Suncor Sarnia Energy Spill Prevention – Ethanol plant **Reviewed 2023**

Suncor Energy, located west of Highway 40, discharges to Turnbull Drain. The site draws municipal water for its cooling towers and other water requirements. Corn is shipped in via truck and rail, and dry distillers grains is shipped out by rail and truck. The Ethanol produced onsite and is blended with gasoline (brought in by tank truck and stored in onsite tanks) and is shipped out by tank truck as denatured ethanol to be used as fuel additive. In addition, corn oil is produced for biodiesel feedstock. The site does not use pipelines for offsite distribution of any products. Rail cars are used for corn and dried distillers grain shipping only.

Waste water from non-contact process units and outdoor secondary containments are conveyed through onsite sewage system (ditches) which flows into the Storm Water Management Pond (SWMP). Outdoor secondary containment (such as tank farm containment) structures are manually pumped (batch discharged) to the onsite ditches.

The storm water management pond (SWMP) continuously discharges via gravity feed only. The SWMP is equipped with an isolation valve and online continuous monitors for dissolved oxygen, pH, temperature and flow.

Surface storm water and process water blowdown (cooling tower, reverse osmosis water and water softener) drains into a storm pond which is monitored and continuously discharged. The SWMP has a total active capacity of 7600 cubic meters (approximately 2,007,700 us gallons). In the event of a large tank fire where 4 hydrants were used to apply foam and water (total of 2000 usg/min) for cooling, the SWMP would be able to contain approximately 16 hours of fire water/foam (without the use onsite ditches for containment) before reaching overflow capacity.

To reduce risk of spills, high risk chemicals have secondary containment (with a number of chemicals stored inside buildings with associated sumps) and a system of sumps to prevent offsite discharge. The contained water runoff from the tank farm/ethanol load out secondary containment is monitored for pH and sheen (presence of ethanol) prior to manual pumping batch discharge.

Should a sheen occur, it would be vacuumed and sent to an approval disposal site.
In case of power failure, the process is safely shutdown. Sensors remain operable through UPS backup.
Although the site is not named under MISA, its protocol requirements are listed in the ECA.
The following chart describes MISA testing parameters, frequency and average limits.

Parameter	**Test Frequency**	**Limit (Average)**
TRC, Total Residual Chlorine	Weekly	0.05mg/L (monthly)
Oil and Grease	Weekly	15mg/L (monthly)
Dissolved Oxygen	Continuous	≥4mg/L (monthly)
Total phosphorus	Weekly	1mg/L (monthly)
pH	Continuous	6.5-9.5 (instantaneous limit)
Chloride	Weekly	No limit
ICP Metal Scan	Quarterly	No limit
Tolyltriazole	Quarterly	No limit
Temperature	Continuous	<30C (instantaneous limit)
Acute toxicity	Monthly	50% lethal concentration
Chronic toxicity	Biannual	50% lethal concentration & 25% inhibiting concentration

EFFLUENT MANAGEMENT: **Suncor Sarnia Refinery Reviewed 2023**

1. Do you use once-through-water cooling systems? (yes/no) **yes**

If "yes", is the cooling water effluent discharged continuously or is it sent to containment and then batch released?

The cooling water is discharged continuously.

2. Is the process water effluent discharged continuously or is it sent to containment then batch released?

The process water is discharged continuously. We do have impounding basins that can be used to decrease final effluent flow if needed.

Process water effluent includes all water that is treated through our on-site Waste Water Treatment Plant (WWTP). The WWTP is designed to use Primary, Secondary and Tertiary treatment to treat and monitor wastewater streams produced in the refinery. Primary treatment in our WWTP mainly consists of settling (using gravity to remove solids from water) and skimming (removing the lop layer of liquid). Secondary/Tertiary treatment consists of biological treatment with aeration basins, settling by clarifiers and carbon treatment.

3. Is the cooling tower blowdown (water) treated prior to its release from the facility? If yes, please briefly describe the treatment.

Yes, water from the cooling tower is treated through the refinery WWTP consisting of primary, secondary and tertiary treatment prior to discharge from the facility.

4. Do you have systems in place to detect leaks and prevent releases from these systems?

Yes, we have a combination of analyzers that provide a rapid response to any abnormal detection of water quality.

An online Gas Chromatograph Flame Ionization Detector (GC-FID) monitors the once through cooling water (OTCW) and process effluent. This analyzer's low detection limit and detailed breakdown provides us with an early indication of any potential issues with the OTCW equipment.

We also have three online Total Organic Carbon (TOC) analyzers strategically located upstream of the GC-FID on our OTCW stream to provide rapid detection of potential issues.

There is also a hydrocarbon sheen detector on our OTCW separator.

When an alarm is triggered on any of these analyzers, operations can respond quickly by shutting down the unit or specific sections where the alarm is triggered. The combination of these analyzers provides us with the ability to identify which piece of equipment requires further evaluation.

In addition to the analyzers, corrosion rates are tracked and they support preventative maintenance programs related to exchangers and other onsite equipment. We also utilize a Process Hazard Analysis (PHA) process where a multi-disciplined team performs a risk assessment on activities around the OTCW and the process effluent. The PHA team identifies improvements that will reduce the risk of impairing the water quality of our effluent.

Do you have stormwater interception systems to retain, and if necessary, treat stormwater? Please describe.

The site has a storm water collection and drainage system which diverts this water to a storm water basin (SWB). From the SWB, the water undergoes further Secondary and Tertiary treatment in our WWT facility before discharge to the St. Clair River.

Site impounding capacity is designed for process and storm water containment. We utilize our analyzer capabilities and our preventative maintenance programs to ensure integrity and to quickly identify concerns with OTCW quality.

SPILL PREVENTION: **Suncor Sarnia Refinery** **Reviewed 2023**

Do you have a *current* spill contingency plan in place? **Yes**

How often do you update your Spill Prevention and Contingency Plan?
Updates are made to the SPCP whenever we determine an update is required, at minimum the SPCP is updated annually per O.Reg 224/07

Is the Spill Prevention and Contingency Plan posted for public viewing? (yes/no)
We share our SPCP with local fire, police and emergency services upon request.

If "no", would you be willing to make it available? (yes/no).

If "no", can you briefly explain why?
Suncor is open to sharing an overview of its spill prevention and mitigation measures through various stakeholder interactions, e.g. community/advisory panel meetings, community events, etc. This provides an opportunity to share information about various upgrades and operational improvements that further safeguard effluents from the Sarnia site to the river.

Can you describe the effectiveness (the outcomes) of the spill prevention initiatives the facility has implemented?
Reliability of equipment and preventative maintenance activities (ie. proactive inspections of tanks and vessels, increased integrity testing, increased monitoring frequency, etc.) has reduced the risks of spills affecting the St. Clair River. Continued participation in emergency drills (minimum of quarterly basis), both table top and live simulations has proactively identified opportunities for improvement to mitigate the potential safety and environmental effects of a release.

What are the long-term plans, if any, to improve spill prevention at the plant?
The spill prevention plan is reviewed annually to identify opportunities for improvement. All onsite incidents and near misses are investigated to proactively identify conditions that could potentially cause spills so they can be addressed. Our PHA process continually operates to reduce the risk of spills.