Health Consultation

ALLIED PRODUCTS CORPORATION
TARGETED BROWNFIELDS ASSESSMENT
13TH AVENUE AND E STREET
CHARLES CITY, FLOYD COUNTY, IOWA

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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

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Prepared by:

Iowa Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

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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Purpose

The Iowa Department of Natural Resources (IDNR) has requested the Iowa Department of Public Health (IDPH) Hazardous Waste Site Health Assessment Program to evaluate environmental data collected at former farm equipment manufacturing facility located in Charles City, Iowa. The site, most recently operated by Allied Products Corporation, is a 70-acre site located at 13th Street and E Street in Charles City, Iowa (Figure 1). The site is undergoing a Targeted Brownfields Assessment conducted by the Contaminated Sites Section of the IDNR. This health consultation addresses potential health risks to people from future exposure to the soil within the property boundary, and any health impacts resulting from contaminated groundwater beneath the site property. The information in this health consultation was current at the time of writing. Data that emerges later could alter this document's conclusions and recommendations.

Background

The site is a former farm equipment manufacturing facility producing tractors and tractor components under the names of Hart-Parr, Oliver, and White from 1902 until 1993. Activities at the plant in the past included: foundry operations, plating, quenching, chemical washing, painting, and assembly operations. The facility was closed on July 1, 1993. The buildings that existed on the site began to be demolished in November 1993. The Charles City Development Corporation has obtained title to the site through bankruptcy court proceedings (1).

Currently all former buildings on the site have been demolished, and all that remains are the concrete floors, foundations and other subsurface structures. At the far southeast corner of the site lies a pile of baghouse dust, foundry sand, slag, and metal scrap (The 'Hill') covering an area approximately 8.2 acres in size and approximately 70 feet in height. To the northeast is a 16.7 acre grass area with a 1,800 feet concrete oval test track. Currently, the only structure on site was built to house the remedial system for the former leaking underground storage tanks just west of the Hill. The groundwater flow in the vicinity of the site is toward the southwest (1).

Site Evaluation

IDNR Contaminated Sites Investigation

Based upon the location of process areas determined through interviews with former employees and plant layout drawings, a sampling plan was developed by the IDNR Contaminated Sites Section (1). Sampling of soil and groundwater within and beneath the site were completed during July, August, and September 2004 and January 2005. The following is a summary of the sampling program at the site:

- Composite shallow soil samples (obtained from a sampling instrument that collected soil from 0 to 1 foot below ground surface) were collected at many locations across the site. The soil sampling locations were within the Test Track area, within the "Hill" area, and

within the Foundry, Shop/Lab, East Factory, and Waste Factory areas. These collected soil samples were analyzed for metals and polycyclic aromatic hydrocarbons or PAHs.

- Groundwater samples were collected at various sampling locations within the Test Track area, within the "Hill" area, and within the Foundry, Shop/Lab, East Factory and West Factory areas. The groundwater samples were analyzed for volatile organic compounds (VOCs) including petroleum constituents. In addition to VOCs, one groundwater sample collected in the Test Track area and two groundwater samples collected down-gradient of the "Hill" area were analyzed for total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

- Additional groundwater samples were collected at several locations just to the south of the West Factory area, in an area between the former facility and residences located to the south of the facility. These groundwater samples were analyzed for VOCs to evaluate the potential for vapor intrusion into nearby residences to the south of the facility.

Soil samples were collected with a truck mounted direct-push soil probe. Groundwater samples were collected with direct-push groundwater sampling equipment. The soil samples were analyzed by X-ray fluorescence spectrometry in the field and by the University of Iowa Hygienic Laboratory. The groundwater samples were analyzed by a field gas chromatograph, a Hack Test Kit, and by the University of Iowa Hygienic Laboratory.

Several areas of concern of soil and groundwater contamination have been identified by the IDNR. These areas include an area of metal contamination of surface soil just north of the "Hill" area along the former railroad spur, an area of petroleum contamination of groundwater in the East Factory area, an area of trichloroethene contamination of groundwater in the West Factory area, and an area of mixed petroleum and chlorinated solvents contamination of groundwater from a former sump area in the West Factory Area.

Tables 1 and 2 include the results of metal contamination of soil in the area of concern located just north of the "Hill" area. Only samples obtained in the top 1-foot of soil have been included in Tables 1 and 2 since human exposure associated with soil contact would normally not occur in soils at a depth greater than several inches. Tables 1 and 2 also include only the results of metal contamination above the Statewide Standard for metals as referenced in the IDNR Land Recycling Program (LRP).

