

Health Consultation

WATERTOWN TIRE FIRE
TOWN OF SHIELDS, DODGE COUNTY, WISCONSIN

EPA FACILITY ID: WIN000509979

APRIL 11, 2006

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

Health Consultation: A Note of Explanation

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

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

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HEALTH CONSULTATION

WATERTOWN TIRE FIRE
TOWN OF SHIELDS, DODGE COUNTY, WISCONSIN

EPA FACILITY ID: WIN000509979

Prepared by:

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

Summary

On July 19, 2005 a fire started at a tire recycling facility located in the Town of Shields, Dodge County, Wisconsin. The Wisconsin Division of Public Health (WI DPH) was contacted for assistance by the City of Watertown and Dodge County Health departments. WI DPH provided technical support to the health departments and the Wisconsin Department of Natural Resources (WI DNR). The fire posed a public health hazard to on-site workers, nearby residents, and to the fire fighters who were called to fight the fire. Air sampling results confirmed high particulate levels in the smoke and the presence of pyrolytic compounds. Similar compounds were also observed in surface water ponded on-site and in off-site drainage ditches that carried runoff water from the site. Airborne levels of particulate matter on-site and in the smoke plume exceeded the USEPA 24 hour National Ambient Air Quality Standards (NAAQS) and in some cases, occupational exposure guidelines. Exposure during the fire to the smoke plume therefore represented a *public health hazard*. Surface water was impacted near the site; however, containment and treatment prevented those impacts from posing a public health hazard due to limited exposure opportunity. Groundwater serving nearby residential drinking water wells was not impacted and does not pose a public health hazard. Some residual contamination exists in soils stockpiled on-site and a plan for management of these soils is currently being developed. Until the soil management activity is completed there could be public contact with site contaminants. Stockpiled soils at the site therefore represent an *indeterminate public health hazard*. A temporary cover should be placed over stockpiled soils until they are permanently capped or removed.

Background

Watertown Tire Recyclers is located at 7910 Provimi Road, in the town of Shields, Wisconsin. The location is in Dodge County and is less than 1 mile north of the City of Watertown. The City of Watertown has a population of 22,824. Dodge County has a population of 88,057. The site is located in an agricultural area. There are about 10 residences within a half mile radius of the site.

The tire recycling facility had been in operation since 1987 and employed 27 people. The facility accepted used tires and shredded them for reprocessing into other products. It was permitted for 200,000 tires and had a history of non-compliance with its operating agreement. A community action group had organized prior to the fire to address fire and health concerns posed by the site. Numerous letters had been written by community members warning of the potential for and costly impact of a fire at this facility. On the day of the fire, a DNR representative was present at the facility to discuss enforcement action when the fire broke out. It was estimated that 320,000 tires were present at the facility when the fire started at about 10:00 a.m. on 7/19/05. Flames rose over 100 feet, and smoke was visible for 30 miles and observed on satellite imagery. The tire facility is located on 12 acres, of which 6 acres of tires were involved in the fire.

Shortly after the fire broke out, winds were from the northwest, and a thick black smoke passed over the City of Watertown. The Watertown Health Department contacted the Wisconsin

Division of Public Health (WI DPH) for guidance regarding the health impact of the smoke. The Watertown Health Department was advised that based on an ATSDR report regarding a tire fire at an Ohio facility¹, the smoke was a likely respiratory irritant and that residents should limit outdoor activity. Those with respiratory conditions were advised to be especially cautious. A press release was issued by the health department with this information and immediately aired on local media outlets. WI DPH arrived on-site at about 3:00 p.m. on 7/19/05 and assisted the Watertown Health Department with monitoring air quality near the site, elsewhere in the community and at a nearby hospital.

On the afternoon of 7/19/05, the smoke plume was rising vertically and traveling east-southeast, well over the City of Watertown, over I-94 and toward Waukesha. On the following day, plume conditions changed and smoke was at ground level and traveling with changing wind direction, changing as much as 270 degrees throughout the day. Particle monitoring indicated high levels in the smoke plume, and it was apparent that nearby residences could be affected when weather conditions moved the plume in their direction. USEPA had offered air monitoring assistance, and this offer was accepted due to the often changing plume conditions and potential for community exposure. WI DPH and local health departments revised the previous health advisory to reflect changing plume conditions.

USEPA arrived on-site on the evening of 7/20/05 and began deployment of direct-reading monitors around the perimeter of the site to measure air quality related to changing plume conditions. The monitors measured airborne levels of toxic gases and particulates. Readings were recorded at intervals ranging from 2 seconds to one minute. Air samples were collected with SUMMA canisters for analysis of volatile organic compounds. Air samples were also collected on filters for metals and particulate levels. Health advisories were issued on several occasions in both English and Spanish. Residents near the fire site were offered voluntary evacuation assistance where avoidance of the smoke plume would be difficult. With the assistance of the sheriff's office, Dodge County personnel went door to door in the neighborhood surrounding the fire to deliver the advisory message. A total of 406 homes were visited covering 625 residents. The written advisory was left at the door of an additional 169 residences. In addition, information packets were mailed to 575 homes. The message was also delivered through newspapers, TV, radio and local health departments.

A community action group that organized prior to the fire to address the risk of such an occurrence had sponsored a public meeting on the evening of 7/21/05. Additional public meetings were held on 7/27/05 and 8/8/05. Residents were extremely frustrated that the facility continued operation in non-compliance with their operating agreement and were also concerned over the impact the fire would have on their health, the environment and on the welfare of their livestock.

¹ Petitioned Public Health Assessment Kirby Tire Recyclers Site (a/k/a Kirby Tire Company) Sycamore, Wyandot County, OH, ATSDR (August 2001)

Fire response involved 106 departments. Water management for fire fighting was a challenge. Water was hauled into the fire scene by tankers around the clock while the fire was fought. Approximately 11,000,000 gallons of water were used to fight the fire. A wetting and encapsulating suppression agent was applied to the fire on the evening of 7/21/05. It was extinguished on 7/24/05. Water from the fire fighting effort was carried from the site via drainage ditches. A retention pond was also constructed on-site to collect water. This water was later treated by a USEPA contractor prior to discharge to the Rock River. A map showing the location of the site and sample locations are shown in Attachment 1.

