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August 30, 2000

Dr. Carl Hansen, MD
St Croix Regional Medical Center
208 S. Adams Street
St Croix Falls, WI 54024

Dear Dr. Hansen:

I was recently contacted by Mrs. Cathy Anderson about her husband, Pete Anderson, and his past exposures to chemicals when he worked for a number of years at the former Penta Wood Products facility, located in the Town of Daniels, Burnett County. She requested that I provide both of you with information about chemicals used in the wood treatment process at the site and the human health implications of these chemicals.

Enclosed is a copy of the public health report that the Department of Health and Family Services prepared last year on the Penta Wood property. While the property is currently undergoing a clean up action by the U.S. Environmental Protection Agency, levels of arsenic and pentachlorophenol in on-site soils were a health concern. However, we are not concerned about the possible exposures by nearby residents unless they regularly went onto the property or entered the ravine and wetland located on the northeast side of the site. Past employees at the former Penta Wood facility may have been exposed to substantial levels of arsenic or pentachlorophenol when they worked in the treatment processes.

I've also enclosed several fact sheets that provide background information on arsenic and pentachlorophenol. You will also find two case study documents on these chemicals. If you would like to discuss this matter further please contact me (608-266-3479) or our Chief Medical Officer for Environmental Health, Dr. Henry Anderson, MD (608-266-1253).

Sincerely,

Henry Nehls-Lowe

Henry Nehls-Lowe, MPH
Epidemiologist
Bureau of Environmental Health

Tom –
Let me know if you'd like the case studies

cc: Cathy Anderson
Carol Larson, Burnett County Health Department
Dr. Henry Anderson, Bureau of Environmental Health
Tom Kendzierski, DNR Northern Regional Office

HEALTH CONSULTATION

PENTA WOOD PRODUCTS

Town of Daniels, Burnett County, Wisconsin

NPL WID006176945

April 26, 1999

Prepared by
Wisconsin Department of Health and Family Services

with funds from the Comprehensive Environmental Response Compensation, and Liability Act
through an interagency agreement with
the Agency for Toxic Substances and Disease Registry
Public Health Service
U.S. Department of Health and Human Services

BACKGROUND AND STATEMENT OF ISSUES

The Agency for Toxic Substances and Disease Registry (ATSDR) requested the Wisconsin Deparment of Health and Family Services, Division of Public Health (DPH), participate in the public health assessment enhancement pilot to experiment with ways in which early interactions with environmental agencies at hazardous waste sites could benefit their needs and the public health assessment process. DPH selected the Penta Wood Products site as appropriate for the pilot. This health consultation summarizes work that has been accomplished at the site, identifies outstanding public health issues, and provides recommendations to protect public health.

Penta Wood Products operated from 1953 to 1992 in a rural part of northwest Wisconsin. The 80-acre property is 2 miles east of the Village of Siren, in the Town of Daniels, in Burnett County. It lies primarily on the north side of Daniels 70 with a small parcel of land on the south side of the road. This was a wood treatment company that preserved wood with chemicals that included pentachlorophenol (PCP) dissolved in fuel oil and other solutions that contained arsenic, zinc, and copper.

During its operation, the company disposed of waste chemical sludges by draining them to a lagoon northeast of the treatment buildings. As a result of disposal practices, the property had significant surface soil, surface water, and groundwater contamination. Additionally, air was contaminated by combustion byproducts and volatilized wood-treatment chemicals. A residence, a farm, and a fire tower are within 200 feet south of the property.

DPH has been involved at this site since the early 1990s as the needs for public health evaluation arose. In planning a 1994 time-critical removal, Kim Bro, an environmental engineer with the DPH, took the public health lead on this site. As such, he consulted with environmental agencies, reviewed sampling data as available, provided comments on health concerns as the U.S. Environmental Protection Agency (EPA) developed public information documents, assisted in analysis of dose and health effects associated with arsenic, PCP, dioxin, and furans and provided consultation to EPA for their use in developing arguments for the Regional decision teams.

In 1993 Bro issued a public health consultation to the Region V ATSDR office. In the consultation, he concluded that PCP and arsenic in surface water and surface soil posed a serious public health threat and that too little was known about dioxin contamination. He recommended that people be restricted from the property, that groundwater contamination be controlled, that the extent of groundwater contamination be characterized, that dioxins be better evaluated and that surface water migration be controlled.

