Health Consultation

AGGREGATE PRODUCTS COMPANY

GLENDALE, MARICOPA COUNTY, ARIZONA

SEPTEMBER 16, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

AGGREGATE PRODUCTS COMPANY

GLENDALE, MARICOPA COUNTY, ARIZONA

Prepared By:

Arizona Department of Health Services
Office of Environmental Health
Environmental Health Consultation Services

Under Cooperative Agreement with the
The U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

Purpose

The Agency for Toxic Substances and Disease Registry (ATSDR) received a petition for a health consultation from Jennings, Strouss & Salmon, PLC, a law firm representing Aggregate Products Inc., a cement manufacturing plant located at a former chemical manufacturing and processing site in the City of Glendale, Arizona. The Arizona Department of Health Services (ADHS) under a cooperative agreement with ATSDR has been asked to determine if there was a risk to public health and the employees from exposure to chemicals that were formerly manufactured, processed and stored at the former pesticide manufacturing facility that was located at the property prior to Aggregate Products purchase of the site.

Background and Statement of Issues

The Aggregate Products Company facility is located at 5420 W. Bethany Home Road, in the city of Glendale, Arizona, a suburb of Phoenix (Appendix A, Fig 1). According to land use documents, the historical use of the property dates back to 1955 when it appeared to be used as a farm. Between 1957 and 1973 the Glendale AZ historical city directory indicated that the property was occupied by the Wilbur-Ellis Co., a pesticide and herbicide manufacturer. Between 1975 and 1985 the property was occupied by Tanita Farms, a produce distributor. In 1988, Aggregate Products Inc. purchased the property for use as a dry cement manufacturing facility. In December 2007 the property was sold back to Wilbur-Ellis. Aggregate Products continues to lease buildings on the property.

Professional Services Industries, Inc (PSI) of Tempe AZ was hired to conduct a Phase I & II Environmental Site Assessment of the property. During the Phase II Environmental Site Assessment, soil samples were collected and analyzed for pesticides at an approved laboratory. Some samples were found to contain aldrin, diedrin, dichlorodiphenyldichloroethane (DDD) dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), endrin, and toxaphene in levels above Environmental Protection Agency (EPA) Residential Preliminary Remediation Goals and Arizona Residential Soil Remediation Levels. For the safety of the surrounding neighborhoods and it employees, Aggregate Products requested assistance from ATSDR and ADHS to address health concerns associated with the pesticide/herbicide exposure.

On Thursday, December 13, 2007, ADHS staff visited the Wilbur-Ellis property which Aggregate Products Inc., leases. ADHS staff was met by legal counsel for Wilbur Ellis and a representative for Aggregate Products Company. The purpose of this visit was to view present conditions and identify areas of interest that should be addressed in this health consultation. ADHS staff learned that the surrounding property is primarily an industrial park. Yet, there are mobile home parks located to the northwest and west approximately ½ mile of the Aggregate Product facility (Appendix A, Fig 2). Appendix B shows some of the photos taken during the visit.

Evaluation Process

ADHS provides site-specific public health recommendations on the basis of toxicological literature, levels of environmental contaminants detected at a site compared to accepted comparison values (CVs), an evaluation of potential exposure pathways and duration of exposure, and the characteristics of the exposed population. ADHS used this approach to determine if the detected chemical concentrations in soil and air at the Aggregate Products facility pose a public health hazard.

Comparison values are screening tools used with environmental data relevant to the exposure pathways. CVs are conservatively developed based on the available scientific data and consideration for the most sensitive groups (e.g. children). If public exposure concentrations related to a site are below the corresponding CV, then the exposures are not considered of public health concern and no further analysis is conducted. However, while concentrations below the CV are not expected to lead to any observable adverse health effect, it should not be inferred that a concentration greater than the CV will necessarily lead to adverse health effects. Depending on site-specific environmental exposure factors (e.g. duration and frequency of exposure) and individual human factors (e.g. personal habits, occupation, and/or overall health), exposure to levels above the comparison value may or may not lead to a health effect. Therefore, the CVs should not be used to predict the occurrence of adverse health effects.

ADHS used the following CVs for the screening process to identify contaminants of concern for this document:

- Arizona Soil Remediation Levels (AZ SRL)
- Arizona Ambient Air Quality Guideline (AAAQG)
- Cancer Risk Evaluation Guide (CREG)
- Environmental Media Evaluation Guide (EMEG)
- Reference Dose Media Evaluation Guides (REMG)

When determining what environmental guideline value to use, this health consultation followed Agency for Toxic Substances and Disease Registry's (ATSDR) general hierarchy and used professional judgment to select CVs that best apply to the site conditions.