Community Health Concerns

Prior to and during the public meetings held after the fire, the community expressed deep concerns over the health impacts of the tire pile. These concerns included the potential for the stored tires to serve as a breeding ground for mosquitoes and other pests, and the associated potential for transmission of West Nile Virus. Concerns were also voiced over what impact the smoke would have on the health of those exposed to it. Residents were advised that the smoke was an irritant to the respiratory system and should be avoided. Where avoidance proved difficult due to proximity to the fire, temporary relocation assistance was offered. Some residents with farm operations voiced concern over their welfare and that of their livestock. They indicated that in some cases, it was imperative they see to their animals needs and would in turn be exposed to the smoke. They were instructed that respirator use, such as an N95 mask, would be beneficial, but that they should be careful to consider proper use recommendations including the impact of increased breathing resistance posed by respirator use

Concerns were also expressed over the safety of eating vegetables and produce grown in local gardens. Residents were told that simple washing would be sufficient protection. With respect to livestock welfare, the state veterinarian was contacted. It was suggested that animals be pastured and not kept in buildings where smoke could concentrate. It was important that animals be kept current for vaccinations as smoke exposure may contribute to stress and the potential for secondary infection.

Responder Exposures

Particulate levels were observed near the fire scene that exceeded occupational exposure guidelines, resulting in potentially high exposures to fire fighters and others present near the scene. While fire fighters engaged in response operations closest to the fire were generally in breathing apparatus, others near the fire generally were not using respiratory protection. This included drivers of tanker trucks bringing water to the site who were at times idling in the smoke plume waiting to unload their water. During the fire response, it was necessary to recruit heavy machinery operators to move the burning tire pile to facilitate the use of the suppression agent. It was necessary for these operators to use breathing apparatus during operations, and they had no prior experience with such equipment. On-scene fire command staff trained the equipment operators in breathing apparatus use, and WI DPH coordinated with a local physician in providing training and medical review as suggested in OSHA 29CFR1910.134. N95 respirators

were secured from a number of sources by Watertown Health Department and provided to those who were working at and visiting the fire scene.

Environmental Sampling Data

Airborne Particulate

Smoke from the fire was expected to contain high levels of particulate, particularly very small particles. Sampling results supported this expectation. The USEPA 24 hour ambient air quality standard (NAAQS) for 10 micron and 2.5 micron particles are $150 \mu\text{g}/\text{m}^3$ and $65 \mu\text{g}/\text{m}^3$, respectively. In addition, the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value for respirable particles, not otherwise specified, is $3,000 \mu\text{g}/\text{m}^3$. These guidelines served as the basis for evaluating community and fire fighter exposures. Airborne particulate was measured by collecting samples on filters for gravimetric and compositional analysis and through the use of direct-reading monitors.

Direct-reading monitors were first used to monitor particulate at the site on the day of the fire. A TSI Dusttrak Model 8520 Aerosol monitor was used to measure concentrations of particles with diameters up to 2.5 microns (PM_{2.5}). A TSI PTRAK Model 8525 Ultrafine Particle Counter was used to measure ultrafine particle counts. Ultrafine particles are those particles with diameters in the range of 0.01 to 1.0 microns. On the day the fire began (7/19/05), PM_{2.5} concentrations were generally below the USEPA ambient air quality standard of $65 \mu\text{g}/\text{m}^3$. However, concentrations at the fire scene did exceed the standard, as would be expected. Ultrafine particle counts were similar to background counts observed upwind of the site, again with the exception of the fire scene. Monitoring was done at several locations throughout the community including a nearby hospital. Elevated particulate levels related to the fire were not observed at any of these locations. On the second day of the fire, particulate levels changed dramatically as the smoke plume was close to ground levels. Numerous locations were identified that exceeded the USEPA NAAQS and in some cases the occupational exposure guideline. Results are summarized in Attachment 2, Tables 1 and 2.

Because of the proximity of the smoke plume to ground level and changing direction of the plume, USEPA was asked for assistance with monitoring air quality around the site to assist with community exposure assessment. USEPA deployed direct reading particulate monitors at five locations around the site that measured concentrations of particles up to 10 microns (PM₁₀). The EPA NAAQS was exceeded at three of the locations for time periods ranging from 3 to 10 hours. Results are summarized in Attachment 2, Table 3.

USEPA collected six samples on 7/21/05 and 7/22/05 for PM₁₀ for analysis by Inorganic Compendium Method IO-3.1. Samples were collected at three locations. Results at one of the locations approached, but did not exceed, the USEPA NAAQS. Results are summarized in Attachment 2, Table 4.

In addition, the Wisconsin Department of Natural Resources (WI DNR) collected an airborne particulate sample at a residence at the intersection of Rich and Provimi Roads on 7/22/05 for PM2.5. The duration of sample collection was 8 hours, and the result was 20.88 µg/m³.

Air Data

USEPA deployed direct-reading monitors at eleven locations around the perimeter of the site on 7/21/05 (see map in Attachment 1). The monitors measured airborne levels of carbon monoxide, hydrogen sulfide, sulfur dioxide, nitric oxide, volatile organic compounds, explosivity and oxygen concentration. The monitors recorded data at intervals ranging from 2 second to one minute intervals. With the exception of an apparent oxygen sensor malfunction at location 11, oxygen and explosivity readings were normal. Air monitoring data corresponded to the presence of the plume and were highest during application of the fire suppression agent on 7/21 and 7/22. ATSDR acute minimal risk levels (MRLs) were exceeded on a number of occasions for hydrogen sulfide and sulfur dioxide at several locations. Carbon monoxide levels above the ACGIH TLV of 25 ppm were also observed. Total volatile organic compounds (VOCs) rose to as high as 11,000 ppm at the fire scene. The high levels of VOCs were unexpected and although the composition of VOCs at this time was unknown, the high concentration likely represented an undesirable exposure. Air monitoring data was generated through direct reading monitoring equipment and are presumed to be reflective of actual exposures. However, except for volatile organic compounds (discussed below) confirmatory samples for lab analysis were not collected. Results are summarized in Attachment 2, Table 5.

Airborne Metals

Samples of airborne particulate for metal analysis were collected on July 22, 2005 from 11:13 to 16:48. Three samples were collected by Weston Solutions at the northeast, west and background sample sites. Samples were analyzed by STAT Analysis Corporation using USEPA Compendium Method IO-3.5. Twenty metals were included in the analyses, and none were detected above the reporting limit in each of the three samples.

Airborne Volatile Organic Compounds (VOCs)

In addition to the VOC data generated by the direct-reading monitors, samples were collected using SUMMA canisters by WI DPH and USEPA for analysis by OSHA Method PV2120 and USEPA Method TO-15. As would be expected from a tire fire, a number of pyrolytic components such as benzene, toluene, trimethylbenzene, and styrene were observed in the sample results. Only trimethylbenzene and benzene exceeded their respective comparison values. In the case of trimethylbenzene, the comparison value is a risk based concentration for a long-term, chronic exposure. The comparison value for benzene was an acute MRL which was met or exceeded at two locations near the fire at levels of 50 and 120 ppm. Results are summarized in Attachment 2, Tables 6 and 7.

