

Bijaya Adhikari

From: Fraser, Benjamin C <benjamin.fraser@esso.ca>
Sent: December 7, 2020 3:13 PM
To: Lloyd Gruben
Cc: Mardy Semmler; Bijaya Adhikari
Subject: Tuk Base Surface Water Discharge SNP 1841-3 Notification
Attachments: Tuk Surface Water_Post Treatment.pdf; Tuk Base: Post Treatment Water - South Landfill

Good afternoon Lloyd,

As discussed earlier this afternoon on the phone – Please see below for the memo discussing the minor exceedances we experienced at site this summer during our discharge activities. The analytical data is attached as well for your reference. I've also attached the notification email provided back in July before we began discharge activities indicating the post treatment sample (TU20-K-01) was below all applicable guidelines. After review, please don't hesitate to reach out if you have any questions or would like to discuss further.

During the summer 2019 remedial excavations, water seepage was encountered within the South Landfill excavation area. The analytical results were exceeding the applicable IWB guidelines on Water Licence N5L8-1841. A water management technical memorandum was submitted on September 13, 2019 to provide update on the water management strategy and no water was discharged to the environment. The water treatment plant was upgraded and tested for on-site implementation during summer 2020 field season to address any water seepage encountered in the South Landfill. The upgraded treatment plant included the following two stages: Stage 1, Sediment Removal – Four parallel settling ponds followed by two 3 bag filter systems (50µm, 25µm, and 10µm) connected in series. Stage 2, Chemical Treatment – two 150kg of BCHR-830 activated carbon vessels connected in parallel followed by one 325kg of BCHR-830 activated carbon vessel and subsequent Lanxess E IN 20 bayoxide vessel connected in series.

During the 2020 summer season, South landfill water seepage was encountered as anticipated. A water sample was collected from within the excavation in July (pre-treatment, SW20-03), water was then pumped through the treatment system and another sample was collected (post-treatment, TU20-K-01). The analytical data from the post treatment sample was below the discharge criteria outlined in the Water License as stated in the email dated July 16, 2020. Treated water was discharged following the notification to the IWB.

As part of the QA/QC of the treatment system, treated water was collected at the treatment system outlet (TU20-K02 through K05) at a frequency of approximately every 150m³, prior to changing of system filters. In addition, water samples (SW20-10 and SW20-11) were also collected at the end of the silt fencing prior to runoff in to the harbour outlet. The pre-treatment water was not collected as part of the QA/QC program. The results of the post treatment samples are attached. These results were received in August and September and data was reviewed as the 2020 annual report is being prepared after the Site demobilization. It should be noted that TSS and total lead concentrations from selected samples collected from the discharge point post treatment unit were greater than the IWB discharge criteria; however, samples collected post silt fencing near the harbour outlet reported total lead below the discharge criteria. It should be noted that sampling of the discharge points was conducted primarily to measure the effectiveness of the treatment system and that there was no impact to the environment as a result of discharging this water.

Since there were some exceedances noted, it indicates that the treatment system in its current form is not fully effective at reducing TSS and lead in the discharge stream. To resolve this issue Golder proposes to implement the following modifications to improve the effectiveness of the treatment unit in the upcoming 2021 field season:

- *Increase the effectiveness of the settling ponds by implementing additional measures. This may include increasing settling time; using instrumentation to evaluate the effectiveness of settling ponds; and/or adding covers to the settling ponds to prevent wind from slowing the settling process*
- *Increase the effectiveness of the bag filters in removing particulate. This may include reducing the filter mesh size ratings/addition of finer size filter and altering the filter change intervals*
- *Increase the effectiveness of the Lanxess E IN 20 bayoxide vessel by altering the backflush and media change intervals*
- *Reduce flowrate through the system*

As these changes are implemented and before they are finalized, water quality of the effluent from the treatment system will be assessed as per the Water License criteria prior to discharge to the environment to ensure that there are no further exceedances. In addition, additional review resources will be added in the future to ensure that the data review process is promptly completed.

Kind Regards,

Benjamin Fraser, E.I.T.

Project Manager

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Summary of Surface Water Analytical Results - Post Treatment

Tuk Base Reclamation
Imperial Oil Limited

Parameters	Units	RDL	Criteria ^(a)	Sample Location			Pre Treatment			Post Treatment - South Landfill			Harbour Outlet		
				Sample ID	Sample Date	Sample Date	Sample ID	Sample Date	Sample Date	Sample ID	Sample Date	Sample Date	Sample ID	Sample Date	Sample Date
Total Suspended Solids	mg/L	1	15	SW20-03	6.7	1.5	9.2	21	25	23	11	6.2	91	30	5.9
Total Petroleum Hydrocarbon	mg/L	2	5	YA3955	<2.0	<2.0	5	<2.0	<2.0	<2.0	<2.0	6.0	<2.0	4.0	2
Total Lead	mg/L	0.00020	0.007	C045928	0.0092	0.0016	0.018	0.024	0.024	0.024	0.0088	0.0011	0.00055	0.00098	<0.00020
Dissolved Lead	mg/L	-	n/g	29-Jun-20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	mg/L	0.00040	0.11	10-Jul-20	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Toluene	mg/L	0.00040	0.002	29-Jul-20	0.0005	0.0005	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Ethylbenzene	mg/L	0.00040	0.025	10-Jul-20	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Xylene	mg/L	0.00089	0.03	10-Jul-20	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089
Hardness	mg/L	0.7	n/g	29-Jun-20	740	740	1,100	750	750	780	610	660	1300	380	480

Notes:

^(a) Effluent quality standards indicated on Water Licence N5L8-1841

Bold/Underlined - value exceeds criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

NA - not available

n/g - no guidelines

RDL - reportable detection limit

TPH - total petroleum hydrocarbons

> - greater than

< - less than

All values reported in milligrams per litre (mg/L)

Table 1
Summary of Surface Water Analytical Results
Tuk Base Remediation
Imperial Oil Limited

Sample Location		Post Treatment - South Landfill	
Parameters	Units	RDL	Criteria ^(a)
Total Suspended Solids	mg/L	1	15
Total Petroleum Hydrocarbon	mg/L	2	5
Total Lead	mg/L	0.00020	0.007
Dissolved Lead	mg/L	-	-
Benzene	mg/L	0.00040	0.11
Toluene	mg/L	0.00040	0.002
Ethylbenzene	mg/L	0.00040	0.025
Xylene	mg/L	0.00089	0.03
Hardness	mg/L	0.7	n/a

Notes:

^(a) Effluent quality standards indicated on Water Licence N5L8-1841

Bold/Underlined - value exceeds criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

n/s - no standards

RDL - reportable detection limit

TPH - total petroleum hydrocarbons

> - greater than

< - less than

All values reported in milligrams per litre (mg/L)