Discussion

Available Environmental Data for the Site

The ADHS reviewed and analyzed the available environmental sampling information to evaluate the potential of being exposed to the chemicals detected at the Aggregate Products facility. Data Sources include:

- Phase II Environmental Site Assessment Results, Aggregate Products Facility (PSI 2007)
- Preliminary Ambient Air Sampling Results, Aggregate Products Facility (PSI 2007)

Soil

During the Phase II investigation, soil samples were collected from suspect chemical storage sites, storm water collections points, and historical railroad loading/unloading points. Surface soil with visible stains and areas adjacent to suspect vault/septic systems were also collected for analyses (Appendix A, Fig 3). Soil samples were collected at depths ranging from 0—3 feet, 3—6 feet, and from 8—10 feet. These samples were analyzed in accordance with ADHS Method 8015 AZR1 for total petroleum hydrocarbons (TPH), US EPA SW-846 Method 6010B/7471 A for leachable RARC 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), Method 8081 for chlorinated pesticides, and Method 8151 for chlorinated herbicides. In addition, six of the samples were selected for organophosphorus pesticide analysis by using US EPA SW-864 Method 8141.

This health consultation evaluates the scenario in which people are most likely to come into contact with chemicals. Therefore, focus will be placed on the upper soil samples (0-3 feet).

Air

PSI collected ambient air samples from four locations on the facility site located at 5420 Bethany Home Road in Glendale AZ. These samples were collected and analyzed in accordance with National Institute for Occupational Safety and Health (NIOSH) Method 5600/5602. The samples were obtained over an approximately 4-hour sample period on a day with relatively heavy winds and intermittent rain. Sampling locations were adjacent to open soil or gravel covered areas and approximately 1 to 3.5 feet above unpaved ground. Sample #1 was analyzed for a pesticide scan. Samples # 2-4 were analyzed for toxaphene, DDT and DDE based on previous soil detects for the same chemicals.

Selection of Chemicals of Interest

Soil

The average concentrations of metals, total petroleum hydrocarbons (TPH), pesticides and herbicides in soil were compared to their respective comparison values. When sample concentrations were below the detection limit, ½ of the detection limit was used to compute the average concentration. The evaluation results indicated that:

- All averaged metal concentrations were below their respective CVs. ADHS does not expect these metals to cause cancer or noncancer health effects in people who frequently come into contact with the soil in the facility (Table 1).
- Averaged concentrations of DDD, DDE, DDT, dinoseb, endosulfan, endrin, and hexachlorobenzene were below their respective CVs. ADHS does not expect these contaminants to cause cancer or noncancer health effects in people who frequently come into contact with the chemicals in the facility.
- Averaged concentrations of aldrin, dieldrin, heptachlor, and toxaphene exceeded their respective CVs (Table 2) and were kept for further evaluation.

Table 1. Summary of detected metal concentrations in soil and their respective comparison values (CVs) in milligrams per kilogram (mg/kg)

Chemical	Number of Samples	Ranges of detected concentration (mg/kg)	Averaged concentration (mg/kg)	Health-based CVs[a] (mg/kg)	Type of CV	Is it a chemical of interest?
Arsenic	14	3.6 − 7	5.54	10	RSRL[b]	No
Barium	14	70 − 210	146.43	15,000	RSRL	No
Cadmium	14	0.5 − 6.4	1.12	39	RSRL	No
Chromium	14	12 − 61	28.14	200	RMEG[c]	No
Lead	14	10 − 120	22.79	400	RSRL	No
Mercury	14	< 0.02 − 0.28	0.05	23	RSRL	No
Selenium	14	< 1	0.5	390	RSRL	No
Silver	14	< 0.5 − 3.2	0.72	390	RSRL	No
TPH[d]	14	< 5 − 6,100	278.5	100	RSRL	No

a. Note that the health-based CVs refer to an average concentration. Average soil concentrations are used for screening and dose assessment because exposure to soil occurs over a large area and duration of time.
b. RSRL: Arizona Residential Soil Remediation Level
c. RMEG: Reference Dose Media Evaluation Guides for children's exposure (ATSDR)
d. TPH: Total Petroleum Hydrocarbons

Table 2. Summary of detected pesticides and herbicides soil concentrations and their respective comparison values (CVs) in milligrams per kilogram (mg/kg)

Chemical	Number of Samples	Ranges of detected concentration (mg/kg)	Averaged concentration (mg/kg)	Health-based CVs[a] (mg/kg)	Type of CV	Is it a chemical of interest?
Aldrin	28	< 0.02 − 220	8.13	0.032	RSRL[b]	**Yes**
DDD	28	< 0.02 − < 10	0.45	2.8	RSRL	No
DDE	28	< 0.02 − 6	0.92	2	RSRL	No
DDT	28	< 0.02 − < 10	0.60	2	RSRL	No