Table 1 – Areas of Concern in Soil – Metal Analysis Results (Collected in 2004) (1)

Sample Location	Antimony (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Chromium (mg/kg)
LRP Standard	31	39	400	230
S-5-C	< LRP Standard	< LRP Standard	529.21	< LRP Standard
S-1-F	< LRP Standard	69.90	< LRP Standard	< LRP Standard
S-4-F	194.24	< LRP Standard	< LRP Standard	< LRP Standard
S-4.75-F	< LRP Standard	< LRP Standard	744.71	295.11
S-5-G	< LRP Standard	< LRP Standard	934.21	< LRP Standard
S-2-I	< LRP Standard	< LRP Standard	451.14	< LRP Standard

Table 1 (Cont.) – Areas of Concern in Soil – Metal Analysis Results (Collected in 2004) (1)

Sample Location	Antimony (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Chromium (mg/kg)
LRP Standard	31	39	400	230
N-2-G	219.24	< LRP Standard	< LRP Standard	< LRP Standard
S-3-J	< LRP Standard	< LRP Standard	427.52	< LRP Standard
S-4-J	< LRP Standard	< LRP Standard	9,077.00	< LRP Standard
S-3-K	< LRP Standard	< LRP Standard	931.88	< LRP Standard
7A-1	< LRP Standard	< LRP Standard	1528.43	< LRP Standard
8B-1	< LRP Standard	< LRP Standard	985.70	< LRP Standard
8C-1	< LRP Standard	< LRP Standard	851.49	< LRP Standard
10B-1	< LRP Standard	< LRP Standard	491.92	< LRP Standard

LRP Standard – means the Statewide Standard as referenced in the IDNR Land Recycling Program.

Table 2 – Areas of Concern in Soil – Metal Analysis Results (Collected in 2005) (1)

Sample Location	Antimony (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Copper (mg/kg)	Manganese (mg/kg)	Chromium (mg/kg)	Vanadium (mg/kg)
LRP Standard	31	39	400	2,900	11,000	230	550
1B-1	281.55	108.88	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
3C-1	257.30	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
4.1	482.66	148.55	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	595.62
5.5-1	255.14	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
7A-1	248.91	< LRP Standard	1,528.43	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
7C-1	< LRP Standard	56.21	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
8B-1	450.03	109.85	985.70	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
8C-1	305.37	86.28	851.49	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
9C-1	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
10A-1	177.31	58.12	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
10B-1	< LRP Standard	< LRP Standard	491.92	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
11A-1	264.07	< LRP Standard	591.18	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
11B-1	< LRP Standard	73.82	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
12B-1	253.57	< LRP Standard	454.58	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
13A-1	402.00	< LRP Standard	1,493.71	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
13B-1	248.81	120.75	3,056.75	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
13C-1	361.46	526.85	2,027.07	2,959.97	19,808.86	255.45	< LRP Standard
14A-1	421.70	< LRP Standard	1,702.68	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
14C-1	555.10	262.89	791.65	< LRP Standard	< LRP Standard	771.32	< LRP Standard
15A-1	301.35	101.33	2,243.44	3,726.75	< LRP Standard	< LRP Standard	< LRP Standard
15B-1	313.65	116.47	1,036.15	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
15C-1	326.94	80.58	1,047.13	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
16A-1	346.84	103.50	910.55	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
16B-1	624.59	229.54	1,983.88	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
17A-1	< LRP Standard	< LRP Standard	665.33	< LRP Standard	< LRP Standard	< LRP Standard	< LRP Standard
18C-1	< LRP Standard	< LRP Standard	772.24	< LRP Standard	< LRP Standard	267.25	< LRP Standard
19A-1	726.58	354.22	1665.34	< LRP Standard	< LRP Standard	242.04	< LRP Standard
19B-1	356.50	109.11	603.63	< LRP Standard	< LRP standard	1,283.13	< LRP Standard

LRP Standard – means the Statewide Standard as referenced in the IDNR Land Recycling Program.

The locations of collected samples identified in Tables 1 and 2 are shown on Figures 2 and 3.

Table 3, below, includes the results of VOC contamination in the groundwater in the areas of concern within the East Factory and West Factory areas. Table 3 includes only the results of VOC contamination above the Statewide Standard for various VOCs as referenced in the IDNR Land Recycling Program. The Statewide Standard is a health based level utilized by IDNR as a level determined to be safe for the entire population. The locations of collected samples in Table 3 are shown on Figure 4.

