Health Consultation

Evaluation of Health Concerns Associated with

COLUMBUS CHEMICAL INDUSTRIES FIRE
DODGE COUNTY, WISCONSIN

Prepared by the
Wisconsin Department of Health Services

SEPTEMBER 25, 2009

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

Health Consultation

Evaluation of Health Concerns Associated with

COLUMBUS CHEMICALS INDUSTRIES FIRE
DODGE COUNTY, WISCONSIN

Prepared by

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

Summary and Statement of Issues

On the morning of May 12, 2009, the Dodge County Human Services and Health Department (DCHSHD), Columbia County Health and Human Services (CCHHS), and the United States Environmental Protection Agency (US EPA) requested assistance from the Wisconsin Department of Health Services (DHS) in assessing public health hazards associated with a large-scale chemical fire at Columbus Chemical Industries (CCI), located at N4335 Temkin Rd, 1 mile northeast of Columbus, Wisconsin. CCI is a processor and packager of high purity chemicals, specializing in acids, salts, and various analytical solutions/blends.

The five main public health concerns and exposure pathways associated with the CCI chemical fire were:

1) The release of toxic chemicals into the air and possible inhalation exposures
2) The deposition of particulates adsorbed with toxins and potential for dermal contact and/or ingestion in communities downwind of the fire
3) Dermal contact and/or ingestion of chemicals in pooled run-off from the plant
4) Dermal contact and/or ingestion of chemicals from contaminated soils near CCI
5) Drinking water contamination of nearby private wells from chemical run-off

With regard to these five potential public health concerns, DHS has reached the following conclusions in this health consultation report:

DHS concludes that inhaling smoke that came from the fire is not expected to have harmed people's health. This is because the downwind areas most impacted by smoke from the fire were evacuated as a precautionary measure. And while the smoke from the fire likely contained chemicals used at the facility, air monitoring found only momentary peaks of certain chemicals in ambient air, and the contaminant concentrations and particulate levels were not sustained at levels of health concern in the nearby residential and commercial areas downwind of the fire.

Next Steps: No additional steps are needed by public health agencies to address this conclusion.

DHS concludes that downwind deposition of particles and chemicals on surfaces are not expected to be harmful to people's health, because wipe sampling either did not find contaminants or only found very low levels of chemicals. Wipe samples at downwind locations did not reveal any notable deposition of acids or metals from the smoke plume. Heavy rainfall on the night of May 13, 2009, would have neutralized, diluted or washed away any residues remaining on off-site surfaces.

Next Steps: No additional steps are needed by public health agencies to address this conclusion.

DHS concludes that people were not harmed by the acidic surface water run-off from the CCI fire. The public did not have any contact with the acidic run-off because emergency responders promptly secured the affected area to protect the public, and berms were constructed to contain the chemical run-off in ditches adjacent to CCI. Additionally, the pooled run-off was neutralized and removed from the site before access controls were removed, and there was no evidence of any exposure by the public.

Next Steps: No additional steps are needed by public health agencies to address this conclusion.

DHS concludes that soils where surface water run-off was once located could be contaminated, but there is a lack of data to determine whether this could harm people in the future. It is possible that chemical residues remain in soils where run-off water collected, and these residues could be at levels that pose a health concern. Until the potentially affected soils have been tested, public access should be restricted.

Next Steps: Additional testing is needed to determine whether any contaminated run-off seeped into the ground prior to being removed and has impacted the soils near CCI. Depending upon the results of the soil analyses, a soil management plan may need to be developed for the impacted soil by the contaminated run-off water.

DHS concludes that drinking water in the vicinity of the CCI property has not yet been affected by run-off from the fire and is safe to drink, but contaminants may reach groundwater in the future and cause nearby private well water to become unsafe. Currently, testing of groundwater monitoring wells and nearby private wells does not indicate that groundwater beneath or around the CCI property has been affected by the fire, and private well water is safe to use and drink. However, groundwater could become affected in the future if soil contaminants continue to leach and eventually reach groundwater.

Next Steps: Continued testing of groundwater monitoring wells and private wells is needed to ensure that the private wells providing drinking water remain safe to use and consume. If there is evidence in the future of private well contamination from the fire, bottled water should be used for drinking and cooking until a remediation plan can be developed, employed, and shown to effectively reduce or eliminate all harmful chemicals.

Background

Summary of Events

On May 11, 2009, at approximately 8:05 pm, a fire occurred at the CCI facility on Temkin Road in Columbus (Dodge County), WI. CCI is a large chemical processing facility, consisting of six buildings. Fire officials established a ½ mile exclusion zone around CCI. Firewalls effectively contained the fire to its site of origin in Building 4, which served as the finished goods warehouse and housed over 1,500 different chemical formulations. Shortly after fire suppression efforts began, there were several explosions due to the presence of water-reactive chemicals in Building 4 (e.g., elemental sodium). Two fire-fighters were injured by the explosions, taken to the local hospital, treated and released. A total of nineteen fire-fighters were run through a decontamination procedure and taken to the local hospital for evaluation. The explosions prompted fire officials to cease fire suppression efforts. An estimated 1000 pounds of hydrogen fluoride, fluorine and sodium bromine may have been released into the air. Officials evacuated approximately 144 residents within ½ mile north (downwind) of the fire at CCI, and issued a shelter-in-place advisory for approximately 8 miles in all directions. The shelter-in-place advisory reached approximately 6000 residences using the county's Code Red Emergency calling system. Officials also closed nearby highways (WI-73 and US-151).