Chemical	Number of Samples	Ranges of detected concentration (mg/kg)	Averaged concentration (mg/kg)	Health-based CVs[a] (mg/kg)	Type of CV	Is it a chemical of interest?
Dieldrin	28	< 0.02 − 420	15.44	0.034	RSRL	**Yes**
Dinoseb	28	< 0.02 − 220	16.16	61	RSRL	No
Endosulfan	28	< 0.06 − < 110	5.36	370	RSRL	No
Endrin	28	< 0.06 − < 210	8.21	18	RSRL	No
Heptachlor	28	< 0.02 − < 10	0.74	0.12	RSRL	**Yes**
Hexachloro-benzene	28	< 0.02 − < 10	0.45	0.34	RSRL	Yes
Toxaphene	14	< 0.4 − 6,500	512.52	0.5	RSRL	**Yes**

[a.] Note that the health-based CVs refer to an average concentration. Average soil concentrations are used for screening and dose assessment because exposure to soil occurs over a large area and duration of time.
[b.] RSRL: Arizona Residential Soil Remediation Level

Air

All measurements were below the detection limits. A detection limit is the lowest level of a contaminant that analytical equipment can measure. When laboratories report that a contaminant was not detected in a sample that does not mean that the contaminant was not present. Rather, it means that contaminant was not present at levels that can be reliably measured by the analytical method, and the actual concentration is somewhere between zero and the reported detection limit. ADHS used one-half of the detection limits to represent the exposure concentration. Table 3 indicates that toxaphene exceeded its CV; thus, it was kept for further evaluation.

Table 3. Air sampling results and their respective comparison values in micrograms per cubic meter (µg/m^3).

Chemical	Number of Samples	Detected Concentration, (µg/m^3)	½ of the Detection Limit (µg/m^3)	Health-based CVs (µg/m^3)	Type of CV	Is it a chemical of interest?
DDE	3	ND[a]	0.0085	0.01	AAAQG[b]	No
DDT	3	ND	0.0085	0.01	CREG[c]	No
Toxaphene	3	ND	0.415	0.003	CREG[c]	**Yes**

[a] ND = Non-detectable
[b] Arizona Ambient Air Quality Guideline
[c] CREG Cancer Risk Evaluation Guide (ATSDR)

Exposure Pathway Analysis

ADHS identified the exposure pathways to determine if and how residents might be exposed to chemicals in the environment. There are five elements are considered in the evaluation of exposure pathways:

- a *source* of contamination,
- a *media* such as soil or air through which the contaminant is transported,
- a *point of exposure* where people can contact the contaminant,
- a *route of exposure* by which the contaminant enters or contacts the body; and
- a *receptor* population

Exposure pathways are classified as completed, potential, or eliminated. Completed pathways exist when the five elements are present and indicate that exposure to a contaminant has occurred in the past and/or is occurring now. Potential pathways are those that may have occurred in the past or present, or could occur in the future. In eliminated pathways, at least one of the five elements is and was missing, and will never be present. Completed and potential pathways, however, may be eliminated when they are unlikely to be significant.

Nearby Residents

In Arizona, dust storms are frequent during the month of May through September, with the most frequent occurrences in June, but they can occur in any month. Their average duration is less than 3 hours. The average maximum wind velocity is over 30 miles per hour (mph). During high wind events, contaminated soil may be blown into residential yards. Therefore, the residents could be exposed to the contaminants via incidental ingestion, skin contact and inhalation.

Exposure to contaminated soil within the Aggregate Products facility is not likely to occur (i.e. eliminated pathway). The site visit results indicated that the property is fenced in on all sides and access is only through a gate located on Bethany Home Road (Appendix B). Therefore, the nearby residents are not likely to have contact with the soil without permission from the Aggregate Product Company.

***People who gain site access on a frequent basis* (*i.e. workers, site visitors, trespassers*)**

The exposures may occur through incidental ingestion of contaminated soils and dermal exposure to contaminated soils within the facility, and inhalation of chemicals in the air. However, the frequency and duration of exposures vary between workers and visitors. Exposure is not likely to occur among trespassers since the property is fenced in on all sides and access is only through a gate (i.e. eliminated pathway).

Table 4 shows the exposure pathway evaluation results. ADHS further evaluated the completed and potential exposure pathways to determine whether realistic exposures are sufficient in magnitude, duration or frequency to result in adverse health effects. Eliminated exposure pathways require no further evaluation.

Table 4. Site conceptual model: exposure pathway evaluation.

Exposure Pathway Elements					Time frame	Type of Exposure Pathway
Source	**Media**	**Point of exposure**	**Route of exposure**	**Potentially exposed population**		
Spills	Soil	Residential yards	Incidental ingestion, Inhalation, skin contact	Nearby residents	Past	Potential
					Current	Potential
					Future	Potential
		On site	Incidental ingestion, inhalation, skin contact	Nearby residents	Past	Eliminated
					Current	Eliminated
					Future	Eliminated
				Workers, site visitors	Past	Potential
					Current	Completed
					Future	Potential
	Air	Ambient air	Inhalation	Nearby residents	Past	Potential
					Current	Potential
					Future	Potential
				Workers, site visitors	Past	Potential
					Current	Completed
					Future	Potential

Public Health Implications

Potential health impacts on nearby residents:

As discussed, the residents may be exposed to the contaminants via incidental ingestion, dermal contact and inhalation. Dust storms and wind events may carry contaminated soils off site overtime. Even though no soil samples were collected from the residential yards, ADHS does not expect to see adverse health impacts among the closest residents based on the distance from the Aggregate Product facility to the residential area (approximately ½ miles) and frequency of high wind events. The ambient air samples were collected from approximately 1 to 3.5 feet above ground at the facility. However, residential areas are generally upwind from the property and located approximately ½ miles away. Therefore, ADHS does not expect the closest residents to be significantly impacted.

