

## Tarbolton Landfill – Summary Report

Investigation into the potential for environmental impacts resulting from consolidated ash waste deposition and lack of operational management

Scottish Environment Protection Agency (SEPA)

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**This is a summary of the investigation into the potential for environmental impacts resulting from consolidated ash waste deposition and lack of operational management at Tarbolton Landfill.**

## **Non-Technical Summary**

Tarbolton Landfill in Ayrshire has accepted consolidated ash waste. This waste can have hazardous properties and the landfill site may not have been authorised to accept it. In addition, the operator company has entered liquidation and there has been a lack of operational management at the site since mid-June 2018. SEPA have undertaken an investigation to assess the potential risks to the water environment and to human health posed by the deposition of consolidated ash waste. This investigation also considers the potential effects of a lack of operational management of the site. This report presents the findings of this investigation.

All non-hazardous landfill sites operate with some degree of environmental impact. This is particularly the case for landfill sites that include unlined phases, which were more commonplace prior to the introduction of more stringent standards through the Landfill Directive.. The monitoring results indicate the site has a water quality impact similar to many other landfill sites in Scotland, particularly those sites with unlined phases or operational management failures.

A conceptual site model has been developed based on a desk study. SEPA used this information to plan an initial monitoring programme designed to collect environmental data, to confirm the results of the site operator monitoring and to provide additional information that was not previously available. This initial monitoring programme has provided a snapshot of conditions at the site in spring 2018.

Based on the spring 2018 monitoring results and the lack of operational management at the site, current risks to the environment and human health have been qualitatively assessed using a Source-Pathway-Receptor approach. The risk assessment results are presented in Table 1 on the following page. Our qualitative risk assessment has graded the risk from Very Low through to High. This is to enable easy comparison and ranking of the relative risks to the different receptors.

Dust and particulate matter monitoring by SEPA indicated that there is a very low risk of dust blowing from site towards local residences. This was further confirmed by low dust deposition and soiling levels (measuring dust arriving both vertically and horizontally) at the local residences. The levels of the inhalable fractions of dust measured at the same local residences were not of concern in relation to Scottish Air Quality Objectives and Defra's Daily Air Quality Index.

Landfill gas monitoring by SEPA is ongoing but has been constrained to date by the condition of the operator's monitoring wells. Further work by SEPA is planned to improve the gas monitoring infrastructure at the site to aid future gas monitoring. Based on the current factors, the risk to human health due to migration of landfill gas is assumed to be low.

There are no known private water abstractions in the vicinity of the landfill. There is a fishery to the southwest of the landfill. The fishery ponds are upgradient of groundwater flow near the landfill and are clay lined which will limit any groundwater inflow. They are fed by a watercourse which is not downstream of the landfill. We consider that the fishery is not linked by the water environment to the landfill and the potential risk is considered to be very low. The key environment receptors are the Water of Fail, the Biggary Burn, and groundwater. SEPA monitoring has confirmed that elevated concentrations of contaminants associated with the landfill, such as ammoniacal nitrogen and metals, are present in the groundwater and the Biggary Burn. Following the recent suspension of leachate management, leachate levels are rising. This will increase the frequency and flows of leachate outbreaks, which will increase the impact on the water environment. Further monitoring will be required to assess the significance of these outbreaks.

A continued lack of operational management will increase the risk of additional impact to the environment. Further environmental monitoring is recommended to assess the developing impacts due to the lack of operational management at the landfill site.

**Table 1 Qualitative risk assessment for Tarbolton Landfill following the deposition of consolidated ash waste and lack of operational management**