Airborne Polynuclear Aromatic Hydrocarbons (PAHs)

Two air samples were collected by WI DPH for polynuclear aromatic hydrocarbons (PAHs) at the command center location on Provimi Road on July 19, 2005, and analyzed by the Wisconsin State Laboratory of Hygiene (SLH), Occupational Health Laboratory, using NIOSH Method 5506. Ten analytes were included in this method and all were below reporting limits for both samples.

Groundwater

In the vicinity of the tire recycling facility, groundwater is typically found in the first 15 to 30 feet of soil and is thought to flow to the southwest. Private well logs for the area suggest bedrock in the area is located at about 50 feet and protected by a layer of hardpan or clay that would limit contaminant travel to the drinking water aquifer. Samples were collected by WI DNR of three private wells near the fire scene both on-site and within half a mile on 7/21/05 and were analyzed by the Wisconsin State laboratory of Hygiene using EPA Method 200.7 for metals, EPA Method 524.2 for VOCs, and EPA Method 8310 for PAHs. Metals were within normal parameters with the exception of one sample that was slightly elevated for arsenic which was not related to the fire. VOCs and PAHs were not detected in any of the samples. Between 8/9/05 and 8/16/05, an additional 11 private wells were sampled by WI DNR extending out as far as 1.25 miles from the site. Results did not show wells were impacted, with the exception of naphthalene detected in a well on-site showing a level of 1.1 µg/L, which is below the Wisconsin Enforcement Standard (NR140) for naphthalene of 40 µg/L. Results of the 7/21/05 samples are summarized in Attachment 2, Table 8.

Surface Water

Surface water samples were collected by WI DNR for analysis of metals by EPA Method 200.7, PAHs by SW846 Method 8310 and VOCs by EPA Method 524.2. Samples were collected from ponded water in both on-site locations and in drainage ditches, where water traveled away from the site. There was limited potential for public contact and none of the standing water locations appeared to be used by livestock for watering. None of the locations where water was present had permanent water bodies on them. Consequently, the comparison values used in evaluating sample results were those for water bodies that did not support established communities of aquatic life. Zinc and aluminum were the highest concentrations present and in the case of zinc, higher than the effluent limits of the Watertown wastewater treatment plant. A number of volatile organic compounds of pyrolytic origin such as benzene, ethylbenzene, and trimethylbenzene were detected in surface water samples. None of these exceeded comparison values, where available, although the benzene concentration of 1,000 µg/L (from the North Breech Foam Water, collected on 7/22/05) approached the comparison value of 1,300 µg/L. A number of PAHs were also detected in these surface water samples, though not at levels that would require water treatment actions. A USEPA contractor was retained to treat 3 million gallons of surface water on-site and in ditches prior to discharge to the Rock River. At the time

of this report, water treatment operations had been completed. Results are summarized in Attachment 2, Tables 9, 10 and 11.

Soils

Two soil samples were collected at the fire scene by WI DNR on 7/21/05 for analysis by the WI SLH using USEPA Method SW486 6010B. The chronic, long-term exposure comparison value for zinc was exceeded, and subsequent samples collected by WI DNR suggested the presence of PAHs. Samples collected of ditches that held standing water did not reveal impacts due to the fire or contaminated surface water run-off. While the soil contamination levels at the fire scene did not represent an immediate health concern, the remediation of site soils were being planned. As of the writing of this report, a plan to manage remaining soils was being developed that would include removal and capping. Results of samples collected on 7/21/05 are summarized in Attachment 2, Tables 12 and 13. Subsequent soil sampling has determined elevated metals and polycyclic aromatic hydrocarbons in soils at the fire scene. Affected soils have been stockpiled on-site. A management plan for affected soils has not yet been submitted by the responsible party. Because some of this work is still pending and soil management decisions will affect exposure potential, exposure to soils at the scene of the fire is considered an *indeterminate health hazard*, pending management plan implementation.

Exposure Pathway Analysis

During the fire a completed inhalation exposure pathway existed for those who were exposed to the smoke plume. The community surrounding the fire site and the fire fighters in particular, were exposed to a high level of fine and ultrafine particulate at various times during the fire. At times when the smoke plume was near the ground, particulate values were observed that exceeded USEPA's National Ambient Air Quality Standards. Particulate levels at the fire scene often exceeded recommended exposure limits for occupational environments. These exposures impacted fire personnel, aid workers, and visitors to the site. Exposure also occurred to gases such as carbon monoxide and benzene, although to a lesser extent. The highest levels of carbon monoxide and volatile organic compounds were observed shortly after application of the fire suppression agent. Benzene levels near and above short term comparison values were observed at a couple of locations. Since the fire has been extinguished, there has been no ongoing completed airborne exposure pathway.

Groundwater sampling to date has not indicated an impact to groundwater and private well drinking water supplies. One sample was identified from a well on site with a low level of naphthalene that was less than the Wisconsin enforcement standard, although there is some question if this was due to cross contamination from nearby fire residue. Surface water in ditches and the retention pond had elevated levels of zinc and aluminum. Public contact with this water was not likely, and it has since been treated. No standing water from the fire remains at the site. There was a completed exposure pathway for surface water during the fire. It was reported that at least one firefighter had complained of a burning sensation to his feet after standing in water.

The WI DNR had reported that PAHs and metals had been detected in soils at the fire site and that remediation would be necessary and likely include scraping of surface soils, incorporation into a berm, and capping. Contaminated soils have been placed in piles. It is possible that children exploring in the area, though trespassing, may be exposed to these stockpiled soils. Capping the piles therefore is very important. It is also possible that high winds could pick up and disperse these soils. Covering these stockpiled soils with tarps or plastic sheeting would provide a temporary barrier to prevent direct contact with trespassers and minimize wind dispersal. Once these stockpiled soils are permanently capped or removed, there will be no completed exposure pathway.

Public Health Implications

During the fire, inhalation exposure to airborne particulate represented the greatest health impact to the public. At times the USEPA NAAQS were exceeded, and in some cases occupational levels were exceeded. On one occasion, the short term exposure guideline for benzene was also exceeded. Other comparison values were exceeded for sulfur dioxide, carbon monoxide and hydrogen sulfide although these exceedences were momentary and lasted not longer than a few hours. Exposure to the smoke plume during the fire therefore was considered a *public health hazard*. No airborne exposures at the site remain. Surface and ground water exposure near the site represent no public health hazard. Because soil management plans are still being developed, exposure to stockpiled soils on-site are considered an *indeterminate health hazard*.

