

## Alberton Canyon Chlorine Rail Car Derailment

Even low-population, rural states face special challenges if a major toxic chemical spill occurs within their boundaries. An example is the chlorine and potassium cresylate spill from two rail cars, which occurred at 4:19 AM on 11 April 1996 in the Clarks Fork Canyon 2 miles west of the town of Alberton, Montana. At least 350 people were injured from chlorine inhalation, some permanently, plus one death, mostly from the small town of Alberton plus others who drove through the toxic cloud while traveling on Interstate 90 before it was shut down. Interstate 90 was closed for 19 days forcing traffic to take a 200-mile detour. Larger trucks were forced to take a much longer detour. Trees in the area were killed or severely damaged by the chlorine cloud.

The same general area was also the scene of between 17 and 22 forest fires along Clarks Fork along Interstate 90 in 2005, which were thought to be human caused. The Interstate was shut down for several days, and the town of Alberton was evacuated. The fires were considered unrelated to the chlorine derailment, but do illustrate an example of problems western states face.

Frenchtown Fire Chief Scott Waldron was the on scene coordinator for the Alberton rail car spill incident. He was also the opening keynote speaker at the 2007 regional fire prevention and hazardous material conference in Casper, Wyoming (March 23-25, 2007), which was attended by this writer (John Nordin). Waldron's main message was on experiences in managing the evacuation and cleanup, including dealing with 20+ agencies and other entities involved. The ramifications of the chlorine release impacted the area and people for many years after the incident. Public health and legal implications were huge.

### The Chlorine Spill Itself



Alberton, MT.; KPAX TV video; Missoula, MT  
photo from <http://wildrockies.org>



Alberton, MT; KPAX TV video; Missoula, MT  
*Photo from "The State of Montana Multi-Hazard Mitigation Plan and Statewide Hazard Assessment, Oct. 2004, video originally taken*

by KPAX-TV



*General area satellite map from Microsoft. Forest fires scared the area since the 1996 Chlorine derailment.*

On 11 April 1996, at 4:19 AM, 19 railroad cars from a Montana Rail Link freight train derailed west of Alberton, Montana, located 34 miles (54km) northwest of Missoula. The rail line was along one side of the narrow Clark Fork Canyon; Interstate 90 paralleled the tracks on the other side of the river about 150 yards to the north. Six of the derailed cars contained hazardous chemicals. The most toxic release was an estimated 130,000 pounds of chlorine from a 90-ton rail car. Additionally, 17,000 gallons of liquid spent potassium cresylate was spilled from a second rail car, plus some solid sodium chlorate from a third rail car.

The chlorine gas cloud spread rapidly across Interstate 90. The winds carried the cloud eastward reaching the small town of Alberton 2 miles away. During the early morning hours there was some light rain falling, which probably knocked down some of the chlorine cloud. The accident area was timbered (as seen in the first photo) and sparsely populated. The chlorine gas cloud was initially confined to the valley. Some of Alberton's 500 residents awoke complaining of burning eyes and throat, chest tightness, and dyspnea. A transient on the train died quickly from acute chlorine toxicity. Both members of the two-man train crew were hospitalized. About 1000 people were evacuated from the area (about 15 square miles, or a radius of 4 miles). Evacuations began at Alberton at 5 AM.

The governor declared a state of emergency for Missoula and Mineral Counties. About 350 people were treated for chlorine inhalation, 123 people with sustained

injury. There were reports of motorists who drove into the cloud thinking it was early morning fog; some became stranded as the result of multiple car accidents. Some motorists did not show up for emergency room treatment until days later because of delayed symptoms. Four motorists were hospitalized in intensive care for chlorine inhalation.

On April 14, residents were temporarily escorted into the evacuation area to feed and water livestock animals, locate pets, and retrieve some personal possessions.

Frenchtown Fire Chief Scott Waldron recaptured the events during a presentation to emergency response personnel during a presentation in Casper WY in 2007. Initially, people in the area including the town of Alberton did not know what happened. The local emergency response personnel learned by daybreak from the railroad that chlorine was spilled. The local volunteer fire department at Alberton had no Hazmat training or personal protection equipment to deal with chlorine, but the Frenchtown fire department was trained for chlorine releases as this chemical was used at the local pulp mill in Frenchtown 10 miles from Alberton. Therefore the Frenchtown Fire Chief found himself in charge of the situation. The Frenchtown fire crews were already equipped with chlorine monitors and SCBA. The first priority was to evacuate people and take the injured to medical facilities. Interstate 90 was shut down.