Bro also interacted with local health officials by providing them with updates of site cleanup information and by asking them for their personal and community health concerns. He and Mary Young, a public health educator, invited local health officials to participate in public meetings

and solicited their involvement in the health assessment process. In 1994, Young provided information to area physicians to help them diagnose and treat people who have illnesses that they believe may be from occupational exposure to PCP and arsenic.

In 1994, DPH provided an evaluation to a nearby resident who was concerned about dermal exposure to PCPs in wood chips (5). In response to the concerns of the fire tower employee, Bro wrote a memo to the supervisor advising that the employee seek assistance from his or her doctor and offered DPH consultation if needed. Division staff participated and made presentations at two public meetings in 1994. Bro worked with EPA to conduct community involvement interviews in 1996. During the interviews he interacted with citizens, provided information and collected health concerns.

From 1994 to 1996, EPA took actions to reduce hot spots in surface soil and sediments. To keep people off the site during cleanup, EPA erected a fence and installed lighting. During the cleanup, they disposed of thousands of gallons of PCP-contaminated waste materials, removed and decontaminated tanks, treated approximately 4,000 yards of contaminated soil and built a concrete treatment pad using stabilized arsenic contaminated soil in the concrete mixture. In EPA's report, the on-scene coordinator recommended that additional time-critical removal occur (3).

In 1994, during public meetings and again in 1995 during interviews, community members expressed concerns. They were most concerned about the cost of the cleanup and the economic impact on the community from the loss of jobs. Some community members were concerned about their water quality, and at least one resident expressed concern about cancer.

In 1996 DPH conducted a preliminary health assessment. Since the assessment followed closely the development of Bro's consultation, conclusions and recommendations were consistent with each other. Conclusions that still pertain to site conditions are listed in the *Conclusions* section of this document.

On May 5, 1998, Mary Young of DPH met with Tom Kendzierski, the DNR project manager, to discuss current health issues and conditions at the Penta Wood site. After discussing the issues, they visited the property. Young noted that people are discouraged from entering the property by a chain-linked fence that stretches the entire width of the property and a locked entrance gate. Once on the property, Young noticed the ground's surface is highly disturbed and primarily unvegetated. The lack of vegetation indicates that soil conditions are not conducive to plant growth. The gravelly, sandy soil is uneven and shows evidence of earth moving equipment that was used to remove highly contaminated soil and grade the site to reduce erosion. Although some of the building are gone, other production buildings remain on the property. The buildings' doors are open and the condition in and around the buildings may present a physical hazard to anyone who trespasses.

A concrete pad built during the cleanup activities is in place. It is cracked and weathered but

looks like it is structurally sound. On the northeast portion of the property, the contractors mounded soil to reroute water away from the gully that runs toward private property to the northeast. According to site records, operators routed wastes from the production buildings to a lagoon that emptied into the gully. The gully was filled with PCP and fuel oil-saturated wood scraps. Significant erosion is occurring in the area of the gully. As water rushed over the filled gully it carried soil, wood scraps and contaminated water to adjacent private property and to a nearby wetland. The upper edge of the gully is undercut from weathering and shows evidence of landslides. Standing on the edge of the gully presents a physical hazard, and possibly a chemical hazard if contact with contaminants in the ditch is substantial, to people who trespass on the property.

After visiting the site and before preparing this health consultation, DPH contacted nearby residents by phone in preparation to address concerns. One resident reported that people occasionally ride all-terrain vehicles on the property. They get into the property around the edges of the fence. After speaking to the resident, DPH called the DNR project manager who then saw to it that the access points around the fence were blocked with downed trees. Another resident said he had no health concerns at this time. DPH called the owner of the largest and closest piece of farm land to the south of the site. That individual reported they do not use the property for dairy farming but does alternates crops of corn and soy beans. They had no health concerns. A fourth resident was concerned about the quality of his drinking water. He noticed a sheen on the water in his business and wanted to know if contamination had reached his well. After speaking to the resident, DPH called the DNR project manager who quickly responded by having the resident's private well tested.Results of the water sample showed the presence of iron-fixing bacteria and no chemical contaminants.

After visiting the site, DPH received a copy of the 1998 Remedial Investigation Report. Among other things, the investigation reported the results of EPA-supervised cleanup activities between 1994 an 1996. During the cleanup, contractors removed what they believed to be the highest levels of PCP in contaminated surface soil. The remedial investigation reports significant changes in the quality of surface soil and groundwater at the site. However, the investigation also points out that all of the areas of highest concentration may not have been removed. The implication is that sampling points prior to the removal may not have been pin-pointed so that resampling could confirm the removal (1, p. 5-7).

