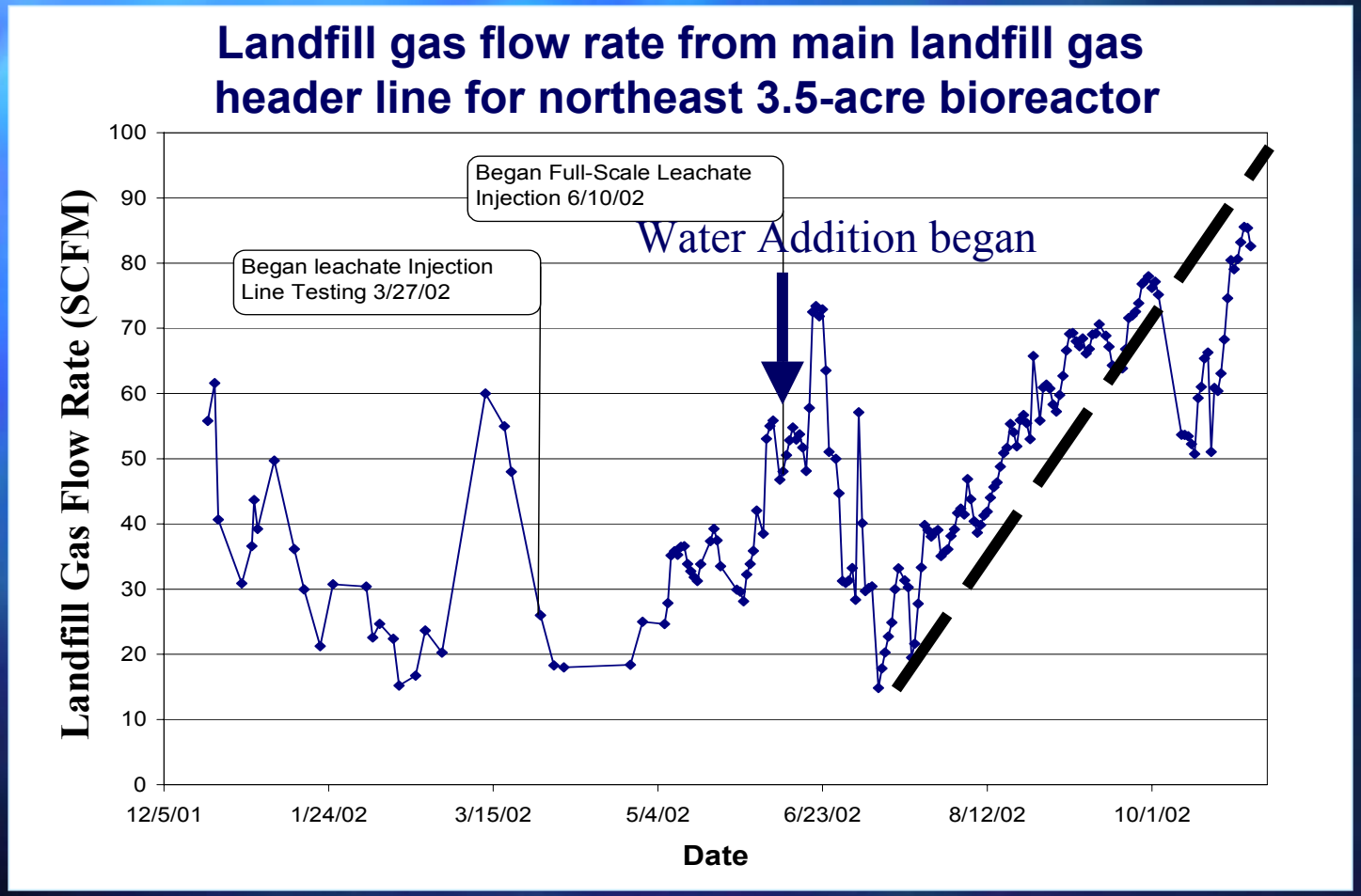
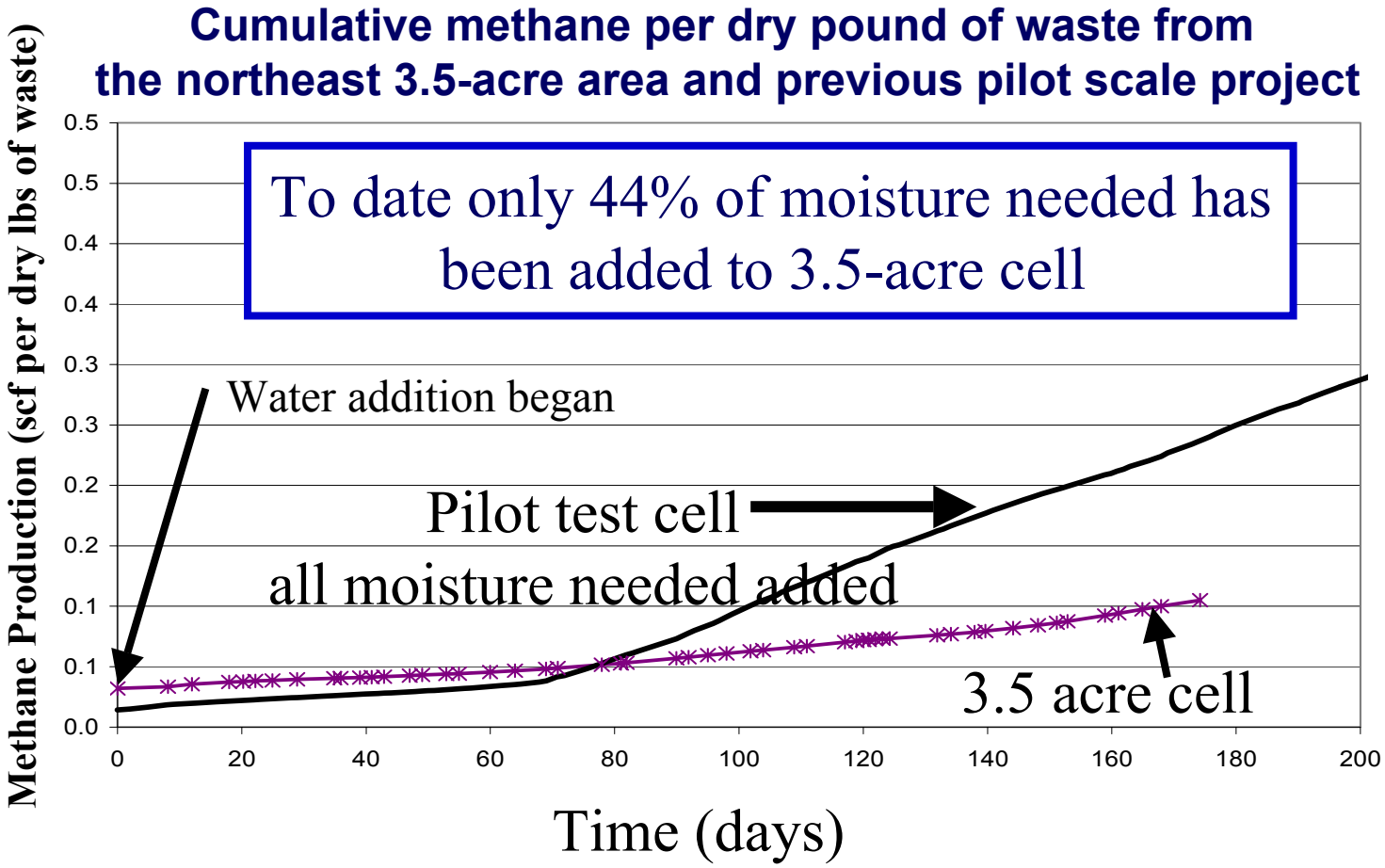
