



TECHNICAL MEMORANDUM

Don

SUBJECT: Pre-Demolition Structure Sampling
Plant 1/10, AlliedSignal Industrial Complex, South Bend, Indiana

PREPARED BY: Peter Kaczor, Cindy Sundquist, and Don Walsh
PK

DATE: December 18, 1998

This technical memorandum documents the procedures and results of sampling conducted in the Plant 1/10 area at the AlliedSignal Industrial Complex, South Bend, Indiana. The sampling was conducted along the Plant 1/10 wall where demolition and construction may take place to repair or replace an unstable roof.

SAMPLING PROCEDURES

Dust samples were collected in three locations from the top of I-beams in the area where demolition and/or construction may occur. The dust was collected directly from the I-beams into the sample containers. Dust samples were analyzed for cyanide and metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver).

Three wipe samples were collected: one from the original concrete floor on the west end of the sand pit, and two from the brick walls above the sand pit. Wipe samples were analyzed for cyanide and metals.

One sample was collected from the backfilled sand of a former machine pit which runs along the Plant 1/10 wall. A stainless-steel hand auger was used to collect the sample, which was then transferred directly into the sample containers. The hand auger sand sample was also analyzed for cyanide and metals. At four locations spread across the pit, sand was recovered with the hand auger and screened for the presence of volatile organic compounds (VOCs) using a photoionization (PI) meter. A maximum level of 4 parts per million (ppm) was measured from the four locations, indicating that VOCs are present at low levels. The sand filling the pit is approximately 18 inches deep.



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One sample of insulation from the ceiling adjacent to the anticipated demolition/construction area was collected for asbestos analysis.

RESULTS

Analytical results for all media are provided as Attachment 1. In general, chromium, arsenic, cadmium and lead levels are slightly elevated. Also, asbestos was detected in the insulation sample. These results and their implications are discussed below.

The American Conference of Governmental Hygienists (ACGIH) has a Nuisance particulates Threshold Limit Value (TLV) of 3 milligrams per cubic meter (mg/m^3) for respirable dust and $10 \text{ mg}/\text{m}^3$ for total dust. Respirable dusts are particle sizes of less than 10 microns in diameter that can reach the deeper parts of the lungs. It is assumed that a high percentage of the dust that has settled on the I-beams is around the size of respirable dust. Also, individual TLVs exist for each metal based upon toxicity, exposure frequency, and duration.

The attached calculations are based on the "percentage" of metals in the dust and using the assumption that if disturbed, that same ratio would potentially be in the breathing zone (see Table 1). A safety factor of 4, indicating good confidence in the data, was applied.

The calculations indicate that the individual metals would exceed their nuisance dust level of $3 \text{ mg}/\text{m}^3$ before exceeding their individual, toxicity-based TLVs. However, collectively, there is a potential for the additive toxicity-based TLV to be exceeded. If compounds have similar effects on a person (e.g., both are irritants), then an additive TLV should be calculated based upon the following formula:

$$C1/T1 + C2/T2 + Cn/Tn = \text{Additive TLV}$$

C = Concentration of Compound

T = TLV of Compound



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The results of the calculations show that, using a safety factor of 4, an action level for upgrading personal protective equipment would be 2.29 mg/m³ on a respirable dust meter. Typically, HLA uses one-half the TLV as the action level for upgrading which, based on the Nuisance TLV, would be 1.5 mg/m³.

Of all the compounds, hexavalent chromium is closest to reaching the TLV, followed by arsenic and cadmium. OSHA has single-substance standards for arsenic, cadmium and lead. The arsenic standard requires training of employees if exposed to airborne concentrations above the action limit of 5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), with a permissible exposure limit (PEL) of 10 $\mu\text{g}/\text{m}^3$. The cadmium standard requires employees be trained who have a potential exposure to cadmium. The lead standard requires basic awareness/Hazard Communication training for any occupational exposure and more specific training on the contents of the standards if lead concentrations are above the action limit or PEL (the lead action limit is 30 $\mu\text{g}/\text{m}^3$; the PEL is 50 $\mu\text{g}/\text{m}^3$).

