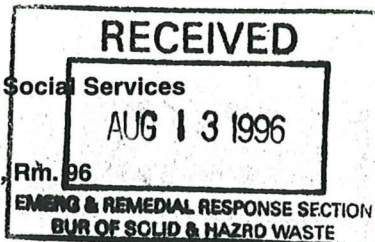


STATE OF WISCONSIN



Department of Health & Social Services
Division of Health
Bureau of Public Health
1414 E. Washington Ave., Rm. 96
Madison, WI 53703-3044



TO: Paul Kozol
Department of Natural Resources

DATE: 8/9/96

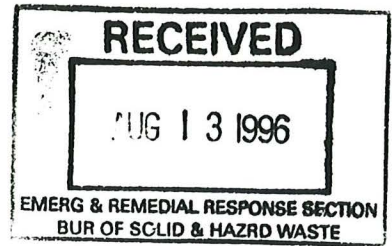
FROM: Kim Bro
Environmental Epidemiology & Prevention

RE: Health consultation on basement seepage near
Better Brite Zinc shop.

Today ATSDR concurred with the public health consultation we performed on the health hazard posed by chromium contamination in basement seepage near the Better Brite Zinc Shop site. Here is a copy of the consultation along with a FAXed copy of ATSDR's certification. We hope that this evaluation will help you in addressing the hazard posed in seepage water in the basements and in deeper soils adjacent to the Zinc Shop site.

Mary Young (x7-6844) will be our staff lead for health issues at this site, and Chuck Warzecha (x7-3732) will assist with some of the technical evaluation of hexavalent chromium transport through soil, groundwater, and basement walls. We would greatly appreciate your sending us a copy of the draft Record of Decision. We appreciate your including us in discussions about how best to address remaining health hazards at the site.

cc: Mary Young



PUBLIC HEALTH CONSULTATION

**BASEMENT SEEPAGE NEAR THE
BETTER BRITE ZINC SHOP SITE**

CITY OF DE PERE, BROWN COUNTY, WISCONSIN

CERCLIS NUMBER WIT560010118

August 7, 1996

Prepared by

Wisconsin Department of Health and Family Services
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Summary

Hexavalent chromium-contaminated groundwater flows through foundation cracks into the basement of a home adjacent to the Better Brite Zinc Shop site and chromium precipitate forms where groundwater evaporates in the basement. Some soil also flows with groundwater into the basement, but it has not been analyzed for chromium. In 1990 ATSDR and the Wisconsin Division of Health recommended preventing renters from using the basement and limiting general use of the basement. Since then the house was sold, and the owner uses the basement regularly. Groundwater with lower levels of chromium contamination is flowing into the sump in the basement of a business adjacent to the site.

EPA removed the Zinc Shop building and twenty feet of soil beneath it, but no removal of subsurface soil has occurred on adjacent property. Hexavalent chromium-contaminated groundwater extends beyond the foundations of a home and a business adjacent to the Zinc Shop site. Contaminated groundwater that does not enter basements is slowly flowing toward a collection sump at the site.

Inhalation of chromium contaminated dust in the basement of the residence poses a public health hazard because it could result in respiratory irritation or asthma in people sensitive to chromium. Touching contaminated seepage water or dust in the basement of the residence also poses a public health hazard because it could result in dermal irritation or an eczema-like reaction in people sensitive to chromium. Future dermal contact with excavated material would pose a public health hazard to people who excavate below the water table around building foundations because contaminated groundwater could cause skin burns and irritation. Excavated soil may also be contaminated with hexavalent chromium. Dermal contact with contaminated sump water in a nearby business poses no apparent public health hazard currently, but chromium concentrations could change.