DISCUSSION

The Remedial Investigation Report points out that residential wells have been sampled several times and are clean. In all cases, prior to 1997, the wells were sampled for PCP only. The nearest well to the southeast had one sample result that showed PCP present at 2.0 parts per billion (ppb). The drinking water standard for PCP is 1.0 ppb. As the agencies confirmed the sample, they also tested for fuel oil constituents (benzene, xylene, ethylbenzene, and toluene). Confirmatory samples shows no PCP or fuel oil contamination present at levels above 1.0 ppb.

In March 1999, Mary Young contacted the DNR project manager who confirmed that the nearest residential wells continue to be monitored twice per year, and they are not contaminated.

Prior to 1996, surface soils were very heavily contaminated and presented a health hazard to people who might trespass on the property. Table 1 shows the range of PCP contamination that existed prior to and after the cleanup of surface soils. The concentrations were taken from figures in the Remedial Investigation. The figures also show that the highest contamination of surface soil and groundwater is in the area of the treatment building where chemicals were spilled, treated wood was allowed to drip, and wastes ran across the soil into a lagoon. The greatest risk for exposure was for on-site workers at the time the facility operated, but trespassers are currently at risk of exposure. Information is provided on the toxicology of PCP and arsenic in the Appendix of this document. The information may be helpful to former employees who wish to discuss their exposure with their health care providers.

Table 1: Current Levels of PCP in Surface Soil (1998)
Compared to previous Concentrations in parts per million

Location	Range Prior to Removals	Range of Current Levels	Comparison Value
Near treatment Buildings	6 - 58,000	No detect - 500	7,000 (1) 20,000 (2)
Western Wood Chip Piles	25,000 (one sample only)	unchanged, no removal	
At the lagoon	1.6-670	unchanged	
Along Daniels 70	17 - 2,800	unchanged	

Reference: 1, Figure 5-1
(1) Intermediate Environmental Media Evaluation Guide (ATSDR) for an adult
(2) Reference Media Evaluation Guide for an adult

As with PCP, the levels of arsenic that remain in surface soils appear to be greatly reduced in the areas that once had very high levels. Table 2 demonstrates the reduction in arsenic of surface soils. During the cleanup, arsenic-contaminated soil was bound with concrete and used to form a pad that will be used in the next phase of cleanup. One of the goals of the remedial investigation was to determine if arsenic remains bound in the concrete. The results of the investigation show that arsenic is not leaching to soil below the pad.

Table 2: Current Levels of Arsenic in Surface Soil (1998) Compared to Previous Concentrations in parts per million			
Location	Range of Levels prior to Removal Action	Range of Current Levels	Comparison Values
Near Treatment Building	0-33,000	No detect - 1,610	200 (1)
Near Western Wood chip Piles	not available	1.6 - 440	

Source: 1, Figure 5-5 and 5-6
(1) Chronic Environmental Media Evaluation Guide (ATSDR) for an adult

Table 3: Current Levels of PCP in Groundwater (1998) Compared to Previous Concentrations in parts per billion			
Location	Range of Levels Prior to Removal Action	Range of Current Range	Comparison Value
Near Treatment Buildings	7.3 - 110,000	No detect - 30,000	0.03 (1) 300.0 (2) 1,000.0 (3) 1.0 (4)
At the edge of the property	not available	not detected	
At residences	not detected	not detected (one sample of 2.0)	

Source: 1, Figure 5-11
(1) Cancer Risk Evaluation Guidelines, 10-6 cancer risk
(2) Child Long-term drinking water advisory
(3) Reference Media Evaluation Guide for an adult
(4) Maximum Contamination Level EPA

As a result of concern about dioxin, three samples were analyzed in 1994. The samples were taken from a location where PCP ran out of the lumber treatment area, a stained area and in the area of boiler ash piles. The intent was to see if dioxins existed on the site as contaminants of PCP or as a result of combustion of PCP-treated wood. The remedial investigation concluded that low levels of dioxin (below levels of health concern) were contaminants of PCP rather than combustion (1, p. 5-8). The total equivalent values of dioxins and furans found in PCP were 11.5 and 6.7 parts per billion and the total equivalent value for ash was 0.1 part per billion. US EPA recommends that total equivalent dioxins and furans not exceed a level of 1 ppb in residential

settings and 5-10 ppb in commercial or industrial settings (4). No samples were taken downwind to determine if smoke may have deposited dioxins. DPH could find no information on whether the smoke or the ash would be substantially different in composition of dioxin, as a product of the combustion of dioxin contaminated PCPs.