The health basis for the NAAQS is offered in “Air Quality Criteria for Particulate Matter by USEPA”. Among the health concerns associated with breathing fine and ultrafine particulate matter are:

- Lung injury and inflammation, increased airway reactivity and asthma, and impaired lung defense mechanisms and susceptibility to infection
- Increased cardio-respiratory effects and lung cancer
- Potential for toxic gases to be carried deeper into the lungs (particularly for small particles)

Some small particle types appear more toxic than others, such as PAHs and metals. Individuals with pre-existing lung injury are more susceptible to effects of breathing small particles. Further, studies of ultrafine (20 nm) particles have demonstrated significantly greater inflammatory response than fine (200 to 250 nm) particles (USEPA 2004).

Monitoring at the site and nearby community indicated particles both in the fine and ultrafine ranges were present in large quantities where the smoke plume was near ground level. At some off-site locations during the fire, the levels of ultrafine particle were as high as 175,000 particles per cubic centimeter (pt/cc) Background levels away from the fire were about 8,000 pt/cc. Exposure to this smoke put residents at increased risk of cardio and respiratory health effects, particularly those individuals with pre-existing health conditions. As a result, at times during the fire the inhalation of this smoke posed a *public health hazard*.

Results of VOC sample analyses for ambient air indicated elevated benzene concentrations at two locations near the fire site, but short term exposure to the highest level of benzene posed a

no apparent public health hazard. Short term inhalation exposure to benzene even at low levels can result in changes to immune function processes. (ATSDR, 2005) While exposure to the smoke for community members was transient (associated with plume contact), the presence of benzene at levels above the short term comparison value suggests that avoidance of the smoke was appropriate to protect public health. It also suggests that in follow-up to the incident, fire fighter exposure should be evaluated closely, as respiratory equipment needs for fire support operations may not be protective of VOC exposures. The ATSDR acute inhalation EMEG for benzene is 50 parts per billion, which was derived from a mice study that found an adjusted LOAEL of 2,550 parts per billion (ATSDR 2005). During the fire, benzene levels up to 120 parts per billion were observed. Because of the uncontrolled nature of this release and the likelihood of exposure to other compounds and gases, benzene exposures from tire fire smoke may have been even higher, but probably did not exceed 1,000 parts per billion. Short term exposure to benzene less than 1,000 would have posed a *no apparent public health hazard.* As with benzene, other toxic gases were detected in ambient air at and near the fire scene, though the presence of these compounds was more transient, lasting generally not more than a few hours and was associated with the presence of the smoke plume.

Surface water, though contaminated with metals and to a lesser extent organic chemicals, poses *no apparent health hazard.* However, there was one report of fire fighters reporting a burning sensation and redness of feet after standing in water. The concentration of compounds reported in surface water sample results would not be expected to cause these effects, however other characteristics of the water that were not tested or other factors associated with fire fighting such as temperature, may have been responsible. Surface water has since been treated.

Stockpiled soils at the site have elevated levels of metals and PAHs and will be treated according to a soil management plan currently being developed by WI DNR. In the interim, it will be important that this plan incorporate a means of preventing direct contact with these stockpiled soils, particularly for children who reside in the area. Until the soil management activity is completed and these soils are permanently capped, DHFS recommends that stockpiled soils at the site are covered to minimize wind dispersal and reduce the potential for direct contact by trespassers. Until either temporarily covered or permanently capped or removed, stockpiled soils on the site represent an *indeterminate public health hazard.*

Child Health Considerations

Children are a primary concern when evaluating the risk posed by toxic substance exposure in the community. The comparison values used in evaluating exposures from the fire consider the entire community including children. However, due to their increased relative respiration rate and surface area, they can be predisposed to greater relative exposures. During the fire, it was possible that children may have been exposed to smoke from the fire. The community was advised during the fire to seek medical attention if adverse respiratory or cardiac symptoms were experienced. No admissions were reported at the local hospital related to the fire. Nonetheless, residents were advised to closely watch those who may be particularly sensitive to the smoke such as children, elderly, and those with asthma.

Risk Communication

On the day of the fire a press release was created and issued by the Watertown Health Department. It advised the community that smoke from the fire was a respiratory irritant, that outdoor events should be cancelled, and residents should remain indoors, particularly those with respiratory sensitivities. Subsequent releases were also issued. Information was delivered in both Spanish and English to TV, radio, government access cable, churches, schools, police, grocery stores, and local health departments. On the second day of the fire when it became clear that the smoke plume could be at times at ground level and rapidly change direction, efforts were made to reach residents through door to door contact. A total of 406 homes were visited covering 625 residents. Information packets were subsequently mailed to 575 homes. This information addressed the possible health impact of the fire and answered resident questions about possible impacts to garden produce, livestock, etc. Three public meetings were held during and after the fire. The first meeting was sponsored by a local community group organized to address the health and environmental concerns of the site. Representatives of state and local health and environmental agencies were present to discuss health risks associated with the site. Subsequent meetings were sponsored by local government to solicit and address community concerns and to provide an overview of the incident response.

Conclusions

An uncontrolled fire from the burning of several hundred thousand tires created a smoke plume that contained high levels of particulate including ultrafine particles as well as volatile organic chemicals. These levels of particulates represented an acute (short term) past *public health hazard* for people who inhaled the smoke. After the fire was extinguished there were no further air emissions. Groundwater beyond the site has not been impacted by the fire. Groundwater on-site may have been impacted and monitoring will be continued to evaluate possible impact. Surface water from fire fighting operations was contaminated with metals and PAHs. Due to limited potential for public contact, it represented a *no apparent public health hazard*. Soil management plans are currently being developed by WI DNR to address contaminated soils remaining at the scene of the fire. Until final soil tests become available and determination is made on a remedy that will prevent public contact or wind dispersal, particularly children from soil contact, soil contamination at the site will be considered an *indeterminate public health hazard*.

Recommendations

- A soil management plan should be developed that will be protective of groundwater and will prevent public contact with the soils, particularly from children.
- Follow-up sampling should occur for the on-site well to determine if previously noted naphthalene presence was related to nearby soil contaminants or to water contamination.
- An interim cover should be placed over stockpiled soils until they are permanently capped or removed.

For best public health practice:

- At similar future events, firefighter and support personnel at the scene should be closely evaluated for respiratory protection needs. At a minimum, filtering face pieces, such as N95 respirators, should be used for personnel near the smoke plume. Personnel should also consider using respirators to reduce VOC exposure.
- Local municipalities should be encouraged to review local options for controlling the hazards associated with tire processing facilities such as disease vectors and the threat of fire.
- Management plans should be developed and implemented for the prevention of fire and management of mosquito populations where tire recycling facilities operate. Local municipalities should review and monitor the execution of such plans.
- A fact sheet regarding the health concerns associated with tire piles including insect and fire concerns should be developed and disseminated electronically to increase awareness of the issues.
- Community health officers should be advised of the impact of tire fires on public health as well as the community and local actions that can be taken to mitigate potential risk.