On day 2 of the fire (May 12, 2009), responders began to incrementally lift the shelter-in-place advisory and shrink the exclusionary zone. This was based on plume dispersion models

developed by the National Atmospheric Release Advisory Center (NARAC) (Appendix A) and air monitoring data collected by fire officials, the Wisconsin National Guard 54th Civil Support Team[1], and the US EPA with input from DHS. However, DHS recommended that six adjacent and/or downwind residences and four businesses remain evacuated throughout the duration of the fire, as a precautionary measure due to the continuing fire and smoke. The fire continued to burn and/or smolder until approximately 1:00 am on May 14, 2009, when the fire went out and responders relinquished control of the property to owners of CCI.

Based on the large variety and total amount of chemicals stored at CCI, and the inability of fire crews at the scene to fight the fire with traditional means (water and foams), there was potential for unsafe chemical exposures to the surrounding community. This health consultation report reviews the environmental investigation performed at residential, recreational, and business sites surrounding CCI and in the path of the chemical fire plume, in terms of the five exposure pathways listed above: air, dust, surface water, soil, and groundwater.

Data Summary

Air monitoring in the adjacent community was conducted during the fire by, or under the direction of, the Wisconsin National Guard 54th Civil Support Team[1] and the US EPA. On May 13, CCI's environmental consultant, BT[2], assumed air monitoring with US EPA oversight. Throughout the incident, air monitoring demonstrated that all chemicals of concern were below the applicable health standards (Table 1), established collectively by DCHSHD, DHS, and US EPA. Particulate levels were mildly elevated at times throughout the duration of the fire; however, only two readings of 0.047 and 0. 070 mg/m^3 (milligrams per cubic meter) were above the applicable health action level of 0.035 mg/m^3 (US EPA 24 hour NAAQS for PM2.5). Of the 92 particulate readings taken during the fire at 13 monitoring stations around CCI (Appendix B), 77 were below 0.010 mg/m^3, and the average particulate concentration over this entire period, in the various locations tested, was 0.007 mg/m^3.

1- The 54th Civil Support Team is the Wisconsin National Guard's response team for assessing emergencies or terrorist events that involve weapons of mass destruction or toxic industrial chemicals.

Table 1. Summary of CCI Air Monitoring Data

Air Contaminant	Instrument	Health Action Level	Average	Range
LEL	MultiRAE and AreaRAE five-gas meters	>25% [1]	0	0
O_2		<19.5% or >25% [2]	20.9	20.7 – 21.2
CO		35 ppm [3]	0	0 - 1
VOCs		0.5 ppm [4]	0.0	0.0 – 2.0
H_2S		5.0 ppm [5]	0.0	0.0
HCN	ToxiRAE single-gas monitor	5.0 ppm [6]	0.0	0.0
Particulates	Personal DataRAM	0.035 mg/m^3 [7]	0.007	0.000 – 0.070
Draeger: Formaldehyde	Draeger Pump	N/A	Negative	Negative
Draeger: Acid		N/A	Negative	Negative – very slightly positive

Notes:

[1]Based on Title 29 of the Code of Federal Regulations Part 1910.94: Ventilation, for lower explosive limit (LEL) (OSHA 2007)
[2]Based on Title 29 of the Code of Federal Regulations Part 1910.146b: Permit-Required Confined Spaces, Definitions, for oxygen (O_2) (OSHA 1998)
[3]1 hour US EPA National Ambient Air Quality Standard (NAAQS) for carbon monoxide (CO) (US EPA 2007)
[4]One-half the Occupational Safety and Health Administration (OSHA) Permissable Exposure Limit (PEL) for benzene, as a measure of total volatile organic compounds (VOCs) (OSHA 2008)
[5]One-half the OSHA PEL for hydrogen cyanide (HCN) (OSHA 2006)
[6]One-half the American Conference of Governmental Hygienists (ACGIH) threshold limit value (TLV) for hydrogen sulfide (H_2S) (ACGIH 2009)
[7]24 hour US EPA NAAQS for particulate matter 2.5 µm and lower (PM2.5) (US EPA 2006)

Because a large amount of chemicals were consumed in the CCI fire, there was concern that chemical contaminants would be carried away in the smoke and deposition in downwind communities would result in chemical contamination of surfaces, and that the public may come in contact with these affected surfaces during routine activities. On May 12, DHS requested wipe sampling in four downwind communities thought to reside in the path of the plume based on ARAC plume dispersion models, and one sample just upwind of the fire in the town of Columbus, WI. The samples were collected in the early morning of May 13, 2009. A representative plume dispersion model and a description of the sampling locations can be found in Appendices B and C, respectively.

In consulting with representatives from CCI and the Wisconsin State Laboratory of Hygiene (WSLH), it was determined that the smoke transport and deposition of acids and metals onto downwind surfaces would be most probable, based on the chemicals reportedly stored and combusted in Building 4. DHS and WSLH also considered the most practicable approach in assessing site-related contaminants on downwind surfaces due to air deposition from the CCI smoke plume. Agencies concluded that only wipe samples with a pH value of 5.0 or lower should undergo laboratory analysis, and such analysis would target metals and anions (the by-product of acids following the loss of hydrogen ions) (Appendix C). The closest downwind community to CCI is Fall River (approximately 3 miles) and this was the only site tested that had a surface pH value at or below 5.0 (Fall River pH = 4). The surfaces tested at the other four locations had pH values ranging between 6 and 7.

Anion analysis of the Fall River wipe samples did not reveal any evidence of acid/anion contamination, as the anion levels were similar as those found on a "field blank" wipe sample (Table 2). Metals analysis of the Fall River wipe samples found only a slightly increased amount of phosphorus (14 µg/wipe), while all other metals were below detection limits (26 metals tested). Phosphorus is ubiquitous in the environment, as it exists naturally in rocks and is a component of many fertilizers and detergents. Thus, the levels of phosphorus detected in Fall River were not deemed to pose a public health concern.