Amosite asbestos was detected in the insulation sample at 75%. Amosite is one of the more toxic varieties of asbestos. While the sample represents a "worst case" location, it demonstrates the potential for friable asbestos mixed in the dust.

SUMMARY

In summary, chromium, arsenic, cadmium, lead, and asbestos may be of concern in dust. Based upon the analysis, the following actions should be considered:

1. Dust suppression by wetting should be conducted during demolition. Care should be taken to block off floor drains and to ensure that potentially metal- or asbestos-impacted water does not run off to other areas of the site. This water should be containerized and tested prior to disposal.
2. The demolition/construction crew should undergo awareness/hazardous communication training on arsenic, cadmium and lead prior to work activities. This training should take less than 1 hour. HLA can provide guidance on the topics required by the regulation, and AlliedSignal HS&E personnel can conduct the training.



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3. During demolition, the ambient air should be monitored for respirable dust using a direct-reading, hand-held instrument (i.e., respirable dust monitor). Respirable dust is not readily visible, and a meter must be used to detect its presence. If the levels exceed the calculated action level of 2.29 mg/m^3 , work should cease and additional engineering controls and/or upgraded levels of personal protection should be evaluated.

4. In a typical demolition scenario, asbestos-containing material (ACM) is removed prior to demolition. However, in the Plant 1/10 area, the roof appears to be structurally unsound and in danger of imminent collapse. As a result, asbestos removal prior to demolition is likely unsafe. Wetting of the area may be conducted prior to demolition to control potential asbestos dust. After the roof has been collapsed, the asbestos can be further addressed.

TABLE 1
DUST EXPOSURE CALCULATION WORKSHEET
ALLIEDSIGNAL INDUSTRIAL COMPLEX
SOUTH BEND, INDIANA

Chemical	Exposure Limit (mg/m ³)	Maximum Soil Concentration (mg/kg)	Exposure Limit Based on Single Compound (EL Mix, mg/m ³)	Dust Quotient for Each Compound (level/limit)	# Times Over TLV at 3 mg/m ³ [3 mg/m ³ /ELmix]
Aluminum	5	1.E-9	1.25E+15	2.00E-10	0.000
Antimony	0.5	1.E-9	1.25E+14	2.00E-09	0.000
Arsenic	0.01	194	12.89	1.94E+04	0.233
Barium	0.5	1,610	77.64	3.22E+03	0.039
Beryllium	0.002	1.E-9	5.E+11	5.00E-07	0.000
Cadmium	0.005	80	15.64	1.60E+04	0.192
Chlordane	0.5	1.E-9	1.25E+14	2.00E-09	0.000
Chromium	0.5	314	398.51	6.27E+02	0.008
Chrome (hex)	0.01	627	3.99	6.27E+04	0.753
Cobalt	0.02	1.E-9	5.E+12	5.00E-08	0.000
Copper	1	1.E-9	2.5E+14	1.00E-09	0.000
Cyanides	5	88	1.42E+4	1.76E+01	0.000
Dioxins	0.001	1.E-9	2.5E+11	1.00E-06	0.000
Endosulfan	0.1	1.E-9	2.5E+13	1.00E-08	0.000
Fluorides	2.5	1.E-9	6.25E+14	4.00E-10	0.000
Lead	0.05	294	42.52	5.88E+03	0.071
Manganese	0.2	1.E-9	5.E+13	5.00E-09	0.000
Mercury	0.05	13	968.99	2.58E+02	0.003
Nickel	1	1.E-9	2.5E+14	1.00E-09	0.000
Oil Mist	5	1.E-9	1.25E+15	2.00E-10	0.000
PCBs	0.5	1.E-9	1.25E+14	2.00E-09	0.000
PAHs	0.2	1.E-9	5.E+13	5.00E-09	0.000
Phthalates	5	1.E-9	1.25E+15	2.00E-10	0.000
RDX	1.5	1.E-9	3.75E+14	6.67E-10	0.000
Selenium	0.2	64	787.4	3.18E+02	0.004
Silica	0.05	1.E-9	1.25E+13	2.00E-08	0.000
Silver	0.01	4.7	531.91	4.70E+02	0.006
Thallium	0.1	1.E-9	2.5E+13	1.00E-08	0.000
Tin	2	1.E-9	5.E+14	5.00E-10	0.000
Titanium	10	1.E-9	2.5E+15	1.00E-10	0.000
Trinitrotoluene	0.5	1.E-9	1.25E+14	2.00E-09	0.000
Vanadium	0.05	1.E-9	1.25E+13	2.00E-08	0.000
Zinc	10	1.E-9	2.5E+15	1.00E-10	0.000
Dust Exposure Level at Mixture PEL =			Sum 2.296	1.09E+05	1.307