Public health hazards still exist at this site. Although the urgency of addressing very high levels of contamination has subsided, contamination on the property continues to pose a long-term health hazard. If the property is not cleaned up, people who use the land could be at risk from long-term dermal exposure to chemicals in surface soil.

Groundwater below the areas of past operations continue to be heavily affected by infiltration of pentachlorophenol and fuel oil. Through remediation activities and natural attenuation the concentrations of contaminants in groundwater are significantly reduced. The groundwater table is relatively flat in this vicinity, so movement toward other off-site wells is very slow. The downward movement of contaminants into bedrock may be more significant. As long as the contamination exists in groundwater, it poses a potential risk for people who use groundwater in the vicinity of the site.

People who trespass on the property are at risk of physical injury. This is an on-going problem. Based on the current data, DPH cannot say if dioxins are a possible health hazard down wind from the point of incineration of PCP-treated wood.

CONCLUSIONS

The following conclusions are consistent with those that appeared in a 1996 preliminary health assessment and are still valid:

1. On-site groundwater is contaminated and could pose a public health threat if nearby residents use it as their drinking water supply. Recent remedial actions have greatly reduced the levels of PCP in groundwater at the site. If remedial actions are discontinued, contaminated groundwater could move to nearby private drinking water wells.

2. Although there is a partial fence around the site, people can trespass on the property. Once on the property, people could come in contact with chemicals that remain in surface soil. They may be physically injured if they go into remaining buildings or come too close to the unstable edge of a contaminated, woodchip-filled gully. If the site is not remediated, any future use of the property would expose residents to a long-term dermal hazard.

3. In the past, on-site workers may have been exposed to PCP and arsenic in the treatment process from inhaling contaminated air, drinking contaminated groundwater, inadvertently ingesting contaminated soil and dust, and dermally absorbing chemicals. Past occupational exposure to chemicals posed a health hazard. However, it is not possible to recreate exposure

scenarios from which we could anticipate specific health effects.

4. The fire tower worker could be exposed to volatile chemicals in air as the remedial activities resume.

5. The possibly exposed population is too small to conduct any meaningful comparison of mobidity and mortality on diseases that may be associated wtih the observed levels of exposure to site-related contaminants.

6. Professional education is appropriate for area physicians and local health department staff as needed to address illness and symptoms that may be consistent with past exposures to harmful site chemicals.

The following conclusions follow DPH review of the 1998 Remedial Investigation.

7. Boilers that produced heat for pressure treatment of PCP and on-site fires may have released dioxins into the air. Although three on-site soil samples contained insignificant levels of dioxin, the samples did not represent areas that would be downwind from the burners. Therefore, additional samples are necessary to confirm that dioxins and furans were not released in significant amounts.

8. Contamination continues to migrate off the site as the gully erodes. The movement of contamination adds to the levels of chemicals in surface soil and surface water off-site.

9. Remedial actions have substantially reduced the threat of exposure to high levels of PCP and arsenic in surface soils.

RECOMMENDATIONS

To those who are responsible for the cleanup of the site, DPH recommends they

1. Analyze at least one sample each of down-wind and background soil to determine if harmful levels of dioxins and furans were produced by site activities. These samples should be from undisturbed soil in areas where the chemicals are likely to have been deposited by wind rather than from dripping or wood storage. The detection limits for dioxins and furans should be in parts per trillion.

2. Keep people from entering the property or remove physical hazards from the property

3. Regularly monitor groundwater to provide early warning to nearby private well owners in case their drinking water supply is threatened by the approach of contamination or control the

threat to drinking water. Any well sampling for PCP should use a detection limit below the enforcement standard of 1.0 part per billion.

4. Control the source of eroding contaminated soil to nearby properties.

5. Notify the fire tower employee if volatile emissions are likely to reach his or her work station during remedial actions. In that way, DNR may choose to temporarily re-assign the individual or provide protective breathing equipment to reduce exposure and the likelihood of symptoms.

To past site workers, DPH makes the following recommendation

1. Make sure your physician is aware of past exposure to site chemicals (pentachlorophenol and arsenic). If your doctor is uncertain of related health effects or would like additional medical consultation, he or she may call Dr. Henry A. Anderson, Chief Medical Officer for Environmental and Occupational Medicine, 608-266-1253.

2. Since the body systems that are most likely affected by PCPs and arsenic include the skin, liver, kidneys, lungs, and bladder; you should avoid additional stress or burden to those systems. Avoid excessive sun, smoking, alcohol consumption and further exposure to PCPs and arsenic.