Table 3 – Areas of Concern in Groundwater – VOC Analyses Results (1)

	Concentration (µg/L)								
Sample	Vinyl Chloride	Trans 1,2 Dichloro-ethene	1,1 Dichloro-ethane	Cis 1,2 Dichloro-ethene	1,1,1 Trichloro-ethane	Benzene	Trichloro-ethene	1,1,2 Trichloro-ethane	Tetra-chloro-ethene
Standard	2	100	7	70	200	5	5	5	5
TBG-01	ND	ND	ND	ND	ND	ND	6.0	ND	ND
TBG-03	2.5	ND	ND	ND	ND	ND	ND	ND	ND
TBG-04	ND	230.0	ND	240.0	350.0	250.0	ND	ND	ND
TBG-07	2.7	ND	ND	ND	ND	ND	ND	ND	ND
TBG-08	2.4	ND	ND	ND	ND	ND	ND	8.8	ND
TBG-09	ND	ND	22.0	ND	ND	ND	ND	ND	ND
TBG-09 Lab	ND	ND	16.0	ND	ND	ND	ND	ND	ND
TBG-10	ND	ND	7.8	ND	ND	ND	16.0	ND	6.9
TBG-12	ND	ND	ND	ND	ND	ND	15.0	ND	ND
TBG-13	2.1	ND	ND	ND	ND	ND	29.0	ND	ND
TBG-13 Lab	ND	ND	ND	ND	ND	ND	18.0	ND	ND
TBG-15	2.7	ND	ND	ND	ND	5.1	ND	ND	ND
TBG-17	3.5	ND	ND	ND	ND	ND	ND	ND	ND
TBG-19	2.8	ND	ND	ND	ND	ND	ND	ND	ND
TBG-20	2.2	ND	ND	ND	ND	ND	ND	ND	ND
TBG-21	2.7	ND	ND	ND	ND	ND	ND	ND	ND
99-4e	ND	ND	ND	ND	ND	ND	39.0	ND	ND
99-4e Lab	ND	ND	ND	ND	ND	ND	26.0	ND	ND

Standard – means the Statewide Standard as referenced in the IDNR Land Recycling Program.
ND – means not detected above the Statewide Standard as referenced in the IDNR Land Recycling Program.
Lab – means the sample was analyzed at the University of Iowa Hygienic Laboratory.

As previously mentioned, groundwater samples were also obtained at several locations in an area between the former West Factory area and residences located to the south of the facility in addition to the samples identified in Tables 3. The closest of these residences is approximately 250 feet south of the West Factory area. The location of these additional groundwater samples are shown in Figure 5. In all of these additional groundwater samples, only trichloroethene was detected just at the method detection limit of 5 µg/L in the groundwater sample at location GP-04. All other VOCs were not detected in all these additional groundwater samples collected located south of the West Factory area.

IDNR Underground Storage Tank Investigation

The Underground Storage Tank (UST) Section of the IDNR is currently overseeing an investigation of several leaking underground storage tanks containing petroleum products. A total of 21 underground storage tanks have been removed at the site in the late 1980's and early 1990's. These underground storage tanks varied in size from 250 to 14,000 gallons and contained gasoline, diesel, used oil, and other chemicals. As part of the IDNR UST investigation, groundwater and subsurface soil samples have been obtained at various locations throughout the site and analyzed for volatile organic chemicals, and total extractable hydrocarbons. A soil-vapor extraction system was installed in the vicinity of some of the underground storage tanks in the mid-1990's to remediate the higher levels of volatile organic chemicals in that area of the site. This system is currently non-operational (2). At the present time the underground storage tank investigation is ongoing.

Table 4, below, includes the latest groundwater sampling results at various selected sampling points within the site included in the UST investigation. The samples of groundwater were obtained from monitoring wells installed as part of the UST investigation. Since the UST investigation has been initiated, some of the levels of contaminants have been reduced – especially in the area where the soil-vapor extraction system was installed (MW-12, MW-18, and EW-1 through EW-5).

