routine sampling should resume at the site, but the number of wells and the frequency of sampling can be reduced from the program implemented in the July 2000 through January, 2004 timeframe. Annual sampling of most wells recommended for retention in the program would be adequate. This frequency would provide an adequate dataset for assessment of trends at the next five-year review and will support most site decisions. Quarterly sampling of the two sentinel wells near the municipal well CW-1 is appropriate given the likely timeframe available for initiating action to protect or replace that well once a significant impact to the sentinel wells is observed. Biennial or less frequent sampling would be appropriate for upgradient or background wells. A