Table 2. Wipe Sample Analytical Results

Sample ID	***WIPE01-051309***	***BLANK01-051309***
Date Collected	**05/13/2009**	**05/13/2009**
Laboratory ID	**1380962**	**1380967**
Metals (µg/sample) [1]		
Phosphorus	14	< 3.0
Anions (µg/sample) [2]		
Bromide	< 3.0	< 3.0
Fluorides (as F)	< 6.0	< 6.0
Phosphate	< 12	< 12
Chloride	43	54
Nitrate	47	38
Sulfate	26	22

[1] Metals were analyzed using Wisconsin Occupational Health Laboratory (WOHL) Method WM002.3.0, based on National Institute of Occupational Safety and Health (NIOSH) Method 7303 for Inductively Coupled Argon Plasma (ICAP) Metals (NIOSH 2003)

[2] Acid anions were analyzed via ion chromatography (IC) using WOHL Method WI002ia.9, based on NIOSH Method 7903 for Inorganic Acids (NIOSH 1994)

On the night of May 13, 2009, a strong storm moved through the upper Midwest and heavy rains fell on large portions of WI, including as much as 2 inches in the Columbus area (Appendix D). The following morning, on May 14, 2009, extensive follow-up pH testing was requested at the 5 locations where wipe samples were previously collected and DHS also performed field screening of puddles and other wet surfaces at many nearby homes, businesses and public areas. All surfaces tested after the rains had a neutral pH range of 6 to 7, indicating that any residual chemicals deposited at these locations had been effectively diluted and/or washed away.

In addition to the heavy rains on the night of May 13, 2009, approximately 10,000 gallons of water were initially used to fight the fire, creating surface run-off from the building and into nearby drainage ditches around CCI. Berms were constructed by responders around the impacted drainage ditches to contain the any potentially contaminated run-off. Run-off water from the fire confined by these berms was tested by US EPA and determined to be acidic (pH < 2). Further laboratory analysis was performed on the contained run-off for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), chloride, nitrates and sulfate. Results found that none of the analyzed chemicals exceeded the screening criteria listed in Title 40 of the Code of Federal Regulations (CFR), Part 261 – Identification and Listing of Hazardous Waste (US EPA 2007). However, there were a number of polycyclic aromatic hydrocarbons (PAHs) detected in the run-off, which could present a potential health risk if they reached groundwater and migrated to nearby private wells. Under direction of the Wisconsin Department of Natural Resources (WDNR), the liquid collected in the run-off containment pond underwent

pre-treatment (neutralization with lime) on-site and was shipped via vacuum truck to an appropriate disposal facility (Appendix E).

Due to the large volume of run-off that was generated from initial firefighting efforts and the heavy rainstorm on the night of May 13, 2009, there were concerns of the potential for chemical seepage into the ground leading to contamination of private wells on neighboring properties. As a precaution, CCI has provided bottled water to nearby homes and businesses with private wells. On May 15, 2009, CCI hired environmental consulting firm BT^2 to begin testing their pre-existing on-site groundwater monitoring wells for VOCs, metals and cyanide. Additionally, BT^2 conducted identical private well water testing for 13 neighboring businesses and residences, and will perform follow-up testing as needed. WDNR is overseeing the well testing and will determine the course of action for any future sampling and analysis.

Laboratory analysis of samples from the on-site monitoring wells and neighboring private wells indicated there was no apparent immediate impact from the CCI fire on private drinking water suppies. The only parameters that were above the Wisconsin Administrative Code, Chapter NR 140.10 public health groundwater quality Enforcement Standards (WDNR 2008) were two private wells that had elevated levels of arsenic and two other private wells that had elevated levels of lead. However, WDNR has determined that the arsenic concentrations are likely naturally occurring and the elevated lead levels are likely from household plumbing. Additional rounds of well water sampling at residences and monitoring wells on CCI property is planned to further evaluate the potential impact to groundwater.

Discussion

Exposure Pathways Analysis

The main exposure pathways associated with the CCI chemical fire identified by DHS were:
1) The release of toxic chemicals into the air and possible inhalation exposures
2) The deposition of particulates adsorbed with toxins and potential for dermal contact and/or ingestion in communities downwind of the fire
3) Dermal contact and/or ingestion of contaminated soils and run-off from the fire
4) Drinking water contamination of nearby private wells from contaminated run-off

Smoke from CCI Fire

During the earliest stages of the fire, a completed inhalation exposure pathway likely existed for certain residents downwind of the smoke plume, depending upon their location and whether or not their homes were well-sealed from the outside. However, residences within ½ mile downwind were evacuated shortly after the fire began, along with a shelter-in-place advisory for all residences within a 8 mile radius of the fire, making any exposure duration quite limited for those that followed the advisories. The homes and businesses within the ½ mile downwind zone were asked by the Dodge County Sherriff's Department to evacuate. One homeowner did not follow this recommendation and chose to shelter-in-place instead. The homeowner lived on a plot adjacent to CCI, but was not directly downwind of the smoke plume. Although air monitoring around the plant and in the nearby community did not take place during the first few hours of the fire, initial air screening results did not indicate any downwind readings that were above the established action levels for the contaminants of potential concern. The lack of air

contamination in the vicinity of CCI was likely due to the height of the plume and a dispersion trajectory that caused the smoke to pass up and over the homes and businesses immediately downwind of the fire. No cases of respiratory distress from smoke inhalation were reported by the public to DCHSHD or DHS, nor were any received by the local hospitals during or shortly after the CCI fire.

Downwind Air Deposition of Smoke Residuals

With regard to chemical contamination of downwind surfaces from smoke particulates, it does not appear there were notable or unsafe levels of metals or acids deposited by the smoke plume in public areas downwind of CCI, based on the analysis of wipe samples collected on the morning of May 13, 2009. Additionally, heavy rains on the night of May 13, 2009 likely neutralized or diluted all potential residuals on downwind surfaces, as indicated by field screening of pH levels the following day (May 14, 2009). Therefore, due to the lack of empirical evidence demonstrating downwind surface contamination, DHS concluded that dermal contact with downwind residuals constituted an incomplete exposure pathway, and the public health threat from particulate deposition was deemed negligible.

