

Pilon, Janet

Subject: FW: Diesel fuel spill to Red Hill Creek

From: Joe Minor
Sent: July-31-15 3:52 PM
To: clerk@hamilton.ca
Subject: Diesel fuel spill to Red Hill Creek

To: The Mayor and All City Councillors c/o the Clerk

Please include this correspondence in the official (publicly accessible) Council correspondence.

I am requesting your assistance in obtaining the public release of information regarding the environmental effects of the diesel fuel spill into Red Hill Creek on July 14th, 2015. I am also interested in information about the short term and long term cleanup measures, as well as lessons learned that could be applied to reducing the chances of a future spills.

This spill contaminated public resources (water and air) in a public location (a City park) and was investigated and treated by public officials paid with public resources (tax dollars) using publicly funded equipment and supplies. A public report seems like a reasonable request.

In order to start the communication I include a summary of what I know, which includes my observations of wildlife injured by the spill. I am confident that this summary can be greatly improved with written documentation from the professionals involved, and I look forward to seeing their observations. If there has been a public release of information about the spill, please let me know where I can obtain it.

On the morning of July 14th, 2015, a flatbed truck carrying two motorized pieces of equipment flipped into the creek just north (downstream) of Barton. The location was approximately:

43.240804°N, -79.773096°W

According to articles in the Hamilton Spectator, the fuel tank ruptured and 100 litres of diesel fuel were spilled into Red Hill Creek.

I spoke with the MOECC Provincial Abatement Officer, and the following is my understanding of what he said:

(Start: notes from comments of MOECC Provincial Abatement Officer)

Clean up crews responded quickly, and in less than two hours after the accident booms were deployed in an attempt to contain some of the diesel fuel spill. In addition, special equipment was used to drill and drain the fuel tank to decrease the amount spilled when the truck was lifted out of the creek. Two sets of booms were deployed. One set immediately downstream of the accident site, location approximately:

43.240965°N, -79.772995°W

And the other set approximately 530 metres downstream just north of where the railroad tracks cross the creek. Location approximately:

43.244356°N, -79.769498°W

(End: notes from comments of MOECC Provincial Abatement Officer)

What follows are my observations and opinions:

Diesel fuel is not a single chemical entity, but rather is a mixture of hydrocarbons distilled from oil (as well as fuel additives such as detergents). On average, these chemicals have a low solubility in water, and are less dense than water. Thus, when an equal volume of diesel fuel is mixed with an equal volume of water, the majority of the diesel fuel sits on top of the water. Even if the ratio of diesel to water is decreased, some of the diesel continues to rise to the surface and spreads on the surface as a thin film. This film is visible due to the rainbow patterns it forms on the surface. This surface film is the target for the skimmer booms placed in the creek. The more volatile components evaporate more quickly, and have a distinctive odour. The air pollution from the diesel spill is not collected by the booms. Several components of diesel (including some fuel additives) have some solubility in water. Since the majority of the volume of the creek flows under the booms, the water soluble (or even water emulsified) parts of the spill are also not effectively collected by the booms.

Please see the photos in the Hamilton Spectator article:

<http://www.thespec.com/news-story/5732355-crash-closes-part-of-red-hill-valley-parkway-for-more-than-12-hours/>

Photo 5/5 is an excellent illustration of the surface film of diesel, as well as the boom system. It is clear that the booms seem to be holding back (and are probably collecting) some of the surface film. However, it is also clear that some of the surface film has escaped all three of the booms and is proceeding downstream.

It was raining on the day of the accident, resulting in increased flow volumes in the creek. This was good for the creek: the increased flows rapidly flushed most of the diesel downstream and out of the creek. However, this increased flow probably means most of the spill was not collected on the booms, but rather was flushed down into the harbour.

The Water Survey of Canada maintains a stream flow monitoring station on Red Hill Creek just upstream of the accident site (at Queenston). Early on the morning of the 14th, the flow in the creek was about 30 L/s (liters per second). At the time of the accident, it had been raining and the flow had increased to 170 L/s. Between 9AM and 3PM, there had been four more pulses of rain causing the creek to increase in flow, with the peak flow being at about 2:45PM when the flow was about 3500 L/s. The total flow from 9AM to 6PM was 45,000,000 litres. The flow past the accident site was actually higher, since the accident site is 1.5 km downstream from the Queenston flow monitoring station.

These increases in flow have several consequences with respect to the effectiveness of the booms for collecting the diesel spill. First of all, there was flow that occurred between the accident and the placement of the booms: the booms were 0% effective during this period. After the booms were placed, increases in flow meant that surface film could escape around the booms until they were reset. The peak flow was more than 20 times higher than it was when the booms were first placed. And during these peak flows, the volume of water going both under and around the booms greatly exceeded the volume making contact with the booms.

The common expression is “oil and water don’t mix”, and the common view is that “diesel does not mix with water”. These views are overly simplistic. It is more accurate to say that most components of diesel fuel have a low solubility in water – but it is important to note that “low” does not mean “zero”. At the accident site, an estimated 100 L of diesel were dispersed into more than 45,000,000 L of water. Even if the solubility of diesel fuel components averaged as low as 0.0002%, it is likely that much of the diesel passed under the booms either solubilized or emulsified in the water column.

I visited lower Red Hill Creek to see the effects of the spill at 4:09PM on July 14th, 2015, and was there until 5:14PM. I parked at the gate for Globe Park, and then walked down the trail to the creek. As I descended down the hill towards the creek, I noticed a strong smell of diesel fuel. I am very familiar with this characteristic odour, because our car runs on diesel and I pump all the fuel for the family vehicle. My location at the time was approximately:

43.248544°, -79.768724°

This location was 100m away from the creek, and about 1030 m downstream from the accident site. The obvious odor of diesel was present more than a kilometre away from the accident site more than 8 hours after the accident. A question:

Was the air pollution from this diesel spill picked up by any of the air quality monitoring stations in the City? Any mobile stations? Any on site monitoring equipment?

