

# SEPA monitoring assessment update for Tarbolton Landfill – December 2019



This report provides:

- A summary of current on site conditions
- A review of environmental monitoring, including data collected from start of November to 16 December 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

## Current site conditions

During planned site assessment work at Tarbolton Landfill Site, SEPA noted a general but marked deterioration in the condition of the eastern side of the landfill site in the area of leachate well (LW) 17 and LW18. This has included increased amounts of leachate and surface water and potentially hazardous gases occasionally detected within the boundary of the hazardous landfill, in the vicinity of LW17 and LW18.

Monitoring by South Ayrshire Council at various off-site locations has not found evidence of harmful gases outwith the boundaries of the site.

As a result of the worsening condition of this eastern area, SEPA suspended on-site monitoring activity during September and October 2019 while reviewing our health and safety risk assessments for the site. Our on-site assessment work recommenced in November 2019 following a review of our monitoring plan, as outlined below.

## 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 has 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 revise the environmental monitoring plan where necessary to inform our ongoing environmental risk assessments.

A significant review of our monitoring plan was undertaken in October 2019, following the identification of worsening conditions on-site. The frequency and in some instances our monitoring locations for groundwater, leachate and surface water sampling were revised. The programme of monitoring for landfill gas has not been altered significantly. These changes were made having taken account of the large amount of data gathered since May 2018 and to ensure the monitoring continues to inform our ongoing environmental risk assessment.

### 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 monthly. This frequency has not changed following a review of our monitoring plan in October 2019. SEPA has not undertaken this sampling in September and October.

Levels of carbon dioxide in November 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 potential for 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, with the exception of a single permit trigger exceedance in November to the south of the site. Similar exceedances occurred during the winter period of 2018. SEPA will continue to keep the situation under review over the coming months to understand if this indicates a deterioration of conditions or a seasonal trend. There is currently 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 6 monthly basis. The frequency was reduced from a quarterly basis following a review of our monitoring plan in October 2019. In addition to the groundwater monitoring, four leachate wells are sampled every 6 months, which has reduced from every 2 months following our review. All of these samples are analysed for a range of inorganic parameters and metals. The levels of leachate measured monthly at the 17 accessible wells has been reduced to four leachate wells every 6 months. SEPA has not undertaken this sampling in September and October.

The results from the leachate wells sampled in November 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 and groundwater quality samples were collected from all 11 boreholes in November 2019<sup>1</sup>.

Groundwater levels are generally stable but with some seasonal influence demonstrated by a rise in levels in every borehole (except GWD4) in November compared to those recorded in summer 2019. Groundwater quality in boreholes GWD5 and GWD7 adjacent to the unlined Zone 1 landfill area continues to be impacted by landfill leachate. These boreholes

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<sup>1</sup> Position of the zones are shown in the maps in the main reports

display elevated chloride concentrations up to 1540 mg/l in GWD7 and 846 mg/l in GWD5 and ammoniacal nitrogen concentrations of up to 316 mg/l in GWD7 and 82.6 mg/l in GWD5. Total metal concentrations are elevated compared with drinking water standards but generally filtered metal concentrations are lower, indicating migration of metals through the subsurface is likely to be partially mitigated by natural attenuation mechanisms. Recent concentrations in GWS5 and GWD6 are considerably lower than in GWD5 and GWD7, closer to background levels. Concentrations monitored in all other boreholes show little or no change.

It should 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 and low to moderate from Zone 2.

## Surface water quality

SEPA monitors a range of inorganic parameters and metals at six locations every second week on the Biggary Burn and Water of Fail. This frequency has reduced from weekly following a review of our monitoring plan in October 2019. The data is compared to statutory water quality standards used to classify water quality under the requirements of the Water Framework Directive (WFD)<sup>2</sup>.

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 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 website<sup>3</sup>.

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

<sup>3</sup> [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](#)

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. The risk has remained high since then as the surface water impacts remained significant.

The evidence gathered during our intensive monitoring programme demonstrates the watercourses around Tarbolton Landfill are heavily influenced by local rainfall patterns and resulting flow, therefore chemical concentrations fluctuate depending on available dilution.

Following a period of mixed rainfall during the Autumn, local rainfall in November was almost a third of the seasonal norm at 42 mm. This decreased the dilution available in the watercourses leading to higher concentrations of ammoniacal nitrogen in the Biggary Burn and Water of Fail. The environmental impact remains significant, with measured concentrations in the range 4 to 12 mg/l in the Water of Fail downstream of the landfill in November. The lower concentrations in this range coincided with periods of increased flow at the start of November. These values would lead to a classification of bad under the relevant WFD standard for ammoniacal nitrogen. December has been extremely wet and is at the seasonal average with just under half the month to go. It was not possible to undertake the sampling on the occasion it was planned in December due to the heavy rainfall conditions.

Ammoniacal nitrogen concentrations detected at the monitoring point on the Water of Fail 50 m upstream of the Biggary burn confluence have increased in line with levels detected at the next downstream point since October. It is unclear what the cause of this change is and SEPA will work to investigate this further.

The monitoring point 5.5 km downstream at Failford has seen increasing concentrations of ammoniacal nitrogen in October and November between 1.1 mg/l at the start of October and increasing to just under 10 mg/l by the end of November.

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

## **Farm animals**

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 (GBR) 19 on the keeping

of livestock states that poaching of any land within 5m of any river, burn or ditch must be prevented<sup>4</sup>. SEPA has had discussions over meeting the requirements of the GBR with farmers in the local area.

The current risk assessment remains at very low.

## **Odours and information to support public health risks**

From November onwards SEPA has received a marked increase in both the number of complainants and volume of complaints. This in part is a consequence of a more frequent northerly wind in conjunction with cold and calm weather conditions. When these climatic conditions occur at Tarbolton the landfill odour is blown towards the village and is not easily dispersed. The odours detected on-site by SEPA Officers remain consistent to that of previous months with the main source of odours coming 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.

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

The PAG met on 10 Sep 2019 and considered results of ongoing monitoring and sampling at the landfill site by SEPA. This monitoring has confirmed that potentially hazardous gases have been occasionally detected within the boundary of the unmanaged landfill site. In response to the detection of gases and the risk of deep water at the site, on behalf of all members of the problem assessment group, South Ayrshire Council has erected signage warning members of the public to keep off the site.

Monitoring by South Ayrshire Council at various off-site locations has not found evidence of harmful gases outwith the boundaries of the site.

Several agencies are undertaking investigations to understand this complex situation. The risk to the general public outwith the site has been assessed as low and this will be kept under review by the Problem Assessment Group.

We would urge members of the public to keep off the unmanaged landfill site. Anyone experiencing symptoms that they think are related to the landfill should seek medical advice from their GP in the first instance.

## **Work to establish potential options for management of the site**

SEPA has 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.

Preparation for the survey work is underway with Giant Hogweed being removed from the leachate lagoons followed by a reconnaissance visit to set up the drainage survey. Provisional dates to clear leachate ponding on the haul roads and undertake the survey work have been agreed for January.

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[equalities@sepa.org.uk](mailto:equalities@sepa.org.uk)

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03000 99 66 99

Strathallan House, Castle Business Park, Stirling, FK9 4TZ