Potential health impacts on people who gain site access on a frequent basis:

Aldrin/Dieldrin

Aldrin and dieldrin are two closely related organochlorine insecticides. They were used in agriculture and mosquito control from the early 1950s until 1989, when their manufacture in the United States was discontinued. Aldrin and dieldrin are not very water soluble, but readily bind to sediment and rarely leach into deeper soil layers and groundwater. Evaporation from moist soil surfaces can occur. They take decades to break down in the environment, particularly in oxygen deprived deeper soil, resulting in persistent soil residues and varying degrees of uptake in a wide range of crops. Aldrin converts rapidly to dieldrin in biological systems of soils, plants, and animals. Dieldrin accumulates in fatty tissues, uterine tissues, and breast milk, and can cross the placental barrier (ATSDR 2002, Liu et al. 1997).

The analytical results showed that the averaged aldrin and dieldrin soil levels were below the ATSDR's chronic Environmental Media Evaluation Guide (EMEG) for aldrin (20 mg/kg) and dieldrin (40 mg/kg). The EMEGs represent the concentrations of chemicals in air, soil or water to which people may be exposed during a lifetime without experiencing harmful noncancer health effects.

Aldrin and dieldrin are carcinogenic in animals, but this effect appears to be specific to the mouse liver. The International Agency for Research on Cancer (IARC) has categorized aldrin and dieldrin as Group 3 (unclassifiable as to human carcinogenic potential) chemicals. Based on the finding of liver tumors in mice, US EPA classified both aldrin and dieldrin as B2, probable human carcinogens; however, current mechanistic data suggest that the mouse carcinogenicity data may not be highly relevant to humans (ATSDR 2002).

ADHS used mathematical model to estimate a theoretical opportunity of a person developing cancer from incidental ingestion of soil containing a specified concentration of a chemical. The theoretical ingestion cancer risks for visitors and workers are listed in Table 5. ADHS prefers to use site-specific conditions whenever possible to evaluate whether people are being exposed to contaminants at levels of health concern. However, the actual worker exposure information was

not made available to ADHS; the assumptions used for the calculations were based on the occupational exposure listed in the ADHS *Deterministic Risk Assessment Guidance* (1997). Similarly, ADHS used conservative assumptions to estimate the exposure to site visitors based on professional judgment (Appendix C). For workers, the theoretical ingestion cancer risks were 2.4×10^{-5} for aldrin, and 4.3×10^{-5} for dieldrin. The results indicated that there will be 2 to 4 additional occurrences of cancer in a population of 100,000 people due to exposure to aldrin or dieldrin contaminated soil[1] in the facility, respectively. As listed in Table 5, the theoretical cancer risk is lower for visitors because they are not exposed to the contaminants as often as the workers.

Table 5. Theoretical cancer risks due to incidental soil ingestions and air inhalation.

Exposure Pathway	Chemical	Visitors	Workers
Incidental soil ingestion	Aldrin	2.0×10^{-6}	2.4×10^{-5}
	Dieldrin	3.6×10^{-6}	4.3×10^{-5}
	Heptachlor	4.8×10^{-8}	5.8×10^{-7}
	Toxaphene	8.2×10^{-6}	9.9×10^{-5}
Inhalation	Toxaphene	2.7×10^{-6}	3.2×10^{-5}
Total Cancer Risk		1.7×10^{-5}	2.0×10^{-4}

Heptachlor

Heptachlor is a manufactured chemical that was used in the past for killing insects in homes, in buildings, and on food crops. It has not been used for these purposes since 1988. There are no natural sources of heptachlor. It does not dissolve easily in water (ATSDR 2007).

The analytical results indicated that the average soil concentration was below the ATSDR's EMEG of 70 ppm. Hence, ADHS does not expect to see noncancerous health effects among the exposed population. With regards to cancerous health effects, animal studies showed increases in liver tumors when fed heptachlor. US EPA and the IARC have classified heptachlor as a possible human carcinogen. Using the same model and assumptions, ADHS calculated the theoretical ingestion cancer risks for visitors and workers. The results showed that the theoretical cancer risks are 4.8×10^{-8} for visitors and 5.8×10^{-7} for workers (Table 5).

