

Chapter 29

Environment – Regulating Landfills

1.0 MAIN POINTS

Municipalities and private companies own and operate landfills throughout the province. These owners are ultimately responsible for the operations of landfills and ensuring their landfills operate in an environmentally-sound manner. The Ministry of Environment (Environment) is responsible for regulating landfills.

Regulating landfill construction and operations is important, as this helps to ensure landfills do not contaminate the air, groundwater or surface water. Some landfills in the province are located over significant groundwater aquifers. Saskatchewan gets drinking water from both surface water (e.g., lakes and rivers) as well as groundwater aquifers. If contamination of the groundwater aquifer occurs, it may have to be abandoned as a source of drinking water, or the municipality may have to incur significant costs to treat the aquifer.

Environment regulates landfills by issuing permits (construction/expansion, operating and closure), reviewing environmental monitoring results, inspecting landfills and enforcing permit requirements.

Our audit for the period of September 1, 2012 to August 31, 2013 found Environment did not have effective processes to regulate landfills. Environment needs to strengthen its requirements for landfill construction and better monitor operating landfills. Environment also needs to better oversee landfill closures. In addition, Environment should ensure non-compliance issues are addressed consistently. Improved landfill regulation will help prevent groundwater contamination.

2.0 INTRODUCTION

Under *The Environmental Management and Protection Act, 2002 (Act)*, Environment is responsible for enhancing and protecting the quality of the environment. Regulations under the Act, *The Municipal Refuse Management Regulations (1986)*, require Environment to permit landfills and transfer stations (i.e., sites at which waste is concentrated or accumulated for transportation to a landfill). In this chapter, we refer to transfer stations and landfills collectively as “landfills.”

Environment issues permits to landfill owners for constructing, operating, and closing landfills other than private landfills (e.g., those owned by farmers) or landfills on federal land. Currently, there are about 500 active municipal landfills, and nine industrial landfills¹ in the province.

As shown in **Figure 1**, Environment is responsible for regulating about 700 landfills throughout the province. As of June 30, 2013, Environment’s Landfills section had five staff responsible for regulating landfills.

¹ Industrial landfills operate under permits issued by the Ministry of Environment.



Figure 1—Landfill Statistics

	Municipal Landfill	Transfer Station	Industrial Landfill	Total
Operating	342	154	9	505
Closed	199	23	-	222
Total	541	177	9	727

Source: Ministry of Environment records

Saskatchewan’s total waste is increasing. For example, Saskatchewan’s volume of waste increased 3.8% from 2008 to 2010.² The waste generated in Saskatchewan is estimated to be between 993,963 and 1,027,313 tonnes per year. It is comprised of approximately 517,585 tonnes of industrial, commercial and institutional waste,³ between 141,738 and 175,088 tonnes of construction, renovation and demolition waste, and 334,640 tonnes of residential waste.⁴ Therefore, about one-third of Saskatchewan’s overall waste generated comes from residential sources. Most industrial, commercial, and residential waste is disposed of in Saskatchewan landfills.

3.0 MONITORING AND PROTECTING OUR WATER RESOURCES FROM LANDFILL CONTAMINATION

Waste management is an important factor in safeguarding human health and environmental protection. Managing waste and minimizing associated environmental impact has become more challenging as worldwide populations and economies continue to grow.

Landfills remain a necessary component of waste management, even with the significant efforts made to reduce, reuse, and recycle waste. Landfills are not designed to break down waste; rather, they are designed merely to bury it. Landfills must be designed to isolate waste from groundwater, and keep it dry and away from contact with the air. Under these circumstances, waste decomposes very little. As shown in **Figure 2**, some waste never decomposes.

Figure 2—Estimated Decomposition Rates for Certain Items

Item	Estimated Decomposition Time in a Landfill
Aluminum can	80 – 200 years
Apple core	1 – 2 months
Cigarette butt	1 – 5 years
Glass bottle	10,000 years
Milk carton	5 years
Paper bag	2 – 4 weeks if wet
Plastic jug	500 years
Styrofoam	Never

Source: www.ways2gogreen.com

² www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/envir32a-eng.htm (29 September 2013).

³ Industrial waste is generated through manufacturing; commercial waste is generated by commercial operations such as shopping centres, restaurants, offices, etc.; institutional waste is generated by institutional facilities such as schools, hospitals, etc.

