Published on *InsideClimate News* (https://insideclimatenews.org)

The Dilbit Disaster: Inside The Biggest Oil Spill You've Never Heard Of, Part 2

Days of confusion followed the spill. Officials thought they were cleaning up ordinary crude. It was an erroneous assumption Enbridge did not correct.

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Jun 27, 2012

Technicians prepare pipe before cutting and removing the section from the Enbridge pipeline oil spill site near Marshall, Mich. Credit: EPA

On Tuesday, July 27, 2010—the day after the biggest pipeline spill of Canadian dilbit in North America was detected—oil was still streaming from Talmadge Creek into the Kalamazoo River near Marshall, a community of 7,400 in southwestern Michigan. Some people had fled their riverside homes because of the overwhelming smell, like burning tar.

Six inches of rain between Thursday and Sunday had turned the normally sedate river into a roiling brown torrent that overflowed its banks by several feet. The creek, usually only five or six feet wide and a foot deep, was at least 100 feet wide.

The EPA officials who had gathered in Marshall still thought they were dealing with the light crude oil that usually flows through U.S. pipelines. As veterans of other spills, they were certain they were prepared for this one.

What they didn't know yet was that 6B, the pipeline that ruptured, was carrying bitumen from Canada's tar sands region. Bitumen is the heaviest oil in use today and is too thick to flow through pipelines. To remedy that problem it is thinned by about 30 percent with liquid chemicals, usually including benzene, which can cause cancer in humans.

This diluted bitumen, or dilbit, is the same type of oil that would be carried on the 1,702-mile Keystone XL pipeline if the controversial project is approved. When dilbit spills, most of the added chemicals evaporate, leaving the heavy bitumen to sink in water.

Pipeline 6B is owned by Enbridge Inc., Canada's largest transporter of crude oil. Enbridge's president and chief executive officer, Patrick Daniel, perpetuated the mistaken belief that this would be a routine cleanup. On Monday, Daniel had flown in from Enbridge's Calgary, Alberta, headquarters in the company jet. In an interview the next day, he said much of the oil could be sucked off the water's surface with vacuum trucks and that only a "minuscule" amount might sink below the surface.

"To tell you the truth, it's lighter than water so it sits on top of the water," he said [1].

Days of confusion followed the spill, with federal and state officials basing their cleanup decisions on the erroneous assumption that the oil was ordinary crude. It was an assumption that Enbridge did not correct. Federal regulations do not require pipeline operators to disclose the specific type of crude oil their lines carry. The nonprofit Pipeline Safety Trust and other organizations have urged the government to change that policy since Canadian dilbit was first pumped into the United States more than a decade ago.

Two deadlines the EPA set Tuesday reflected the agency's confidence in a quick turnaround. Enbridge was ordered to clean up the wetlands near the broken pipeline by Aug. 27. The creek, the river and all shorelines were expected to be oil-free by Sept. 27. Both of the orders mentioned only oil—not dilbit.

The agency's overarching objective was keeping the oil from reaching the spot where the Kalamazoo empties into Lake Michigan, about 115 river miles west of Marshall. Together with the other four Great Lakes, Lake Michigan is a drinking water source for at least 26 million Americans and almost 10 million Canadians.

The EPA was also concerned about a Superfund site near the city of Kalamazoo, about 43 river miles west of Marshall. Polychlorinated biphenyls, better known as PCBs, were embedded in the river, and nobody was sure what would happen if oil mixed with PCBs, which are known human carcinogens.

While the scientists worried about protecting Lake Michigan from the oil, health experts fretted about the oil's effect on people living along the Kalamazoo's banks.

Benzene readings picked up by hand-held monitors were still swinging wildly. Readings ranged from less than 50 parts per billion, a level that didn't worry the health experts, to 3,000 ppb. The highest readings were in areas where oil was being recovered.

Jim Rutherford, Calhoun County's public health director, huddled with state and federal health experts. They had no idea how long the benzene would linger. And they still hadn't found any clear guidelines on whether people should be evacuated in these circumstances.

Finally they decided to create their own benchmark for evacuation, based on their analysis of the available scientific information.

The Michigan Occupational Safety and Health Administration lists 500 ppb as the workplace benzene limit. Using that standard, plus the federal standards they had studied earlier—and taking into account differences between workers and a general population that included children, the sick and the elderly—they decided on Wednesday to set 200 ppb as the benchmark for evacuation [2].

