

SFUND RECORDS CTR
1227-00153

SFUND RECORDS CTR
88075378

PRELIMINARY
Health
Assessment
for

AR0014

BROWN & BRYANT, INC.

ARVIN, KERN COUNTY, CALIFORNIA

CERCLIS NO. 09CAD052384021

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

OCT 25 1989

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(i)(7)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in the site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

SUMMARY

Brown & Bryant, Inc. is a National Priorities List Update 7 site located in Arvin, California. The facility began operations in 1960 as a formulator of agricultural chemicals. It is currently inactive. Previous chemical spills and waste disposal practices have resulted in contamination of on-site soils and groundwater with numerous pesticide chemicals. A water supply well for the Arvin public water system is located within one-third mile of the site, but no recent data are available to indicate whether this or other off-site wells have been impacted by the migration of contaminated groundwater. The use of contaminated water for potable or nonpotable purposes could pose significant health risks. On-site workers and trespassers may be exposed to contaminants in soils by ingestion, inhalation, or dermal contact. Potential health risks resulting from contact with off-site environmental media cannot be assessed because of the absence of information on the existence or extent of off-site contamination.

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

Brown & Bryant, Inc. (B&B) is located at 600 South Derby Road in Arvin, Kern County, California. Beginning in 1960, the 5-acre site was used for the formulation of agricultural chemicals including fertilizers, herbicides, pesticides, insecticides, and fumigants. When representatives of the Agency for Toxic Substances and Disease Registry (ATSDR) visited the site in April 1989, the facility was not in operation. During previous inspections by State agencies, the improper handling and disposal of hazardous wastes at the facility have been documented. Accidental spills of Dinoseb have occurred at the site, and a bin of contaminated soil was shipped to the Class 1 dump at Kettleman City, California.

In 1979, a double-lined evaporation pond was constructed in the southeastern corner of the site. This pond received pesticide rinse water and surface runoff from the site. As the result of heavy rains, this pond has overflowed on at least two occasions. It was reported that there was another unlined pond on-site that was previously used for wastewater disposal.

B. SITE VISIT

Representatives of the ATSDR headquarters and regional office visited the site on April 18, 1989. The main building was at the front of the property, and behind it were a trailer and numerous storage tanks, waste bins, loading hoppers, and miscellaneous equipment. The site was inactive except for a workman who was cutting up a tank with an oxyacetylene torch. The site was surrounded by a 6-foot chain-link fence topped with barbed wire. However, there were openings in the fence that would have allowed unauthorized persons to enter the site. The lined evaporation pond was dry except for some dried sludge on the bottom. The pond was encircled by a small earthen dike. Along the southern edge of the site was an oil-stained patch of soil that was fenced (with an open gate) and posted with a warning sign. The on-site soil was bare of vegetation.

To the west of the main facility across Derby Road is a fenced storage area that was reportedly used for filling mobile tank trailers. During the site visit, a tanker truck was pumping liquids from a group of about 25 drums stored on the site. West of this storage yard were several schools. Several private homes and low-rent apartments were located across Derby Road northwest of the site. To the east of the B&B facility is farmland. Railroad tracks run along the southern and western boundaries of the site.

C. COMMUNITY HEALTH CONCERNS

No community health concerns were brought to the attention of ATSDR.

DEMOGRAPHICS, LAND, AND RESOURCE USE

The area surrounding the site is divided among industrial, agricultural, and residential use. A significant portion of the population surrounding the site is Hispanic.

The Arvin-Edison Water District maintains six municipal groundwater wells within a 1-mile radius of the site. The public well that is believed to be at greatest risk for being impacted by the site is the city of Arvin well No. 1. This well is located 1,760 feet south of the site. The public water system provides water to a population of 7,800 (August 1987) (1). The district also maintains numerous groundwater wells that are used in conjunction with surface-water sources to provide irrigation water.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

A. ON-SITE CONTAMINATION

Table 1: ON-SITE GROUNDWATER CONTAMINATION

CHEMICAL	CONCENTRATION (ug/l)		
	AMW-1	AMW-2	AMW-4
Dinoseb	9,433	890	0.14
Dibromochloropropane	13,846	28,000	NR
1,2-Dichloropropane	57,692	550,000	1
1,3-Dichloropropene	130,000	50,442	NR
Trichloropropanes	5,000	4,000	NR
Ethylene dibromide	26,800	15,000	NR

NR - Not Reported

AMW-1 and AMW-2 are on-site monitoring wells in the upper "unconfined" aquifer. AMW-4 is an on-site monitoring well located in the deeper "confined" aquifer. The listed values are average results for groundwater samples collected from the wells over the period March 26 - October 9, 1984 (2).

Table 2: ON-SITE SOIL CONTAMINATION

CHEMICAL	CONCENTRATION (mg/kg)
Dinoseb	48
DDT	4.2
Dichloropropane	42
Temik	15
Prowl	97
Benefin	110

These results were reported for on-site soil samples that were collected in 1985 (4).

