

SEPA monitoring assessment update for Tarbolton Landfill - June 2019



This report provides:

- a review of environmental monitoring, including data collected up to the end of June 2019
- information on any additional monitoring collected by SEPA to support the NHS-led Problem Assessment Group
- an update on work to establish potential options for management of the site

Environmental Risk Assessment

Media	Risk type	Previous Risk Assessment	Current Risk Assessment
Landfill gas	Migration of landfill gas through sub-surface pathways	Low	Low
Groundwater	Groundwater quality impact	Low/Moderate	Low/Moderate
Surface water	Surface water quality impact	High	High
	Impact on farm animals drinking contaminated surface water	Very Low	Very Low

SEPA have carried out intensive environmental monitoring around the Tarbolton site since May 2018 to assess the site impact on associated water bodies and wider effects. SEPA continues to review the monitoring data gathered on each sampling occasion and revising the environmental monitoring plan where necessary to inform our ongoing environmental risk assessments.

Migration of landfill gas through sub-surface pathways

SEPA monitors landfill gas in perimeter boreholes to assess the risk of landfill gases migrating off site through sub-surface pathways. Methane, carbon dioxide, oxygen and other supporting parameters are monitored every month.

Levels of carbon dioxide during April, May and June continued to be detected at or above permit trigger levels in perimeter gas boreholes on the southern and western perimeter of the site indicating the possible migration of landfill gas. However, levels have remained stable month on month. Levels of methane during this period were all below the permit trigger levels. This continues to constitute a low risk to local receptors when considering the site conditions and pathway from site to receptors. SEPA will continue monitoring the potential for landfill gas migration.

Groundwater quality

SEPA monitors the level and quality of groundwater at 11 boreholes on a quarterly frequency. In March 2019, we increased the frequency of monitoring three boreholes to monthly. In addition to the groundwater monitoring, four leachate wells are sampled every two months. All of these samples are analysed for a range of inorganic parameters and metals. The levels of leachate are measured at the 17 accessible wells every month.

The environmental risk assessment for groundwater quality was initially assessed as low/moderate and has remained at that level following a review of all groundwater monitoring to date.

The results from the leachate wells in March and May 2019 show that the results in 2019 are consistent with those from previous monitoring rounds and suggest that there has been little change in leachate quality in 2018-2019. Leachate levels generally display either a rising trend or are largely stable.

Groundwater levels were monitored in February, April and May 2019. Groundwater quality samples were collected from all monitored boreholes in April 2019. In addition, groundwater quality samples were recovered from three boreholes surrounding the unlined Zone 1

landfill area in March and May 2019¹. Groundwater levels have generally been stable or have fallen slightly compared to peak levels in winter 2018-2019.

Groundwater quality has generally been stable over the last 12 months. The range of concentrations of ammoniacal nitrogen and chloride identified in groundwater are in line with those recorded in the historic site operator monitoring data for the majority of boreholes. The only notable exception to this is two boreholes (GWD5 and GWD7) in the west and south west of the site, adjacent to the unlined Zone 1 landfill area. These boreholes display elevated chloride concentrations in GWD7 and ammoniacal nitrogen in GWD5. However, these adverse trends in GWD5 and GWD7 are localised to the area immediately surrounding the Zone 1 unlined landfill and are not reflected in other down gradient monitoring locations. The groundwater quality in GWS5, located down gradient, has improved compared to the pre-2018 period.

It should also be noted that, while the leachate outbreaks are having an impact on surface water, this will constrain the leachate head and amount of infiltration of leachate through the base of the landfill. As such the risk to groundwater is not expected to significantly worsen. The overall risk from the landfill to groundwater is considered to remain moderate from Zone 1 (partially lined area of landfill) and low to moderate from Zone 2 (lined area of landfill).

Surface water quality

SEPA monitors a range of inorganic parameters and metals at six locations on a weekly frequency. This includes an increased monitoring frequency for the site at the bottom end of the Water of Fail at Failford from monthly to weekly. The data is compared to statutory water quality standards used to classify water quality under the requirements of the Water Framework Directive (WFD)².

An initial surface water quality risk assessment based on monitoring data collected during May, June and July 2018, showed levels of contaminants that were considered to pose a moderate risk to surface water quality. This was based on the potential for the

¹ Position of the zones are shown in the maps in the main reports

² [The Scotland River Basin District \(Standards\) Directions 2014](#)
[The Scotland River Basin District \(Standards\) Amendment Directions 2015](#)

concentrations to lead to a deterioration in the water quality classification for the Water of Fail and is discussed in full in the reports available on our website³. The risk assessment was elevated to high environmental risk in February 2019 following a series of short-term spikes in ammoniacal nitrogen concentrations over the winter period.

Rainfall over the last three months was below average, although at the end of May there was a period of significant rainfall. A nearby SEPA rainfall monitoring station measured 53mm of rain during this period, 72% of the monthly average. However, total rainfall for April, May and June was only 78%, 94% and 65% of the respective monthly averages.

