Sarnia Shell Manufacturing Spill Prevention Technology minutes (updated 2023)

An aerial map of the site was used to review 2 outfalls to Talfourd Creek, process areas, water retention ponds for both OTCW (Once Through Cooling Water) process storage and API separators and surface run off. The Shell Manufacturing site contains processes for the refinery (oil/hydrocarbon), Shell Chemicals (isopropyl alcohol) and Air Products (separate company).

Shell chemicals uses cooling towers and all discharges (process water, surface water run off and cooling tower blowdown) flow to the refinery facility. All water is treated in the refinery's wastewater treatment plant prior to discharge.

There are 3 OTCW (Once Through Cooling Water) streams to manage for discharge.
One stream, referred to as the Clean Water Sewer, has a higher pressure on the cooling water side of the heat exchangers compared to the process stream. Therefore, any leaks in cooling water will flow into the process stream.

The other two streams have lower pressure in the cooling water side of the heat exchangers. Thus, it is at higher risk for contaminants in the cooling water should a leak occur in the exchanger. Therefore, these two streams flow into two oil-water separators, also referred to as Potentially Oily Water Separators prior to discharge

To address the risk of potential leaks via the cooling water processes, all 3 streams have continuous upstream analyzers for dissolved hydrocarbons. In addition, the API separators have sheen detectors with alarms to prevent release. OTCW and process water can all be diverted to storage ponds and treated through WWTP. There are 2 storm water management ponds totaling 70 million litres. The smaller pond can be used to divert up to 5-6 million gallons (~25 million litres). The larger pond is used for stormwater only. Shell process water flows into an oil-water separator to remove any free oil, then to dissolved nitrogen flotation units to remove any residual oil and oily solids, and then finally into the Biox system (Equalization basin and aeration basin) where microbes remove any dissolved hydrocarbons. There are many operational targets for the Biox unit. Total organic compounds (TOC) are just one of the criteria used to maintain a healthy unit. TOC is actually the "food" for the bugs. Should the discharge from the biox unit be off-spec, the water can be diverted to retention ponds and re-routed for treatment.
The company uses continuous on line analyzers and alarms in addition to MISA composite samplers, as the MISA samplers do not provide real-time data.

How often do you update your Spill Prevention and Contingency Plan? The SPCP is reviewed and signed off annually, at a minimum.

When was your last significant spill reported to MOECC? What were lessons learned? Ie prevention of recurrence?
A small release of hydrocarbon containing material into the cooling water system created a sheen on Talfourd Creek in Sept. 2017. It was discovered that the oil skimming equipment in the POW did not remove all material as expected. It was learned that the type of material released can become entrained in the water column, compromising the effectiveness of the skimmers. Enhanced lighting in the area material will allow operations to improve the response to any future events of this nature.

Shell cont'd

Would you make the Contingency Plan available? Sections of the SPCP that do not include commercially sensitive information can be made available.

Can you describe the effectiveness (outcomes) of the spill prevention initiatives the facility has implemented?

The Sarnia Manufacturing Centre completes many drills each year that include the prevention or mitigation of spills on and off site. Spills to the river have also been used as scenarios in mock Emergency Operations Centre (EOC) exercises where emergency responders role play effective response and discuss opportunities for improvement. Shell Global Process Owners in Emergency Response also provide guidance specific to marine response. Shell hosted the annual SADS exercise in November 2021 where local industries, emergency response professionals, and local, provincial, national and international government authorities simulated a marine spill emergency on the St. Clair River at the Shell dock.

There was a preventative maintenance overhaul of the North Potentially Oily Water Separator in 2016 that included the replacement of oil containment and removal equipment.

As part of an extensive multi-phased wastewater treatment plant upgrade project, the dissolved nitrogen flotation units were added to the WWTP in 2015/16.

The north stormwater pond was added in 2012. This provided additional storage for approximately 10 M imp. gallons of stormwater.

What long term plans for spill prevention?

As part of the wastewater treatment plant upgrade project, Shell is evaluating further enhancements including the review of the primary oil-water separators for greater efficiency and reliability.