

Landfill Gas to Renewable Natural Gas in Niagara: Wellfield Considerations

Denise Burgess, P.Eng. – Director of Engineering

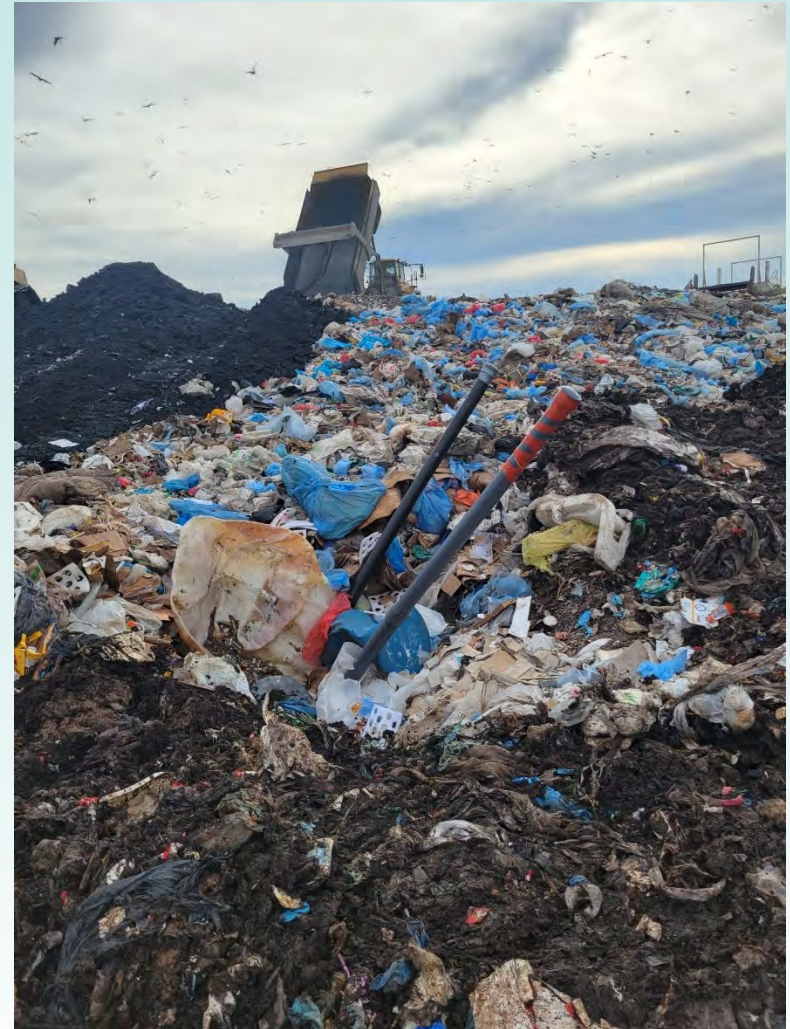
Shannan McGarr, B.Sc. – Director of Operations



Presentation Overview



- Comcor Environmental Limited and IGRS
- Introduction to South Landfill
- History of LFG Control at South Landfill
- Wellfield Considerations for RNG



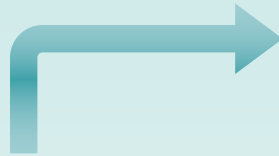
Comcor Environmental Limited



- ❖ Professional Engineers and Landfill Gas Experts
- ❖ Projects across Canada over the last 38 years
- ❖ Operations and Maintenance of over 25 LFG Facilities