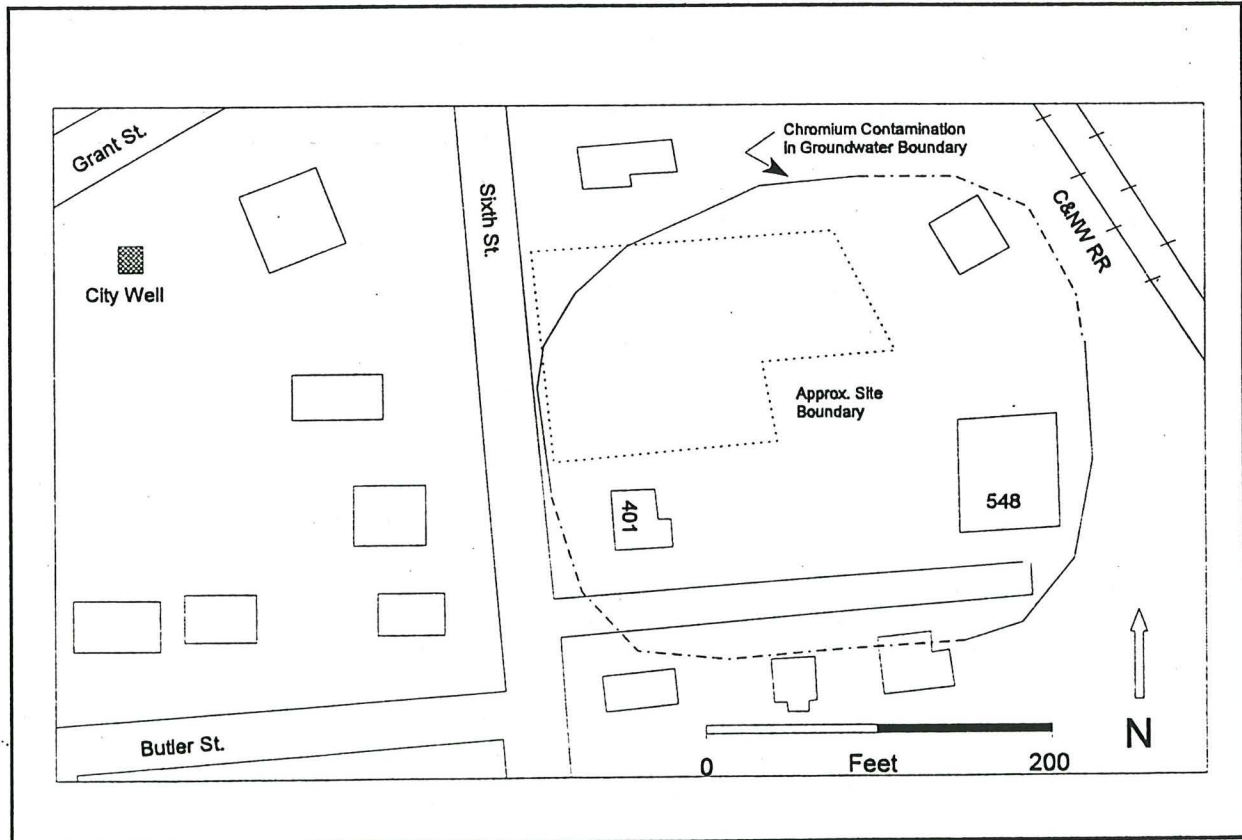
Steps should be taken to prevent residents in the house from touching or breathing contaminated dust or touching contaminated seepage water. Proper personal protection and wet methods using a reducing agent in solution should be used to remove soil, dust, and precipitate from the basement. Steps should be taken to prevent additional contamination from entering nearby basements. Prior to any excavation for construction or buried utility lines, the extent of chromium contamination in subsurface soils should be determined. If any excavation occurs for foundation or utility work in the area affected by subsurface chromium contamination, appropriate actions should be taken to prevent workers and nearby residents from touching excavated material or breathing dust blown from excavated material.

Background

The Wisconsin Department of Natural Resources (DNR) requested a consultation on the public health hazard posed by hexavalent chromium in basements of buildings south and east of the Better Brite Zinc Shop site. The DNR also asked about health risks posed by chromium contamination in groundwater and subsurface soil adjacent to the basement walls.

In March 1990, because of hexavalent chromium in seepage water and precipitate in the house at 401 South Sixth Street, ATSDR and the Wisconsin Division of Health recommended that residents of the home should limit their use of the basement and renters should not have access to the basement at all (1). The Wisconsin Division of Health prepared a preliminary public health assessment of the site in 1991(2). Since that time, extensive removal activities have taken place at the Zinc Shop site (315 South Sixth Street), but removal activities at the adjacent property were limited to installation in 1990 of a sump pump in the basement at 401 South Sixth Street. In 1992 EPA installed a groundwater collection sump at the Zinc Shop site in a 20-foot pit where the Zinc Shop building and chromium-contaminated soil beneath it had been removed. Clean fill and a clay cap were placed over the sump. The sump is drawing chromium-contaminated groundwater from the area adjacent to the site. As the on-site sump fills, contaminated groundwater is pumped into a tank truck and carried to a treatment facility at the Better Brite Chrome Shop site.