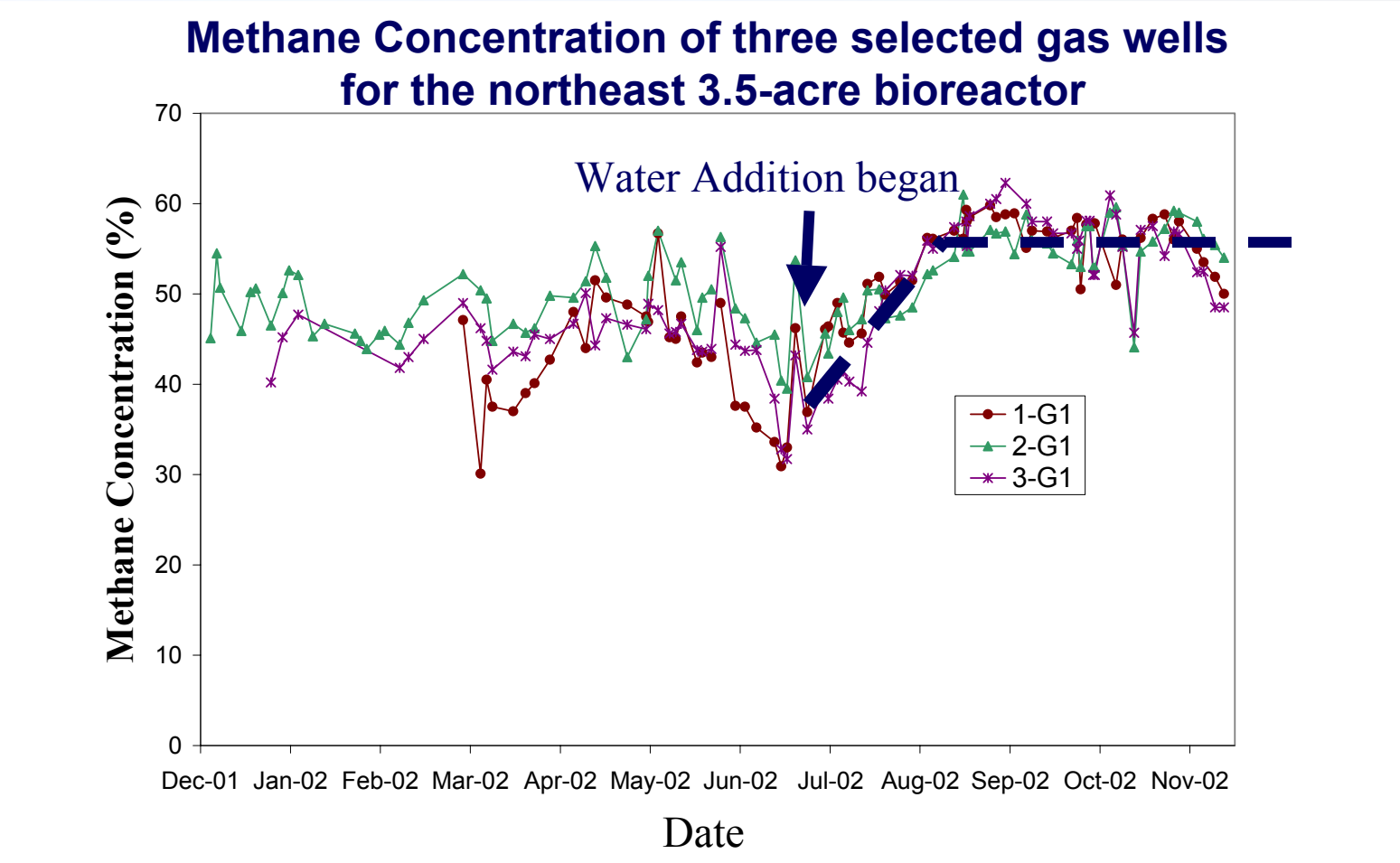
Full-Scale Project Results



Full-scale Project Results