[1]There is a background incidence of cancer in the general population due to everyday exposure to common materials. Nearly half of all men and one-third of all women in US population will develop cancer at some point in their life (American Cancer society 2008).

Toxaphene

Toxaphene was a widely used pesticide on cotton, other crops, and in livestock and poultry. In 1982, most of its uses were cancelled, and in 1990, all uses were cancelled in the US. At very high levels, long-term inhalation exposure to toxaphene in humans results in reversible respiratory toxicity. Studies in animals show that long-term exposure (1-2 years) to toxaphene can damage the liver, kidneys, adrenal glands, and immune system, and may cause minor changes in fetal development (ATSDR 1996). The average soil toxaphene concentration was below the ATSDR's EMEG of 700 ppm, therefore, noncancerous health effects are not likely to occur among the exposed population.

With regards to cancerous health effects, a study by the National Toxicology Program reported an increase in liver tumors in mice and an increase in thyroid tumors in rats when fed toxaphene in the diet. Several human studies were unable to conclude the incidence of cancer associated with inhalation exposure to a number of pesticides, including toxaphene, due to lack of information on exposure levels and concurrent exposure to other pesticides. ADHS' calculations showed that the theoretical ingestion cancer risk is 8.2×10^{-6}, and the theoretical inhalation cancer risk is 2.7×10^{-6} for visitors. The theoretical ingestion cancer risk is 9.9×10^{-5}, and the theoretical inhalation cancer risk is 3.2×10^{-5} for workers (Table 5).

To addressing the potential for cumulative effects from multiple chemicals occur through more than one exposure pathways, ADHS assumed the adverse health effects are additive and calculated the theoretical cumulative risk by summing the theoretical cancer risk for each contaminant. For visitors, the estimated theoretical cumulative excess lifetime cancer risk was 1.7×10^{-5}. For workers, the estimated theoretical cumulative excess lifetime cancer risk was 2×10^{-4} which exceeded the range of public health guidelines (10^{-6}~10^{-4}) for protection of human health (Table 5).

Child Health Considerations

ADHS considers children in its evaluations of all exposures, and we use health guidelines that are protective of children. In general, ADHS assumes that children are more susceptible to chemical exposures than are adults. ADHS has taken into account that children are at a greater risk for exposure than are adolescents or adults because the normal behavior of children might result in higher rates of ingestion of contaminated soil and dust. Children might also receive a higher dose of contaminants because they have lower body weights than do adults. Some children might eat soil excessively (called soil-pica behavior) and therefore have a higher exposure dose to contaminants in soil. The CVs used in this health consultation are developed to be protective of susceptible populations such as children

Conclusions

On the basis of available environmental data and current land use scenario, ADHS made the following conclusion:

(1) General public/nearby residents

- Detected metals, pesticides and herbicides in the Aggregrate Product facility pose *no public health hazard* since directly contact to the soils are not likely to occur.
- Soils and ambient air at the closest residences currently pose *no apparent public health hazard* since the residences are ½ miles away from the Aggregate Product facility and the dilution during air transport would be high.

(2) People who gain site access on a frequent basis

- The site poses a *public health hazard* to *workers* since the potential for cumulative adverse health effects from aldrin, dieldrin, heptachlor and toxaphene could exceed the public health guideline for protection of human health under the assumed exposure scenario.
- Site visitors are not expected to experience noncancerous or cancerous health effects under the assumed exposure scenario.

Uncertainty factors that may affect the current conclusion:

When conducting health assessments, ADHS prefers to have surface soil samples collected from 0 to 3 inches, because people are typically only exposed to the top 3 inches of soil. Yet, only upper level soil samples (0 to 3 feet) were available for the health effects evaluation. With the temperature and soil conditions, the surface soil concentrations may differ than the upper level soil concentrations.

All measurements of the air samples were below the detection limits. But, the detection limits are above their corresponding comparison values. ADHS took the common practice by using ½ of the detection limit to evaluate the inhalation risks. Yet, this may over- or under-estimate the actual health risks since the actual chemical concentrations in the ambient air are somewhere between 0 and the reported detection limits.

Because of conservative models used to derive cancer risks, using this approach provides a theoretical estimate of risks. To provide more accurate estimations, ADHS prefers to use site-specific conditions whenever possible. However, the actual worker exposure information was not made available to ADHS. ADHS took the default assumptions for occupation exposures listed ADHS *Deterministic Risk Assessment Guidance* (1997). Depending on the working schedules and activity patterns of the staff, the actual cancer risks may differ from the predicted theoretical cancer risks.

Recommendations

- The property owner should continue with their remediation plan being addressed under the Arizona Voluntary Remediation Program through the Arizona Department of Environmental Quality (ADEQ). ADEQ should continue with its oversight of the investigation and remedial action.
- The responsible party should complete the investigation and remedial efforts.
- ADEQ should monitor the site for future remediation actions due to the toxaphene and other chemical contamination.