ATTACHMENT 1
ANALYTICAL RESULTS



REPORT OF ANALYSIS

Mr. Don Walsh
 Harding Lawson Associates
 39255 Country Club Drive, Suite B-25
 Farmington Hills, MI 48331
 Tel No: 248-489-8040
 Fax No: 248-489-8048
 PO No: SE825309
 Project Name: Allied Plants 1/10

Report Date: 12/18/98
 EIS Order No: 981100261
 EIS Sample No: 056110
 EIS Project No: 2818-1002-98

Client Sample ID: #1 West
 Date Collected: 11/16/98
 Date Received: 11/24/98
 Collected By: P. Kaczor

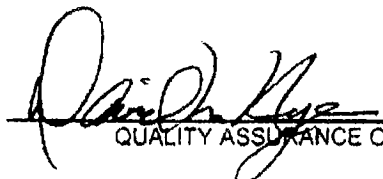
This report presents results of analysis for your sample(s) received under our Order No above. This Number is to be used in all inquiries concerning this report. The EIS Sample No above, as well as your Sample ID, refer to the first sample in a multi-sample submission

DEFINITIONS:

- MDL = Method Detection Limit normally achieved in the absence of interferences or other matrix difficulties.
- SDL = Sample Detection Limit achieved in your sample. If numerically greater than the MDL, dilutions were required in order to perform the analysis. If numerically less than the MDL, alternate techniques were employed.
- nd = Not Detected at the SDL value. If present, result is less than this value.
- < = Not Detected at the numerical value shown. If present, result is less than this value.

CHAIN-OF-CUSTODY is enclosed if received with your sample submission.

DRINKING WATER CERTIFICATIONS: Chemistry = C-71-02 Bacteriology = 52715


 QUALITY ASSURANCE OFFICER


 LABORATORY DIRECTOR

The data in this report has been reviewed and complies with EIS Quality Control unless specifically addressed above.

EIS Analytical Services Inc 1701 N. Ironwood Drive, Suite B * South Bend, IN 46635 * Tel: 219-277-0707 * Fax: 219-273-5699

SAMPLE RESULTS

CLIENT SAMPLE ID: #1 West
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/16/98
 Date Received: 11/24/98

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Report Date: 12/18/98
 EIS Sample No: 056110
 EIS Order No: 981100261

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	80	mg/kg(wet)	5	5	SzkarlatM	12/17/98	9014
METALS							
Arsenic, Total	44.1	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Barium, Total	1610	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Cadmium, Total	79.9	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Chromium, Total	941	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Lead, Total	239	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Mercury, Total	4.2	mg/kg(wet)	0.8	0.2	ShaneD	12/4/98	7471
Selenium, Total	48.3	mg/kg(wet)	25	5	ShaneD	12/2/98	6010
Silver, Total	<5	mg/kg(wet)	5	1	ShaneD	12/2/98	6010