Table 4 – Groundwater Sampling Results-UST Investigation (2)

	Concentration (µg/L)					
Sample (Date)	Benzene	Toluene	Ethylbenzene	Xylenes	TEH-D	TEH-WO
MW-1 (1994)	<4	5.6	39	140	na	na
MW-7 (2000)	<1	<1	<1	<3	<380	7,800
MW-8 (2000)	<1	<1	<1	<3	<380	1,300
MW-10 (2000)	<1	<1	<1	<3	<380	960
MW-12 (2000)	<1	<1	<1	<3	<380	<380
APT-2 (2000)	<1	<1	<1	<3	790	<380
MW-17 (2000)	45.5	162	690	<60	<380	<380
MW-18 (2000)	<1	<1	<1	<3	<380	<380
MW-20 (2000)	<1	<1	4.3	5.3	<380	470
MW-20D (2000)	<1	<1	<1	<3	<380	520
MW-53 (2000)	<1	<1	<1	<3	<380	<380
EW-1 (2003)	<1	10.1	75.2	404	na	na
EW-2 (2003)	<1	20.2	79.4	1,190	na	na
EW-3 (2003)	<1	4.2	67.1	289	na	na
EW-4 (2003)	<5	32	666	2,610	na	na
EW-5 (2003)	<1	<1	4.1	<3	na	na
EW-6 (2003)	<1	2	15.3	48.2	na	na
EW-8 (2003)	<1	<1	<1	<3	na	na
EW-9 (1996)	<2	<2	<2	<2	na	na
EW-10 (2003)	<1	<1	8.5	<3	na	na
EW-11 (1995)	<2	340	360	590	na	na
EW-12 (2003)	<1	<1	<1	<3	na	na
EW-13 (1996)	<2	<2	<2	<2	na	na

TMW110 (2003)	6.9	10.6	<5	<15	656,000	1,080,000

Table 4 (Cont.) – Groundwater Sampling Results-UST Investigation (2)

	Concentration (µg/L)					
Sample (Date)	Benzene	Toluene	Ethylbenzene	Xylenes	TEH-D	TEH-WO
TMW109 (2003)	119	101	20.2	74.5	437,000	696,000
TMW105 (2003)	<1	<1	<1	<3	1,320	2,050

TEH-D – means total extractable hydrocarbons measured in the diesel range.
TEH-WO – means total extractable hydrocarbons measured in the waste oil range.
na – means not analyzed for contaminant.

Contaminants of Potential Concern

The contaminants of potential concern at the site further discussed in this health consultation are the metals detected within the surface soil samples – antimony, cadmium, lead, copper, manganese, chromium, and vanadium; and the volatile organic chemicals and total extractable hydrocarbons detected in groundwater samples. The soil samples collected as part of the UST investigation will not be further discussed in this health consultation, since human exposure to soils at the depths where soils were collected for sampling (greater depth than several inches below ground surface) is not likely.

Discussion

Exposure to Chemicals of Potential Concern

Exposure to the chemicals of potential concern at the former farm equipment manufacturing facility is determined by examining human exposure pathways. An exposure pathway has five parts:

1. a source of contamination,
2. an environmental medium such as air, water, or soil that can hold or move the contamination,
3. a point at which people come in contact with a contaminated medium, such as, in drinking water, or in surface soil,
4. an exposure route such as, drinking water from a well, or eating contaminated soil on homegrown vegetable, and
5. a population who could come in contact with the contaminants.

An exposure pathway is eliminated if at least one of the five parts is missing and will not occur in the future. For a completed pathway, all five pathway parts must exist and exposure to a contaminant must have occurred, is occurring, or will occur.

The site has been used in the past as a large manufacturing facility and is planned to be utilized in the future as an industrial or commercial property. As a result, only adult-age people had been routinely exposed in the past to the site contaminants when operating as a manufacturing facility, and only adult-age people are anticipated to be exposed to site contaminants in the future since the site is proposed to be used as an industrial or commercial property. There is a possibility of children being exposed to site contaminants since the site in not completely enclosed by fencing,

but only to those children who may be trespassing on site. The site does not appear to be utilized as a regular play area and is separated from residences by a rail line and several roads on the north side of the property and by a major road on the south side of the property.

Exposure to Groundwater

Exposure to contaminated groundwater from the site would be possible if individuals were drinking water supplied by private wells located in the vicinity of the site, or if the chemicals of potential concern within the groundwater could migrate to water supply wells used to provide water to individuals in Charles City. Charles City has two active municipal wells that supply water to residents, including those living in the area of the site. These active municipal wells are located approximately one-half mile northwest from the site. There is another municipal well located approximately 500 feet north of the site. According to officials at Charles City, this closest municipal well is utilized as a standby well for no more than 8 days per year at a rate of no more than 800 gallons per minute (Steve Simerson, Charles City Water Superintendent, personal communication, March 16, 2005). According to the Charles City Water Superintendent, this well has not been utilized in the past two years and is planned to be abandoned during the next 2 years.