Full-scale Project Results



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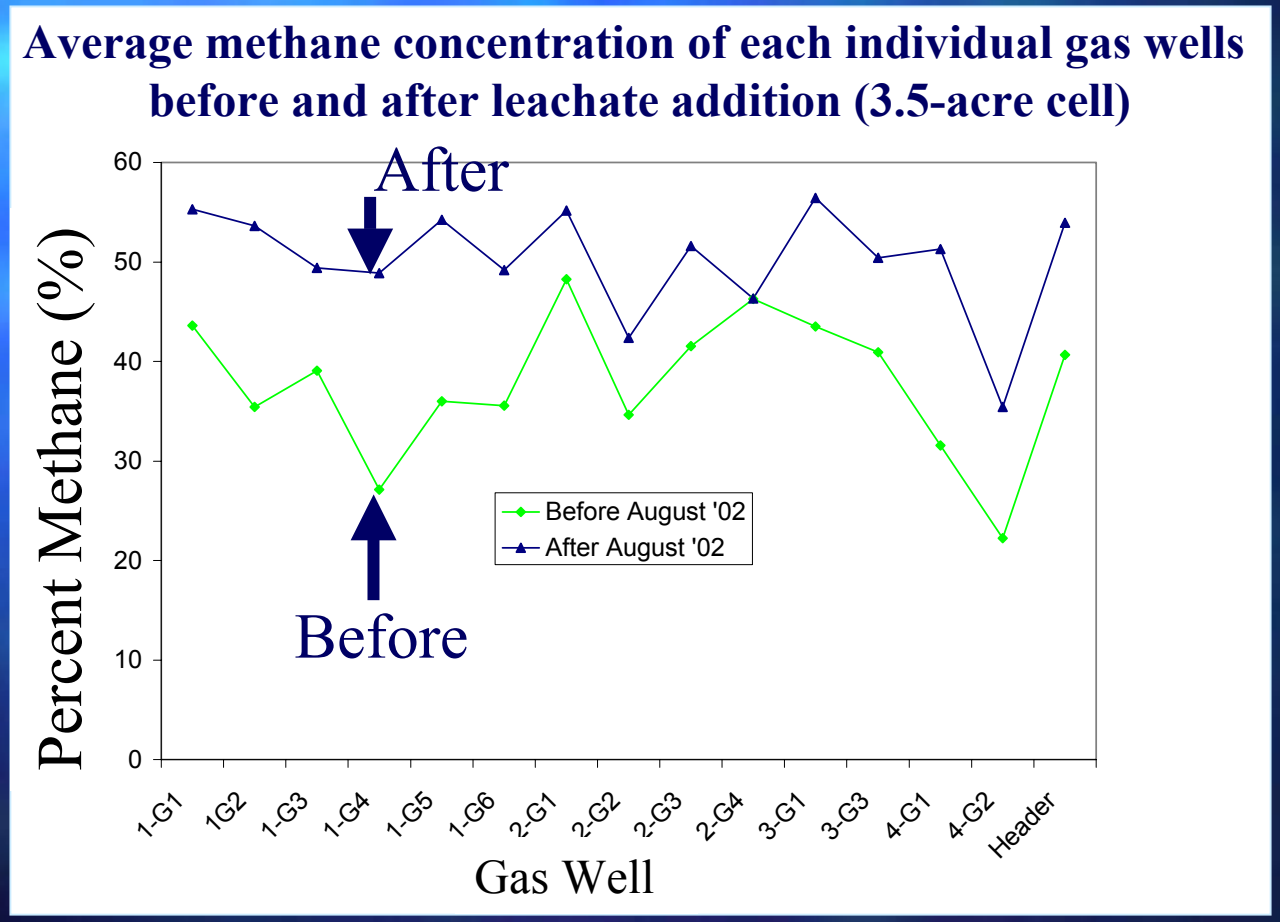