Surface Water Run-off

While the run-off from CCI into nearby drainage ditches was acidic (pH < 2), public contact with this fluid did not occur because the area was cordoned-off and only accessible to emergency workers. The run-off was subsequently neutralized and removed when the rains stopped on the morning of May 14, 2009. No standing water from the fire remains at the site. Thus, DHS determined that a completed direct contact exposure pathway for the general public did not exist for pooled run-off from CCI.

Drinking Water Wells

As the acidic, PAH-containing run-off was pooling in berm-contained areas, there was likely some seepage into the ground. Although the vast majority of the run-off water was neutralized and removed in a timely manner, it is plausible that the acidic run-off water could have percolated down into deeper soils prior to cleanup actions. It is also unlikely that smoke-generated PAHs in run-off water would migrate significantly through soils because PAHs are large molecules and tend to bind tightly with soil particles. Initial sampling of monitoring wells on the CCI property have not shown apparent changes in groundwater quality due to the fire; however, the seepage of acidic run-off from the surface to the water table will likely take many months. Private well water testing has also found no evidence of groundwater impact due to the CCI fire. DHS recommends ongoing testing of on-site monitoring wells and nearby private wells by WDNR to ensure that groundwater remains unaffected and is safe for ingestion, inhalation, and dermal exposures.

Public Health Implications

Smoke from CCI Fire

During the CCI fire, inhalation exposure to airborne particulates and other chemical by-products represented the greatest potential health concern to the public. The US EPA 24 hour NAAQS for PM2.5 was exceeded on two occasions at two off-site locations, although there were no sustained elevations in particulate levels at any of the 13 perimeter air monitoring sites. As an important

note, the particulate monitors used during the fire did not differentiate between PM10 and PM2.5 fractions, so the measured particulate concentrations constitute a fairly broad range of sizes. Thus, assessing the measured particulate concentrations against the PM2.5 guidance value is a conservative approach, because the actual PM2.5 levels were likely somewhat lower than those measured. PM2.5 constitutes the respirable fraction of smoke particles believed to pose the greatest health risks because of their small size and their ability to lodge deeply into the lungs, inducing a significantly greater inflammatory response than larger particles (US EPA 2004). Nevertheless, based on the lack of any sustained elevations in particulate concentration in nearby residential and commercial areas downwind of CCI, DHS determined that smoke plume exposure during the fire is unlikely to result in adverse health effects among the general public, and for those who sheltered-in-place and/or evacuated, smoke from the fire posed *no apparent public health hazard*.

On one occasion, perimeter air monitoring found that the exposure guideline for benzene (VOCs) was exceeded with a reading of 2.0 ppm, although this single reading was clearly an outlier compared to all other VOC measurements taken around CCI. In fact, despite this transient spike, the average VOC concentration measured by monitoring during the fire was still very close to 0.0 ppm. Although there were likely momentary pockets of high VOC concentration in and around the burning building, the general public was not allowed close enough to CCI to gain significant VOC exposure, and all emergency responders wore respiratory protection. Therefore, DHS concluded that there was *no apparent public health hazard* associated with inhalation exposure to VOCs for the general public. No other comparison values were exceeded for the remaining air contaminants of concern (carbon monoxide, hydrogen sulfide, hydrogen cyanide, formaldehyde and acids). Therefore, DHS determined that exposure to these chemicals during the CCI fire also posed *no apparent public health hazard*.

Downwind Air Deposition of Smoke Residuals

Wipe samples at downwind locations didn't reveal any notable deposition of acids or metals from the CCI smoke plume. Additionally, heavy rainfall on the night of May 13, 2009, would have neutralized and/or diluted all residuals remaining on any off-site surfaces. As a result, DHS concludes that air deposition from the CCI smoke plume posed *no apparent public health hazard*.

Surface Water Run-Off

Surface water exposure near the site represents *no public health hazard*, since it was not accessible to anyone other than protected emergency respondents and because it has since been removed. While the contaminated water run-off was removed, it may have impacted the soils it came in contact with. Pending lab results of the potentially impacted soils, a soil management plan may need to be developed. Such a plan may include temporarily covering, permanently capping, or removing any impacted soils. Until there is more testing of the potentially contaminated soils, they remain an *indeterminate public health hazard*.

Drinking Water Wells

Currently, testing of groundwater monitoring wells and nearby private wells does not indicate that groundwater beneath or around the CCI property has been adversely affected by the fire and

subsequent run-off. Thus, drinking water is presently safe to drink and poses *no public health hazard.* However, it is possible that groundwater near CCI could become contaminated in the future. Because of this potential, nearby private well water remains a *future indeterminate public health hazard,* necessitating continued groundwater and private well monitoring to ensure that drinking water remains safe to use and consume.

Community Health Concerns

The surrounding communities were initially concerned about the potential impacts from the fire. As part of the unified response, a Pubic Information Officer was appointed at the beginning of the fire, as well as a media staging area and public shelter location. These steps were a success and information was very quickly sent to the media, briefings were held on an hourly basis leading into the early hours of the following morning. Detailed press releases (Appendix F) were also held after each morning and afternoon command briefing. It was conveyed back through local residence feed back that the constant information relayed to the media created a sense of ease and feeling of security that things were being handled adequately. The arrival of state and federal agencies early in the event was also helpful.