Public Health Action Plan

- DHFS will review and evaluate the remediation plans for remaining soils for protectiveness of public health.

References

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Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) for Hazardous Substances, <http://www.atsdr.cdc.gov/mrls.html>. Atlanta: US Department of Health and Human Services; January 2005.

Agency for Toxic Substances and Disease Registry (ATSDR), Toxicological Profile for Benzene, Draft for Public Comment. August 2005

Agency for Toxic Substances and Disease Registry (ATSDR), Petitioned Public Health Assessment Kirby Tire Recyclers Site (a/k/a Kirby Tire Company) Sycamore, Wyandot County, OH, ATSDR (August 2001)

United States Environmental Protection Agency (USEPA), Air Quality Criteria for Particulate Matter. October 2004.

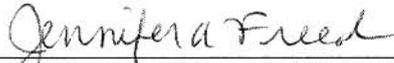
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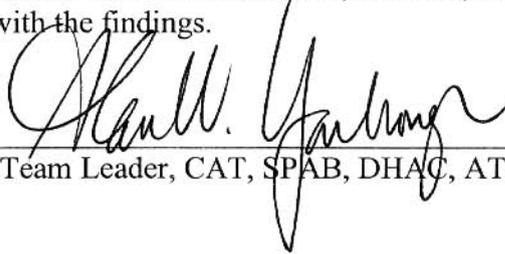
CERTIFICATION

This Watertown Tire Fire 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 public health consultation was begun. Editorial review was completed by the Cooperative Agreement Partner.



Technical Project Officer, CAT, SPAB, DHAC

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



Team Leader, CAT, SPAB, DHAC, ATSDR

Attachment 1

Map Showing Fire Site and Sample Locations
Watertown Tire Fire
7/19/05



ERT #5

QUARRY RD.

ERT #13

ERT #3

ERT #15

ERT #10

EPA #3

ERT #12

ERT #4

ERT #14

Fire Site

PROVIMI RD.

ERT #2

RICH RD.

CTY. K

ERT #11

HWY. 19



USEPA REGION 5
START-2

Monitoring Locations
Watertown Tire Fire

Attachment 2

Summary of Sampling Results
Watertown Tire Fire
7/19/05 to 7/22/05

Table 1
PM2.5 Concentrations²
Collected with Direct-Reading Monitors by WI DPH and Watertown HD
7/19/05 to 7/21/05

Location	Date	PM 2.5³ (micrograms per cubic meter)	Comments
Hwy 26 & Zillge	7/19/05	23	On approach to City of Watertown
Ebenson & 26	7/19/05	33	“
Turf & 26	7/19/05	26	“
Gateway & 26	7/19/05	24	“
26 & City Limits	7/19/05	27	“
26 & Y (beneath plume)	7/19/05	25	“
Boome & 26	7/19/05	20	“
Omena & 26 (beneath plume)	7/19/05	17	87F, Wind NW 10-15 mph
Command center (downwind of fire)	7/19/05	14	~3:30 pm
On site at fire location	7/19/05	657	
Hospital N side air intake at ground level	7/19/05	26	~4:30 pm
Hospital SE Roof air intake	7/19/05	49	
Hospital Inside lobby	7/19/05	16	
Hospital NE ICU	7/19/05	38	Counts possibly due to instrument response to humidification that is introduced post-filter
Hospital Day Surgery	7/19/05	13	
Hospital ICU	7/19/05	10	
Hospital Surgery	7/19/05	11	
Hospital 3 rd Floor S OB	7/19/05	14	Following hospital monitoring data was collected about 9 miles east near town of Ixonia. Typical background values were observed. Plume was widely dissipated overhead.
Walton Rd.	7/20/05	230	
Richwood Rd.	7/20/05	760	
Quarry & Rich	7/20/05	1,610	
Just past Barricade (gray house)	7/20/05	1,860	
Jody	7/20/05	46	
K & Q	7/20/05	715	
Breckeridge & Welch	7/20/05	214	Heavy downpour
Fleet Farm	7/20/05	240	
K & 19	7/20/05	50	
Rich Rd. & 19	7/20/05	250	
Hospital parking lot	7/20/05	50	
Hwy 26 & Q	7/20/05	730	
26 & CG	7/20/05	55	

² Though these were short term measurements, highlighted values indicate PM2.5 levels exceeding the USEPA National Ambient Air Quality Standard of 65 micrograms per cubic meter for a 24 hour period.

³ PM2.5 collected with a TSI Instruments Dusttrak Aerosol Monitor Model 8520

Location	Date	PM 2.5³ (micrograms per cubic meter)	Comments
Back W corner of tire place (semis)	7/20/05	2,120	
Back W corner tire place (300-400 yards)	7/20/05	19,000	
Walton & Long Rd.	7/20/05	500	
Mile & Q	7/20/05	370	
Mile & Q	7/20/05	353	
Mile & Q	7/20/05	219	
Watertown City Health dept. parking lot	7/21/05	>200	~9:45pm

Table 2
Direct-Reading Particle Counts for Ultrafine Particles
Collected by WI DPH and Watertown HD
7/19/05 to 7/20/05

Location	Date	Ultrafine ⁴ (particles per cubic centimeter)	Comments
Hwy 26 & Zillge	7/19/05	-	On approach to City of Watertown
Ebenson & 26	7/19/05	-	“
Turf & 26	7/19/05	-	“
Gateway & 26	7/19/05	-	“
26 & City Limits	7/19/05	-	“
26 & Y (beneath plume)	7/19/05	-	“
Boome & 26	7/19/05	-	“
Omena & 26 (beneath plume)	7/19/05	-	87F, Wind NW 10-15 mph
Command center (downwind of fire)	7/19/05	7,500	~3:30 pm
On site at fire location	7/19/05	163,000+	
Hospital N side air intake at ground level	7/19/05	8,000	~4:30 pm
Hospital SE Roof air intake	7/19/05	9,400	
Hospital Inside lobby	7/19/05	2,900	
Hospital NE ICU	7/19/05	12,000	Counts possibly due to instrument response to humidification that is introduced post-filter
Hospital Day Surgery	7/19/05	1,700	
Hospital ICU	7/19/05	700	
Hospital Surgery	7/19/05	2,000	
Hospital 3 rd Floor S OB	7/19/05	2,000	Following hospital monitoring, data was collected about 9 miles east near town of Ixonia. Typical background values were observed. Plume was widely dissipated overhead.
Walton Rd.	7/20/05	100,000	
Richwood Rd.	7/20/05	134,000	
Quarry & Rich	7/20/05	175,000	
Just past Barricade (gray house)	7/20/05	202,000	
Jody	7/20/05	7,810	
K & Q	7/20/05	151,000	
Breckeridge & Welch	7/20/05	170,000	Heavy downpour
Fleet Farm	7/20/05	47,000	
K & 19	7/20/05	15,000	
Rich Rd. & 19	7/20/05	3,000	
Hospital parking lot	7/20/05	37,000	
Hwy 26 & Q	7/20/05	104,000	

⁴ Ultrafine particle count (counts per cubic centimeter) collected with a TSI Instruments PTRAK Ultrafine particle counter Model 8525. Ultrafine particles are those with a diameter between 0.01 and 1.0 microns.