Public Health Action Plan

Public Health Action	Who Will Implement the Action	Time Frame for Implementation	Desired Outcome When Implemented	Public Health Impact
Mail finalized health consultation to petitioner	ADHS	After the health consultation is finalized	Raise petitioners' awareness about the soil quality in the area	Reduction in exposure to toxaphene in air and soil.
Attend Public Meeting(s)	ADHS, ADEQ	After the health consultation is finalized	Provide an interactive environment to discuss the health consultation and petitioners' concerns	Assures petitioners' concerns will be heard and addressed. If needed, ADHS will attend additional meetings

References

Agency for Toxic Substances and Disease Registry (ATSDR) (2002). Toxicological profile for aldrin/dieldrin. ATSDR, Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ATSDR) (2007). Toxicological profile for heptachlor/heptachlor epoxide. ATSDR, Department of Health and Human Services.

Agency for Toxic Substances and Disease Registry (ATSDR) (1996). Toxicological profile for toxaphene. ATSDR, Department of Health and Human Services.

Arizona Department of Health Services (ADHS) (1997). Deterministic Risk Assessment Guidance. ADHS, Office of Environmental Health.

Professional Services Industries Inc., 2720 S. Hardy Drive Suite 4, Tempe, AZ 85282. Phase I Environmental Site Assessment, Aggregate Products facility, 5420 Bethany Home Road, Glendale, Arizona, PSI Project 723-6G039, January 17, 2007.

Professional Services Industries Inc., 2720 S. Hardy Drive Suite 4, Tempe, AZ 85282. Phase II Environmental Site Assessment, Aggregate Products facility, 5420 Bethany Home Road, Glendale, Arizona, PSI Project 723-6G039, January 18, 2007.

Professional Services Industries Inc., 2720 S. Hardy Drive Suite 4, Tempe, AZ 85282. Preliminary Ambient Air Sampling Results, Aggregate Products facility, 5420 Bethany Home Road, Glendale, Arizona, PSI Project 723-79001, April 10, 2007.

http://www.mapquest.com/maps/map.adp?country=US&address=5420+W+Bethany+Home+Rd&city=Glendale&state=AZ

http://maps.yahoo.com/;_ylc=X3oDMTExNmIycG51BF9TAzI3MTYxNDkEc2VjA2ZwLWJ1dHRvbgRzbGsDbGluaw--#mvt=s&trf=0&lon=-112.175292&lat=33.524161&mag=2

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Certification

This Health Consultation entitled *Aggegrate Products Inc., Glendale, Maricopa County, Arizona* was prepared by the Arizona Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures' existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.

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The Division of Health Assessment and Consultation, Agency for Toxic Substance and Disease Registry, has reviewed this health consultation and concurs with its findings.

Alan Yarbrough
Team Leader, Cooperative Agreement Team
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Appendix A