SAMPLE RESULTS

CLIENT SAMPLE ID: #2 Central
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/16/98
 Date Received: 11/24/98

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Report Date: 12/18/98
 EIS Sample No: 056111
 EIS Order No: 981100261

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	23	mg/kg(wet)	5	5	SzkarlatM	12/17/98	9014
METALS							
Arsenic, Total	189	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Barium, Total	360	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Cadmium, Total	14.0	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Chromium, Total	110	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Lead, Total	83.2	mg/kg(wet)	5	1	ShaneD	12/2/98	6010
Mercury, Total	12.9	mg/kg(wet)	2	0.2	ShaneD	12/4/98	7471
Selenium, Total	63.5	mg/kg(wet)	25	5	ShaneD	12/2/98	6010
Silver, Total	<5	mg/kg(wet)	5	1	ShaneD	12/2/98	6010

SAMPLE RESULTS

CLIENT SAMPLE ID: #3 East
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/16/98
 Date Received: 11/24/98

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Report Date: 12/18/98
 EIS Sample No: 056112
 EIS Order No: 981100261

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	46	mg/kg(wet)	5	5	SzkarlatM	12/17/98	9014
METALS							
Arsenic, Total	194	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Barium, Total	373	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Cadmium, Total	29.1	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Chromium, Total	605	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Lead, Total	294	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Mercury, Total	7.0	mg/kg(wet)	1	0.2	ShaneD	12/4/98	7471
Selenium, Total	44.9	mg/kg(wet)	5	5	ShaneD	12/2/98	6010
Silver, Total	<5	mg/kg(wet)	1	1	ShaneD	12/2/98	6010

SAMPLE RESULTS

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CLIENT SAMPLE ID: Sand Pit
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/16/98
 Date Received: 11/24/98

Report Date: 12/18/98
 EIS Sample No: 056113
 EIS Order No: 981100261

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
<u>Insulation - Asbestos</u>							
Actinolite	nd	%	1	1	RoziteAC	12/11/98	9002
Amosite	75	%	1	1	RoziteAC	12/11/98	9002
Anthophyllite	nd	%	1	1	RoziteAC	12/11/98	9002
Chrysotile	nd	%	1	1	RoziteAC	12/11/98	9002
Crocidolite	nd	%	1	1	RoziteAC	12/11/98	9002
Tremolite	nd	%	1	1	RoziteAC	12/11/98	9002
Cyanide, Total	22	mg/kg(wet)	5	5	SzkarlatM	12/17/98	9014
<u>METALS - Sand Pit</u>							
Arsenic, Total	<5	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Barium, Total	24.0	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Cadmium, Total	1.7	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Chromium, Total	74.9	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Lead, Total	17.0	mg/kg(wet)	1	1	ShaneD	12/2/98	6010
Mercury, Total	<0.2	mg/kg(wet)	0.2	0.2	ShaneD	12/4/98	7471
Selenium, Total	<5	mg/kg(wet)	5	5	ShaneD	12/2/98	6010
Silver, Total	<1	mg/kg(wet)	1	1	ShaneD	12/2/98	6010

SAMPLE RESULTS

CLIENT SAMPLE ID: #1 Wipe-West Ground

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CLIENT PROJECT: Allied Plants 1/10

Report Date: 12/16/98

Date Collected: 11/25/98

EIS Sample No: 056177

Date Received: 11/25/98

EIS Order No: 981100291

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	58	Total ug	30	5	SzkariatM	12/17/98	9014
METALS							
Arsenic, Total	<2.5	Total ug	2.5	1	ShaneD	12/16/98	6010
Barium, Total	340	Total ug	0.5	1	ShaneD	12/16/98	6010
Cadmium, Total	7.9	Total ug	0.5	1	ShaneD	12/16/98	6010
Chromium, Total	52.3	Total ug	0.5	1	ShaneD	12/16/98	6010
Lead, Total	52.7	Total ug	2.5	1	ShaneD	12/16/98	6010
Mercury, Total	0.294	Total ug	0.04	0.2	ShaneD	12/16/98	7471
Selenium, Total	<2.5	Total ug	2.5	5	ShaneD	12/16/98	6010
Silver, Total	<0.5	Total ug	0.5	1	ShaneD	12/16/98	6010