Location	Date	Ultrafine⁴ (particles per cubic centimeter)	Comments
26 & CG	7/20/05	2,500	
Back W corner of tire place (semis)	7/20/05	108,000	
Back W corner tire place (300-400 yards)	7/20/05	275,000	
Walton & Long Rd.	7/20/05	-	
Mile & Q	7/20/05	-	
Mile & Q	7/20/05	-	
Mile & Q	7/20/05	-	
Watertown City Health dept. parking lot	7/21/05		~9:45pm

Table 3
Summary of Direct-Reading Aerosol (Particulate) Monitor Data
Collected by USEPA/Weston
7/21/05 to 7/22/05

Location (see Attachment 1)	Date & Time	Result $\mu\text{g}/\text{m}^3$	Comments
11- Hwy 19 ~1.5 mi. S of fire	7/21 16:27-21:29	Max: 211.4 Ave: 33.3	
	7/22 9:35-19:49	Max: 341.5 Ave: 11.7	
12- Rich Rd. & Provimi Rd. ~0.25 mi W of fire	7/21 15:54-21:18	Max: 312.8 Ave: 6.82	Ave. diam. = 0.50 μm
	7/22 9:18-19:41	Max: 6,253 Ave: 185.74	Ave. diam. = 1.232 μm
4- Fire Scene, Provimi Rd.	7/21 17:48 to 3:13 7/22	Max: 51,470 Ave: 3471.43	Ave. diam. = 1.054 μm
14- Command center, Provimi Rd., ~ 0.25mi E of fire	7/21 15:54-18:08	Max: 3,921.67 Ave: 447.46	Ave. diam. = 0.746 μm
	7/22 10:47-14:46	Max: 40.50 Ave: 8.65	Ave. diam. = 0.238 μm
	7/22 16:32-19:07	Max: 723.7 Ave: 57.83	Ave. diam. = 0.275 μm
3- Hwy K, ~0.5mi NE of fire	7/21 16:07-21:05	Max: 31.22 Ave: 12.74	Ave. diam. = 3.397 μm
	7/22 9:03-19:30	Max: 51.85 Ave: 14.11	Ave. diam. = 0.376 μm

Table 4
Total Suspended Particulate
Collected by USEPA/Weston
7/21/05 to 7/22/05

Location	Date	Time	Result µg/m³	Comments
NE of fire on Hwy K N of Provimi Rd.	7/21/05	16:42	16.96	EPA/Weston
	7/22/05	16:48	25.97	EPA/Weston
W of fire on Rich Rd., S of Provimi Rd.	7/21/05	19:05	138.03	EPA/Weston
	7/22/05	16:31	120.75	EPA/Weston
SE of fire @ Hwy K and Hwy 10	7/21/05	18:00	45.07	EPA/Weston
	7/22/05	11:13	30.06	EPA/Weston

Table 5
Summary of Direct-Reading Toxic Gas Data
Collected by USEPA/Weston
7/21/05 to 7/22/05

Location (see Attachment 1)	Date & Time	Result Summary (parts per million) ⁵	Comments
12- Rich Rd. & Provimi Rd. ~0.25 mi W of fire	7/21 16:54- 7/22 19:24	NO: 0 VOC: 0-5ppm, highest on morning of 7/22 SO2: 0	
EPA3-	7/21 18:33- 7/22 19:19	CO: 0.5-10ppm from 18:57 to 19:15 then 2-30ppm on a number of occasions beginning at 19:24 VOC: 1 to 4 ppm on several occasions beginning at 19:25 H2S: 0.1 to 0.2ppm on several occasions beginning at 17:38	Momentarily exceeded occupational guidance value of 25 ppm for CO
5- Quarry Rd. & Rich Rd., ~1.0 mi N	7/21 16:30- 7/22 19:24	NO: @10:16 steady increase to 5.0 ppm @ 15:42, then declines to 0 VOC: 0-10ppm until 6:38, then rise to 100-300 ppm for ~90 minutes SO2: 0	
15- Rich Rd., ~0.5mi N of fire	7/21 16:40- 7/22 19:24	NO: 0 to 1.0 ppm up to 10:17, then rise to 1.8 ppm VOC: 0-27ppm from 7:09 to 8:15 wit peak @7:16 SO2: 0	
10- Hwy K, ~0.4 mi NE of fire	7/21 16:30 7/22 18:13	NO: 0 to 1.5 through sample period, peak ~21:26 VOC: 0 SO2: 0	
3- Hwy K, ~0.5 mi NE of fire	7/21 16:29 7/22 8:59	CO: 15 to 50ppm from 18:30 to 19:30 VOC: 0.5 to 3ppm on a couple of occasions H2S: 0.3 to 0.4 ppm for most of sample period	Exceeded CO occupational exposure value of 25 ppm and H2S acute minimum risk level (MRL) of 0.2 ppm
14- Provimi Rd., ~0.5mi N of fire	7/21 19:05 7/22 19:24	CO: 1 to 5 ppm until 9:01, then sharp drop to zero NO: VOC: 0 until 21:48, then steady rise to 40 ppm @7:22 H2S: 0	
13- ~0.1 mi W of intersection of	7/21 16:30	CO: 0 to 5 ppm on a couple of occasions	SO2 acute MRL

⁵ CO: Carbon Dioxide, H2S: Sulfur Dioxide, NO: Nitric Oxide, SO2: Sulfur Dioxide, VOC: Volatile Organic Compounds

Location (see Attachment 1)	Date & Time	Result Summary (parts per million)⁵	Comments
Hwy K and railroad tracks, ~0.2mi NE of fire	7/22 19:24	VOC: 0 to 2 ppm on several occasions SO2: 0.1 ppm on several occasions @ 14:58	of 0.01 ppm was exceeded
2- Rich Rd. ~0.2 mi S of Provimi Rd.	7/21 18:33 7/22 19:19	CO: 0.5 to 13 ppm from 18:57 to 19:15, then 0.1 to 30 ppm from 19:24 to 19:25 VOC: 0.1 ppm on a few instances H2S: 0.0 to 0.2 ppm on several instances from 10:29 to 13:20	
11- Hwy 19, ~1.5 mi S of fire	7/21 16:45 7/22 19:24	CO: NO: 0.1 to 0.2, @ 14:43 a steady climb to 2.4 ppm VOC: 0-40 ppm on a couple of occasions SO2: 0 to 0.2 ppm	O2 sensor fluctuated between high alarm and low alarm conditions (sensor malfunction?) SO2 acute MRL of 0.01 ppm exceeded.
4- Fire scene, Provimi Rd.	7/21 18:33 7/22 8:54	CO: 1 to 28 ppm from 18:57 to 21:31, then decline to 0 VOC: 0 to 15 until 00:54 then rise to 100 to 11,000 ppm	