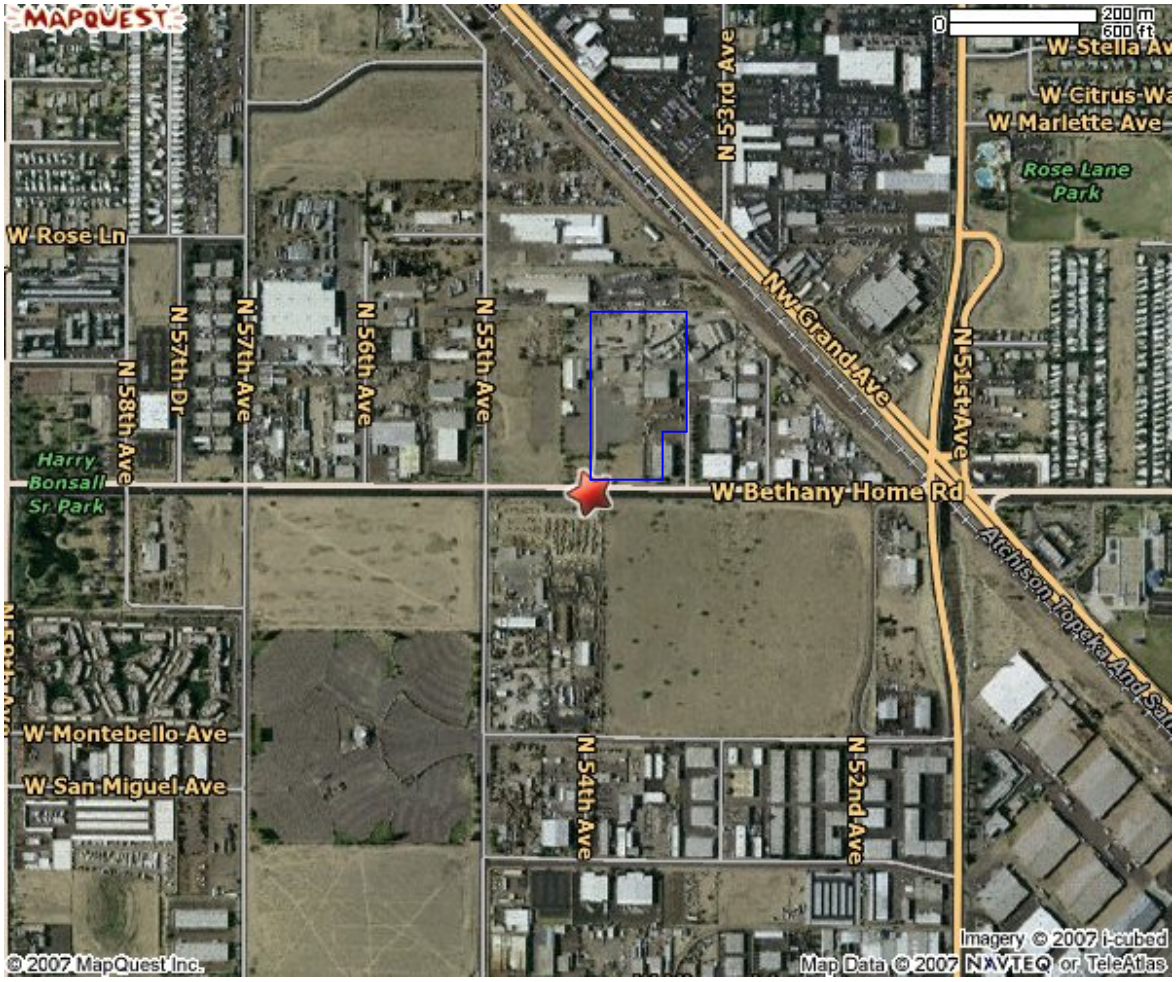

Figure 1. Site map[2]. The Aggregate Products Co. facility is approximately ½ miles west of the intersection of Bethany Home Road and Grand Avenue in Glendale AZ.

[2] The map is adapted from http://www.mapquest.com.

Figure 2. Site map[3]. The Aggregate Products Co. facility is on 9.02 acres in an industrial park. The closest residential area is approximately ½ mile away to the northwest.

[3] The map is from http://maps.yahoo.com.