Rutherford would order an evacuation Thursday if monitors continued to show benzene readings of 200 ppb or above, they agreed. As the county health director it was also up to him to make the final call and to decide if it should be a mandatory or voluntary evacuation.

That Wednesday night, before Rutherford headed home, the EPA reported that the size of the spill was at least 1 million gallons. That figure exceeded Enbridge's Monday estimate of 819,000 gallons.

Even after three days of working double shifts, sleep didn't come easily for Rutherford that night.

At home, he walked for miles under the stars, sorting out his burdens. Being thrust into the limelight as a local health official was scary. He knew some people thought he wasn't acting quickly enough. But they weren't in the war room grappling with a multitude of unknowns. Was it practical, or reasonable, to displace elderly people and families with young children when hotel rooms were already at a premium because of the enormous influx of cleanup workers? Plus, he and the other health professionals didn't have any hard scientific evidence that temporary exposure to 200 ppb of benzene did, indeed, pose a danger.

All along, his priority had been to protect people's health, not compound the chaos the spill was already causing.

"You can't just evacuate an entire county," he said recently, recalling those days of indecision. "It's easier said than done."

Rutherford walked until long past midnight, rehearsing how he would deliver the news if benzene levels were still high on Thursday.

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The next morning he saw the test results that had come in during the night and knew what he had to do.

Although benzene levels were generally dropping, hand-held monitors still showed levels of 200 ppb or higher at some locations. Most of the readings had dropped below the level of concern, but there also were single measurements of 200 ppb, 250 ppb, 500 ppb and 1,350 ppb.

The more sensitive sampling equipment had arrived, and the first results would be ready later that day. But Rutherford decided not to wait. It was time to call a press conference and start evacuating people.

Residents of 61 riverside homes north and northwest of the rupture site were asked to leave because of "higher than acceptable levels of benzene." It was a voluntary [3], not mandatory order, because Rutherford didn't want to have to force people from their houses.

Rutherford also announced that people living within 200 feet of the river between Talmadge Creek and the Kalamazoo County line shouldn't use their well water for cooking or drinking. Tests showed no evidence of groundwater contamination, but he didn't want to take any chances. Enbridge agreed to provide bottled water.

Workers from the county and state health departments fanned out along the river to deliver the evacuation notices in person. If nobody was home, a notice was stuck on the front door.

Twenty-seven households in the evacuation zone refused to leave. But more than 100 families outside the zone moved out—some of them driven out by the stench before the evacuation was announced.

The evacuation notice offered hotel options, told them how to arrange accommodations for their pets, and encouraged them to save their receipts, so Enbridge could reimburse them. Enbridge also offered to help the uninsured with medical bills, whether they evacuated or not.

Rhonda Stepp, an administrative assistant at Marshall High School, learned her house was in the evacuation zone when her retired husband called her at work. She hurried home so they could gather a few belongings before heading to her parents' house in Battle Creek.

"When they tell you to pack up what can't be replaced, you're just thinking, 'Oh my God, what do I take?'" Stepp said. "I took pictures off the wall and the contents of our safe."

On the day the evacuation began, Enbridge gave EPA officials and other responders at the command center a second Material Safety Data Sheet [4]. Like the first MSDS, it didn't mention dilbit. Again, Enbridge did not volunteer that information.

Mark Durno, the EPA deputy incident commander, said in a recent interview that if Enbridge had provided more specific information about the chemical makeup of the oil, the EPA would have rushed sampling equipment to the scene so sampling could have begun Monday.

Environmental organizations contend that dilbit contains more benzene than conventional oil. But it's difficult to determine if that's true. Most of the research conducted on dilbit has been done by the industry and is considered proprietary information.

The first air sampling data arrived from the lab that afternoon. It confirmed what the hand-held instruments had already indicated— although most of the benzene levels were below 50 ppb, some were as high as 550 ppb. Readings taken next to oil recovery sites ranged from 1,450 to 10,000 ppb.

The EPA was able to deliver one piece of positive news on Thursday. Although the oil had spread through more than two miles of Talmadge Creek and about 36 miles of the river, workers had managed to stop it before it reached the city of Kalamazoo. That meant that the PCBs buried in the river at the Superfund site wouldn't be disturbed—and that the drinking water so many people depended on from Lake Michigan was no longer at risk.

Susan Hedman, who directs EPA Region 5 in Chicago, was upbeat when she spoke with reporters on Sunday.