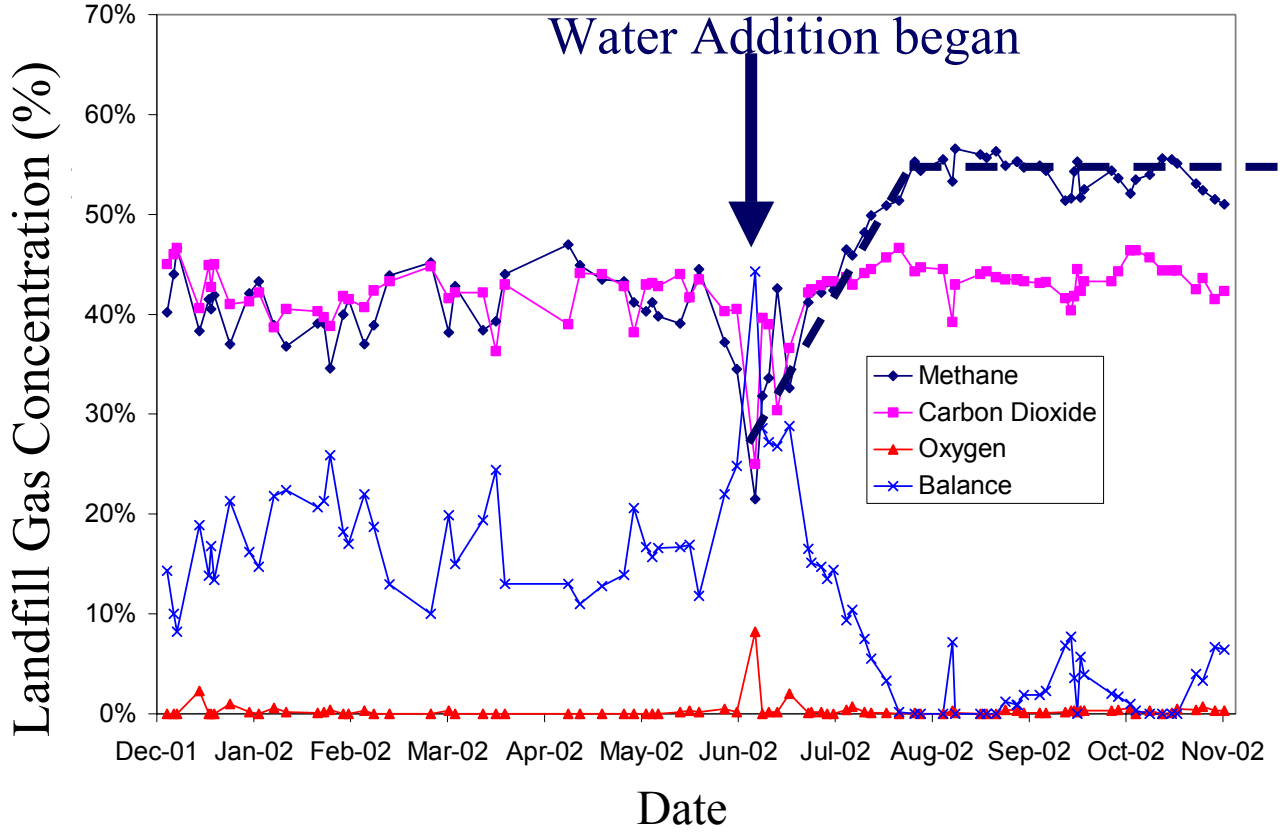
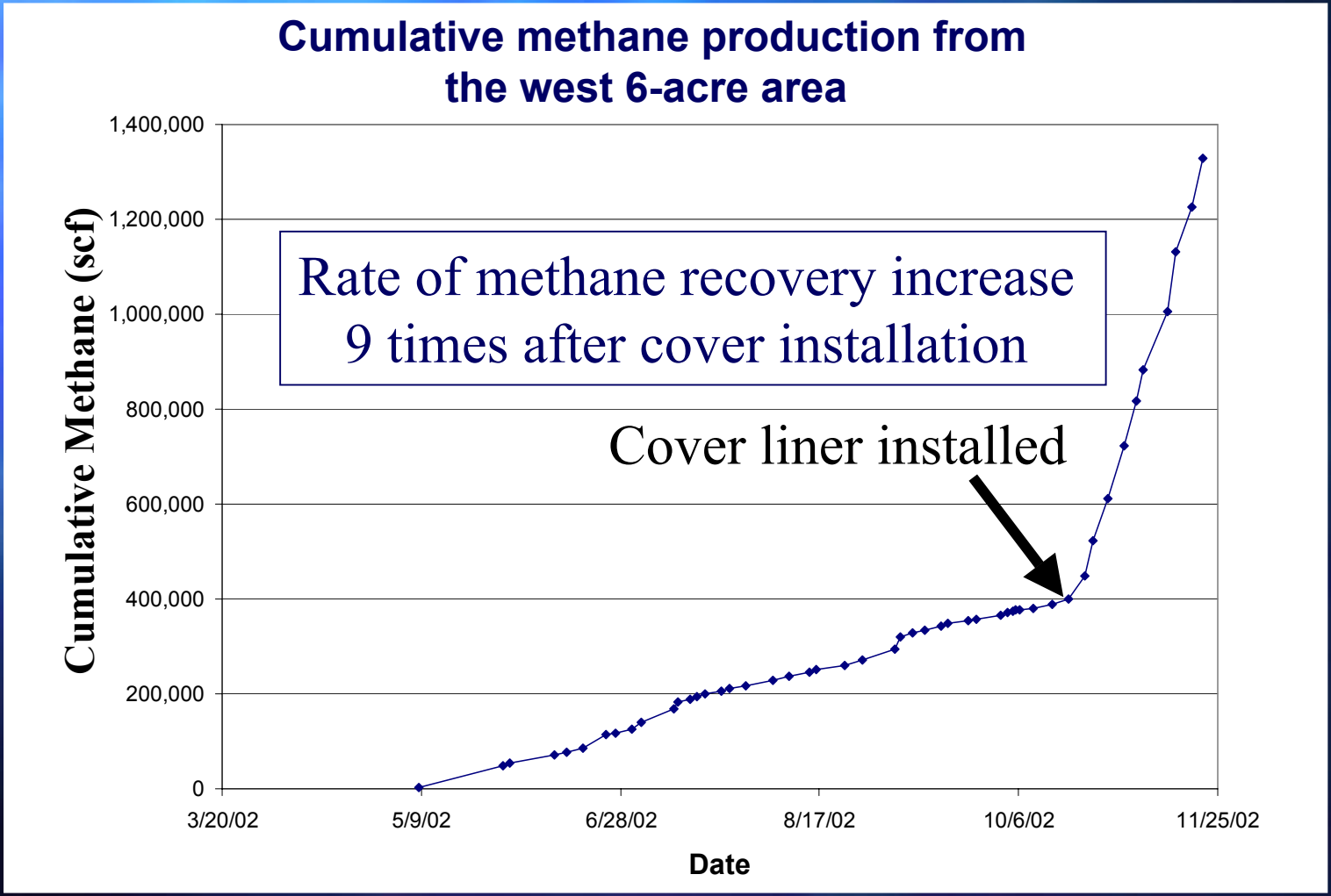