Integrated Gas Recovery Services



A Landfill Gas Utilization Company

Formed in 2001 to develop landfill gas utilization projects across Canada



Comcor Environmental Limited

- LFG Specialists
- Design & Engineering
- Plant & Wellfield Operations



Walker Environmental Group

- Landfill Owner/Operator
- Project Management
- Contract Management

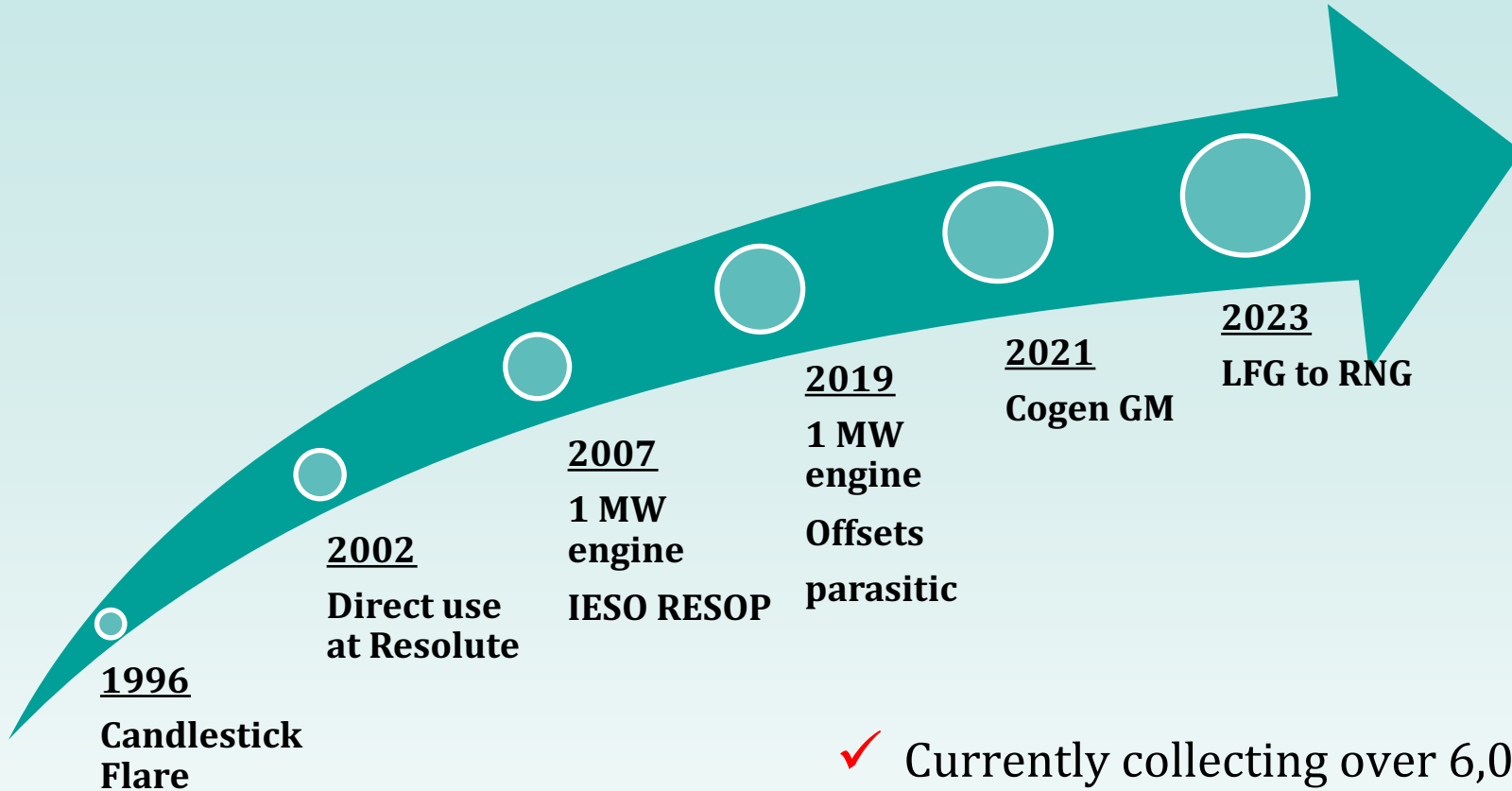
Waste Disposal – South Landfill



- **130-acre landfill facility for non-hazardous solid waste**
- **Disposal Capacity**
 - 10,000 tonnes/day
 - 1,100,000 tonnes / year
- **Acceptable Materials:**
 - Residential Waste
 - Commercial Waste
 - Industrial Residues
 - Demolition Debris
 - Contaminated Soils
 - Railway Ties