SAMPLE RESULTS

CLIENT SAMPLE ID: #2 Wipe-Middle Wall
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/25/98
 Date Received: 11/25/98

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Report Date: 12/18/98
 EIS Sample No: 056178
 EIS Order No: 981100291

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	<30	Total ug	30	5	SzkariatM	12/17/98	9014
METALS							
Arsenic, Total	<2.5	Total ug	2.5	1	ShaneD	12/16/98	6010
Barium, Total	148	Total ug	0.5	1	ShaneD	12/16/98	6010
Cadmium, Total	<0.5	Total ug	0.5	1	ShaneD	12/16/98	6010
Chromium, Total	3.5	Total ug	0.5	1	ShaneD	12/16/98	6010
Lead, Total	9.6	Total ug	2.5	1	ShaneD	12/16/98	6010
Mercury, Total	<0.04	Total ug	0.04	0.2	ShaneD	12/16/98	7471
Selenium, Total	<2.5	Total ug	2.5	5	ShaneD	12/16/98	6010
Silver, Total	<0.5	Total ug	0.5	1	ShaneD	12/16/98	6010

SAMPLE RESULTS

CLIENT SAMPLE ID: #3 Wipe-East Wall
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/25/98
 Date Received: 11/25/98

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Report Date: 12/18/98
 EIS Sample No: 056179
 EIS Order No: 981100291

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	88	Total ug	30	5	SzkarlatM	12/17/98	9014
METALS							
Arsenic, Total	<2.5	Total ug	2.5	1	ShaneD	12/16/98	6010
Barium, Total	647	Total ug	0.5	1	ShaneD	12/16/98	6010
Cadmium, Total	1.3	Total ug	0.5	1	ShaneD	12/16/98	6010
Chromium, Total	45.5	Total ug	0.5	1	ShaneD	12/16/98	6010
Lead, Total	268	Total ug	2.5	1	ShaneD	12/16/98	6010
Mercury, Total	0.149	Total ug	0.04	0.2	ShaneD	12/16/98	7471
Selenium, Total	<2.5	Total ug	2.5	5	ShaneD	12/16/98	6010
Silver, Total	<0.5	Total ug	0.5	1	ShaneD	12/16/98	6010

SAMPLE RESULTS

CLIENT SAMPLE ID: Blank
 CLIENT PROJECT: Allied Plants 1/10
 Date Collected: 11/25/98
 Date Received: 11/25/98

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Report Date: 12/18/98
 EIS Sample No: 056180
 EIS Order No: 981100291

Parameter	Results	Units	SDL	MDL	Analyst	Test Date	Method
Cyanide, Total	<30	Total ug	30	5	SzkariatM	12/17/98	9014
METALS							
Arsenic, Total	<2.5	Total ug	2.5	1	ShaneD	12/16/98	6010
Barium, Total	1.5	Total ug	0.5	1	ShaneD	12/16/98	6010
Cadmium, Total	<0.5	Total ug	0.5	1	ShaneD	12/16/98	6010
Chromium, Total	<0.5	Total ug	0.5	1	ShaneD	12/16/98	6010
Lead, Total	<2.5	Total ug	2.5	1	ShaneD	12/16/98	6010
Mercury, Total	<0.04	Total ug	0.04	0.2	ShaneD	12/16/98	7471
Selenium, Total	<2.5	Total ug	2.5	5	ShaneD	12/16/98	6010
Silver, Total	4.7	Total ug	0.5	1	ShaneD	12/16/98	6010