Full-scale Project Results

Landfill gas concentrations from gas header line for northeast 3.5-acre cell



Full-scale Project Results



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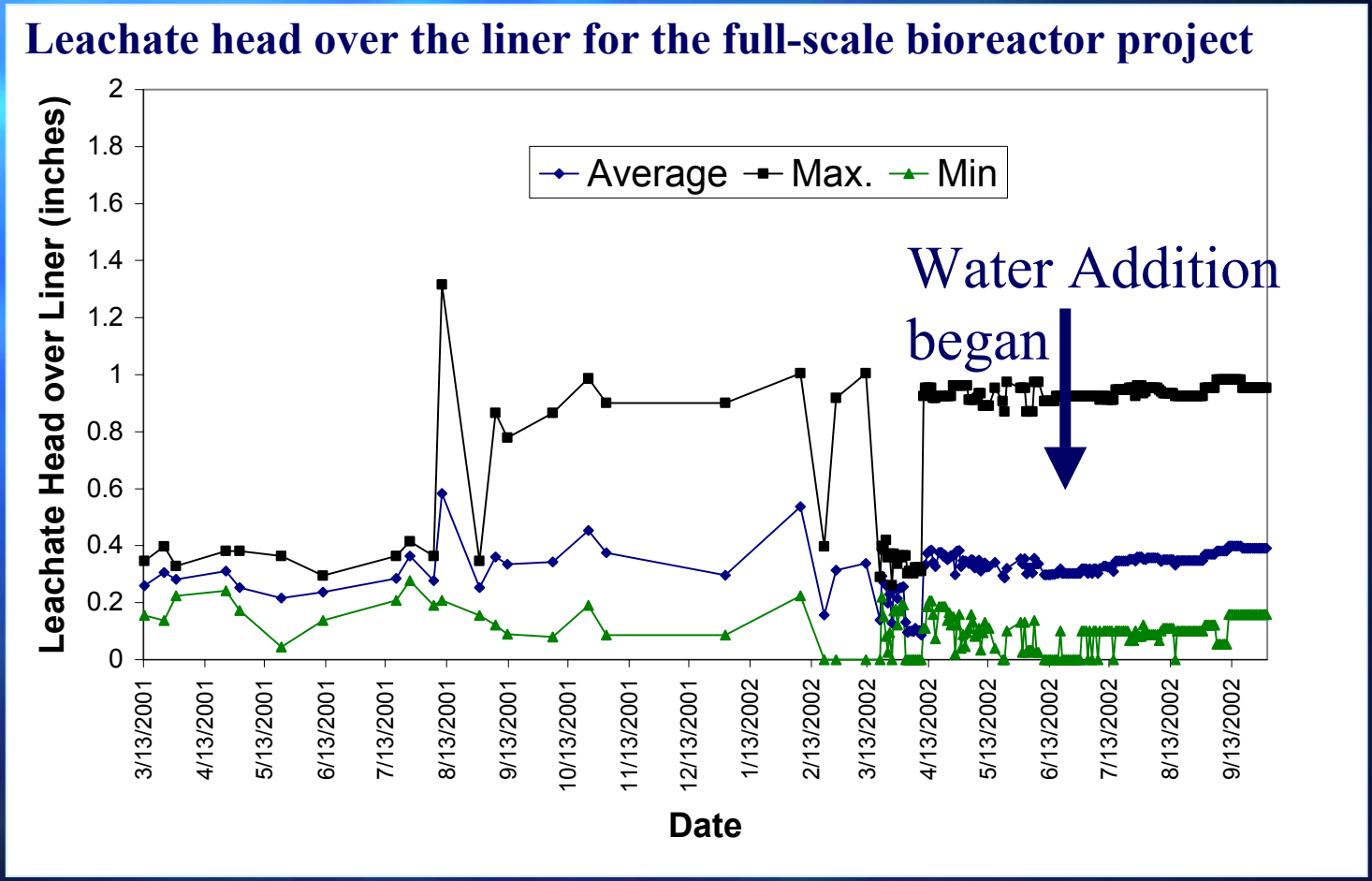
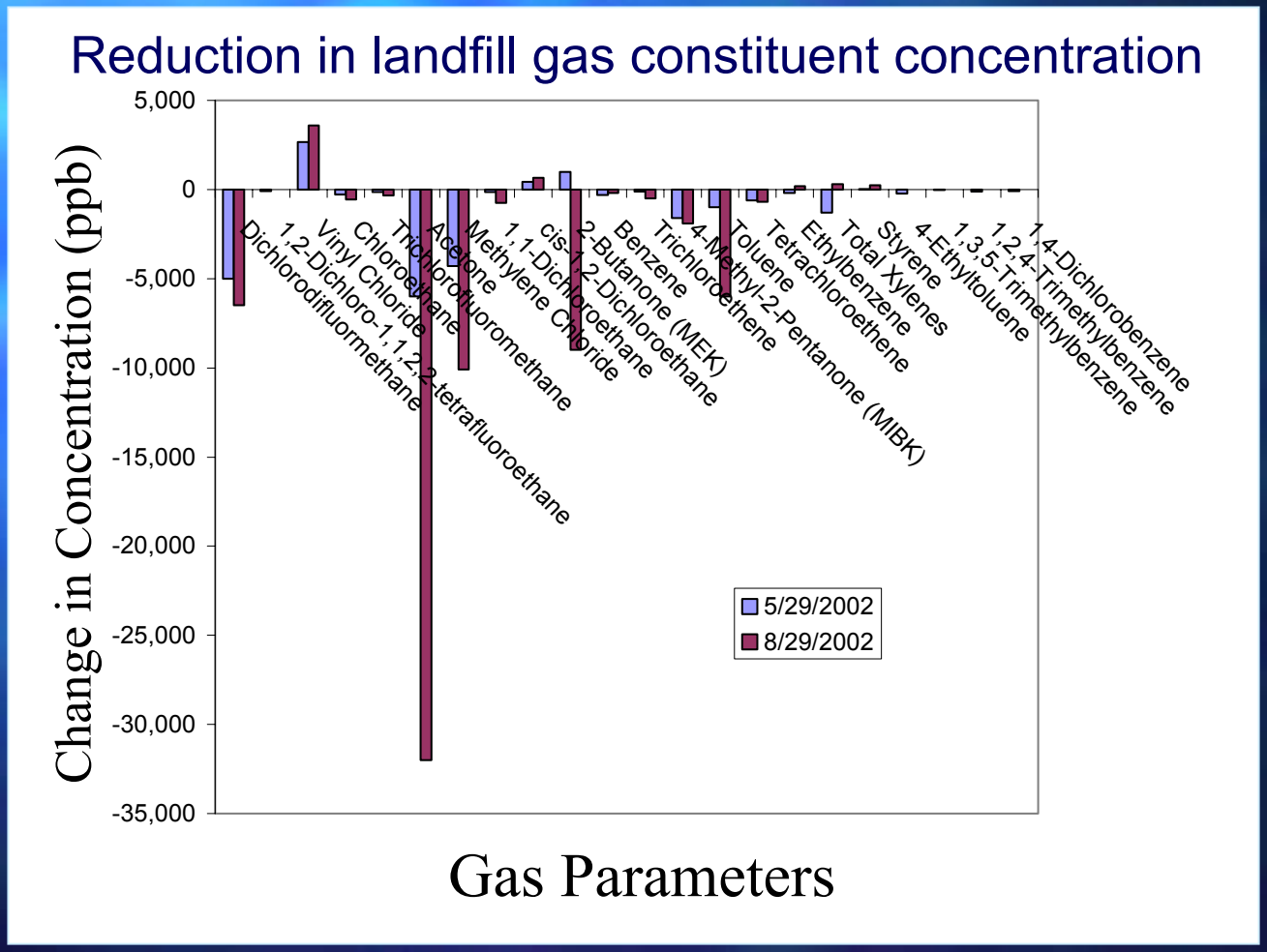