History of LFG Control/Utilization



- ✓ Currently collecting over 6,000 cfm
- ✓ >300 LFG extraction wells/points

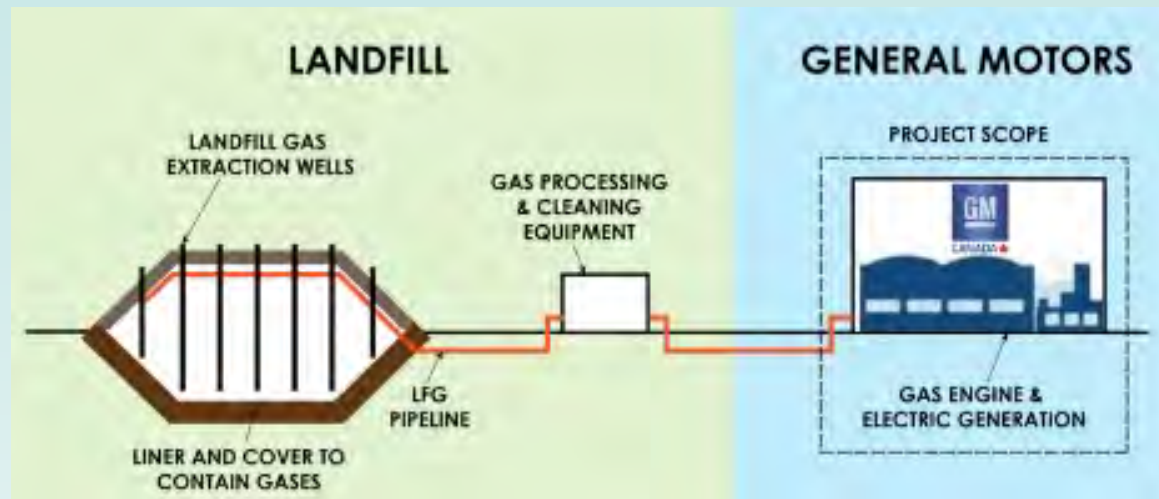
1. Electricity Generation



- 1 MW to the electrical grid, powering our community
- 1 MW “behind the meter” powering our landfill gas plant



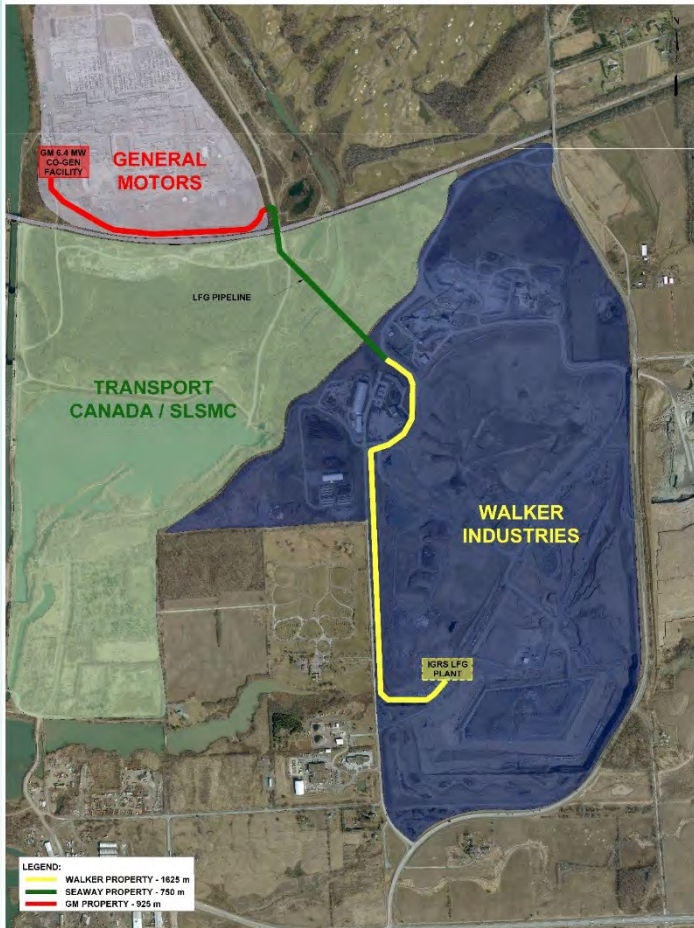
2. Co-generation - General Motors



20-YEAR RENEWABLE ENERGY PROJECT - 3 KEY PARTS

1. Gas Plant Upgrades
2. Landfill Gas Pipeline
3. Co-Generation (Co-Gen) Facility

Landfill Gas Pipeline/Upgrades



- 3.3 km pipeline through Walker, TC and GM property
- Pipeline Approvals [*Niagara Escarpment Commission (NEC), St. Lawrence Seaway & Transport Canada, CN Rail & TSSA*]
- Horizontal Directional Drilling (HDD) & Open Trench Cut
- Installation of new conditioning equipment
- Electrical Service Upgrade