Child Health Considerations

Children are a primary concern when evaluating the risk posed by toxic substance exposure in a community. The comparison values used in evaluating exposures from the fire consider the entire community, including children. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase exposure potential. Children have increased relative respiration rates and surface areas, predisposing them to greater relative exposures. If children are exposed to higher levels of contaminants during critical growth stages, their developing body systems can sustain permanent damage. Therefore, it is important to impose exposure guidelines that carefully consider the enhanced susceptibility of children to toxic insults. Because it was possible that children may have been exposed to smoke from the fire, the community was advised during the incident 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 smoke, including children, the elderly, and those with respiratory disease.

Conclusions

DHS reached five conclusions regarding the May 2009 fire at the Columbus Chemical Industries facility, in Columbus, Wisconsin.

DHS concludes that inhaling smoke that came from the fire is not expected to have harmed people's health. This is because the downwind areas most impacted by smoke from the fire were evacuated as a precautionary measure. And while the smoke from the fire likely contained chemicals used at the facility, air monitoring found only momentary peaks of certain chemicals in ambient air, and the contaminant concentrations and particulate levels were not sustained at levels of health concern in the nearby residential and commercial areas downwind of the fire. Thus, this pathway posed "no apparent public health hazard".

DHS concludes that downwind deposition of particles and chemicals on surfaces are not expected to be harmful to people's health, because wipe sampling either did not find contaminants or only found very low levels of chemicals. Wipe samples at downwind locations did not reveal any notable deposition of acids or metals from the smoke plume. Heavy rainfall on the night of May 13, 2009, would have neutralized, diluted or washed away any residues remaining on off-site surfaces. In summary, any contaminants deposited from the smoke plume were at very low levels, present for a very short period, and posed "no apparent public health hazard."

DHS concludes that people were not harmed by the acidic surface water run-off from the CCI fire. The public did not have any contact with the acidic run-off because emergency responders promptly secured the affected area to protect the public, and berms were constructed to contain the chemical run-off in ditches adjacent to CCI. Additionally, the pooled run-off was neutralized and removed from the site before access controls were removed, and there was no evidence of any exposure by the public. Thus this pathway posed "no public health hazard."

DHS concludes that soils where surface water run-off was once located could be contaminated, but there is a lack of data to determine whether this could harm people in the future. It is possible that chemical residues remain in soils where run-off water collected, and these residues could be at levels that pose a health concern. Until the potentially affected soils have been tested public access should be restricted as these soils pose an "indeterminate public health hazard".

DHS concludes that drinking water in the vicinity of the CCI property has not yet been affected by run-off from the fire and is safe to drink, but contaminants may reach groundwater in the future and cause nearby private well water to become unsafe. Currently, testing of groundwater monitoring wells and nearby private wells does not indicate that groundwater beneath or around the CCI property has been affected by the fire, and private well water is safe to use and drink and poses "no public health hazard". However, groundwater could become affected over time and poses a "future indeterminate public health hazard", and continued groundwater and private well monitoring is needed to ensure that drinking water remains safe to use and consume.

Recommendations

In follow-up to the EPA- and WDNR-led cleanup efforts at CCI, DHS recommends the following actions:

- Additional testing to determine whether any contaminated run-off that seeped into the ground prior to its removal has impacted the soils near CCI. Depending upon the results of the soil analyses, a soil management plan may need to be developed for the impacted soil by the contaminated run-off water.

- Continued testing of groundwater monitoring wells and private wells to ensure that private wells used for drinking water remains safe. If there is evidence in the future of private well contamination as a result of the fire, bottled water should be used for drinking and cooking until a remediation plan can be developed, employed, and shown to effectively reduce or eliminate all harmful chemicals.

Public Health Action Plan

The public health action plan (PHAP) identifies actions that have been or will be taken to protect the health of residents near CCI. The PHAP ensures that public health hazards have been identified and that a plan of action is established to halt or prevent unsafe exposures to hazardous substances in the environment.

Actions that have been taken by agencies for this case include:

- EPA has overseen air monitoring activities throughout the duration of the fire, at locations around the perimeter of CCI, on nearby highways and in neighborhoods surrounding CCI.
- DHS worked with DCHSHD and Dodge County Emergency Management to inform local businesses and residents of the potential health hazards associated with the CCI fire.
- WDNR recommended the construction of berms in the drainage ditches around CCI to contain run-off from the site.
- EPA collected run-off samples for laboratory analysis of VOCs, SVOCs and pH.
- DHS directed the collection of wipe samples from downwind locations for analysis of metals, anions and pH.
- WDNR has conducted initial sampling and laboratory analysis of on-site monitoring wells and nearby private wells for cyanide, metals and VOCs.
- WDNR is currently analyzing potentially impacted soils for metals, VOCs, SVOCs and pH.
- CCI has provided bottled water to those with potentially impacted private wells since shortly after the fire began.

Current and future actions to be implemented by agencies involved in this case include:

- DHS will review and evaluate future analyses of potentially impacted soils and private wells near CCI for protectiveness of public health.
- WDNR will work with DHS to develop a soil management plan, if necessary, to prevent soil exposure to any contaminants from the contaminated CCI runoff.
- If private wells are found to be contaminated in the future, DHS will collaborate with WDNR to apprise well owners of the health concerns associated with their well, and develop a plan to minimize or eliminate exposure.