⁴ Earthbound Environmental Inc., StewardEdge Inc., MGM Management. *System Analysis of Saskatchewan Waste Management Practice and Costs*, (August 2009).

Currently, Saskatchewan's municipal landfills are filling up with waste that could be recycled or reused, including cardboard, plastic bottles, milk cartons and paper. Recycling programs are essential for waste management. While consumers have an obligation to reduce their waste, municipalities can play an active role in diverting waste from landfills. For example, both the cities of Regina and Saskatoon began a curbside residential recycling program in 2013.

Landfills must be designed and managed carefully to minimize and mitigate the potential negative effects on the environment such as the risks of contamination of groundwater, surface water, air and soil. In Saskatchewan, some landfills are located over significant aquifers (e.g., City of Regina landfill).⁵ Water that we drink and use comes from lakes and rivers (i.e., surface water) and aquifers (i.e., groundwater). About 73% of municipal or communal waterworks use groundwater to serve 28% of Saskatchewan residents with drinking water, while 27% use surface water to serve about 57% of Saskatchewan residents.⁶

Landfills are a threat to water supplies when liquids (leachates)⁷ percolate through waste, picking up a variety of substances such as metals, minerals, organic chemicals, and bacteria. Groundwater contamination may result from very small amounts of leachate. For example, it would take less than four drops of the carcinogen trichloroethylene⁸ mixed with the amount of water found in an average-sized swimming pool to render the water undrinkable.⁹ Once contaminated, aquifers can remain polluted for decades.

Because groundwater moves slowly, contamination problems can take a long time to appear. Contamination of groundwater can result in poor drinking water quality, loss of water supply, degraded surface water systems, high cleanup costs, high costs for alternative water supplies, and/or potential health problems. It is therefore preferable to prevent contamination from happening in the first place. Waste management strategies must carefully consider the location of landfills to reduce risks of leachate contaminating underlying groundwater.

Once a landfill site reaches capacity, it must be closed in a manner that ensures the long-term protection of the environment. Because the waste in a landfill can remain indefinitely, the post-closure period may extend for many decades. Post-closure care and monitoring is essential to minimize the risk of contaminants posing a concern to the environment.

According to the *2010 State of the Watershed Report*, the overall health of many Saskatchewan watersheds is stressed by human activity. In the report, landfills are identified as one of the stressors on watersheds in Saskatchewan. As such, the effectiveness of Environment's processes to regulate landfills is essential to avoid and mitigate the potential threats posed by landfills to our current and future water resources.

⁵ www.environment.gov.sk.ca/2007-067ProjectSpecificGuidelines, p. 5, (29 September 2013).

⁶ www.water.ca/wkd-guide-drink-water-1.asp *A Guide to Canada's Drinking Water – Part 1* (22 October 2013).

⁷ Leachate is a combination of sediments and chemicals produced when water leaches down through layers of solid waste.

⁸ Trichloroethylene is a carcinogen typically found in landfill leachate.

⁹ www.wegreen-usa.org/landfill-problems.html (16 September 2013).



4.0 AUDIT OBJECTIVE, SCOPE, CRITERIA, AND CONCLUSION

The objective of this audit was to assess whether Environment had effective processes to regulate landfills. We examined municipal landfills and transfer stations, as well as industrial landfills in our audit. We did not include federally-owned or privately-owned landfills. We examined Environment's processes to regulate landfills for the period of September 1, 2012 to August 31, 2013.

We examined Environment's policies, procedures, processes, database reports and website. We tested a sample of permits, interviewed Environment staff, and attended landfill inspections alongside Environment staff.

To conduct this audit, we followed the standards for assurance engagements published in the *CPA Canada Handbook – Assurance*. To evaluate Environment's processes, we used criteria based on the work of other auditors and current literature listed in the selected references. Environment's management agreed with the criteria (see **Figure 3**).