"I am happy to report significant improvement of the spill site, at the creek and the river," she said [5]. "Oil continues to be removed and we have not seen any further contamination."

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Enbridge had dispatched 730 workers to Marshall by the end of the first week. That didn't include the hundreds of local, state and federal experts still flocking to the scene. More than 69,000 feet of containment boom arrived, along with 43 boats, 48 oil skimmers, 79 vacuum trucks, 19 tanker trucks and 77 mobile storage tanks.

Helicopters zoomed overhead. Airboats plied the river. The grind of internal combustion engines added to the cacophony as transfer trucks hauled goo sucked out of the river.

Deb and Ken Miller's tiny neighborhood in Ceresco had been transformed into a staging area complete with Dumpsters and a temporary dining area for workers. An ambulance and a fire truck were stationed near the bridge on 12 Mile Road, where buses and vans unloaded swarms of workers tasked with collecting oil. Decked out in white biohazard suits, they looked like space explorers. Sheriff's deputies set up a barricade at the bridge, and residents traveling that route risked arrest if they didn't stop.

Enbridge moved the command post to Walters Elementary School. Workers propped up their laptop computers on cardboard boxes and wedged themselves into chairs designed for grade-schoolers.

Daniel, the Enbridge CEO, apologized repeatedly for the damage his company had done in Calhoun County, where the rancid odors of oil were still powerful. At meetings, one-on-one talks and media interviews, he reassured residents that the company was committed "to cleaning up anything and everything" the oil had touched.

"We are responsible for the cleanup and we will be here until you are happy in this community... that we have completed our responsibilities," Daniel said [6].

Daniel promised John LaForge and several others who lived near the rupture point that Enbridge would "make them whole," by buying or building them new homes away from the river.

The Millers declined Enbridge's offer to move to a hotel. The closest hotels were already booked and they needed to watch over their store, their elderly dog and a homebound neighbor. To keep the stink at bay, they shut their windows and blasted the air conditioning.

Every time Deb Miller looked out her window, she fumed about the pain a broken oil pipe had inflicted on her community. She wondered why so few local authorities had known of 6B's existence and worried about the impact the oil was having on neighbors up and down the river. She was still taking oral chemotherapy as part of her treatment for breast cancer in 2002 and she wondered if chemicals in the oil would compromise her health.

On Monday, Aug. 2, Miller and hundreds of other residents filed into the Marshall High School gymnasium for a public meeting organized by the EPA. Enbridge provided carpeting, so the folding chairs wouldn't scratch the gym floor. But company officials weren't invited to attend, because the EPA wanted to make sure, as it does after every such disaster, that the public understood that state and federal oversight agencies were in charge of the cleanup, not the company that had caused the problem.

Hedman, the EPA Region 5 director who opened the meeting, was still upbeat.

"We will continue working until your river looks like this again," she said, showing a PowerPoint image of the pre-spill Kalamazoo.

Most of the audience applauded enthusiastically. But Deb Miller wasn't in any mood to clap. To her, it seemed people were responding to wishful thinking rather than reality. She was dismayed that they weren't allowed to take the microphone and vent their concerns. Instead, they were directed to the cafeteria, where booths had been set up so they could speak privately with various officials.

In her one-on-one meeting, Miller told an EPA employee about a mass of oil that had accumulated in a river alcove near her carpet store. The official listened attentively and promised to send workers to investigate.

Still, Miller headed home that night feeling she had wasted her time. She wanted someone to spell out what kind of financial compensation would be available to those directly affected by the spill and she wanted to know when the oil would be cleaned up.

She also wanted assurances that the foul air wasn't jeopardizing people's health.

"We were given a spiel, then herded into areas to ask questions," Miller said. "We're not scientists. How do we know what to ask? That's what made so many of us resentful, like you cannot trust that our federal government is going to tell you everything. We don't know exactly what kind of oil is in the river and you have a gut feeling that they haven't been forthright."

The day after the meeting, Enbridge rolled out a program to buy properties along the polluted section of the river and creek. More than 310 properties, about half of them homes, were eventually eligible. Owners were given a year to accept or reject the offer.

By then, the terrible smell was abating. Experts at the National Oceanic and Atmospheric Administration later said [7] most of the chemicals that had been added to dilute the bitumen probably evaporated by Aug. 4.