Consultation Authors, Technical Advisors

Ryan Wozniak, MPH, Ph.D.
Toxicologist
Health Hazard Evaluation Unit
Bureau of Environmental and Occupational Health
Division of Public Health
Wisconsin Department of Health Services

Bruce Rheineck, MS
Hydrogeologist
Bureau of Environmental and Occupational Health
Division of Public Health
Wisconsin Department of Health Services

ATSDR Regional Representative
Mark Johnson
Division of Regional Operations, Region V
ATSDR

ATSDR Technical Project Officer
Jennifer Freed
Superfund Program Assessment Branch
Division of Health Assessment and Consultation
ATSDR

References

OSHA. 2007. Code of Federal Regulations, Title 29, Part 1910.94. *Ventilation*. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9734&p_table=standards

OSHA. 1998. Code of Federal Regulations, Title 29, Part 1910.146b. *Permit-Required Confined Spaces, Definitions, for Oxygen*. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9797

US EPA. 2007. Code of Federal Regulations, Title 40, Part 50.8. *National Primary and Secondary Ambient Air Quality Standards, National Primary Ambient Air Quality Standards for Carbon Monoxide*. http://www.access.gpo.gov/nara/cfr/waisidx_07/40cfr50_07.html

OSHA. 2008. Code of Federal Regulations, Title 29, Part 1910.1028. *Regulations, Toxic and Hazardous Substances, Benzene*. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10042

OSHA. 2006. Code of Federal Regulations, Title 29, Part 1910.1000. *Regulations, Toxic and Hazardous Substances, Table Z-1 Limits for Air Contaminants*. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992&p_text_version=FALSE

ACGIH. 2009. Hydrogen Sulfide: TLV® Chemical Substances Draft Documentation, Notice of Intended Change.

US EPA. 2006. Code of Federal Regulations, Title 40, Part 50.13. *National Primary and Secondary Ambient Air Quality Standards, National primary and secondary ambient air quality standards for PM2.5*. http://www.access.gpo.gov/nara/cfr/waisidx_07/40cfr50_07.html

NIOSH. 2003. Method 7303 for Inductively Coupled Argon Plasma Metals. http://www.cdc.gov/NIOSH/nmam/pdfs/7303.pdf

NIOSH. 1994. NIOSH Method 7903 for Inorganic Acids. http://www.cdc.gov/niosh/nmam/pdfs/7903.pdf

US EPA. 2007. Code of Federal Regulations, Title 40, Part 261. *Identification and Listing of Hazardous Waste*. http://www.access.gpo.gov/nara/cfr/waisidx_07/40cfr261_07.html

WDNR. 2008. Groundwater Quality. Chapter NR 140.10 Wisconsin Administrative Code. http://www.legis.state.wi.us/rsb/code/nr/nr140.pdf

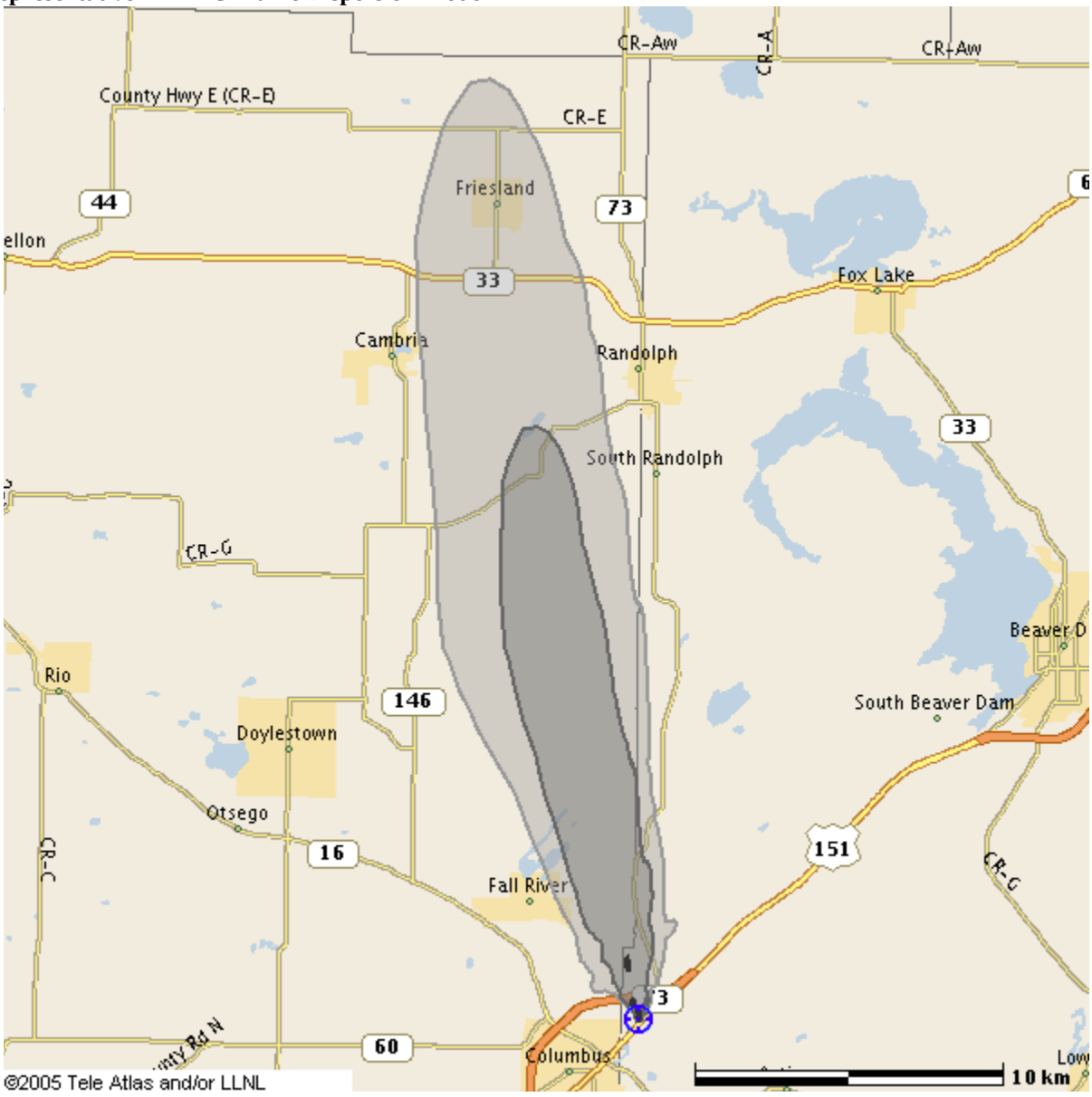
US EPA. 2004. Air Quality Criteria for Particulate Matter. http://www.epa.gov/EPA-AIR/2004/October/Day-29/a24232.htm

ATSDR. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. http://www.atsdr.cdc.gov/toxprofiles/tp69.pdf

Appendices

Appendix A.