Figure 1: Better Brite Zinc Shop (315 S. Sixth St., De Pere, Wisconsin).



In 1990 seepage water containing hexavalent chromium at 10,000 µg/L accumulated in the basement of the residence. Patches of yellow precipitate containing hexavalent chromium at 390-650 mg/kg also had formed on the concrete floor of the basement in areas where seepage water evaporated. At the time, the homeowners reported that episodes of yellow groundwater seeping into the basement had happened several times previously. The investigation of off-site soil contamination in the area between the Zinc Shop and the basement foundation was limited to surface soil samples and one soil sample at 3.5 feet below the surface. The deep sample contained total chromium at 200 mg/kg, and surface soil concentrations near the residence ranged from 21.7 mg/kg to 127 mg/kg (compared to background concentrations of approximately 20 mg/kg). In 1987 on-site soil boring samples along the southern perimeter of the site showed a maximum soil concentration of 1100 mg/kg total chromium at a depth of 12 to 14 feet (2, 3-App J).

Samples of shallow groundwater in 1995 indicate that chromium contamination likely encompasses the areas occupied by the home adjacent to the site and a building to the southeast (see Figure 1). The concentration of hexavalent chromium in groundwater south of the buildings (near Butler Street) was 47,000 µg/L, and at the collection sump at the Zinc Shop site was 144,900 µg/L. The depth to groundwater in the area is 6 to 10 feet, and shallow groundwater currently flows toward the groundwater collection sump at the Zinc Shop site (4-Figs 4.11, 6.6). The concentration, depth, and areal extent of chromium contamination in subsurface soil adjacent to the site and around off-site building foundations has not been determined.

The residence adjacent to the Zinc Shop site is owned and occupied by a couple and their five young children. The family uses the basement regularly to wash laundry. The owner told a DNR representative that the sump pump installed by DNR failed and was replaced. The new pump still runs frequently. Soil enters the basement with flowing groundwater through a joint in the concrete where the foundation wall meets the basement floor. The owners occasionally sweep up accumulated soil. They also expressed concern about settling of the foundation walls. They would like to repair the foundation and construct additions to buildings on the property (5).

Sump water from the basement of the business southeast of the site (548 Butler St) was analyzed twice, once in September 1991 for chromium, cyanide and zinc and again in August 1994 for twenty-five inorganic parameters including hexavalent and total chromium. Chromium was found at 110 µg/L in 1991 (6). In 1994 hexavalent chromium occurred at 139 µg/L, and total chromium occurred at 186 µg/L (4-Table 5.3). During the past few years, this building has been occupied by several businesses dealing with trucking or automobiles. In 1991 DNR and the City of De Pere conducted a door-to-door survey of buildings in the vicinity of the Zinc Shop to inspect for signs of contaminated basement seepage and for private water supply wells. No indications of contamination were found in any other buildings near the Zinc Shop (3-App. B).

Discussion

Environmental samples from inside the basements of the house and the business as well as groundwater monitoring well samples indicate that hexavalent chromium from the Zinc Shop extends around the foundations of these buildings. Because the shallow groundwater table is

above the basement floor level, hexavalent chromium-contaminated groundwater and, possibly, chromium-contaminated soil steadily flow into the basement of the residence. The concentration of hexavalent chromium in groundwater flowing into the basement of the residence is roughly one hundred times greater than that entering the sump at 548 Butler Street.

People who enter the basement at the residence can be exposed to hexavalent chromium through dermal contact with basement seepage water, soil, and precipitate or through inhalation of dust stirred up when the basement floor is swept. Such people may include the seven family members. The family purchased and moved into the house within the past three years. The previous owner grew up in the house and then rented it for several years. Household members may have inhaled or touched hexavalent chromium when sweeping soil and dust in the basement and may have touched hexavalent chromium when replacing the sump pump.

People who touch soil and dust in the basement may incidentally ingest small amounts of hexavalent chromium in basement soil and dust. Ingestion readily reduces the chromium to its much less toxic trivalent form when the soil mixes with gastric juices in the stomach. Trivalent chromium is an essential nutrient required for normal energy metabolism (7, pp. 75, 80) and is toxic only in high doses.

People who may be exposed to hexavalent chromium in the future include those who excavate soil near the site. Such people may include workers who install or repair building foundations or buried utility lines. These workers may be exposed through dermal contact with groundwater or soil and inhalation of airborne dust blown from excavated soil. Likewise, residents may come into contact with excavated soil and windblown dust if soil from construction or utility work were left uncovered near the site.