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While Enbridge was reaching out to the community, it was also rushing to get 6B back on line. At least three U.S. refineries had been forced to reduce production, because they needed 6B's oil.

The company was losing money, too. Though Enbridge spokespeople didn't want to discuss it, the company's annual report [8] states that earnings were down $85 million in the second half of 2010 for costs associated with the 6B spill.

Extricating the ruptured pipeline from the oil-saturated wetlands near John LaForge's home took more than a week. The two 20-foot pieces were trucked to the National Transportation Safety Board facility in Ashburn, Va., so they could be studied as part of the spill investigation. Enbridge pulled new pipe from its stock in Marshall and welded it into place.

On Aug. 9, two weeks after the spill occurred, Enbridge asked the Pipeline and Hazardous Materials Safety Administration (PHMSA) for permission to restart 6B.

PHMSA rejected the request [9] less than 24 hours later.

The plan lacked "sufficient technical details ... to permit a conclusion that no immediate threats are present elsewhere on the line that require repair prior to any re-start of the pipeline," PHMSA said in its letter to Enbridge. The agency wouldn't approve [10] any restart plan that "did not include excavating and exposing additional pipe and repairing or replacing additional pipe as necessary."

Among the flaws PHMSA listed was Enbridge's failure to "determine, investigate and remediate as necessary, at least four additional anomalies in Line 6B" that were similar to conditions near the spot where the Marshall leak occurred. Line 6B had several hundred corrosion defects and Enbridge had exercised its legal option to reduce pressure while it decided whether to repair or replace the line.

On Aug. 10, the Millers temporarily closed their carpet and flooring business. With the road in front of their store blocked off because of the cleanup, customers couldn't reach them.

By then, volunteers and workers were removing oil [11] from 83 turtles, 66 Canada geese, 12 ducks, three swans and four muskrats at a vacant warehouse Enbridge had turned into a rescue center. They had already cleaned and released 22 turtles and a frog.

More than 99,000 feet [12] of boom was now positioned in 37 spots between the creek and Morrow Lake. Another 250,000 feet of boom was ready—just in case.

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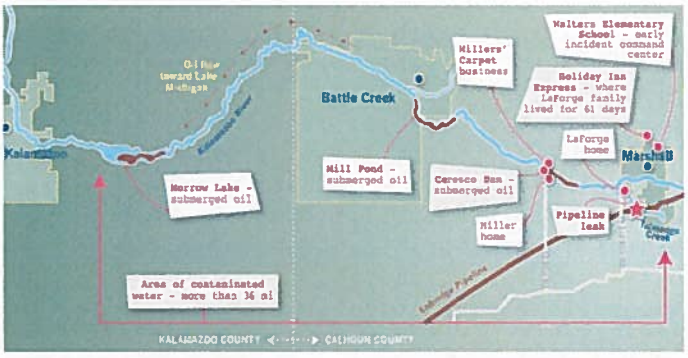
On Aug. 17, Rutherford, the county health officer, lifted the July 29 voluntary evacuation order because benzene readings were consistently below 6 parts per billion. He advised riverside residents to continue using bottled water for cooking and drinking.

At about the same time, cleanup crews began to notice something they hadn't seen at spills involving light crude oil.

The surface of the river was clearing in some places, a sign of progress. But when an EPA employee disturbed a clear patch of water near Morrow Lake—the dammed lake west of Marshall where they had finally stopped the oil—he noticed that tiny flakes of tar floated to the surface and formed a small oil sheen.

Click on map to enlarge



[13]

Closer to Battle Creek, crews with the Michigan Department of Natural Resources also noticed an odd phenomenon. When they disturbed the sediment at the river's bottom with their hip waders, globules of tarry oil popped up and created similar but larger sheens.

To determine whether these were isolated incidents or signs of a deeper problem, workers lowered absorbent material wrapped in chicken wire into the river to see what it captured. They also shook up the sediment with hand-held poles to see what floated to the top.

They were shocked by what they learned. Tar balls the size of marbles were being swept along the river's bottom with the clay, sand and other organic material that is normally caught up in river currents. Basically, the tar balls were bouncing downstream, stopping only when a deep pool, an eddy or a man-made barrier like a dam halted the ride. At low points in the riverbed, they were settling into as much as six inches of sediment.

Mark Durno, who has 20 years of experience with the EPA, had never seen anything like it.

"We had no idea sinking oil would be such a problem," Durno said. "Not only was this material submerged but it was mobile and moving along the river bottom."