B. OFF-SITE CONTAMINATION

None of the information provided to ATSDR indicated that off-site environmental media have been monitored for contamination.

C. QUALITY ASSURANCE AND QUALITY CONTROL

In preparing this Preliminary Health Assessment, ATSDR relies on the information provided in the referenced documents and assumes that adequate

quality assurance and quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of the analyses and conclusions drawn for this Preliminary Health Assessment is determined by the availability and reliability of the referenced information.

D. PHYSICAL AND OTHER HAZARDS

Numerous tanks, drums, and bins on-site could pose physical hazards to trespassers. An inventory of remaining on-site chemicals was not available, but residual flammable materials in storage tanks could pose a fire or explosion hazard.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

The aquifer at the site consists of interbedded layers of sand, silty sand, and clay. High concentrations of chemical contaminants were detected in water samples from monitoring wells (AMW-1 and AMW-2) that are completed in the upper unconfined aquifer, which extends to a depth of about 75 feet. Beneath the unconfined aquifer is a 25-foot-thick clay bed that separates the upper aquifer from the lower confined aquifer, which is 140 feet below the surface of the site. The nature and extent of the clay bed is currently being evaluated. This information is needed in order to determine the homogeneity of the clay aquitard and the potential for contaminants to travel from the upper to the lower aquifer. Trace amounts of contaminants were detected in water samples from the on-site monitoring well AMW-4, which is completed in the confined aquifer.

The city of Arvin obtains water for its public water system from a series of groundwater wells in the confined aquifer. These wells are completed to a depth of approximately 800 feet below surface level and are generally screened between 350 and 730 feet. The nearest city of Arvin well (No. 1) is located 1,760 feet south of the B&B facility.

The groundwater in the confined aquifer reportedly migrates in a southeasterly direction. It is not known whether the confining clay layer beneath the B&B facility extends off-site. Therefore, migration of contaminants from the site could impact the deeper aquifer.

B. HUMAN EXPOSURE PATHWAYS

The contamination of the environmental media previously discussed may result in human exposures by the following pathways:

1. The migration of contaminated groundwater may impact off-site wells, including the city of Arvin public water supply well No. 1. Data from 1984 indicated that no site-related contamination was detected in the Arvin public water supply well No. 1 (2). However, more recent data for this well or other potable or nonpotable wells in the area were not available for review.

2. The surface of the site is covered with bare, unvegetated soil. Numerous spills of agricultural chemicals on the site have been reported, and analytical results have documented on-site soil contamination. During the ATSDR site visit, areas of stained soil were visible, and dried sludge was present in the evaporating pond. Human contact with these media could result in exposures to contaminants by the ingestion of soil, by the inhalation of dusts, or by dermal contact with contaminants from soil or sludges.

3. Wastewaters were reportedly disposed of into open evaporating ponds when the site was in operation. The emission of volatile compounds from these ponds may have resulted in inhalation exposures to airborne contaminants. However, no air monitoring data were provided to ATSDR for use in determining whether any significant health risks could have resulted from inhalation exposures. During the ATSDR site visit, the lined evaporating pond was dry, and no standing water was observed except for a shallow pool of water near the front of the maintenance building. No open containers of chemicals or standing wastewaters were observed. Although significant concentrations of air contaminants would not be expected under these conditions, recent air monitoring data would be needed to unequivocally determine if current concentrations of air contaminants are of potential health concern.

4. Directly east of the B&B facility are several large tracts of commercial farmland. It is likely that agricultural chemicals have been used on this farmland, so the presence of chemical residues in this area may not necessarily be related to runoff from the B&B site. No data were available to determine if off-site soils are contaminated. Therefore the potential health impact resulting from the ingestion of consumable crops grown in the surrounding area cannot be assessed.

The terrain and land use of the area surrounding the site are such that hunting or fishing in the area are unlikely.

PUBLIC HEALTH IMPLICATIONS

Groundwater from the unconfined aquifer at the site was contaminated with high concentrations of the pesticides, Dinoseb, and 1,2-dichloropropane (1,2-DCP). Water from the on-site, confined aquifer contained trace concentrations of these same chemicals (Table 1).

In 1987, the U.S. Environmental Protection Agency issued a Suspension Order for the use of the herbicide, Dinoseb, because of its potential toxicity (3). Results of animal experiments have indicated that exposure to Dinoseb may result in developmental and reproductive toxicity. The administration of Dinoseb to pregnant animals during gestation has resulted in reduced fetal weights and developmental defects, such as supernumerary ribs, delayed ossification, and brain or spinal cord defects. Reproductive failures and alterations in spermatozoa morphology have also been observed in rats that were fed Dinoseb.

Exposure of pregnant women to Dinoseb is of particular concern because of the potential for adverse effects on the fetus. Results of animal studies have suggested that developmental toxic effects could occur at dose levels below those causing maternal toxicity (3).