<b>Media</b>	<b>Risk type</b>	<b>Current Risk Assessment</b>	<b>Future Risk Assessment - lack of operational management</b>	<b>Comments</b>
<b>Air</b>	Human health impact due to dust from lack of operational management.	<b>Very Low</b>	<b>Very Low</b>	The risk is unlikely to increase, particularly where the site is not operational. No further monitoring required. No elevated levels of windblown dust from the site, and most receptors lie upwind. See section 4 for more detail.
	Human health impact increased due to landfill gas from lack of operational management.	<b>Low</b>	<b>Low</b>	Gas sampling points need to be adequately maintained so that future risks can be fully characterised. See section 5 for more detail.
<b>Ground-water</b>	Human health impact increased due to lack of operational management.	<b>Very Low</b>	<b>Very Low</b>	Available evidence suggests that no private water supplies in the area are sourced from surface water or groundwater. See section 3.3 for more detail.
	Groundwater quality impact increased due to lack of operational management.	<b>Low/Moderate</b>	<b>Moderate</b>	There are groundwater impacts but the scale of impact is similar to other landfill sites with unlined phases elsewhere in Scotland. High pH leachate could compromise site liner integrity but there is no evidence to support this at present. Increasing leachate heads are expected to increase the risk to groundwater. See section 6.5 for more detail.
<b>Surface Water</b>	Surface water quality impact increased due to lack of operational management.	<b>Moderate</b>	<b>Moderate/High</b>	Currently, data suggest the landfill is having a localised impact on the quality of surrounding surface water. See section 6.6 for more detail.
	Ecology impact due to landfill impact on water quality.	<b>Low</b>	<b>Low/Moderate</b>	Invertebrate data suggest that there is currently no obvious impact due to the landfill. See section 6.6 for more detail.

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<b>Media</b>	<b>Risk type</b>	<b>Current Risk Assessment</b>	<b>Future Risk Assessment - lack of operational management</b>	<b>Comments</b>
	Impact on fishery water quality and human health from consuming the fish.	<b>Very Low</b>	<b>Very Low</b>	No evidence of a water environment connection to the landfill. The fishery is upgradient of groundwater flow near the landfill and the ponds are clay lined, limiting any groundwater ingress. The ponds are fed from a stream to the southwest of the fishery, which is not downstream of the landfill area. See section 3.4 for more detail.

## Conclusions

The risk assessment findings are summarised in Table 1 at the start of this report.

The key conclusions from the SEPA investigation are:

- The monitoring results indicate the site poses a very low risk to human health from dust.
- Based on the available evidence, the landfill gas risk is also considered to be currently low.
- The monitoring results indicate the site has a water quality impact similar to many other landfill sites in Scotland, particularly those sites with unlined phases or operational management failures.
- There is currently no operational management taking place at the site. If this situation continues, then this will increase the risk of additional impact to the environment from the landfill, particularly for risks relating to leachate levels.

## Actions and Recommendations

Based on the conclusions above, the following actions are underway by SEPA to assess the developing impacts due to the lack of operational management at Tarbolton landfill:

- Landfill gas monitoring points are to be sealed and appropriate gas sampling taps installed. Further landfill gas monitoring will be undertaken to further assess potential for landfill gas migration from the site.
- Additional monitoring of leachate levels and chemistry is being undertaken to assess the rise in leachate levels as well as the frequency and magnitude of leachate outbreaks.
- Further surface water monitoring, including at additional locations, will be undertaken to assess the impacts due to the lack of active leachate management.
- Ongoing groundwater monitoring of the site to assess the impacts due to the lack of active leachate management will be undertaken. Groundwater monitoring will be less frequent than surface water monitoring given the differences in relevant timescales for the groundwater pathways compared with the surface water pathways. Metals analysis should include both total and dissolved metals to aid risk characterisation.

If operational management of the site is resumed in the future, then a further recommendation is made:

- Replace two groundwater boreholes as downgradient boreholes in a more suitable location, further from the influence of the unlined lagoons.

## Glossary

Term		Explanation
Dust		Particulate matter in the size range 1-75 µm in diameter
EQS	Environmental quality standard	Standards adopted by the Scottish Government and used by SEPA to protect aquatic ecosystems
Groundwater		Water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil
Leachate		Liquid formed when water infiltrates through waste, taking in soluble contaminants as it does
Non-hazardous waste		Category of waste materials that do not meet the criteria for classification as either inert nor hazardous wastes
PM	Particulate matter	Airborne particulate matter made up of a collection of solid and/or liquid materials of various sizes
PPC	Pollution Prevention and Control	Regulatory regime under the Pollution Prevention and Control (Scotland) Regulations that covers certain industrial activities  PPC is the principal regulatory regime for operational landfills
Status		The physical, chemical or ecological condition of a water body, defined in accordance with the Water Framework Directive (WFD)
Waste		Materials which the holder discards or intends or is required to discard
Water body		A discrete geographical unit of surface water or groundwater defined for the purposes of river basin management planning in accordance with the Water Framework Directive (WFD)