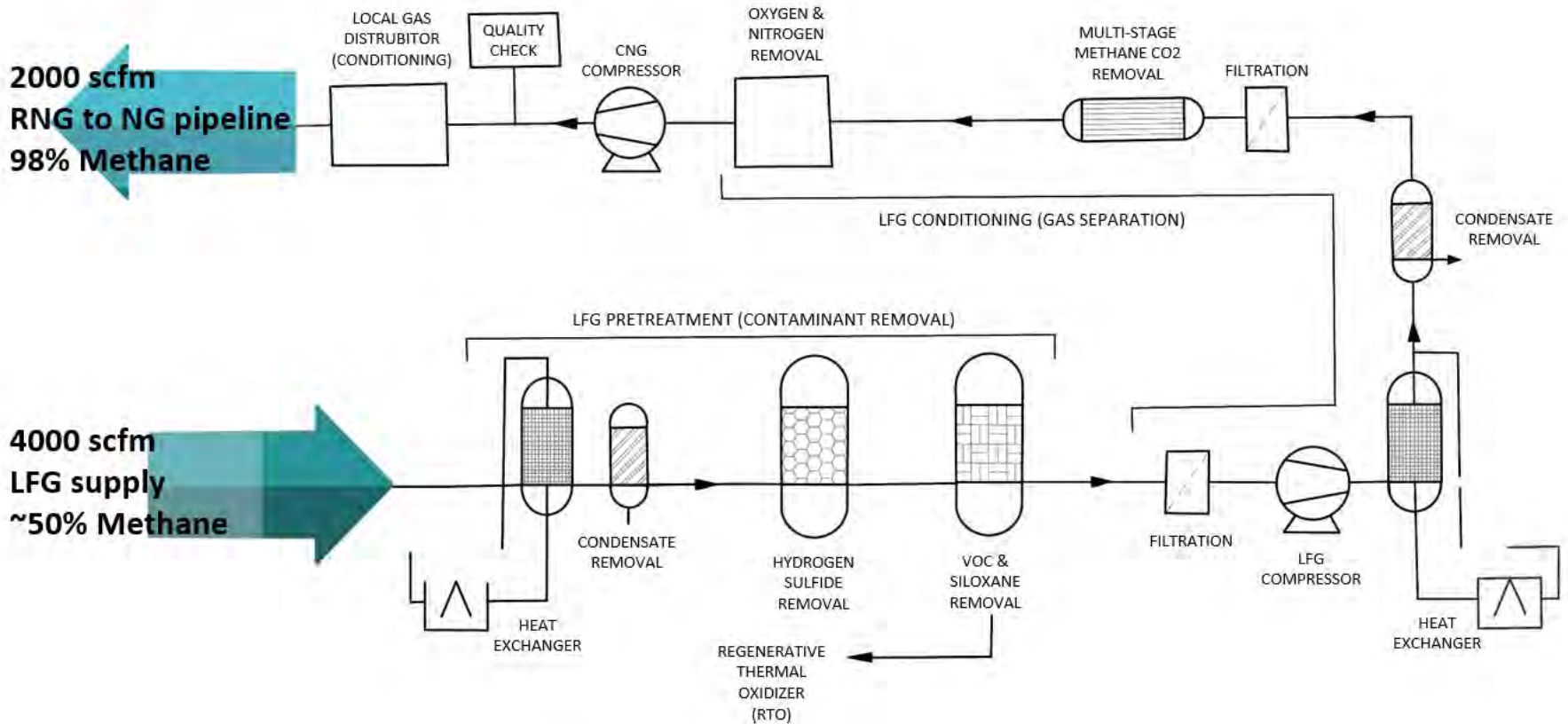


3. Renewable Natural Gas (RNG)



- LFG to RNG facility currently under construction
- Will produce nearly 1 million GJs of renewable energy per year
- Largest project of its kind in Province of Ontario; Will be the 2nd largest in Canada