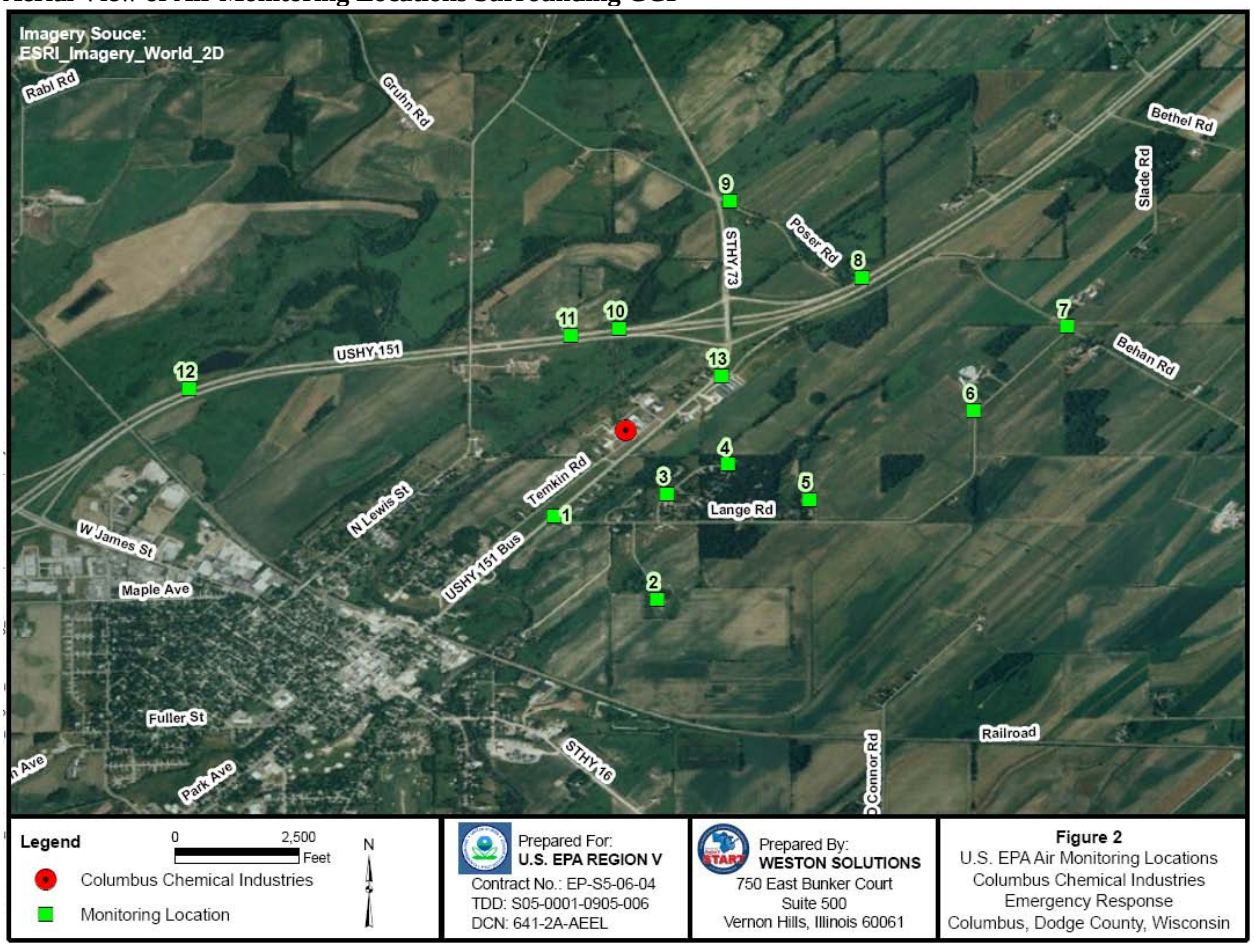
Representative NARAC Plume Dispersion Model



From NARAC

Appendix B.

Aerial View of Air Monitoring Locations Surrounding CCI



From US EPA

Appendix C.