Figure 3—Audit Criteria

To effectively regulate landfills, the Ministry of Environment should:

- 1. Approve landfill constructions and expansions**
 - 1.1 Set appropriate requirements for constructions/expansions
 - 1.2 Review and approve construction/expansion plans
 - 1.3 Ensure owners meet construction/expansion requirements
- 2. Monitor landfill operations**
 - 2.1 Set appropriate requirements for operations
 - 2.2 Regularly assess compliance with requirements
 - 2.3 Ensure sufficient environmental impact monitoring of operating landfills
- 3. Oversee landfill closures**
 - 3.1 Set appropriate requirements for closures
 - 3.2 Assess compliance with requirements
 - 3.3 Ensure sufficient environmental impact monitoring of closed landfills
- 4. Address and report non-compliance**
 - 4.1 Require action on non-compliance and serious risks
 - 4.2 Identify and take action on non-approved landfills
 - 4.3 Report non-compliance and serious risks to owners, senior management, and the public

We concluded that, for the period of September 1, 2012 to August 31, 2013, the Ministry of Environment did not have effective processes to regulate landfills. Environment needs to strengthen its requirements for landfill construction and better monitor operating landfills. It also needs to better oversee landfill closures. In addition, Environment should ensure non-compliance issues are addressed consistently. Improved landfill regulation will help prevent groundwater contamination from occurring.

5.0 KEY FINDINGS AND RECOMMENDATIONS

In this section, we describe our key findings and recommendations related to the audit criteria in **Figure 3**.

5.1 Standards Needed for Approving Landfill Constructions or Expansions

5.1.1 Formalized Standards Needed for Landfill Construction or Expansion

Environment has established requirements and practices for issuing permits to construct or expand a landfill. *The Municipal Refuse Management Regulations* (Regulations) outline some information that applicants must provide when seeking to have a landfill approved by Environment. As environmental knowledge and techniques change, Environment has adapted its practices and expectations for the construction and expansion of new landfills.

Generally, Environment may only issue a few permits for new landfills; more commonly, it issues permits to expand existing landfills.

Although Environment's current application form for new landfills does not include all the information required by the Regulations, construction/expansion plans which often accompany applications provide the required information. Plans include maps of the area, surface drainage information, design drawings, required environmental monitoring and for larger landfills, technical investigations. When planning to construct larger landfills, applicants hire engineering consultants to undertake a technical investigation of the site. This investigation includes determining the location, depth, and water quality of water wells within two kilometers of the proposed landfill site.

Environment staff need site-specific information to determine the level of environmental risk associated with the landfill (A – high,¹⁰ B – moderate, or C – low) and establish permit requirements for the landfill site based on those risks. Environment includes its requirements on approved permits issued to landfill owners.

In addition, Environment requires industrial landfills to provide financial assurances (e.g., letters of credit, trust agreements) at the onset of building and operating a landfill. The financial assurance must cover the costs to carry out the closure and cleanup plan. As of August 2013, Environment has not had to make use of the financial assurances provided by any of the nine industrial landfill operators in the province to clean up a landfill site.

We found that Environment has not set specific design requirements for landfill owners to follow and to assist Environment staff when assessing proposed landfill design plans. Such information would provide standard expectations on how to build landfills depending on their environmental risks. For example, certain landfills may require a

¹⁰ High-risk landfills are ones that serve a population of greater than 5,000 people, are close to a water source (groundwater aquifer, lake, water well, etc.), and have soil in the area that is subject to permeation.



leachate collection and removal system depending on the type of waste accepted and water source receptors (e.g., groundwater aquifer) near the landfill site.

Environment plans to formalize its expectations for landfill site developments into requirements under a proposed Environmental Code.¹¹ The Code will form a type of regulation under *The Environmental Management and Protection Act, 2010*. As of September 2013, the Act was not yet proclaimed and the Code was not yet in effect.

Codes of operating practice provide standard guidance and promote environmentally-sound management practices at all landfills. We note that Alberta and Ontario also have codes of operating practice for landfills.

We found the proposed Code sufficiently outlines specific design requirements of landfills including the base layer required for various landfills, the buffer zone required around a landfill, and the number of groundwater monitoring wells required. Without specific design requirements, not all landfills may be built to the same environmental standard.

1. We recommend that the Ministry of Environment adopt guidance on landfills from the proposed Environmental Code as operating practice.

Many of Saskatchewan's 700 landfills were constructed prior to the current environmental regulatory requirements. Environment acknowledges that in the past, less consideration was given to the location of landfills and waste was dumped in low-lying areas, sloughs or over significant aquifers which enhanced the potential for leachate to contaminate groundwater.