LFG to RNG Process Flow



RNG Plant Construction



Walker IGRS 2023-05-15 14:54:24



RNG Plant Construction



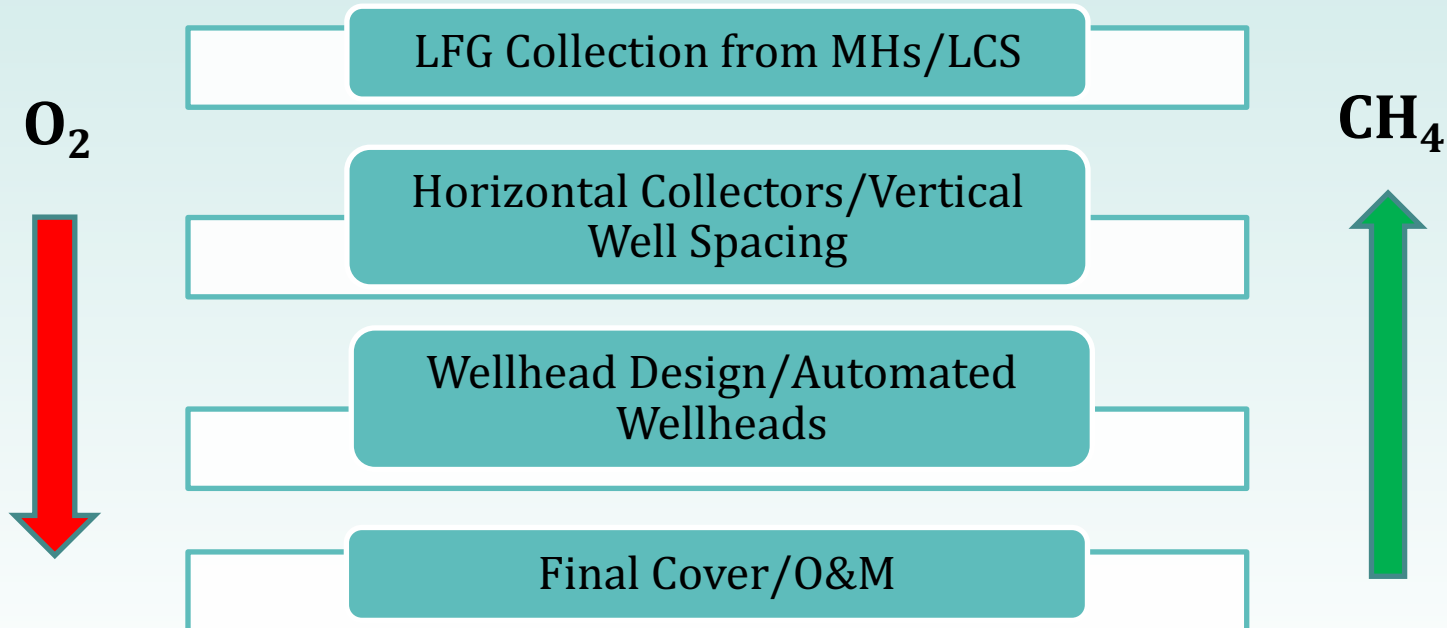
RNG Wellfield Considerations



Is a wellfield that supports an RNG project different than a wellfield meant to control odours or migration?