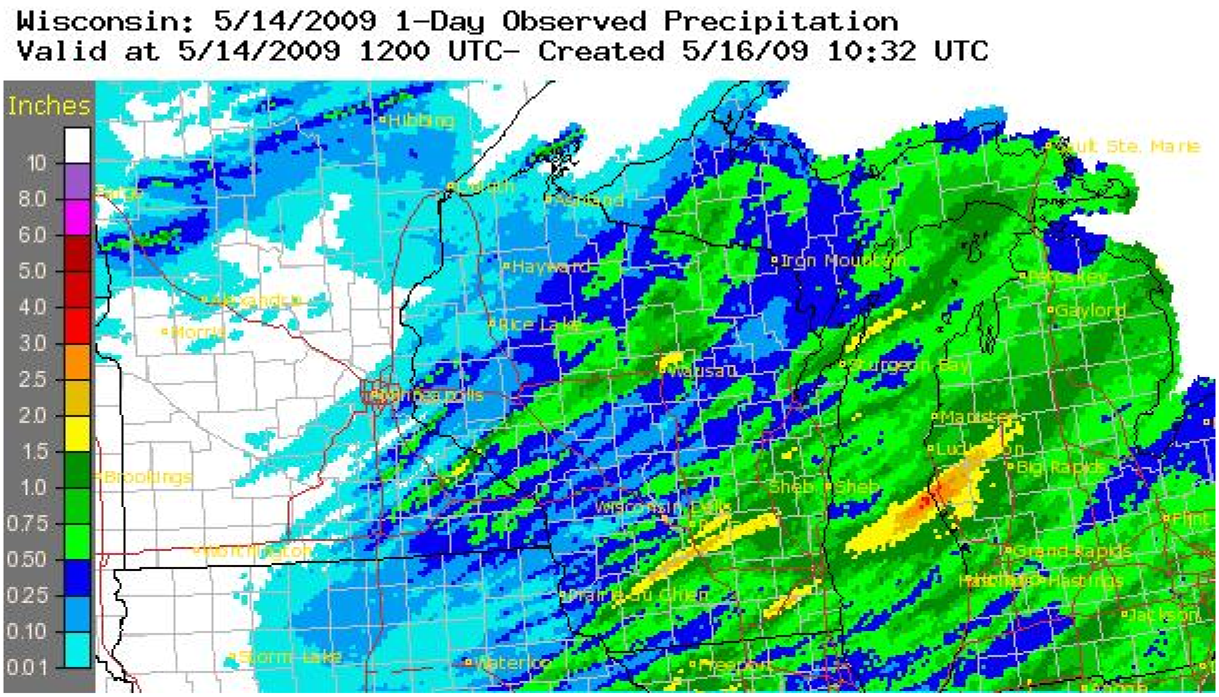
Wipe Sample Descriptions
Columbus Chemical Industries
Emergency Response
Columbus, Dodge County, Wisconsin

Wipe Sample Location			Date	Time	Sample Name	pH of Surface Wiped	Wipe Sample Description
Number	City	Area					
1	Fall River, WI	Brayton Park	5/13/2009	0105	WIPE01-051309	4	Brayton Park is located near the intersection of Main St. and Prairie St. The sample was taken from the west vertical side of a shed on aluminum siding (appeared to be hand-painted) that was located on the southeast part of the park.
2	Cambria, WI	Cambria Park Tarrant Lake	5/13/2009	0358	WIPE02-051309	6	Cambria Park Tarrant Lake is located near the intersection of County P and Wisconsin Dr. The sample was taken in the interior of a covered picnic area from the south vertical side of a post. The exposed part of the post appeared to be made of industrially painted aluminum.
3	Friesland, WI	City Right-of-Way	5/13/2009	0427	WIPE03-051309	7	Wipe sample #3 is located on Winebago St. just east of Madison St. The sample was taken from the interior vertica lsurface of an open-air, south-facing, indusctrially painted payphone.
4	Randolph, WI	Randolph Village Park	5/13/2009	0453	WIPE04-051309	7	Randolph Village Park is located near the intersection of Randolph St. and Second St. The sample was taken from the horizontal surface of an aluminum picnic table located in a covered area on the northeast side of the park.
5	Columbus, WI	Columbus Fireman's Park	5/13/2009	0541	WIPE05-051309	7	Columbus Fireman's Park is located near the intersection of WI-89 and Poet St. Due to the absence of any covered/dry areas to sample, the sample location was the metal lid of an industrially painted garbage can.
6	Blank		5/13/2009	0546	BLANK01-051309	Blank	

Notes:
Wipe samples were taken from approximate 6"x 6" surface areas with filter paper.
There were scattered showers from 0250 until after sampling was complete.

From US EPA

Appendix D.


Wisconsin: 5/14/2009 1-Day Observed Precipitation
Valid at 5/14/2009 1200 UTC- Created 5/16/09 10:32 UTC
Inches
10
8.0
6.0
5.0
4.0
3.0
2.5
2.0
1.5
1.0
0.75
0.50
0.25
0.10
0.01
Hibbing
Hayward
Rice Lake
Iron Mountain
Gaylord
Minneapolis
Brookings
Wisconsin Dells
Grand Rapids
Big Rapids
Jackson
Prairie du Chien
Storm Lake

Appendix E.

Run-off path

Pumping run-off into vacuum truck

From US EPA

Appendix F.
Example Press Release

FOR IMMEDIATE RELEASE

CONTACT: Jody Langfeldt
Dodge County Health Officer
920-386-3674

Susan Lorenz
Columbia County Health Officer
608-742-9227

SUBJECT: Public Health Message regarding fire at Columbus Chemical Industries

DATE: May 12, 2009

Jody Langfeldt, Dodge County Health Officer and Susan Lorenz, Columbia County Health Officer are working with various agencies including local and state Emergency Management, Department of Natural Resources, 54th Civil Support Team, local fire, law, hazmat, Columbus Chemical Industries, Environmental Protection Agency and Wisconsin Department of Health Services to address concerns relating to the fire at Columbus Chemical Industries.

Nearby residents and businesses were evacuated last night as a precaution. Continuing air monitoring indicated all chemical levels were below health standards and posed no threat to humans or animals. Area residents are being allowed to return back to their homes and businesses.

Health officials do not expect adverse health effects as a result of the fire. Symptoms of chemical exposure include eye, nose and throat irritation or excessive coughing. If you experience any of these symptoms, consult your healthcare provider.

If you have questions, please contact your local health department. The contact for Dodge County Human Services and Health Department is 920-386-3670 and Columbia County Health and Human Services is 608-742-9227.

CERTIFICATION

This Health Consultation for an Evaluation of the Health Concerns Associated with the Columbus Chemical Industries Fire was prepared by the Wisconsin Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved methodology and procedures existing at the time the Health Consultation was begun. Editorial review was completed by the Cooperative Agreement partner.

Jennifer Freed
Technical Project Officer
CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Health Consultation and concurs with the findings.

Alan Yarbrough
Team Leader
CAT, CAPEB, DHAC, ATSDR