I would really like to see the data for the substances monitored and the levels measured.

I proceeded down to the creek. The banks of Red Hill Creek in this area are covered in thick, high vegetation meaning in most areas it is very difficult to get to the creek to see it. This also makes observing the creek and its banks for wildlife very difficult. There could be a lot of wildlife present (contaminated or not) that would go unnoticed in the thick vegetation.

I found a small opening in the vegetation that allowed me to see the water along the near shore. Clinging to the sides of the creek was a thin (about 20 cm wide) ribbon of surface sheen (rainbow hues). Since this was about 4:15PM, the creek was still running high and fast: about 1300 L/s, down from the peak of 3500 L/s just an hour and a half earlier. The surface film was actually present all across the creek, but the faster flowing water in the middle of the channel made the film thinner and harder to observe. It only thickened up and developed the rainbow hues in the back eddies formed by streamside vegetation.

I then proceeded upstream to the section where the creek is underneath the expressway. Location, about:

43.245303°, -79.769438°

In this area, the shade from the overhanging expressway prevents vegetation from growing, allowing access to the creek (a pretty dismal place.....). While I was watching the diesel slick flow by, I noticed a bird floating down the creek. It pulled itself out of the creek and I took its picture:

See photo "gullA.jpg", attached.

(Photos sent to clerk in a second eMAIL.)

(Please note: my pictures have been downsized for eMAIL. If you wish to see more detail, please contact me for the originals. I also have video clips, which are best for seeing the moving diesel slick, but these videos are too large to eMAIL.)

I sent the photo out for identification, and I was told that the photo shows a "heavily oiled juvenile Ring-billed Gull". The juvenile bird was quite ill and was unable to fly. It even lacked the energy to move away, and when approached dropped back into the water, paddled slowly back across the diesel slick, and pulled itself out on the other side of the creek. Photo:

See photo "gullB.jpg".

I include this photo because the graffiti on the expressway support wall makes the location easy to identify to those familiar to the area.

After leaving the diesel sickened bird, I then proceeded upstream. The odor of diesel did not seem to be increasing greatly, but since I was probably acclimating to the smell that fact that it remained noticeable could mean the air pollution levels were increasing. The diesel slick along the shoreline seemed to be getting thicker and more colourful.

I then approached the downstream set of booms across the creek.

Location: 43.244356°N, -79.769498°W

At this location, it was clear that the booms were not collecting all of the surface film of diesel, because chunks of the film were floating around the booms near the shoreline.

See photo: "downboom.jpg".

So even 9 hours after the accident, the diesel spill was still spreading downstream. Signs of ongoing air pollution and water pollution were obvious.

It is my opinion that it would be difficult to improve upon the spill response efforts at the site. Efforts to minimize the amount of diesel spilled were made. Efforts to contain what was spilled were also made, but were hampered in part by high water flows in the creek. The high flows flushed much of the spill downstream to the harbour. The high volume of the flow (4,600,000 L) may have diluted the diesel spill enough to decrease the damage to wildlife, but trying to assess the damage to wildlife is difficult due to the thick vegetation in the area.

As for lessons learned about the cleanup response:

When a spill occurs, the highest priority needs to be given to containment, because it is extremely difficult to extract significant amounts of pollutants from moving water. The first responders (after properly seeing to the needs of the people at the crash site) should focus on cleaning at the source. (I.e., efforts should focus on removing the diesel from the tanks, as opposed to setting up booms.)

Because good cleanup efforts were made, and the diesel spill still spread anyway, some thought needs to be given to spill prevention measures.

It is truly unfortunate that a high volume expressway was built literally on top of Hamilton's second largest creek. The result was easily predictable. This is not the first truck that has slid off the Red Hill Creek Expressway into the water, and unless the design of the Red Hill Creek Expressway is fixed, further pollution events are likely.

Measures that need to be considered could include:

- 1) Safety barriers where the expressway and/or its access ramps cross the creek.
- 2) Weather closures for the expressway (did rain contribute to the accident?).
- 3) Equipment closures for the expressway. Since the expressway was built in the bottom of a narrow creek valley, the on/off ramps are in many locations sharply angled (sometimes in all three dimensions). This combined with a tight spacing on entrances and exits and a high volume of truck traffic makes for hazardous

conditions. I was told during the expressway planning phase that the Red Hill Creek Expressway was not intended for “through truck traffic”, and Councillors said that signs would be put up saying “No Through Trucks”. It may be time to revisit some type of restrictions on truck traffic on the oddly configured Red Hill Creek Expressway. These could include some combination of weight and or time restrictions (e.g., weight restrictions during rush hour).

4) Cargo limitations. I am aware of two trucks that have slid off the expressway and into the water. (Are there more?) Thankfully neither of them was carrying hazardous materials as their primary cargo. Considering the odd design of the Red Hill Creek Expressway, with many of these features either adjacent to or over moving water, it would be prudent to consider if certain types of hazardous materials should be banned from the Red Hill Creek Expressway. With respect to avoiding a hazardous cargo spill into a creek, the metric version of the Franklin idiom applies: A gram of prevention is worth more than a kilogram of cure.

I would really like to know what others think about this. If anyone receiving this is aware of available information about the spill and/or the cleanup, please send it to me.

Sincerely,

Joe Minor