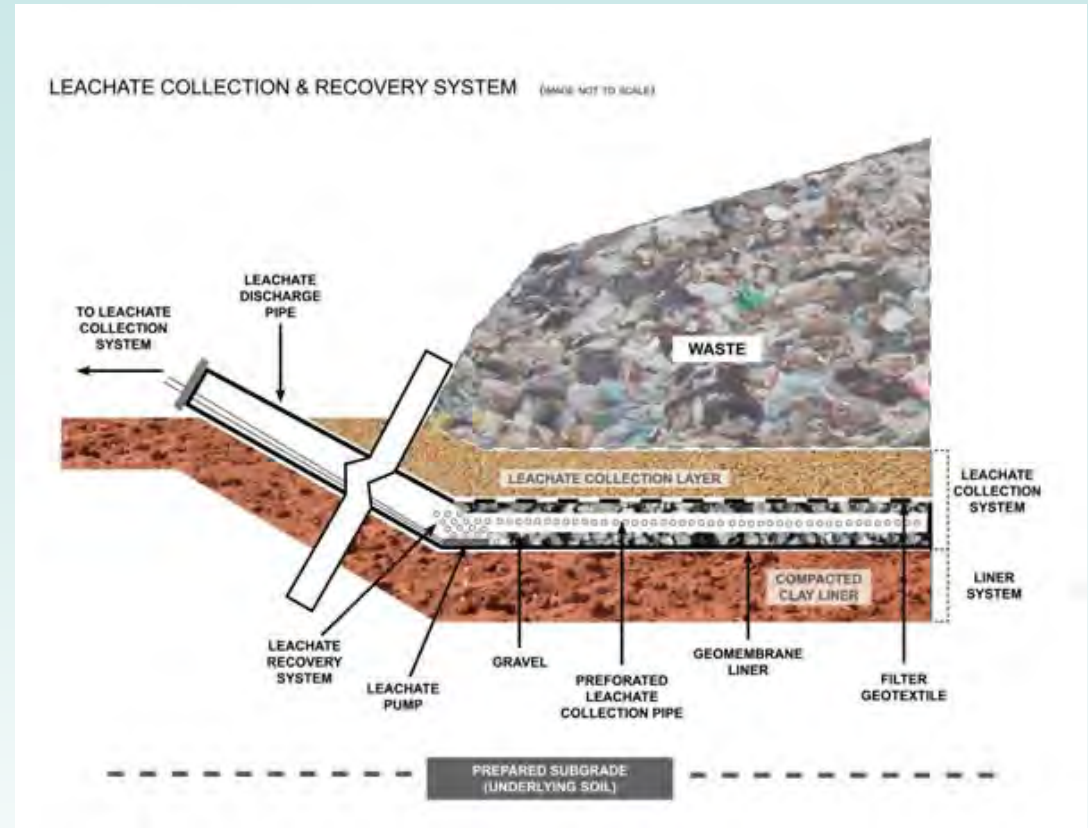
Why does ambient air intrusion matter?



LFG Collection from MHs/LCS



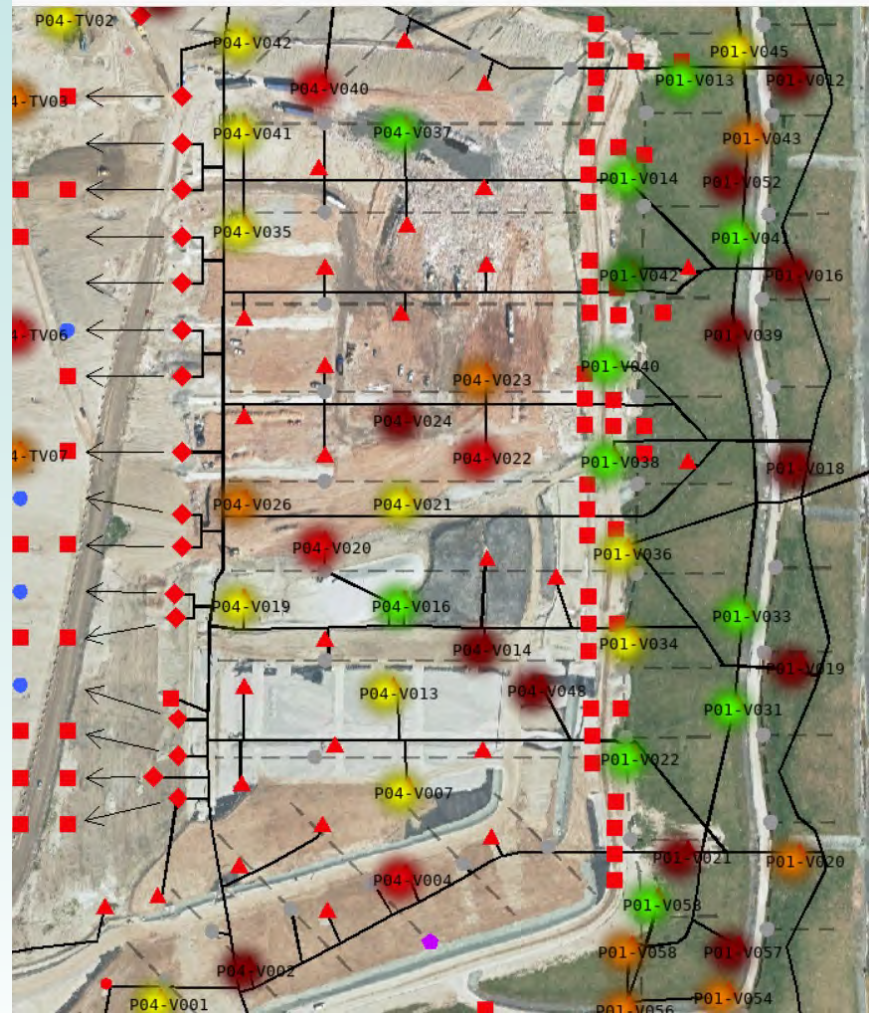
- Can be a great source of gas
- Must be well sealed