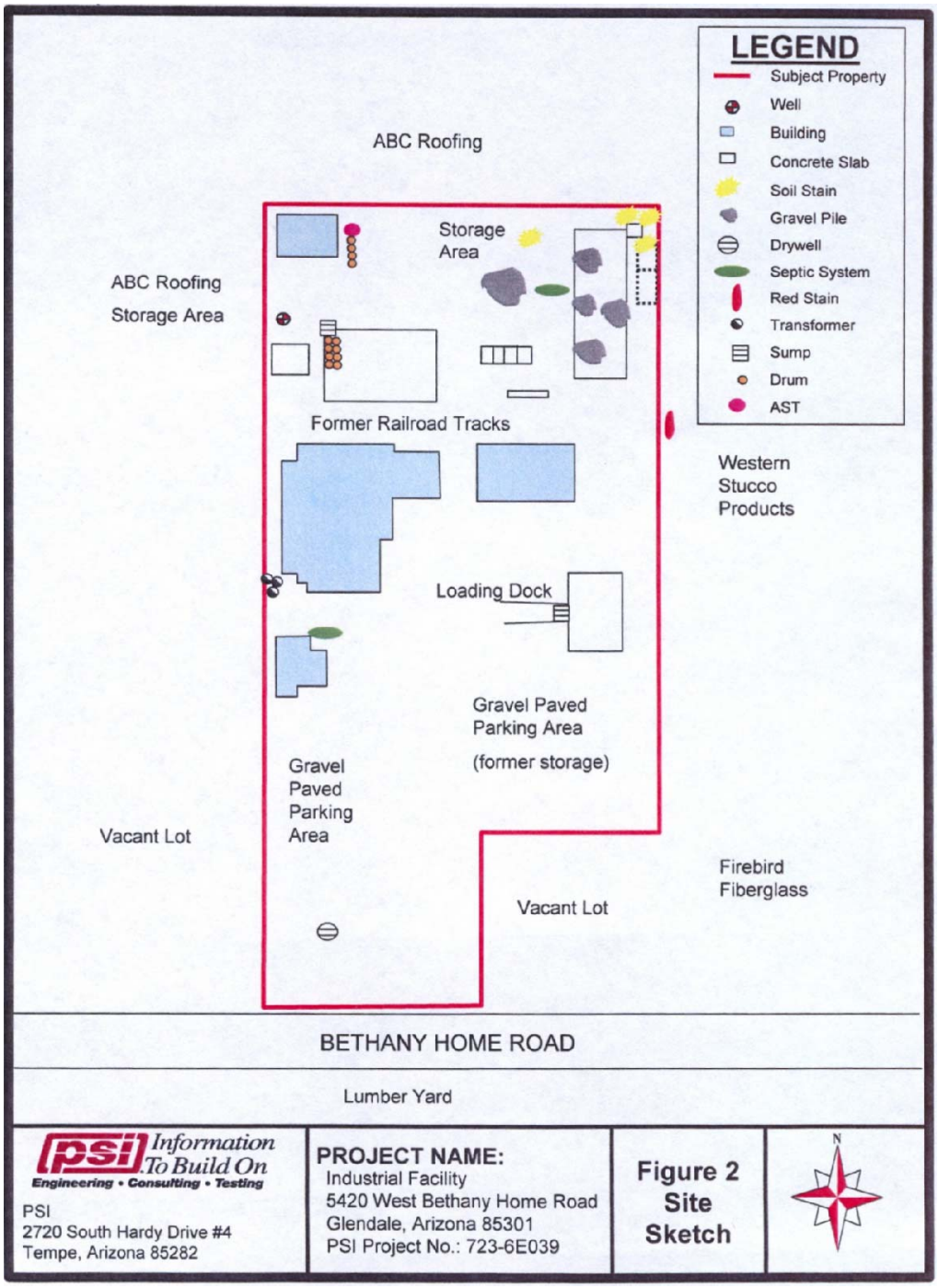

Figure 3. Site map[4]. The site sketch depicts the layout on the Aggregate Products Co. facility on January 17, 2007.

[4] The site sketch is from PSI Inc. report: Phase 1 Environmental Site Assessment, Glendale, Arizona, PSI Project 723-6G039, January 17, 2007.

Appendix B

Photo 1. Entrance. The photo is on the inside of the 5420 Bethany Home Road looking south to the front entrance to the property.

Photo 2. West view. The photo is on the inside of the 5420 Bethany Home Road looking west ward along south property line towards adjacent industrial property and Grand Avenue

Photo 3. East view. The photo from entry road inside of the 5420 Bethany Home Road looking northeast towards fence, parked semi trailers and the adjacent industrial property and Grand Avenue

Photo 4. East property line. The photo is on the inside of the 5420 Bethany Home Road looking southward along east property line

Photo 5. North property line. The photo is on the inside of the 5420 Bethany Home Road looking west ward along north property line

Photo 8. Along north property line. The photo is on the inside of the 5420 Bethany Home Road looking eastward along north property line

Photo 9. Along west property line. The photo is on the inside of the 5420 Bethany Home Road looking southward along west property line

Appendix C

Formula and assumptions used to calculate cancer risk from accidental soil ingestion:

$$\text{Chronic Daily Intake (mg/kg/day)} = \frac{\text{CS} \times \text{CF} \times \text{IR} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}}; \quad \text{Cancer Risk} = \text{Chronic Daily Intake} \times \text{SF}$$

Variable			Exposed population: Visitors			
			Aldrin	**Dieldrin**	**Heptachlor**	**Toxaphene**
CS	Chemical concentration in soil	mg/kg	8.13	15.44	0.74	512.52
CF	Conversion factor	kg/mg	$1/10^6$	$1/10^6$	$1/10^6$	$1/10^6$
IR	Ingestion rate	mg/day	50	50	50	50
EF	Exposure frequency	days/year	52	52	52	52
ED	Exposure duration	years	10	10	10	10
BW	Body weight	kg	70	70	70	70
AT	Averaging time	days	25,550	25,550	25,550	25,550
SF	Slope Factor	$(\text{mg/kg/day})^{-1}$	17	16	4.5	1.1

Variable			Exposed population: Workers			
			Aldrin	**Dieldrin**	**Heptachlor**	**Toxaphene**
CS	Chemical concentration in soil	mg/kg	8.13	15.44	0.74	512.52
CF	Conversion factor	kg/mg	$1/10^6$	$1/10^6$	$1/10^6$	$1/10^6$
IR	Ingestion rate	mg/day	50	50	50	50
EF	Exposure frequency	days/year	250	250	250	250
ED	Exposure duration	years	25	25	25	25
BW	Body weight	kg	70	70	70	70
AT	Averaging time	days	25,550	25,550	25,550	25,550
SF	Slope Factor	$(\text{mg/kg/day})^{-1}$	17	16	4.5	1.1

Formula and assumptions used to calculate cancer risk from air inhalation:

$$\text{Chronic Daily Intake (mg/kg/day)} = \frac{\text{AC} \times \text{IR} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}}$$

$$\text{Cancer Risk} = \text{Chronic Daily Intake} \times \text{SF}$$

Variable			**Toxaphene**	
			Visitors	**Workers**
AC	Chemical concentration in air	mg/m^3	0.000415	0.000415
IR	Inhalation rate	m^3/day	20	20
EF	Exposure frequency	days/year	52	250
ED	Exposure duration	years	10	25
BW	Body weight	kg	70	70
AT	Averaging time	days	25,550	25,550
SF	Slope Factor	$(mg/kg/day)^{-1}$	1.1	1.1