Inhalation of hexavalent chromium in basement dust could result in respiratory effects in residents sweeping dust and soil contaminated with chromium. Such effects would most likely include respiratory irritation or asthma. Inhalation of hexavalent chromium in occupational settings is associated with a wide range of adverse respiratory system effects, most likely from the compounds' direct irritation and burning of the respiratory mucosa. Chronic inhalation of hexavalent chromium by workers also is associated with increased respiratory cancer risk. Workers who developed a sensitivity to chromium have had asthma after inhaling hexavalent chromium. Less than one percent of the general population is estimated to be sensitive to chromium. Such sensitivity typically develops among those who are chronically exposed in occupational settings, although exposure to low levels of chromium in consumer products can also result in sensitization. Dermal exposure to chromium in the environment can also result in rashes and eczema in people who are sensitive to chromium.

Workers or residents who may be exposed to chromium-contaminated soil and groundwater in the future as a result of working on building foundations or buried utility lines may also experience dermal and respiratory effects. Exposure to higher concentrations of chromates in excavated soil and groundwater may result in burns, irritation, or rashes of the skin; respiratory irritation; or asthma (7, pp 87-89, 106-107).

Incidental dermal exposure to hexavalent chromium at the concentrations found in sump water of the building at 548 Butler Street is not likely to result in adverse health effects. While contamination levels in this building are relatively low, concentrations of hexavalent chromium in groundwater near the building are much higher and might pose a dermal exposure hazard in the future.

Conclusions

1. Hexavalent chromium in seepage water, precipitate, and possibly soil in the basement of the house at 401 South Sixth Street poses a public health hazard to those who touch the material or who inhale dust while sweeping contaminated material.
2. Hexavalent chromium in groundwater and possibly in subsurface soil in the area adjacent to the Zinc Shop site poses a public health hazard in the future to those who may conduct deep excavation or come in contact with contamination in excavated material.
3. The extent of chromium contamination in subsurface soil around buildings adjacent to the Zinc Shop site has not been evaluated.
4. Incidental dermal contact with the concentrations of hexavalent chromium currently found in sump water at 548 Butler Street pose no apparent public health hazard. But, if concentrations increase in the future, seepage water could become a health hazard.

Recommendations

1. Restrict residential contact with hexavalent chromium in basement seepage water, soil, and precipitate. Control additional seepage of hexavalent chromium into the home. Do **not** disturb the soil and dust in ways that stir it into the air, such as sweeping. Rather, use such damp methods for clean up as mopping with a ferrous sulfate solution that will reduce the hexavalent chromium to its less toxic trivalent form.
2. Restrict workers' and residents' potential future contact with chromium-contaminated groundwater and possibly contaminated subsurface soil. Workers who excavate soil for construction or utility work at the properties adjacent to the site should be prevented from touching or inhaling the soil. Any contaminated material that is excavated should be handled in a manner that will prevent exposure to residents in the area.
3. Evaluate the extent of chromium contamination adjacent to the site in subsurface soil where excavation for foundation work or utility work may occur.
4. Either continue monitoring chromium levels (hexavalent and total) in the basement sump at 548 Butler Street or restrict the flow of contaminated groundwater into the building.

Consultation Preparer

Kenneth Bro
Environmental Civil Engineer
Division of Health
Wisconsin Department of Health and Family Services

References

1. Jordan-Izaguirre, Denise. 1990. Consultation to Walter Neid, U. S. Environmental Protection Agency, regarding Smet basement flooding, on-site insulation, and off-site soils at the Better Brite Zinc Shop. U. S. Agency for Toxic Substances and Disease Registry, Region 5, Chicago, Illinois. March 22.
2. Wisconsin Department of Health and Social Services and U. S. Agency for Toxic Substances and Disease Registry. 1991. Preliminary Public Health Assessment for the Better Brite Chrome and Zinc Shops, De Pere, Wisconsin. Madison, Wisconsin. May.
3. Hydro-Search, Inc. 1992. Site evaluation report of Better Brite Plating, Inc., De Pere, Wisconsin. Brookfield, Wisconsin. 13 March.
4. Hydro-Search, Inc. 1995. Remedial investigation of Better Brite Plating, Inc., De Pere, Wisconsin. Brookfield, Wisconsin. 18 September.
5. Evanson, Terry. 1996. Personal communication regarding use of buildings adjacent to the Better Brite Zinc Shop site. Wisconsin Department of Natural Resources, Madison, Wisconsin. July.
6. Koehn, Terry. 1992. Correspondence with Ms. Ute M. Ryan regarding sump water sample results at 548 Butler Street, De Pere, Wisconsin. Wisconsin Department of Natural Resources, Lake Michigan District, Green Bay, Wisconsin. 19 March.
7. U. S. Agency for Toxic Substances and Disease Registry. 1993. Toxicological profile for chromium. Atlanta, Georgia. April.