At first, the scientists thought they could mount sonar or other high-tech instruments on boats or helicopters and map exactly where the oil had sunk. But the depth of the river, the type of sediment and the nature of the oil made that impossible.

Instead, teams of specialists had to resort to the laborious process of manually recording every square inch of the oiled river. Wielding hand-held poles, they poked the sediment to gauge how much oil they found. Each point was assigned a GPS (global positioning system) reading and added to a GIS (geographic information system) database. Using this digital map they could estimate the oil's footprint and volume. Over time, they could see where it moved and measure the effectiveness of their cleanup techniques.

This unusual twist in the cleanup operation was discussed at daily meetings attended by Enbridge and the government agencies supervising the cleanup. But Durno, who attended all the meetings, said Enbridge never volunteered the information that the oil was not light crude but Canadian dilbit.

What was happening at the spill site is now clear. After 6B ruptured, the liquid chemicals that had been added to dilute the bitumen began evaporating, and the heavy bitumen began sinking. When the surface of the river started clearing, it wasn't necessarily because the oil was gone, but because it had disappeared from sight.

The Natural Resources Defense Council, a powerful advocacy organization that opposes the Canadian tar sands industry as well as the Keystone XL pipeline, already suspected that 6B was carrying bitumen from Western Canada's tar sands fields.

Kari Lyderson, a former Washington Post reporter who was writing for the NRDC's quarterly magazine, spoke with Enbridge's Daniel [14] several times in August and asked [15] if the oil in 6B was tar sands oil, or bitumen. She said he told her [16] several times that it was not.

In a teleconference call [17] with Lyderson and other reporters, Daniel implied that the oil in 6B wasn't tar sands oil because it had been extracted by steam distillation rather than mining. On that same call, however, he acknowledged that the oil was so thick that it had to be thinned by a third with light crude before it could be pumped through pipelines.

The NRDC attacked Daniel [16] for "trying to be cute with his language."

A few days later, the CEO backpedaled on the tar sands issue. "What I indicated is that it was not what we have traditionally referred to as tar sands oil," he told the Michigan Messenger [18]. "If it is part of the same geological formation, then I bow to that expert opinion. I'm not saying, 'No, it's not oil sands crude. It's just not traditionally defined as that and viewed as that.'"

As far as the EPA was concerned, the semantics of the debate didn't matter much. What did matter was the challenge the agency now faced. Bitumen lay at the bottom of a major U.S. river, a river that also happened to be at flood stage because of recent rains. The oil had to be removed. But how could they complete that cleanup mission without destroying the waterway they were trying to save?

Less than a month after the dilbit spill in Marshall, Enbridge's image took another knock. On Aug. 17 the Pipeline and Hazardous Materials Safety Administration fined the company $2.4 million for violating safety regulations on a pipeline in Clearbrook, Minn., which like 6B is part of the company's Lakehead system. It involved a November 2007 incident in which two company employees were killed after repairs caused leaking crude oil to ignite. PHMSA said [19] "Enbridge failed to safely and adequately perform maintenance and repair activities, clear the designated work area from possible sources of ignition, and hire properly trained and qualified workers."

The company received even more public scrutiny when the initial Aug. 27 deadline for cleaning up the Marshall spill came and went, unmet. By then, however, the EPA was beginning to understand why Enbridge was so far behind.

"It's safe to say we had a set of circumstances that combined to give us some challenges," said Ralph Dollhopf, who was leading the agency's efforts in Marshall. "At the onset of something like this, you rarely have details on the scope of work required. As Enbridge progressed, we learned how much oil was out there."

Researcher Lisa Schwartz and InsideClimate News intern Kathryn Doyle contributed to this report.

Links
[1] http://www.youtube.com/watch?v=NltlLUzLNxc&feature=player_detailpage#t=86s
[2] http://www.documentcloud.org/documents/371669-benzene-monitoring-decision-tree.html
[3] http://www.documentcloud.org/documents/371668-evacuation-notice-72910.html
[4] http://www.documentcloud.org/documents/371685-westerncanadianselect.html
[5] http://www.theglobeandmail.com/globe-investor/oil-spill-pipeline-wont-reopen-this-week-enbridge/article1212730/
[6] http://www.ctv.ca/CTVNews/World/20100729/oil-spill-michigan-100730/#ixzz1vFVkmgDP%20
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