The current sources of the municipal water supply in Charles City are the wells located more than one-half mile to the northwest of the site. In addition to being located one-half mile from the site, these active municipal wells are located up-gradient to the site, since groundwater flow direction has been determined to be to the southwest, away from the active municipal wells (1). There is also approximately 65 feet of relatively impervious glacial till separating the upper aquifer located on-site and the aquifer in which the public water supply wells are located (1). Due to the direction and distance the active public water supply wells are located with respect to the site and the 65 feet of glacial till separating the aquifers, it is not expected that individuals within Charles City will be exposed to groundwater at the site through ingestion. Analytical results from ongoing sampling of the Charles City water supply indicate no exposure to the chemicals of potential concern (3). Therefore the groundwater exposure pathway has been eliminated from further consideration.

Exposure to Soils

Exposure to soils at the site is possible through incidental ingestion of the soils from ingestion of dust and hand to mouth activities, and through incidental dermal exposure to soils. Due to the proposed future use of the site as a heavy industrial manufacturing site and/or general commercial site, it is anticipated that exposure to surface soils at the site will be minimized. The more intensive exposure to surface soils, such as with residential or recreational uses, is not considered in this health consultation. Exposure to soils can be reduced by maintaining a vegetative cover or paving over areas of higher soil contamination. Table 1, shown previously, includes the concentration of the chemicals of potential concern in the surface soils at the site detected above the statewide standard for metals as referenced in the IDNR LRP. The levels of antimony, cadmium, lead, copper, manganese, chromium, and vanadium detected in all surface soil samples will be considered further in this health consultation.

Exposure to Volatile Organic Chemicals from Indoor Air

As seen in Tables 3 and 4, there are detected levels of VOCs within groundwater and soils beneath the site. There is a potential for VOCs vapors to migrate from contaminated groundwater and belowground soil into void spaces such as basements due to the volatility of these chemicals. There is very little potential for vapors to migrate from chemicals measured as total extractable hydrocarbons. One area of groundwater contamination noted on the southwest portion of the site has higher levels of VOCs. A groundwater sample obtained from TBG-04 had levels of trans 1,2 dichloroethene, cis 1,2 dichloroethene, 1,1,1 trichloroethane, and benzene at 230, 240, 350, and 250 µg/L, respectively. Since the direction of groundwater flow is to the southwest, there may be a potential for some of the VOCs to migrate along with the groundwater. These VOCs could volatize into the soil void spaces and travel into basements to the southwest of the site. Additional groundwater sampling was completed in the area to the south of these higher VOC detections and just to the north of nearby residences. As previously discussed, VOCs were not detected in all but one of these groundwater samples. The only VOC detected was trichloroethene at the method detection limit of 5 µg/L. Since VOCs were not detected in the groundwater, it is unlikely that VOCs would volatize into the soil void spaces. As a result, it is expected that residents located near the site are not being exposed to harmful levels of VOC vapors.

Toxicological Evaluation

The following information has been prepared as a toxicological evaluation of exposure to the chemicals of potential concern in surface soils. The chemicals of potential concern found in surface soils are antimony, cadmium, lead, copper, manganese, chromium, and vanadium. The Agency for Toxic Substances and Disease Registry (ATSDR) has developed a set of soil comparison values that are levels of chemicals in soil that are unlikely to cause harmful (adverse) health effects in exposed people (4). These comparison values utilize health effect levels developed by ATSDR and the US Environmental Protection Agency (EPA). These health effect levels include the ATSDR Oral Minimum Risk Levels (MRLs), and the EPA Chronic Reference Doses (RfD).

Table 5, below, is a list of soil comparison values for all the chemicals of potential concern, along with the average detected concentration and the 95% upper confidence level concentration of the chemicals of potential concern detected in soil samples. The upper 95% upper confidence is a statistical calculation an upper level of the true mean of the concentration using the data collected from the site investigation. The comparison values included in Table 5 are for exposure to adults, since children are very unlikely to be exposed to site contaminants. The comparison value included in Table 5 for lead is obtained from EPA regulations and are preliminary remediation goals recommended by a technical review workgroup assessing safe levels of exposure to adults in a non-residential setting (5).

Table 5 – Comparison Values and Chemicals of Potential Concern in On-Site Soils

Chemical and Comparison Value	Comparison Value Concentration (mg/kg)	Sample Mean and 95% Upper Confidence Level (mg/kg)
Antimony – RMEG for Adult	300	262 and 379

Table 5 (Cont.) – Comparison Values and Chemicals of Potential Concern in On-Site Soils

Chemical and Comparison Value	Comparison Value Concentration (mg/kg)	Sample Mean and 95% Upper Confidence Level (mg/kg)
Cadmium – Chronic EMEG for Adult	100	95 and 141
Cadmium – RMEG for Adult	700	95 and 141
Lead – Adult Non-Residential Exposure	710 to 1,700	261 and 1,684
Copper – Intermediate EMEG for Adult	10,000	306 and 916
Manganese – RMEG for Adult	40,000	1,018 and 3,083
Chromium – RMEG for Adult	2,000	100 and 284
Vanadium – Inter. EMEG for Adult	2,000	53 and 120

EMEG – means Environmental Media Evaluation Guide.
RMEG – means Reference Dose Media Evaluation Guide.
Inter. – means Intermediate.

