Novel Approach to Leachate Management at an Older Landfill:

*Solar Photovoltaic Leachate Extraction System*
Spyhill Waste Management Facility

- One of three active Waste Management Facilities operated by The City of Calgary
- Began accepting waste in 1968
- Located in the northwest of the City
Stage 1 Environmental Assessment and Management Plan
2013/2014 Leachate Investigation
After 2 Years of Pumping

- Well construction and pump type left standing head
- Diesel generator high maintenance
- Wide range of recovery rates
- Intermittent pumping is appropriate
What would the ideal pumping system look like?

<table>
<thead>
<tr>
<th>Pump</th>
<th>Power</th>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable</td>
<td>Portable</td>
<td>Explosion-proof</td>
</tr>
<tr>
<td>Rates up to 3 LPM</td>
<td>Matches pump requirements</td>
<td>Secondary containment</td>
</tr>
<tr>
<td>Heads up to 20 m</td>
<td>Low maintenance</td>
<td>Stable (wind and snow)</td>
</tr>
<tr>
<td>Minimal standing head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can operate dry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What Power Options are Available?
What Pump Options are Available?
Pumping choice
Results

Pumped 5/16 to 6/16
Pumped ~11,000 L
Sunlight Dependent

13-02L - Pumping May 27

Water Level Datalogger
(corrected for barometric pressure)
Pumping Cycle Over 3 Weeks

13-02L - Pumping May 26 to June 16

Leachate Depth (m)

0
0.5
1
1.5
2
2.5

Time
26/05/2015 31/05/2015 05/06/2015 10/06/2015 15/06/2015

Water Level Datalogger
(corrected for barometric pressure)
Results

1. A pump can be run on a solar panel
   – Operates as late as November
   – Operates in cloud cover
2. Wells can be reduced to minimal standing head during daylight hours
3. The pumping system is mobile
4. Low O&M Requirements
Lessons Learned

• Leachate quality didn’t impact pump and components

• Winter operations not feasible
Lessons Learned

- Tank Sizing, secondary containment
- Leachate level monitoring
- 2” wells
- TBD: Long term maintenance
How Will this Work Help Leachate Management in the Future?

1. Expand to other landfills
2. Use in gas collection systems