The late May rainfall event, and the otherwise drier than usual conditions, are reflected in river flows in the area. We do not measure flow in the Water of Fail and the Biggary burn directly, but at a nearby river gauging station high flow occurred at the end of May and in early June. Following this high flow event, flow has been below the Q95 (SEPA's standard measure of low flow). In an average year we would expect flow to be this low for around 18 days, but so far this summer these low flows have been experienced for over 50 days since late April.

This long period of low flow conditions has led to a significant reduction in the dilution available to mitigate the impact of the leachate entering the Biggary burn and the Water of Fail. Therefore, the concentrations of ammoniacal nitrogen, one of the main leachate indicators, in the Biggary burn have remained very high. Measured concentrations are in the range 40-150 mg/l in the Biggary burn during June. The low concentration of this range coincided with the period of increased flow. The concentrations measured during June 2019 are lower than those from the previous samples taken since the beginning of April. Very low levels of dissolved oxygen were observed in the Biggary burn during April. Monitoring data from May and June has shown that the oxygen is still depressed to some extent but some recovery is evident.

Concentrations of ammoniacal nitrogen measured downstream of the confluence on the Water of Fail were just over 12 mg/l at 0.5 km downstream and slightly lower 1 km

³ [Tarbolton Landfill –Report Investigation into the potential for environmental impacts resulting from the consolidated ash waste deposition and lack of operational management](#)
[Tarbolton Landfill – Report Monitoring plan and update of potential for environmental impacts resulting from consolidated ash waste deposition and lack of operational management](#)

downstream (average 9 mg/l). These values would lead to a classification of bad under the relevant WFD standard for ammoniacal nitrogen. The monitoring point 5.5 km downstream at Failford has seen lower concentrations of ammoniacal nitrogen since the start of the year. The latest samples taken in June, although still slightly elevated, are much more typical of the long-term results from the Water of Fail at Failford.

Concentrations of manganese were above the Environmental Quality Standard (EQS) in the Biggary burn and downstream locations in the Water of Fail. However, monitoring data at locations upstream of the landfill show concentrations of manganese in the region of 50% of the EQS. Monitoring of dissolved chromium shows concentrations above the EQS in the Biggary burn.

The overall risk assessment for surface water quality remains at high.

Farm animals drinking contaminated surface water

In the Biggary burn, in particular, there is significant contamination of the watercourse as discussed above. However, the burn is steep and fenced in this area and as such should be inaccessible to livestock. In addition, under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), General Binding Rule 19 on the keeping of livestock states that poaching of any land within 5m of any river, burn or ditch must be prevented⁴. Consequently, the current risk assessment remains at very low.

Odours and information to support public health risks

Since April there has been a reduction in the reported number of complaints that SEPA has received regarding odours from Tarbolton Landfill site. SEPA Officers have continued to undertake odour assessments and site inspections on a regular basis. On the 31 May an offensive odour from a leachate outbreak was recorded out-with the site boundary by SEPA. No offensive odours were detected out-with the site boundary in June. However, a mild leachate and landfill gas odour was recorded during SEPA's routine odour assessments. Odours on site remain strong, as per previous months, but generally

⁴ [The water Environment \(controlled Activities\) \(Scotland\) Regulations 2011- A practical guide](#)

localised to the area within the landfill site. The main source of odours are from leachate outbreaks and the uncapped areas of the site.

A cross agency Problem Assessment Group (PAG) was established by NHS Ayrshire & Arran to enable the NHS to assess risks to public health. In addition to the NHS, the members of this group are: South Ayrshire Council, SEPA, Health Protection Scotland, Health and Safety Executive and Scottish Water. SEPA updates the PAG on odour assessments and environmental monitoring.

Following discussions with the PAG, SEPA commissioned further sampling to establish the concentration of trace components in the raw landfill gas and in the air in areas immediately overlying open leachate overflows and an open leachate well. The monitoring investigation focussed on six locations within the boundary of Tarbolton Landfill, three in-waste gas wells, two areas immediately overlying leachate overflows and one immediately overlying an open leachate well.

The sampling took place at the start of April, with analysis results received by SEPA on 30 April 2019 from the contractor. This information was shared with the PAG to inform discussions on whether additional monitoring was needed to further inform the public health risk assessment.

Work to establish potential options for management of the site

SEPA have been in regular contact with Scottish Government in relation to Tarbolton landfill site. Earlier this year, Scottish Government asked SEPA to commission a report into options for the management of the site which would mitigate the impact on the environment.

As a result of this work it has become clear that, in order to arrive at accurate costed options for managing the site, further survey work will be required. Scottish Government has confirmed that it will fund this additional work and we are in the process of preparing to award that contract. Once we have the results of this survey work we intend to discuss further with Scottish Government.

We expect to be in receipt of this further information by early September.

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