Reference Dose Media Evaluation Guide

The RMEG is an estimate of an exposure level in a particular media below which a negative health impact is not expected. The RMEG utilizes a reference dose developed by EPA which is, "an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime" (6). RMEGs are determined utilizing the reference dose and then making assumptions regarding the amount of the soil a person may incidentally ingest.

Environmental Media Evaluation Guide

An EMEG is an estimate of an exposure level in a particular media below which a negative health impact is not expected. The EMEG utilizes an MRL developed by ATSDR which is, "an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure" (7). MRLs are developed for acute (1 to 14 days), intermediate (greater than 14 days to 365 days), and chronic (greater than 365 days) durations of exposure. EMEGs are determined by utilizing MRLs and then making assumptions regarding the amount of soil a person may incidentally ingest.

Evaluation of Comparison Values and Adult Exposure to Site Soils

An evaluation has been made between the comparison values shown in Table 5 and the mean concentration of chemicals of potential concern within site soil. Mean concentrations of chemicals of potential concern are used for evaluation since adult individuals will not be exposed to only select areas of the site during potential exposure events, but to levels of chemicals of potential concern throughout the site. All comparison values included in Table 5 are above the

mean detected concentration of all of the chemicals of potential concern. It is not expected that exposure to site soils will negatively effect the health of any adults exposed to the site.

Children's Health Concerns

Children have unique vulnerabilities to some environmental chemicals, and IDPH's Hazardous Waste Site Health Assessment Program evaluated the potential impact of the presence of the chemicals of potential concern detected in the soil samples collected by the IDNR on children's health. Some of the mean levels of the chemicals of potential concern were above published comparison values. If children were routinely exposed to areas of the site, they would be exposed to levels of metals in surface soils that may have a negative health impact. It is our understanding that the site has never been utilized as a residential or recreational area. As long as the future use of the site is restricted to non-residential and non-recreational uses, children will not be exposed to harmful levels of metals in site soils for any continuous period.

Community Health Concerns

The community of Charles City is awaiting IDPH's determination on whether there are levels of soil and/or groundwater contamination existing at the former Allied Products Corporation site that would impact human health. The IDPH has evaluated the levels of chemicals of potential concern in the soil and the potential for exposure to groundwater from the site. The Charles City community wishes information on what human health risks remain on the property if the site is redeveloped for heavy manufacturing or commercial use.

Conclusions

From evaluating the soil and groundwater sampling and analytical data collected by the IDNR, and other background information on the site and vicinity it is concluded that:

- Human exposure to the soils through incidental ingestion would not be expected to produce any adverse health effects if the site will be used as heavy manufacturing or commercial activities.

- Because all residences are supplied with water from the Charles City public water supply wells located more than one-half mile to the northwest, it is anticipated that individuals within Charles City will not be exposed to any contaminated groundwater that currently exits at the site.

Recommendations

- The City of Charles City public water supply well utilized as a standby well and located approximately 500 feet from the site should be properly plugged and abandoned.

- The site should be limited to non-residential and non-recreational uses.

- If future plans at the site include large amounts of truck traffic, a plan to control dust could be considered to reduce exposures from incidental ingestion of soil.

Public Health Action Plan

- IDPH will provide assistance with community health education as needed and requested.
- IDPH will continue to review sampling and analytical data provided by the IDNR and update health recommendations as necessary.
- IDPH will continue to address and evaluate community concerns.