Landfills that do not meet current design standards may need to be upgraded or closed to minimize the negative consequences to the environment. Rigorous monitoring of the environmental impacts of these sites is needed, as described in **Sections 5.2.3** and **5.3.3**.

To address older, improperly designed landfills, Environment has been encouraging older landfills to close and a regional landfill to serve a larger, surrounding area. The benefits of a regional landfill include lower capital, operating and maintenance costs, improved landfill operations, and enhanced waste minimization through a more comprehensive waste management system.¹² According to Environment, there is one new regional landfill site potentially opening in 2013-14, which will result in the closure of about 10 existing landfills.

5.1.2 Applications for Construction or Expansion Plans Properly Reviewed and Approved

Environment properly reviewed and approved applications for recent construction or expansion plans prior to granting approval of permits.

¹¹ www.environment.gov.sk.ca/Default.aspx?DN=90730c83-5bda-4d33-9b25-bcde57eef1e8 (29 September 2013).

¹² www.environment.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=523 (30 September 2013).

Environment requires proper site assessment before approving any new landfill or expansion. For example, new landfills are required to have clay or synthetic liners and leachate collection systems¹³ to protect groundwater. We found that new and expanded landfills are being appropriately designed and approved.

Environment conducts a landfill site suitability review using the engineering consultant's report or landfill owner's application prior to issuing a permit to construct or expand a landfill. Environment requires significant construction projects to proceed through an environmental assessment review process. It also requires that landfills are sited in environmentally-sound locations, and are compatible with nearby land uses.

5.1.3 Not Verifying that Construction or Expansion Requirements are Met

Environment did not always ensure landfill owners met approved construction or expansion design requirements.

Environment does not consistently inspect landfills as they are being constructed to confirm construction meets the approved design plan. Upon completion of construction or expansion, Environment requires the landfill owner to submit "as-constructed" drawings and a certificate from an authorized engineer that supports that the construction has been carried out as per the approved plans. For new landfills, Environment issues a permit to operate after receipt of this certificate. Environment indicated that engineering certificates can take a long period of time to receive.

We found that in four out of the five construction/expansions we looked at, there was no evidence (e.g., engineering certificate) that the landfill was constructed as planned. Environment did not have evidence that engineering certificates were actively sought and yet some of these construction/expansions were approved two years ago.

Proper construction of landfills is essential for storing waste in a manner that protects water resources. Proper oversight of the construction is critical so that owners comply with Environment's approved construction or expansion design requirements.

- 2. We recommend that the Ministry of Environment obtain evidence, in a timely manner, that landfills are constructed in compliance with approved design plans.**

¹³ A leachate collection system has perforate pipes that run through the landfill to collect leachate. These pipes carry leachate to a leachate collection pond where it is then removed and treated.



5.2 Improved Monitoring of Landfill Operations and Environmental Impact Needed

5.2.1 Requirements Set for Operating a Landfill

Out of the approximately 700 landfills that are permitted by Environment, about 500 are operational.

Environment uses permits as its primary vehicle to set requirements for operating a landfill. It requires operators to obtain a permit to operate before any waste is disposed of in a newly constructed landfill. The permit to establish, operate and maintain a landfill includes the location of the site, the operation and maintenance required at the site (often outlined in an operating plan), and the monitoring and reporting requirements the landfill owner must follow. Also, Environment makes policies available on its website that outline various operating procedures (e.g., compacting and covering waste).

5.2.2 Need to Assess Operating Compliance More Frequently

Environment did not assess compliance of landfill operators and owners with the requirements of its operating permits as frequently as required.

Environment uses routine inspections as its primary way to monitor whether landfill operators and owners comply with its permit requirements. Environment has assigned the responsibility for inspecting operating landfills to four Environment staff called Environmental Protection Officers (EPOs). The operating permit covers everything that an EPO will look for when performing their site inspections.

Environment expects and plans for EPOs to inspect landfills in accordance with predetermined frequency targets. The frequency target for landfills in cities is once a year and all other landfills are once every three years. Also, according to Environment, consistent with the proposed Code, those landfills identified as high risk (i.e., those labelled with an “A”, which are usually the larger sites), are targeted for inspection once a year. As of June 2013, Environment has identified approximately 170 operating landfill sites as “A” – high risk. If EPOs identify issues during inspection, Environment expects EPOs to inspect landfill sites more frequently so that the landfill operator/owners can address the identified issues in a timely way.

