



CMEI PRESENTATION TO FUNDY REGIONAL SERVICE COMMISSION

27 JUNE, 2024

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OUTLINE

Objective

CMEI Role

CMEI Concerns

- Technology
- Leachate
- Community Environment
- Groundwater Contamination
- Methane
- Approval to Operate

Recommended Actions

Questions



OBJECTIVE

Explain CMEI concerns with current operation and monitoring of the Landfill

Present CMEI's conclusions

Discuss impact of Capacity Augmentation Project



CMEI ROLE

CMEI is an independent, community-based advisory committee responsible for monitoring all aspects of the Crane Mountain Sanitary Landfill site.

CMEI was created by OIC 96-849 providing approval for the Fundy Region Service Commission (FRSC) to construct and operate a regional sanitary landfill at Crane Mountain:

condition (l) – “the Commission shall establish a Community Environmental Monitoring Committee.”



CMEI ROLE (Continued)

Monitor the Operation of the Facilities

Act as community eyes and ears with respect to Landfill

Communicate community concerns to FRSC

Communicate with community on behalf of FRSC

Oversee FRSC community funding

Funded by Landfill



CMEI CONCERNS

Technology

- Landfill was designed using standards in place in 1996
 - Design for 25-year lifespan
- Almost 30 years later technology has advanced in areas such as:
 - Liner technology – current research (Dr. Kerry Rowe, Queen's)
 - Known contaminants (PFAS, Microplastics and Fire Retardants) in landfill Leachate (the liquid formed when water percolates through landfill waste) – forever chemicals
 - Effect of contaminants on liner
 - Landfill waste processing
- Crane Mountain Approval to Operate is based on original EIA approval



CMEI CONCERNS (continued – Technology)

Other Technology Changes since 1996:

- Understanding of health issues related to PFAS, Microplastics and Fire Retardants
- New environmental standards (EPA, Environment Canada)
- Climate Change – reduction in Green House Gases (GHG)
 - Methane has considerably larger effect than CO₂
- Statistical evaluation of landfill leakage



CMEI CONCERNS (continued)

Groundwater Contamination, caused by:

- Leakage (landfill liner life, effects of contaminants)
 - Leakage discovered at discrete points throughout liner – not uniform
- Possible inadequate thickness of clay base
- Fractured bedrock
- Possibility of leakage not discovered

Impact:

- Approximately 1000 private wells downstream
- Approximately 10 km strip of housing
- Local streams empty into Wolastoq (Saint John) river



CMEI CONCERNS (continued – Groundwater)

Canadian Environmental Law Association (regarding another facility):

“The design of this facility is tantamount to an **ordinary domestic landfill**, and we know that **such facilities always** eventually **leak** to the surrounding environment”

When will it leak – not “if”



CMEI CONCERNS (continued – Groundwater)

Potential Financial Impact:

- OIC 96-849 condition (i) “in the event that groundwater becomes contaminated as a direct result from landfill operations, the Commission will ensure that the resident affected by the contamination will have a safe, uninterrupted and adequate water supply.”
- Monitoring needs to continue for many years (>100) following closure



CMEI CONCERNS (continued - Groundwater)

Landfill Liners

- Recommendation by ADI (now exp) in 2009 report:
 - Use of double geomembrane liners separated by a geonet drainage layer instead of current single membrane
 - Recommendation ignored
 - Dr. Rowe - “single liners should NOT be used”
- 25-year reliability and effectiveness of clay base
- Possible leakage reaching community in 20 to 200 years



CMEI CONCERNS (continued – Groundwater)

Borrow material under Clay Cell 2

- QA/QC Report Construction of Cell 2, October 2005

Leakage Rates – what is acceptable?

Fractured Bedrock

- Identified in 2009 Study report
- Horizontal and vertical fractures
- Very localized paths



Single Composite Liner Leakage Rate

Table 6.1. Probability, P , that the leakage, Q , through a single composite liner will be exceeded (based on New York State landfills, Beck 2015)

Q (lphd)	P (%)	Q (lphd)	P (%)	Q (lphd)	P (%)
10	91	75	48	300	8
20	82	100	38	400	6
30	74	150	24	500	5
40	67	200	16	750	4
50	61	250	11	1000	4

Source: Rowe, R.K. and Jefferis, S. (2022) “Protecting the environment from contamination with barrier systems: advances and challenges”, Proceedings of the 20th International Conference on Soil Mechanics and Geotechnical Engineering, Sydney, Australia.

lphd - litres per hectare per day

CMEI CONCERNS (continued – Groundwater)

Leakage Monitoring

- Drains under liner – possibility of leakage not reaching drain
 - Spacing between the drains
 - Possible plugging – known problem
- Groundwater Monitoring wells – not sufficient coverage between landfill and residences
 - Vertical and horizontal fractures can take leakage in many different paths
 - Not enough is known about the bedrock downstream of the landfill
 - Some wells have failed – no mitigation identified



CMEI CONCERNS (continued – Monitoring)



MW46 and MW50

Not sampled in 2023

No mitigation



CMEI CONCERNS (continued)

Leachate

- Pre-treatment of Leachate:
 - OIC 96-849 (g) “pretreated leachate shall be trucked offsite to an approved treatment facility”
- Treatment at Lancaster Wastewater Treatment Facility
 - No testing for Microplastics and PFAS
- Dr Rowe “Leachate must be tested for PFAS”
 - Has found significant levels in Leachate

Impact

- Pollution in Bay of Fundy
 - Bio-accumulation of Forever Chemicals in aquatic life



CMEI CONCERNS (continued)

Methane Emissions

- Landfill Gas (LFG) collection system in place to capture emissions
- TetraTech FRSC LFG Master Plan states:
 - “As many as 55 of the existing [76 total] vertical LFG extraction wells [perforated gas extraction pipes] are non-functional due to various issues”
- Several Reports available and studies in progress identifying landfills as significant sources of Green House Gases.

Impact

- Odour – residents’ complaints
- Fully operational collection system will assist reduction in GHG



CMEI CONCERNS (continued – Community Environment)

Community Environment

- Approximately 1000 private wells downstream of landfill
 - Approximately 10 km strip of houses along Wolostoq river
 - Area is solid bedrock
 - Cost of building water lines is extremely high
 - Trucking water into the area is prohibitive
- Grand Bay – Westfield is planning to grow
 - Sight Lines are not pretty for residents – see next two slides
 - Residents complain when they drive by and smell the landfill
 - Odour is carried into residential areas depending on the wind direction





27 June 2024

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WRONG
WAY
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REGULEZ

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RECOMMENDED ACTIONS

Comprehensive evaluation of bedrock and leakage paths

- Includes test drilling, seismic testing and ground penetrating radar to determine possible leakage paths

Evaluate advances in methane capture and incorporate improvements

Enhance landfill monitoring program

Review and plan for alternative landfill waste stream diversions and processing



RECOMMENDED ACTIONS (continued)

Enhance landfill monitoring program

- Fix broken monitoring wells; add several more downstream
- Fix broken LFG extraction pipes; add more for better coverage
- Tighten and enhance monitoring testing requirements



RECOMMENDED ACTIONS (continued)

All these steps should be completed before the Capacity Augmentation project starts

- Additional weight (larger hydrostatic head) increases leakage rate
 - Seven more cells in original plan
 - No decision required until 2048



QUESTIONS