Horizontal Collectors



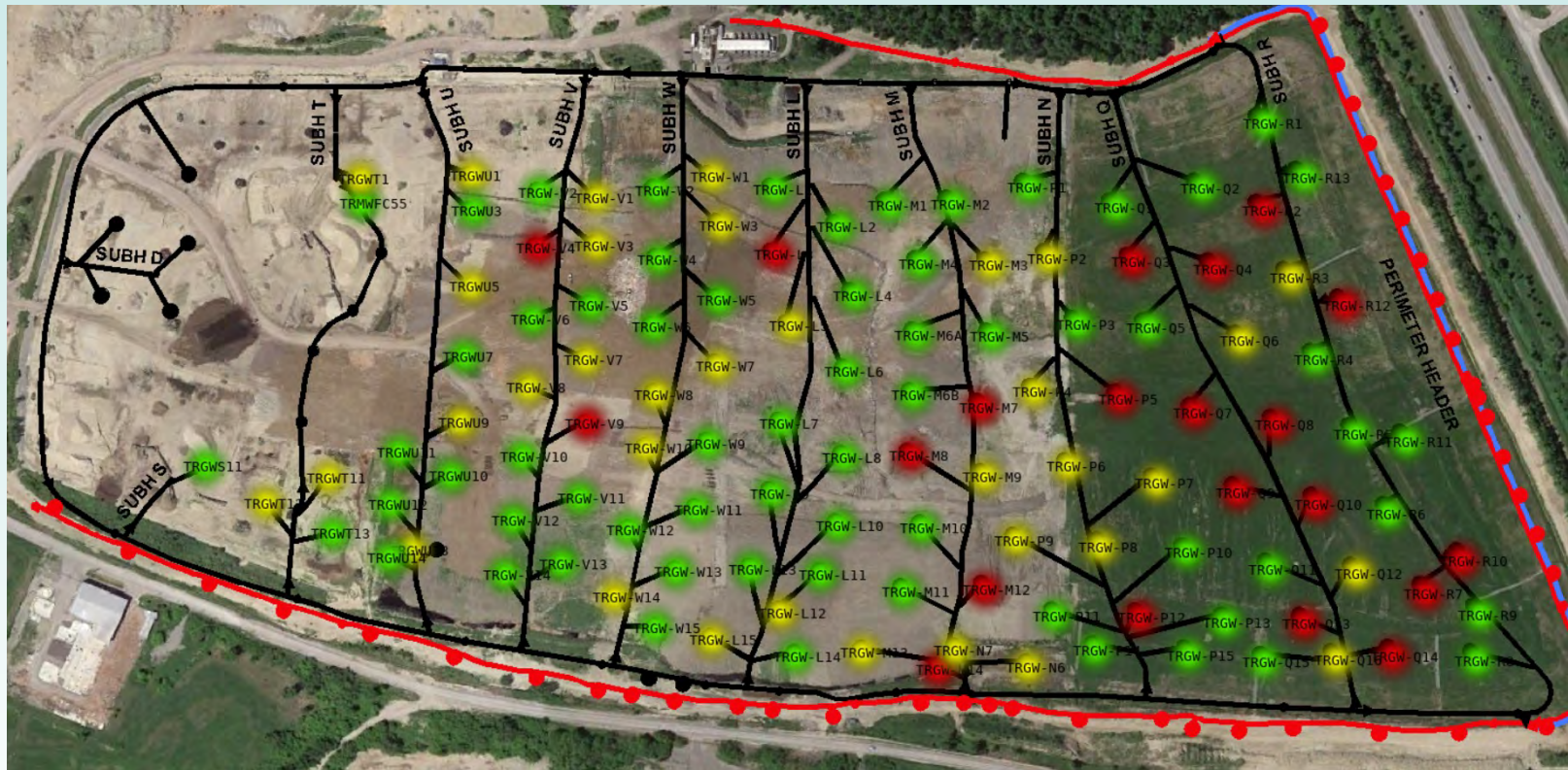
- Well planned and timed horizontal collectors very helpful in active gas collection areas