We found 30 out of 350 landfills were not inspected as frequently as Environment’s plan expects. In one instance, the length of time between inspections was almost six years.

Timely inspections are a good monitoring tool to ensure that landfills are operating in accordance with best practices and permit requirements.

3. We recommend that the Ministry of Environment perform landfill inspections in accordance with its established frequency requirements.

EPOs complete a standard comprehensive checklist for each municipal landfill inspection (see **Figure 4**). Completed inspection checklists, other than industrial landfill inspection reports are posted on a public website, www.saskh20.ca (SaskH2O website). We found that EPOs properly completed the checklists and posted them on the website.

Figure 4—Summary of Areas Covered During Inspection of Municipal Landfills

- › **Landfill location** - Is the landfill properly isolated? (e.g., is the landfill site 100 m from a highway and 500 m from a residence/motel/hotel?)
- › **Landfill perimeter** - What type of perimeter fencing is in place? Is the site gated and locked when the site is closed? Is there proper signage at the site entrance?
- › **Landfill operations** - Is the landfill operating properly? (e.g., is there evidence of unauthorized burning? Is litter blown off the site retrieved?) What is the landfill site's cover/compaction frequency?
- › **Landfill reporting** - Is the landfill's annual report submitted to Environment? Is there appropriate record keeping?

Source: Ministry of Environment's municipal landfill compliance inspection checklist

Environment requires some landfill sites to submit an annual report (usually not the smaller communities because they are considered low risk). Annual reports include operational information for the year (e.g., types and volume of waste accepted, environmental monitoring results). As noted in **Section 5.2.3**, we found annual reports that include groundwater monitoring results are not always timely.

5.2.3 More Environmental Impact Monitoring Needed

Environment's guidelines¹⁴ expect that operating permits for certain landfill sites assessed with higher environmental risks require landfill owners or operators to carry out environmental monitoring of groundwater (e.g., to test the quality of groundwater on a regular basis [e.g. semi-annually or annually]) and to submit the results of their monitoring to Environment. Owners of municipal waterworks and private water supplies (e.g., a well on a farm) are responsible for having their water tested to ensure it is safe to drink.

More recent landfills have built groundwater monitoring wells into their design. These wells are intended to capture liquids that leak out of the landfill containment system and are used to monitor environmental impact on nearby groundwater. Landfill owners use either their own staff or hire engineers to sample liquids from the monitoring wells.

Eleven of the 25 landfills classified as high risk ("A") or moderate risk ("B") that we sampled did not have environmental monitoring requirements as part of the operating permit. Also, we found four instances where Environment had not received the required groundwater monitoring results and had not sought the missing annual reports from the landfill owners/operators.

Groundwater monitoring is used to detect groundwater contamination. Once groundwater contamination has occurred, groundwater may have to be abandoned as a source of drinking water. Contaminated groundwater can be treated in one of several ways:

¹⁴ The proposed Environmental Code has explicit guidance on the frequency of required groundwater and leachate monitoring at landfills.



- › Containing the contaminant to prevent migration (e.g., clay wall)
- › Pumping the water, treating it, and returning it
- › Leaving the groundwater in place and treating either the water or the contaminant
- › Allowing the contaminant to reduce naturally with monitoring, following the implementation of an appropriate source control

Selection of the appropriate remedial action often takes into account cleanup costs and the potential risk to human health and the environment.

Not putting ongoing groundwater monitoring requirements into approved operating permits increases the risk that groundwater contamination may not be detected on a timely basis. Generally, the longer the contamination is left, the higher the risk to health and the greater the cost to clean up.

4. We recommend that the Ministry of Environment amend operating permits for all high-risk landfills to ensure they require appropriate groundwater monitoring.

5. We recommend that the Ministry of Environment follow up on groundwater monitoring reports that are not received from landfill owners in a timely manner.

5.3 Lack of Environmental Impact Monitoring at Closed Landfills

5.3.1 Approvals Needed for Closed Landfills

Closed landfills can continue to pose a groundwater contamination threat if they are not capped with an impermeable material such as clay before closure to prevent the leaching of contaminants by precipitation. Depending on the specifics of the landfill site, groundwater monitoring may be required to periodically check the integrity of the final cover.