It was not until full daylight before the accident scene could be viewed from the Interstate side of the river. The Frenchtown fire department was equipped with chlorine monitors. There were some chlorine readings above the Immediately Dangerous to Life and Health level of 10 ppm taken at the Interstate (according to ATSDR, <http://www.atsdr.cdc.gov/HS/alberton/>). Even so, emergency response personnel could not see how many railcars were involved. Eventually, it was discovered that the chlorine came from a 90-ton rail car with a 24-inch hole in the side of the tank. There was an estimated 20,000 pounds of chlorine still remaining inside the tank when responders could approach the scene. There was an unofficial report (<http://www.wildrockies.org>) based on vegetation completely wiped out that the spill site area was roughly 300 feet by 50 feet. Ambient chlorine level monitoring at the accident site was reported to be between 12 and 52 ppm.

### The Derailment

The two-man train crew reported that the train was traveling at 40 mph just before the derailment. The train consisted of 3 locomotive units, 36 loaded freight cars, and 35 unloaded freight cars. Twenty-five rail cars were placarded "hazardous materials". The train crew applied the train breaks when they felt the locomotive "dip to the left" and come back upright. When they looked back and saw sparks, they believed that the train derailed.

The six-derailed tanker rail cars all contained hazardous materials. Four contained chlorine, one liquid potassium cresylate, and one containing solid cresylate. Three of the four chlorine tankers remained intact.

No rail defects were discovered when an ultrasound rail inspection vehicle traversed the area on 1 March 1996. Studies after the accident showed that the rail broke under the moving train, and that the failure mode was a vertical split head. A metallurgical laboratory report on a rail section recovered conclude that the level of wear rendered the rail susceptible to fracture due to its diminished load bearing capacity. More details at <http://www.nts.gov/publicn/1998/RAB9807.htm>.

### After the Spill

The Frenchtown fire chief shared his experiences at the 2007 Casper WY presentation on dealing with the approximately 20 governmental agencies, the railroad, general public, and various private entities involved in the spill aftermath. Two major problems were (1) Interstate 90 was shut down for 19 days creating a transportation bottleneck and (2) people were denied access to their homes and property during this period, and livestock had to be fed. The economic effects to the area were felt for many years afterwards, including road repair from detoured traffic, pine trees browned or killed by the chlorine gas cloud rendering them susceptible to forest fires, and lawsuits due to injuries.

The Interstate 90 detour was initially 81 miles (according to the 2004 "The State of Montana Multi-Hazard Mitigation Plan and Statewide Hazard Assessment"), but the roads could not handle the traffic, and the detour was extended to about 200 miles. Some large vehicles could not even take that detour. There were also issues of managing the roadblocks, which had to be addressed.

An initial problem was locating rural people so they could be evacuated.

One of the first actions undertaken by the Frenchtown fire department (after people were evacuated and detours set up) was to create an HazMat task force for taking care of livestock and other animals left behind. On April 14, residents, under favorable winds, were escorted back to their properties to retrieve pets and provide for feeding of livestock. However, because chlorine was still in the railcar, the residents were not permitted to stay. The highest ambient chlorine level measured during the trip back was 0.1 ppm. The media covered the stories of animal care, which bought a lot of community goodwill.

The railroad and EPA personnel were the primary emergency response personnel on site to deal with stabilizing the spill and its cleanup. As there were legal issues with working on railroad property, the Frenchtown fire department was not directly involved in this. The State of Montana Department of Environmental Quality was not prepared to take over responsibility after the spill.



There were some initial conflicts resulting from interfacing with the many governmental agencies involved, as each agency had its own protocol.

Attorneys were at the site inciting people to sue which made holding public meetings difficult.

One of the first tasks was to figure out how to stabilize the situation. One chlorine tank cars was still leaking chlorine, and the other three chlorine tankers were not leaking chlorine. Cleanup began April 14. Ambient concentrations in the area were above the 10 ppm, requiring Level A protection. During the separation process, when the leaking rail car was separated from the intact rail cars, there was an ambient air spike of 1400 ppm chlorine, at one of the 18 monitoring stations at the site. The next job was to remove the intact rail cars and chlorine and treat the chlorine in the leaking rail car. The treatment decided was to wrap the leaking railcar in a plastic tent and to steam heat the chlorine tank. The chlorine given off was scrubbed in a caustic scrubber turning the material into bleach which was removed off site.

The spill cleanup proved very difficult. Operations were tricky, and ambient chlorine concentrations varied, with readings over 1 ppm and spikes as high as 1000 ppm. Safety protocol required Level A protection suits with SCBA for cleanup operations which greatly slowed operations. Interstate 90 was to remain closed until all the chlorine had been safely treated. The estimated time for operations using level A suits was about 3 months, which would require the Interstate to be shut down for that period. If level B protection were used, projected cleanup time would be much shorter. The EPA on-scene coordinator made the decision to allow level B protection with people in Level A or have level A protection on standby, something the railroad or local agencies could not do. The Interstate was reopened after 19 days. The chlorine aggressively corroded equipment involved in cleanup, including vehicles, tires, and air compressors; sometimes the parts had to be replaced after 12 hours.