DOCUMENTS REVIEWED

1. CH2M Hill for the US.EPA, Remedial Investigation Report: Penta Wood Products, March 1998.

2. KM Bro, Activity Log, 11/17/93.

3. Steadman, P, US EPA Memo: Pollution Report. June 1996.

4. US EPA Directive for Dioxin, April 1998.

5. Young, M. Notes on Preparation for ATSDR conference call, January 1997.

6. Bro, Notes, 6/93.

7. US Dept of Health and Human Services, Toxicological Profile, PCP, 1994.

8. US Dept of Health and Human Services, Toxicological Profile, Arsenic.

9. Bro, K, FAX message to Ed Forrester, 4/97.

10. US Dept of Health and Human Services, Toxicological Profile for Chlorinated Dibenzo-p-Dioxins 1998.

11. Bro, K. Letter to Burkland re: wood chips and PCP contamination. 9/7/94.

12. Young, M. Meeting notes, 11/94

13. Bro, K. Draft Memo: Fire Tower Employee Exposure 5/20/94

14. Parkinson, A. Letter: Wood Chips 9/7/94

PREPARERS OF REPORT

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CERTIFICATION

This Penta Wood Products Health Consultation was prepared by the Wisconsin Department of Health and Family 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 begun.

Technical Project Officer, SPS, SSAB, DHAC

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

Chief, SPS, SSAB, DHAC, ATSDR

ATTACHMENT

TOXICOLOGICAL INFOMATION ABOUT PENTACHLOROPHENOL (PCP) AND ARSENIC

The Penta Wood Products company was a moderately-sized operation. At the time it closed in 1992, about 30 employees worked there. Although DPH is unaware of records of work-related illness, the following description of health effects may be useful to workers' health care providers. The chemicals of concern at Penta Wood are PCP and arsenic. The discussion that follows includes reference to dioxins and furans because sample results have not ruled out dioxin as a chemical of concern. Workers may have been exposed to high levels of wood-treatment chemicals as they worked at the plant. However, DPH cannot estimate the exposure for individual workers. A person's job and their personal care to reduce exposure would greatly affect the type and amount of exposure that they experience. Furthermore, a person's reaction to chemical exposure is influenced by his or her heredity, personal habits, use of medication, and general state of health.

Toxicological research shows a number of conditions that may be influenced by high-level exposure to wood-treatment chemicals. People who work with PCP are more likely to experience upper respiratory irritation, eye irritation, and a certain type of skin condition called chloracne. PCP may also affect the functioning of kidneys, liver, nervous system, and immune system. Human studies do not show PCP exposure causes cancer, but some animal studies demonstrate an association (7, pp 12-14, 72). People who worked at the company drank water from the production well at the time when the Wisconsin Department of Natural Resources (DNR) found PCP present in the water at a level of 2,700 parts per billion. Laboratory animals that were fed similar amounts of PCP over a long time experienced damage to their liver, kidneys, and nervous and immune systems. The same doses affected fetal development and caused cancer in laboratory animals. The same illnesses could be found in humans if they drank water containing those levels over a long time.

Research shows that when workers are exposed to arsenic, some develop digestive upset that disappears when the exposure is stopped. People who are exposed to arsenic over a long time may have an increased risk of skin changes - warts and discoloring of the skin. Scientists report an increase in skin cancers. Some people who are exposed to arsenic report feelings of "pins and needles" in their hands and feet as their nervous system is affected. A growing body of evidence indicates that exposure to arsenic over a long time may increase a person's risk of liver, bladder, kidney, and lung cancers. (8, pp. 45-48)

Wood treatment workers may be exposed to dioxins and furans as a result of impurities in PCP or by heating PCP. If dioxins and furans move off the property as runoff or in the air, they may pose a public health hazard. Developing fetuses and newborns are the most sensitive populations. (7) If animals graze on contaminated soil or children play on contaminated soil, there is a health risk. People exposed to contaminated dairy products or soil could experience

reproductive system damage and an increased risk of contracting cancer. Dioxin can accumulate in the food chain and be passed to people who eat contaminated fish or beef. (10,11, Bro Consult)

In 1994, a DNR fire tower employee expressed concern that she may have been exposed to chemicals migrating in air to her work station just south of the wood treatment plant while the remedial actions occurred. DPH acknowledged that she may have been exposed to PCP in air and sent a recommendation to her supervisor that she discuss her concerns with her physician. DPH further offered consultation with Dr. Henry Anderson who is the Chief Medical Officer for Environmental and Occupational Medicine in Wisconsin. (9)