The Regulations require landfill owners to submit a pre-closure proposal to Environment for approval. The pre-closure proposal outlines the steps the owner will take when closing the landfill.

Environment did not have approval of the pre-closure proposal on all 10 closed landfill files that we sampled. We note that larger landfills and industrial landfills often include future intended closure plans as part of their operating plans that are reviewed by Environment when operating permits are approved.

6. We recommend that the Ministry of Environment review and approve landfill closure plans.

5.3.2 Assessment of Closure Compliance Needed

It is important that Environment knows that landfill owners have closed landfills properly to ensure the risk of environmental contamination is reduced.

Environment indicated that certain landfill closures require a closure report from the landfill owner.

We found no evidence of closure reports on all 10 closed landfill files we sampled. According to Environment, landfill owners put a final cover on the top of the landfill site to prevent exposure to wind and rain and notified Environment of the closure. Environment then closed the file on the landfill (that is, discontinued active monitoring activities).

Environment does not consistently inspect and document landfill closures and it does not ensure landfill owners provide evidence of proper closing of the landfill (e.g., engineering certificate).

7. We recommend that the Ministry of Environment confirm landfill closures are done in accordance with approved closure plans.

Under the proposed Code, Environment will require a closure report prepared by a qualified person (e.g., engineering consultant) for all landfill closures.

5.3.3 Impact Monitoring of Closed Landfills Needed

When a landfill closes, the groundwater should be monitored for a long time (e.g. up to 30 years). As previously noted, owners of municipal waterworks and private water suppliers are responsible for having their water tested to ensure it is safe for human consumption.

Because Environment does not properly oversee landfill closures, it may not be aware of closed landfills that pose a serious risk to the environment.

Environment should perform an analysis to determine if there are closed landfills that need environmental monitoring, and require owners to monitor and report findings to Environment regularly. Monitoring would allow for early detection of contamination and therefore may result in lower clean-up costs.



- 8. We recommend that the Ministry of Environment perform a risk assessment of closed landfills and require landfill owners to undertake groundwater monitoring where required.**

5.4 Addressing Non-Compliance Needs Improvement

5.4.1 Non-Compliance Not Consistently Addressed

To identify issues with permit non-compliance, Environment uses landfill inspections, a complaint process, and observations of other Environment staff (e.g. Conservation Officers) when patrolling areas near landfill sites. EPOs typically track complaints, and follow them up either immediately or during the next site inspection, depending on the severity of the complaint. Conservation Officers may also become aware of illegal burning of waste occurring at landfill sites, and will inform Environment's Landfills section.

Environment has established a compliance framework for staff to achieve compliance with requirements set out in permits. The compliance framework provides staff with possible alternatives for communicating and enforcing non-compliance issues including documenting issues on inspection reports, verbal warnings, notice of violations, and laying charges. Environment has laid charges in the past for repeat violations (e.g., unauthorized waste burning).

We found 9 out of 30 permitted landfills had non-compliance issues that continued from one inspection to the next and limited enforcement action occurred. Some repeat non-compliance issues included landfills not meeting standard compaction and covering policies, and uncontrolled burning taking place. Guidance should outline required and consistent enforcement action based on the non-compliance issue.

- 9. We recommend that the Ministry of Environment establish guidance that will aid staff in consistently addressing landfill owners that do not comply with the law and permit requirements.**

5.4.2 Non-Permitted Landfills Addressed

Environment passively monitors for unpermitted landfills through the complaint process and Conservation Officers patrolling various parts of the province. For example, EPOs may learn of illegal dumping through patrolling done by Conservation Officers. Environment gives those responsible for the illegal dumping a warning and asks for a plan to address the concerns. If concerns are not adequately addressed, Environment can pursue legal action.

We found that Environment is aware of some non-permitted sites and is in the process of obtaining and approving plans to address the violations.

5.4.3 Adequate Reporting of Non-Compliance

Environment reports non-compliance issues to landfill owners as each inspection is conducted. Also, as previously noted, Environment makes the results of each inspection public through its website (other than industrial landfills).

Environment requires the landfill owner to sign the completed inspection report. We found that landfill owners properly signed the completed checklists and Environment made them public as expected.

6.0 SELECTED REFERENCES

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