Vertical Well Spacing



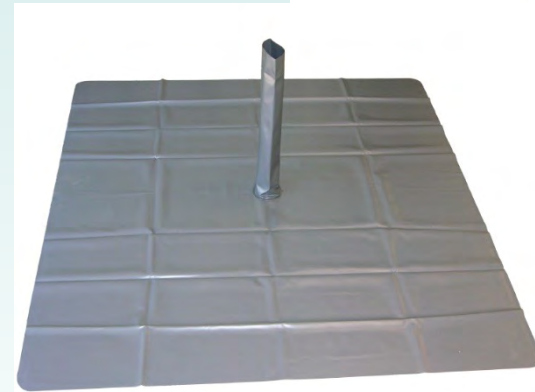
- Increase well density to allow for better flow control
- Use surface emission sweeps to determine if additional wells could be added to existing systems



Wellhead Design



- Choose valve with good throttle control
- Change size of wellhead based on gas flows
- Have a way to measure gas readings on both sides of throttle valve
- Have a means of measuring gas flow
- Insulation in some climates
- Allow for settlement
- Consider wellbore seals if short circuiting is a concern



Automated Wellheads



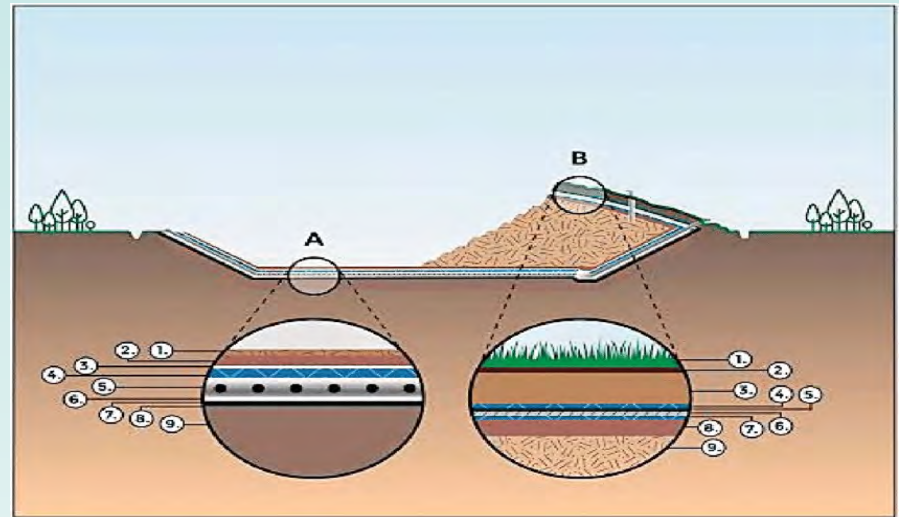
- Real-time data
- Automatic remote tuning
- Reacts quickly to changes due to barometric pressure
- Maximize gas collection
- Find leaks quicker
- Reduce downtime



Cover Considerations



- A good final cover is very important for gas collection
- Impermeable plastic cover system allows for low oxygen intrusion
- Geosynthetic Clay Liner (GCL) good alternative
- 1m low hydraulic conductivity clay



LINER SYSTEM

FINAL COVER SYSTEM

A

1. Waste
2. Protection cover
3. Geotextiles
4. Drainage layer
5. Collection pipe
6. Geotextiles
7. Geomembrane
8. Detection drain
9. Subsoil

B

1. Vegetation
2. Top soil
3. Protection cover soil
4. Geosynthetic drainage system
5. Geomembrane
6. GCL
7. Geosynthetic drainage system
8. Leveling Layer
9. Waste

Operations and Maintenance Considerations



- Add valves to isolate or “bracket” landfill for easy, while-running maintenance
- Avoid mechanical couplers – fusion is best
- Eliminate weak points like elastomeric couplers
- Allow for settlement in well design
- Change gas usage destination based on quality
- Data Management and Maintenance System



Thank you!



Denise Burgess, P.Eng. – Director of Engineering
Shannan McGarr, B.Sc. – Director of Operations