Table 6
Summary of Volatile Organic Compound Data
Collected by USEPA/Weston and Analyzed by Method EPA TO-15
7/21/05 to 7/22/05

Compound	S of Provimi Rd. at entrance to tire facility (W7910) 7/21 10:00	NW of fire area at Rich Rd., ~100 feet from fire 7/21 10:20	Parking lot of Watertown Health Department (background sample) 7/22 16:48	West of fire area, on Rich Rd. S of Provimi Rd. (near residence) 7/22 17:27	Comparison Value (CV)	Type of CV ⁶
1,2,4-Trimethylbenzene	3.4	8.1	0.75	ND	1.26	RBC
1,3,5-Trimethylbenzene	1.2	ND	ND	ND	1.26	RBC
1,3-Butadiene	9.8	5.3	ND	ND	0.028	RBC, 0.03 µg/m3 CREG
4-Ethyltoluene	5	15	ND	ND	NA	
4-Methyl-2-pentanone	2.5	18	ND	ND	758	RBC
Benzene	50	120	ND	ND	50	MRL (acute)
Bromomethane	ND	ND	1.1	ND	50	MRL (acute)
Cyclohexane	0.64	ND	ND	ND	1,805	RBC
Dichlorodifluoromethane	1	ND	1.2	0.58	364	RBC
Ethanol	4.1	ND	4.5	1.4	NA	NA
Ethylbenzene	ND	63	ND	ND	1,000	MRL (intermediate)
Heptane	1.4	48	ND	ND	NA	
Hexane	2.7	5	0.45	ND	600	MRL (chronic)
Methylene chloride	ND	ND	3.2	1.7	600	MRL (acute)
m,p-Xylene	22	83	ND	ND	2,000	MRL (acute)
o-Xylene	4.3	16	ND	ND	2,000	MRL (acute)
Propene	88	35	1.3	0.55	NA	
Styrene	5.2	29	ND	ND	60	MRL (chronic)
Toluene	36	180	3.1	ND	1,000	MRL (chronic)
Trichlorofluoromethane	ND	ND	0.48	0.23	130	RBC

⁶ Risk Based Concentration Tables, USEPA Region 3, 2005.

RBC: Risk Based Concentration (chronic values), MRL: Minimum Risk Level, CREG: Cancer Risk Evaluation Guide

Table 7
Summary of Volatile Organic Compound Data
Collected by WI DPH and Analyzed by Method OSHA PV2120
7/19/05 to 7/20/05

Compound	Command Center 7/19/05 15:30	Richwood Rd. ~1 mile N of fire 7:54 7/20/05	Comparison Values	Comments⁷
1-ethyl-2-methyl benzene	ND	7 (estimated.)	NA	
1-methyl-4-(1-methylethyl)-Benzene	ND	16 (estimated)	NA	
2-methyl-1-propene	ND	25 (estimated)	NA	
2-methyl-1,3-butadiene	ND	8 (estimated)	NA	
7-methyl-7H-Dibenzo {b,g} carbazole	ND	10 (est.)	NA	
Acetone	ND	7 (estimated)	26,000	
Benzene	ND	27	50	MRL (acute)
D-Limonene	ND	13 (estimated)	NA	
Ethylbenzene	ND	5.4	1,000	MRL (intermediate)
Hexamethylcyclotrisiloxane	ND	7 (estimated)	NA	
Hexanal	14	ND	NA	
Methylene chloride	49	ND	600	MRL (acute)
Nonanal	17	ND	NA	
Octamethylcyclotetrasiloxane	10	ND	NA	
Octanal	5	ND	NA	
p&m-xylene	ND	9.8	2,000	MRL (acute)
Propene	ND	11 (estimated)	NA	
Toluene	ND	22	1,000	MRL (chronic)

⁷ MRL: Minimum Risk Level

Table 8
Summary of Metals in Groundwater Data
Collected by WI DNR
7/21/05

Compound	Private residence at west side of fire site on Provimi Rd.	Private residence south of site on Provimi Rd.	~0.5 miles SW of fire site	Comparison Value	Comments ⁸
Aluminum	5.21	4.82	5.16	20,000	Intermediate EMEG-child
Arsenic	0.702	8.11	0.484	3	Chronic EMEG-child, NR140 ES= 10
Barium	69.3	46.6	63.2	2,000	NR140 ES
Boron	176	26	26	100	Intermediate EMEG-child, NR140 ES 960
Cadmium	0.026	0.032	0.70	2	Chronic EMEG-child, NR140 ES 5
Cobalt	1.37	0.355	1.57	40	NR140 ES
Copper	18.4	1.56	1.12	100	Intermediate EMEG-child, NR140 ES= 1,300
Lead	0.501	0.123	0.400	15	NR140 ES
Lithium	6.45	3.71	3.46	NA	NA
Manganese	20.2	22.9	111	300	LTHA
Molybdenum	0.697	0.987	0.555	40	LTHA
Nickel	10.5	1.20	1.55	100	NR140 ES
Selenium	1.4	ND	ND	50	NR140 ES
Thallium	0.157	0.005	0.088	0.5	LTHA
Vanadium	ND	ND	0.162	30	Intermediate EMEG child
Zinc	28.9	21	8.54	2,000	LHAL

⁸ EMEG: ATSDR Environmental Media Evaluation Guide, LTHA: USEPA Lifetime Health Advisory, NR140ES: Wisconsin natural Resources 140 enforcement standard, LHAL: Wisconsin Lifetime Health Advisory Level

Table 9
Summary of Metals in Surface Water Data
Collected by WI DNR
7/20/05 to 7/22/05

Compound	Unnamed ditch Farm road 200 yds S of Provimi Rd crossing 7/20/05 12:25	Downstream of Culvert Provimi Rd.	Drainage from Fire Site to Ditch 7/20/05 13:10	300 ft. SE of office bldg. 7/21/05 14:30	100 ft. NW of Hopper in bean field 7/21/05 16:20	North Breech Foam 7/22/05 13:12	Comparison Value ⁹	Comments
Aluminum	ND	ND	ND	2,190	486	32,000	NA	
Barium	ND	ND	ND	ND	ND	470	28,000	
Chromium	ND	ND	ND	ND	ND	37	NA	NR105.09 for hexavalent chromium
Copper	12	20	24	ND	ND	93	NA	
Iron	0.5 (mg/L)	0.7 (mg/L)	0.9 (mg/L)	ND	ND		NA	
Lead	ND	ND	ND	ND	ND	119	2,240	NR105.08
Mercury	ND	ND	ND	ND	ND	0.08	336	NR105.08
Zinc	205	805	1,280	12,000	1,980	12,400	889.38	City of Watertown WWTP discharge limit

⁹ Comparison values for surface water are from Wisconsin Natural Resources 105 and assume non-public water supply and limited aquatic life.