CERTIFICATION

The Basement Seepage Near the Better Brite Zinc Shop Site Health Consultation was prepared by the Wisconsin Department of Family Services, Division of Health 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.



Technical Project Office, SPS, SSAB, DHAC

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



Chief, SPS, SSAB, DHAC, ATSDR



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date August 9, 1996

From Chief, SPS, SSAB, DHAC

Subject Health Consultation: Basement Seepage Near The Better Brite Zinc Shop Site, City of De Pere, Brown County, Wisconsin

To Louise Fabinski, Senior Representative, Region V

Attached please find the health consultation, Basement Seepage Near The Better Brite Zinc Shop Site, prepared by the Wisconsin Division of Health under cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

As indicated on the certification page, the Division of Health Assessment and Consultation (DHAC), ATSDR has reviewed the consultation and concurs with their findings.

If you have any questions or comments, please call me at 404-639-0628.

Richard E. Gillig

Attachment

CC:
Kenneth Bro, WDOH
Sharon Williams-Fleetwood, DHAC, ATSDR
Monty Howie, DHAC, ATSDR
William Greim, DHAC, ATSDR
Diane Narkunas, DHE, ATSDR

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages > 2

To <i>Kim Bro</i>	From <i>Bill Greim</i>
Dept./Agency <i>WDOH</i>	Phone # <i>404 639 0626</i>
Fax # <i>(608) 267-4853</i>	FAX # <i>404 639-0653</i>

NBN 7540-01-317-7308

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GENERAL SERVICES ADMINISTRATION



Tommy G. Thompson
Governor

Joe Leean
Secretary

State of Wisconsin

Department of Health and Family Services

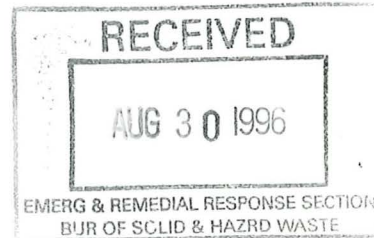
DIVISION OF HEALTH

BUREAU OF PUBLIC HEALTH
1414 E. WASHINGTON AVE., ROOM 167
MADISON WI 53703-3044

(608) 266-1251

August 29, 1996

John Schmidt
Progressive Farmers Coop
1221 Grant Street
De Pere WI 54115



Dear Mr. Schmidt:

As you recall, on August 8, I sampled crystals on a basement wall and water from the sump basket at 548 Butler Street. The purpose of the testing was to determine if a hazardous type of chromium (hexavalent) might be seeping into the basement creating a health risk. Test results show there is no hexavalent chromium in crystals that appeared on the walls. However, the sump water contained hexavalent chromium at levels three times over the groundwater standard. Since no one is drinking or touching the sump water on a regular basis, we do not believe the water is a health risk. According to the DNR, previous sampling of groundwater in your sump basket showed similar levels of chromium.

With this letter, I am including results for the crystal sample. The sample from your basement wall is #592127 4. The results are listed as ≤ 75 which means the result was less than ($<$) the level of detection which was 75 nanograms per sample. Also attached is the result from your sump sample. The result indicates hexavalent chromium at 140 UG/L (micrograms per liter) which is quite a bit higher than the groundwater standard of 50.

If you have questions about the sample results or other health concerns related to the Better Brite Zinc Shop, please call me at 608/267-6844. To avoid high telephone charges, please remind me right away that you are calling long-distance, and I will be happy to call you right back.