The monetary damage of the spill was estimated (from "The State of Montana Multi-Hazard Mitigation Plan and Statewide Hazard Assessment " report, October 2004) to be \$3.9 million. The Frenchtown fire chief estimated that the total economic cost was several hundred million dollars. The railroad paid the cost of motels for displaced residences, monitoring, cleanup, some medical costs, and some repair of damage to roads.

A study on the effects of chlorine on the area Ponderosa Pine and Douglas Fir trees is published in the Annuals of Botany (August 2001) and is available at <http://pt.wkhealth.com/pt/re/abot/abstract.00008707-200108000-00003.htm;jsessionid=Gn6XpJ8nhjrspvWbNTh2jkNGvh7kzdjhd9fZqqJHs5yBs07gRvff!95098694!-949856144!8091!-1>. The trees (if not killed or heavily damaged) were rendered more susceptible to drought.

## ATSDR Study Evaluating Health Effects

The federal Agency for Toxic Substances and Disease Registry (ATSDR), headquartered in Atlanta, Georgia, completed a follow up study on the 1000 area residents who were evacuated from the Alberton area. To qualify, the residents had to be home at the time of the spill and had to be evacuated, which eliminated the motorists who drove into the toxic cloud on the Interstate. Of the approximately 1000 people eligible, 682 participated in the study. A total of 121 were selected for follow up medical exams. These were compared with a control group of 99 individuals from a nearby community. The medical exams included blood samples to include IgE levels, skin and eye examinations by a physician, pulmonary function tests, and methacholine challenge tests. The draft report (November 1999) is available at <http://wwwq.astdr.cdc.gov/HS/alberton/>.

The study results showed that acute exposure to chlorine may have resulted in chronic health effects in exposed persons. The “exposed group” had increased respiratory and neurological symptoms, increased eye and skin problems, poorer performance in the pulmonary function and methacholine challenge tests compared with the control group. The differences were more noticeable comparing non-smokers between the two groups.

ATSDR mentioned that exposure assessment was complicated by the use of distance and direction from the accident site was used as the indicator of exposure, and we don't know what their actual exposure was.

Another study (from K.H. Kilburn, Archives of Environmental Health, Dec. 2003) looked at 97 adults who lived in or near Alberton at the time of the spill. The average exposure time of the subjects was 117 minutes. The 97 adults were divided into two groups, those who were clients of three law firms and those who were not represented by law firms.

The U.S. Bureau of Transportation count of the number of people injured from chlorine inhalation at 787.

## The Chlorine Institute Studies

The Chlorine Institute, Washington D.C., is a not-for-profit institution made up of companies involved in the safe production, distribution, and use of chlorine. Their website is <http://www.chlorineinstitute.org>. The institute recognized the need for safe removal of chlorine from rail cars/tankers in case of a breach or spill after the Alberton, MT incident. During September 2000, The Chlorine Institute hosted proof-of concept tests demonstrating “hot-tapping” a chlorine rail car containing 17 tons of chlorine and removing its contents in a safe matter to another railcar. The tests were conducted at the HAZMAT Spill Center, near

Mercury Nevada. This site is owned by the U.S. Department of Energy and operated by Bechtel Nevada.

The procedure allows withdrawal of liquid chlorine from a breached railcar and transfer to another railcar, a safer and faster method than what was used at Alberton in 1996. The HAZMAT Spill Center is in a remote area where procedures dealing with hazardous chemicals can be tested without endangering the public.

### Frenchtown Fire Chief Recommendations

The Frenchtown Fire Chief had several further recommendations presented at the 2007 Casper WY meeting:

- Evacuation: Who plans it, who does it, where do the people go, and how are the people maintained? A responsible party who pays the bills and feeds them is necessary.
- Evacuation vs shelter in place. Shelter in place is an option only when evacuation is not possible. There are liability risks if you don't offer evacuation as an option. If persons refuse to go, adults might be allowed to stay, but children can be removed.
- There are legal issues involved in working on private property. The responsible party has a say as to whether the hazard is no longer present.
- Let federal agencies such as the EPA do their job and make the tough decisions.
- Documentation is absolutely necessary. This includes conversations with the Principal Responsible Party and with the many agencies. Who is responsible for billing and collection?
- Expect the unexpected. Each situation is different, and there will be many governmental agencies and private groups to deal with, including such diverse agencies as the Coast Guard and the FBI, and a government funded group from University of Michigan Business School gathering data on how area businesses are affected.
- When does the Incident Command terminate? Who makes the decision? Get policies, SOPs.
- Long term financial costs hard to recover especially without adequate documentation.
- Make a project termination list (toxic chemicals removed, contaminated soils removed, etc.).
- Don't cozy up to the Principal Responsible Party or other group.
- Maintain public trust. Videos and public meetings go a long way.
- Expect to be called to testify in court. . Get experts. Attorneys look for "deep pockets"