Table 10
Summary of Volatile Organic Compounds (VOCs) in Surface Water Data
Collected by WI DNR
7/20/05 to 7/22/05

Compound	Runoff Ponding From Fire Suppression 7/20/05 8:55	Ditch Downstream of Fire Site, Hwy 19 & Rich Rd. 7/20/05 12:05	Ditch, 50 ft. N of Provimi Rd., E of fire site 7/20/05 9:02	North Breech Foam Water 7/22/05 13:35	S berm near Telephone Pole	Unnamed Ditch, Hwy 19 Bridge 7/21/05 13:35	Unnamed Stream, Navan Rd. Crossing 7/21/05	Bean field, N of site 7/21/05 16:25	Comparison Value	Comments
1,2,4-Trimethylbenzene		20			6.3	1.7		5.4	NA	
1,2-Dichloroethane		0.84							770	NR105.09
1,3,5-Trimethylbenzene	0.83	5.8		9.2	1.8	0.51		1.9	NA	
Benzene	170	500		1,000	85	44		130	1,300	NR105.09
Ethylbenzene	28	140		180	19	15		27	560,000	NR105.08
Isopropylbenzene	1.9	16		28	2.3	1.0		2.6	NA	
m&p Xylene	58	200		310	68	24		57	NA	
n-Propylbenzene	1.5	9.1		16	1.1	0.42		1.8	NA	
Naphthalene	27	130	1.5	83	27	16	0.53	23	NA	
o-Xylene	18	54		61	12	6.2		11	NA	
p-Isopropyltoluene	5.8	33		74	24	1.5		8.5	NA	
Styrene	39	150		110	7.7	4.1		30	NA	
Toluene	99	710		1,100	100	55		110	1,200,000	NR105.08
4-Methyl-2-pentanone	230	1,200		1,200	360	290		560	NA	
Acetone	370	1,800		860	360	600		320	NA	
Methylethylketone	84	410		270	68	170		86	NA	
Carbon disulfide				5.9					NA	
n-Hexane				1.9					NA	

Table 11
Summary of Polynuclear Aromatic Hydrocarbons (PAHs) Data in Surface Water Data
Collected by WI DNR
7/20/05 to 7/22/05

Compound	Runoff Ponding From Fire Suppression 7/20/05 8:55	Ditch Downstream of Fire Site, Hwy 19 & Rich Rd. 7/20/05 12:05	Ditch, 50 ft. N of Provimi Rd., E of fire site 7/20/05 9:02	North Breech Foam Water 7/22/05 13:08	Unnamed Ditch, Hwy 19 Bridge 7/21/05 13:35	Unnamed Stream, Navan Rd. Crossing 7/21/05	Comparison Value	Comments
1-Methylnaphthalene	3.7	9.1	ND	12	0.68	ND	NA	
2-Methylnaphthalene	3.1	8.4	ND	12	0.54	ND	310	USEPA Region 3 RBC for residential soil
Acenaphthene	1.1	1.3	ND	2.3	ND	ND	600	RMEG-child for drinking water
Acenaphthylene	2.8	ND	ND	ND	ND	ND	NA	
Anthracene	1.6	0.28	ND	0.83	ND	ND	300	RMEG-child for drinking water
Benzo (g,h,i) perlyene	1.4	ND	ND	ND	ND	ND	NA	
Fluorene	ND	1.8	ND	3.0	ND	ND	400	RMEG-child for drinking water
Indeno(1,2,3-cd) pyrene	0.56	ND	ND	ND	ND	ND	0.87	USEPA Region 3 RBC for residential soil

Compound	Runoff Ponding From Fire Suppression 7/20/05 8:55	Ditch Downstream of Fire Site, Hwy 19 & Rich Rd. 7/20/05 12:05	Ditch, 50 ft. N of Provimi Rd., E of fire site 7/20/05 9:02	North Breech Foam Water 7/22/05 13:08	Unnamed Ditch, Hwy 19 Bridge 7/21/05 13:35	Unnamed Stream, Navan Rd. Crossing 7/21/05	Comparison Value	Comments
Naphthalene	13	71	ND	55	8.5	ND	100	USEPA Lifetime Health Advisory for drinking water
Phenanthrene	6.6	1.6	ND	3.4	ND	ND	NA	

Table 12
Summary of Metals in Soils Data (parts per million)
Collected by WI DNR
7/21/05

Compound	200 ft. from NW Corner of Bldg. 7/21/05 14:50	300 ft. SE of Office Bldg. 7/21/05 16:30	Comparison Value	Comments
Aluminum	4,700	1,900	NA	
Arsenic	11		0.43	USEPA Reg. 3 Risk Based Conc. for residential soils (cancer), pica level= 10 ppm
Cadmium	24.1	0.9	78	USEPA Region 3 Risk Based Conc. for residential soils - food,
Chromium	4.1	2.5	230	Reg. 3 (hexavalent)
Lead	65	29	400	USEPA
Zinc	39,700	13,000	23,000	Reg. 3 Risk Based Conc. for residential soils.

Table 13
Summary of VOCs in Soils Data (parts per billion)
Collected by WI DNR
7/21/05

Compound	200 ft. from NW corner of building 7/21/05 14:45	300 ft. SE of Office Bldg. Corner 7/21/05 14:30	Comparison Value	Comments
1,2,4-Trimethylbenzene	1.7	0.73	NA	
1,3,5-Trimethylbenzene	0.6		NA	
Benzene	17		200	RMEG-child= 200, CREG= 10
Ethylbenzene	3.7	1.7	5,000	RMEG-child= 5000
Isopropylbenzene	0.49	0.53	NA	
m&p Xylene	7.3	0.82	10,000	Intermediate EMEG-child
n-Butylbenzene		1.2	NA	
n-Propylbenzene	0.60	0.71	NA	
Naphthalene	8.3	7.1	NA	
o-Xylene	1.1		10,000	Intermediate EMEG-child
p-Isopropyltoluene	15	5.8	NA	
Styrene	2.3	1.2	10,000	Intermediate EMEG-child
Toluene	13	1.5	1,000	Intermediate EMEG-child