Sincerely,

Mary Young
Public Health Educator
Bureau of Public Health

Enclosure

CC: Terry Evanson, DNR
Kathy Erdmann, DNR
Judy Fassbender, Hydrosearch



Tommy G. Thompson
Governor

Joe Leean
Secretary

State of Wisconsin

Department of Health and Family Services

DIVISION OF HEALTH
BUREAU OF PUBLIC HEALTH
1414 E. WASHINGTON AVE., ROOM 167
MADISON WI 53703-3044

(608) 266-1251

August 29, 1996

Pamela Garcia
401 South 6th Street
De Pere WI

Dear Ms. Garcia:

As you recall, on August 8, I sampled crystals from a wall and at the bottom of a wall of your basement. The purpose of the testing was to determine if a hazardous type of chromium (hexavalent) might be seeping through the walls and creating a health risk. Test results show there is a very small amount of hexavalent chromium in crystals and soil. However, the levels are about a hundred times lower than what we consider a health risk. Since levels of hexavalent chromium could increase from time to time, it is still a good idea to avoid stirring up dust when you clean the basement area.

With this letter I included the sample results from the State Laboratory of Hygiene. The first sample result was for the small clear crystals on the wall. The crystals contained 82 nanograms, which is equal to 1.75 micrograms per gram (or 1.75 parts per million ppm) of hexavalent chromium. Sample 2 of yellowish clumpy crystals contained 120 nanograms (1.43 ppm), and Sample 3 of soil at the bottom of the wall contained 132 nanograms (3.07 ppm). The last sample result was from a location away from your home. We are concerned about samples when the results show levels of hexavalent chromium over 200 ppm.

If you have questions about the sample results or other health concerns related to the Better Brite Zinc Shop, please call me at 608/267-6844. To avoid high telephone charges, please remind me right away that you are calling long-distance, and I will be happy to call you right back.

Sincerely,

A handwritten signature in cursive script that reads 'Mary Young'.

Mary Young
Public Health Educator
Bureau of Public Health

Enclosure

CC: Terry Evanson, DNR
Kathy Erdmann, DNR
Judy Fassbender, Hydrosearch



Wisconsin Occupational
Health Laboratory

979 Jonathon Drive
Madison, WI 53713-3226
Phone: (608) 263-6550
FAX: (608) 263-6551

Wisconsin State Laboratory of Hygiene

University of Wisconsin

August 14, 1996

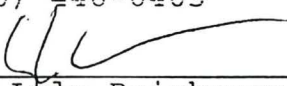
CHUCK WARZECHA
WI DOH ENV TOX - RM 96
BUREAU OF PUBLIC HEALTH
1414 E WASHINGTON RM 96
MADISON, WI 53703

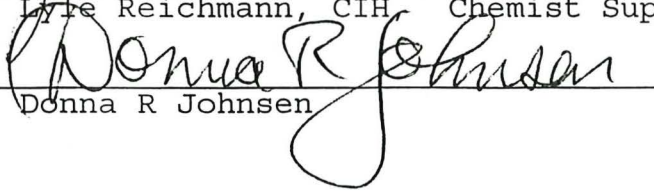
Company #: 174

The results for the samples received by the lab on 08/09/96
are as follows:

Lab#	Field#	Value	Unit	Analyte
592124	1	82	ng/sample	Hexavalent Chromium(as Cr)
Comments: Sample result is 1.74 ug/g.				
592125	2	120	ng/sample	Hexavalent Chromium(as Cr)
Comments: Sample result is 1.43 ug/g				
592126	3	132	ng/sample	Hexavalent Chromium(as Cr)
Comments: Sample result is 3.07 ug/g.				
592127	4	<=75	ng/sample	Hexavalent Chromium(as Cr)
Comments: Sample result is <= 1.36 ug/g. Each sample had approximately 0.05 g weighed out for digestion. The samples were digested and analyzed the same way the filters stated in our cover letter.				

If you have any questions about these results, please call the lab at
(800) 446-0403


Lyle Reichmann, CIH, Chemist Supervisor


Donna R Johnsen

State Laboratory of Hygiene
University of Wisconsin Center for Health Sciences
465 Henry Mall, Madison, WI 53706

R.H. Laessig, Ph.D., Director S.L. Inhorn, M.D., Medical Director

Environmental Science Section (608) 262-3458 DNR LAB ID 113133790
Inorganic chemistry

Id: Point/Well/...: Field #: S01 Route:
Collection Date: 08/08/96 Time: 15:40 County: 05 (Brown)
From: 548 BUTLER DEPERE WI 54115 SURFACE WATER GRAB SAMPLE FOR HEX CHROME
To: CHUCK WARZECHA/WDOH
1414 E. WASHINGTON, RM. 96 Source: Surface Water
MADISON, WI 53703
Account number: DH034 Collected by: MARY YOUNG
Date Received: 08/09/96 Labslip #: IH004734 Reported: 08/22/96

CHROMIUM HEXAVALENT 140. UG/L