Figure 1 – Site Map

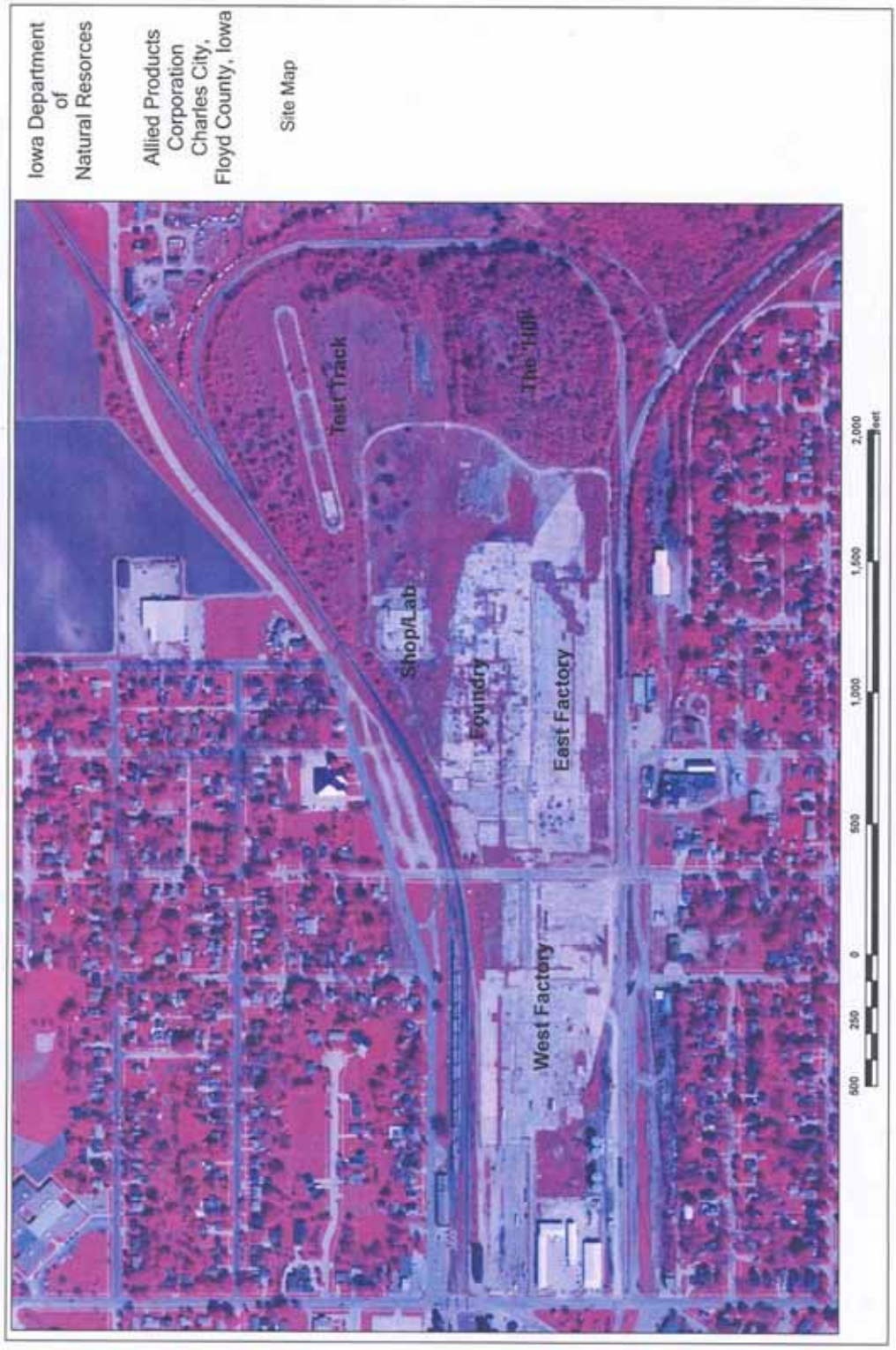

Figure 2 – Location of Samples Identified in Table 1

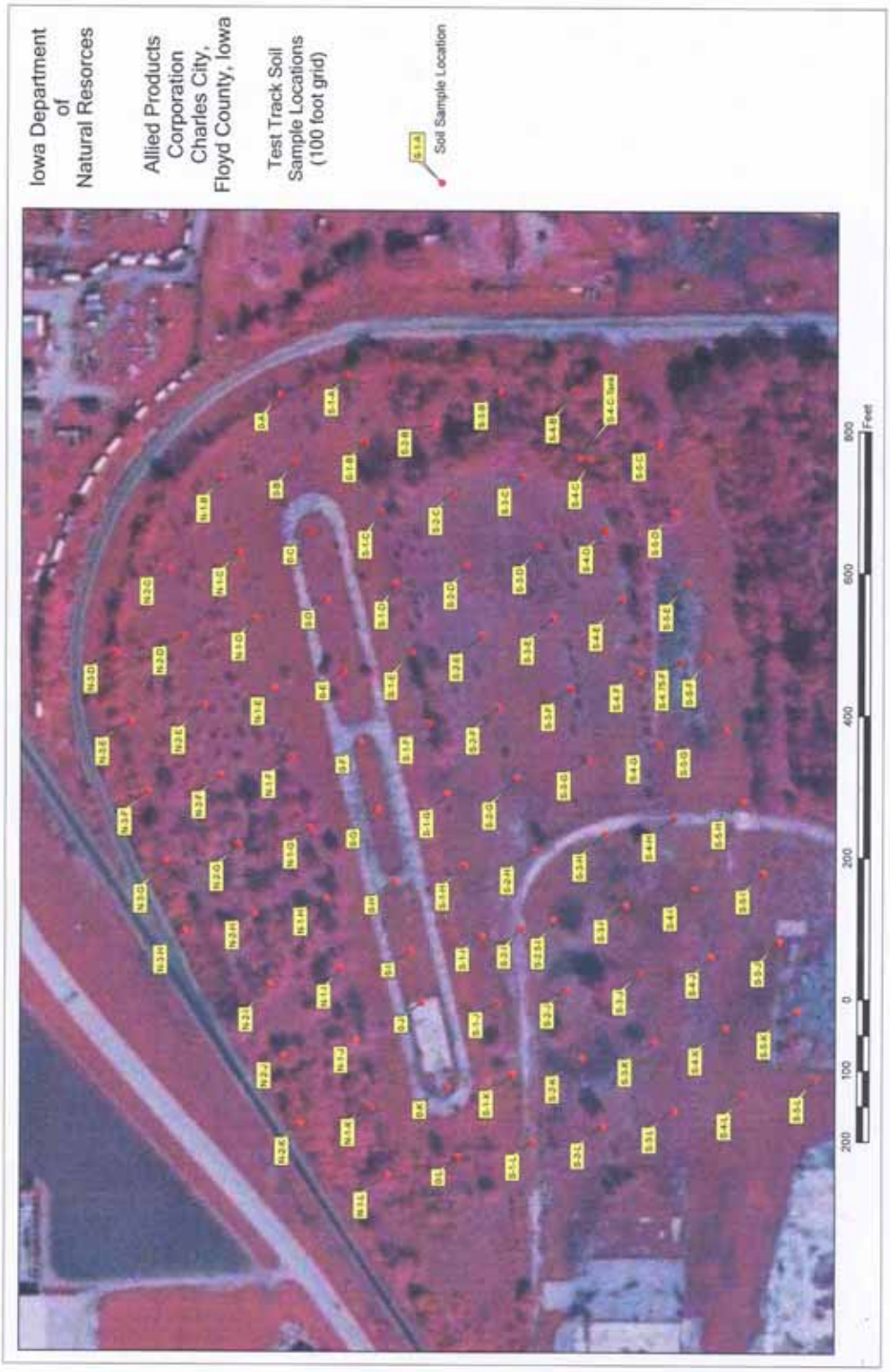

Figure 3 – Location of Samples Identified in Table 2

Figure 4 – Location of Samples Identified in Table 3

Figure 5 – Groundwater Sample Locations South of West Factory Area

References

1. Targeted Brownfield Assessment – Phase II Site Assessment Work Plan Results for the Allied Products Corporation, Iowa Department of Natural Resources, Des Moines, Iowa.

2. Leaking Underground Storage Tank File No. 7LTY45, Iowa Department of Natural Resources.

3. Data supplied by Water Supply Section of Iowa Department of Natural Resources.

4. Soil Comparison Values, Division of Health Assessment and Consultation, Agency for Toxic Substances and Disease Registry; 2004.

5. Recommendations of the Technical Review Workgroup for Lead for an Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. EPA Web Site Link: http://www.epa.gov/superfund/programs/lead/products/adultpb.pdf

6. United States Environmental Protection Agency, Integrated Risk Information System. EPA Web Site Link: http://www.epa.gov/iris/gloss8.htm#r

7. Agency for Toxic Substances and Disease Registry. ATSDR Glossary of Terms. ASTDR Web Site Link: http://www.atsdr.cdc.gov/glossary.html

Preparers of the Report

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Hazardous Waste Site Health Assessment Program
Iowa Department of Public Health

CERTIFICATION

The Iowa Department of Public Health, Hazardous Waste Site Health Assessment Program, has prepared this health consultation evaluating site information and soil and groundwater sampling data at a former Allied Products Corporation manufacturing site in Charles City, Iowa under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). The document is in accordance with approved methodology and procedures existing when the health consultation was being prepared. Editorial review was completed by the Cooperative Agreement partner.

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Technical Project Officer, CAT, SPAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

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Team Leader, CAT, SPAB, DHAC, ATSDR