Mixtures of 1,2-DCP, 1,3-dichloropropene, and other related hydrocarbons have been used for soil fumigation. Human exposure to 1,2-DCP is of concern because of its potential for causing liver toxicity. In addition, animal experiments have indicated that 1,2-DCP may induce tumors in some species of animals.

Groundwater from the upper, unconfined aquifer was also contaminated with high concentrations of 1,3-dichloropropene. The toxicity of 1,3-dichloropropene is similar to that of 1,2-DCP, and in addition, it may also cause kidney toxicity.

The soil fumigants, 1,2-dibromo-3-chloropropane (DBCP) and ethylene dibromide (EDB), were also detected in groundwater from the upper aquifer. Epidemiological studies have provided evidence that exposure to DBCP is associated with low sperm counts or sterility in male workers engaged in its production. Results of animal experiments have confirmed the reproductive toxicity of DBCP and have also shown that DBCP can produce kidney toxicity and tumors at several anatomical sites.

In experimental studies, EDB has been shown to be a potent carcinogen by oral, inhalation, or dermal administration. In some animals, a toxic effect of EDB on the testes and spermatozoa has also been demonstrated.

No contamination of the Arvin public water supply well No. 1 was detected during monitoring in 1984. Therefore, the use of this well for the public water supply posed no known health concerns prior to this time. More recent monitoring data are needed, however, in order to assess the potential health risks associated with current use of this well.

The presence of site-related pesticides in potable water supplies could result in their ingestion from drinking water or from water used in drink and food preparation. The use of water containing these contaminants for nonpotable purposes can also pose a health concern, since these contaminants are readily absorbed through the skin. In addition, many of them are volatile and can escape from water during showering and other indoor water use, which may lead to inhalation exposures.

On-site soils at the B&B facility have been contaminated by previous spills and improper handling of wastewaters. In addition, uncharacterized sludge wastes remain in the lined evaporation pond. On-site workers may be exposed to contaminants by ingesting soil or by inhaling vapors or contaminated dusts. Soil fumigants and Dinoseb can also be absorbed through intact skin. Fumigants can even penetrate some rubber and plastics used in protective garbs. Therefore skin contact with materials containing high concentrations of these compounds could pose health risks. The magnitude of the health risks associated with exposure to soil contaminants cannot be assessed at this time because the soil contamination at the site has not been adequately characterized.

CONCLUSIONS

This site is of potential health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted above, significant health concerns could result from the use of pesticide

contaminated water for potable and nonpotable purposes. The use of contaminated water could result in exposures by oral ingestion, dermal absorption, or inhalation. There is no evidence that such exposures have occurred, but recent data are needed to determine if exposures are currently occurring. Additional exposures to on-site contamination could occur by ingestion, inhalation, or dermal contact with pesticides present in soils, sludges, and other on-site wastes.

RECOMMENDATIONS

1. All groundwater wells that are downgradient from the site and at potential risk for contamination should be regularly monitored for site-related contaminants. If contamination of a well is detected, the public health implications resulting from the further use of the well for potable or nonpotable purposes should be evaluated.
2. On-site soil contamination should be characterized to identify areas of significant concern and to support an assessment of associated public health risks. Analyses of off-site soils are also needed, particularly in those areas where overflowing of the evaporation pond may have contaminated off-site soils.
3. The perimeter fence should be repaired to prevent unauthorized entry and potential exposures to chemical and physical hazards.
4. During remediation, workers should be protected in accordance with Occupational Safety and Health Administration regulations and National Institute for Occupational Safety and Health recommendations. Appropriate air monitoring should be conducted to ensure that on-site workers and off-site residents and neighbors are not exposed to unacceptable concentrations of dusts or airborne chemicals.

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, the Brown & Bryant, Inc., Kern County, California site has been evaluated for appropriate follow-up with respect to health effects studies. Inasmuch as there is no extant documentation or indication that human exposure to on-site contaminants is occurring or has occurred in the past, this site is not being considered for follow-up health studies at this time.

PREPARER OF REPORT

Environmental and Health Effects Reviewer: Kenneth G. Orloff, Ph.D.
Senior Toxicologist
Health Sciences Branch

ATSDR REGIONAL REPRESENTATIVE

Regional Representative: Donald W. Hawkins
Public Health Advisor
Field Operations Branch
Region IX

REFERENCES

1. U.S. Environmental Protection Agency Hazard Ranking System packet, October 1, 1987.
2. Memorandum from Timothy G. Souther, Central Valley Regional Quality Control Board, to Sargeant J. Green, January 7, 1985.
3. Decision and Emergency Order Suspending the Registrations of All Pesticide Products Containing Dinoseb, Federal Register, 51, No. 198, October 14, 1986, pages 36,634-36,649.
4. Soil Sample Results, Canonie Engineers, 1985, cited in U.S. Environmental Protection Agency Hazard Ranking System packet, October 1, 1987, reference no. 24.