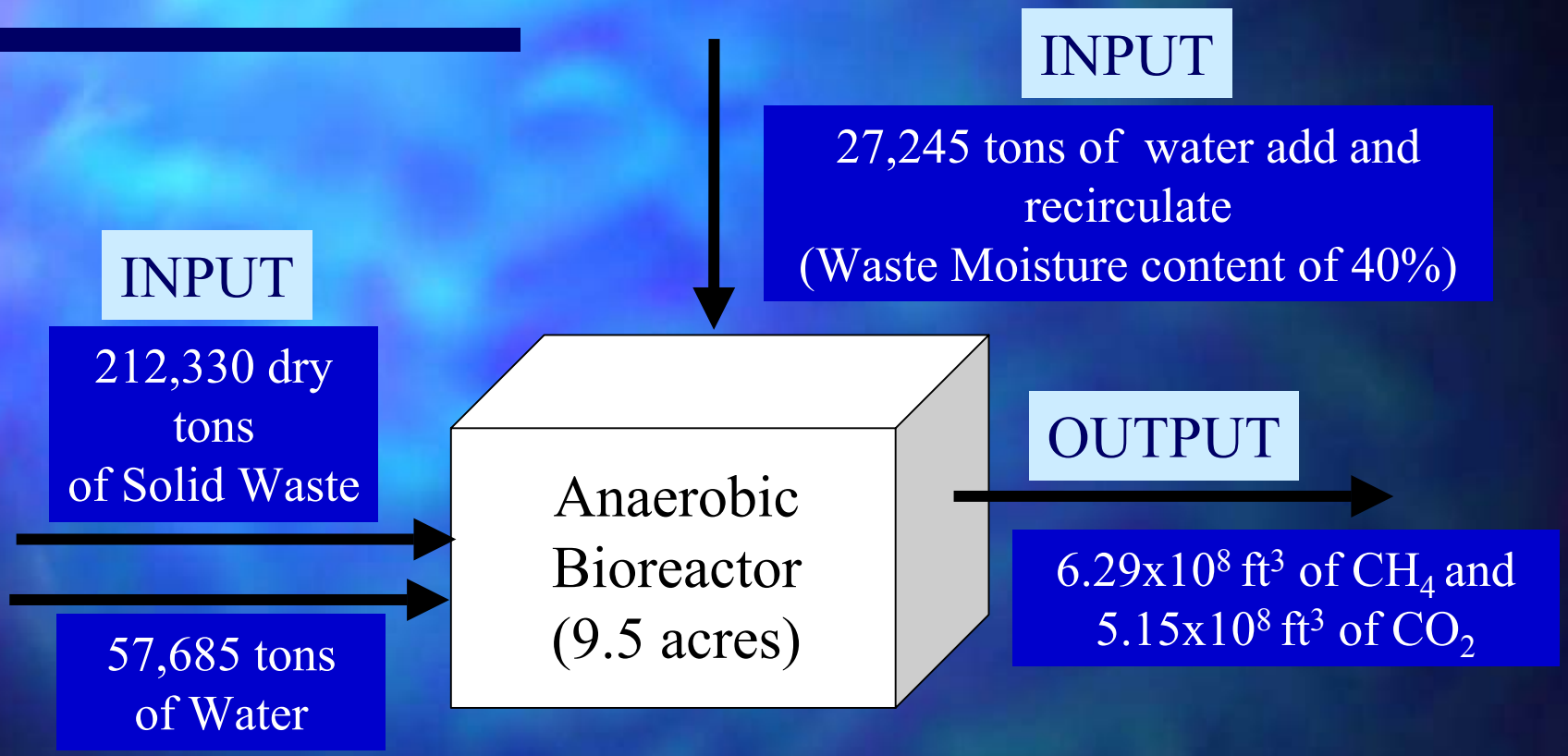


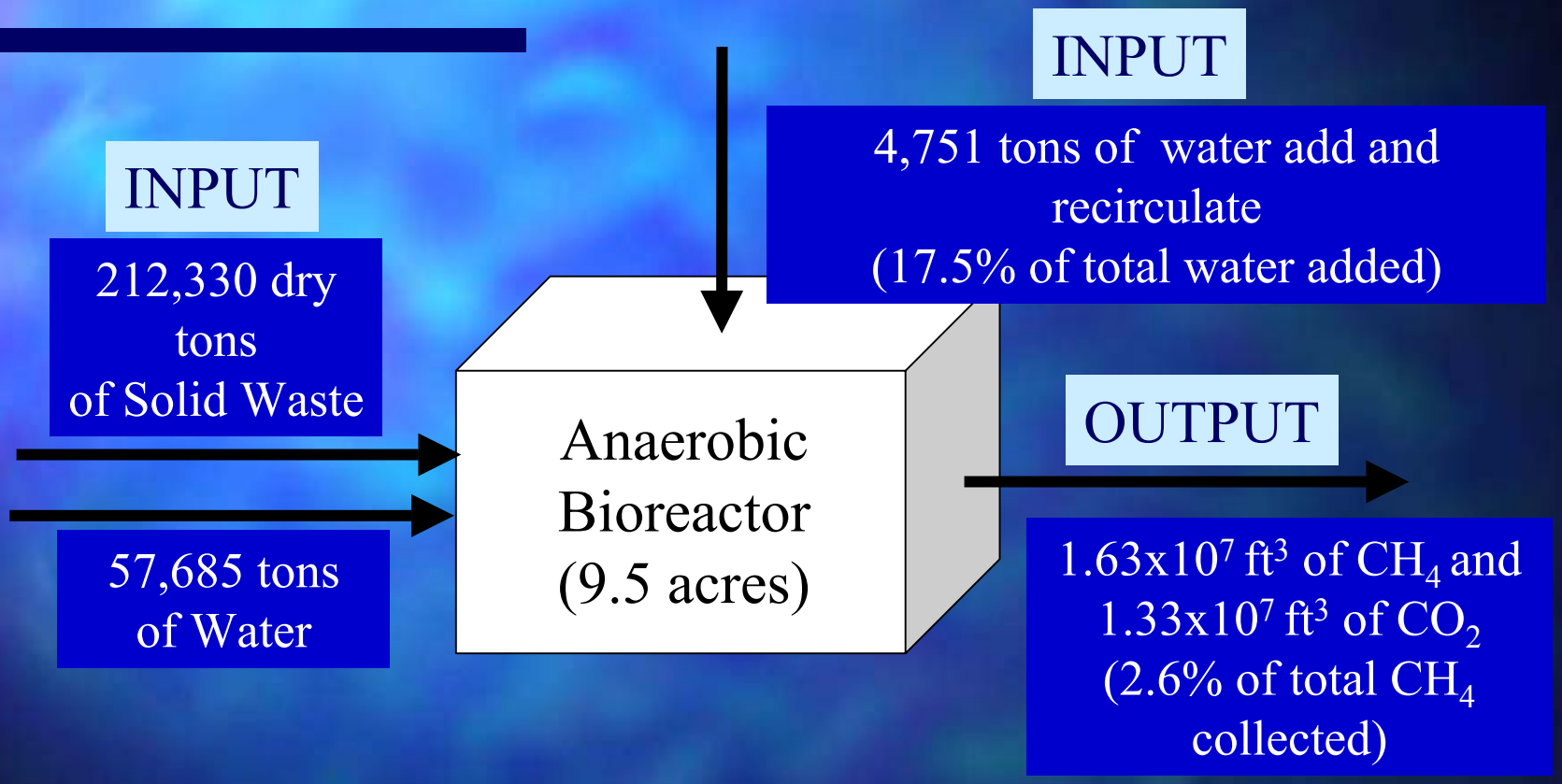
Full-Scale Project Results



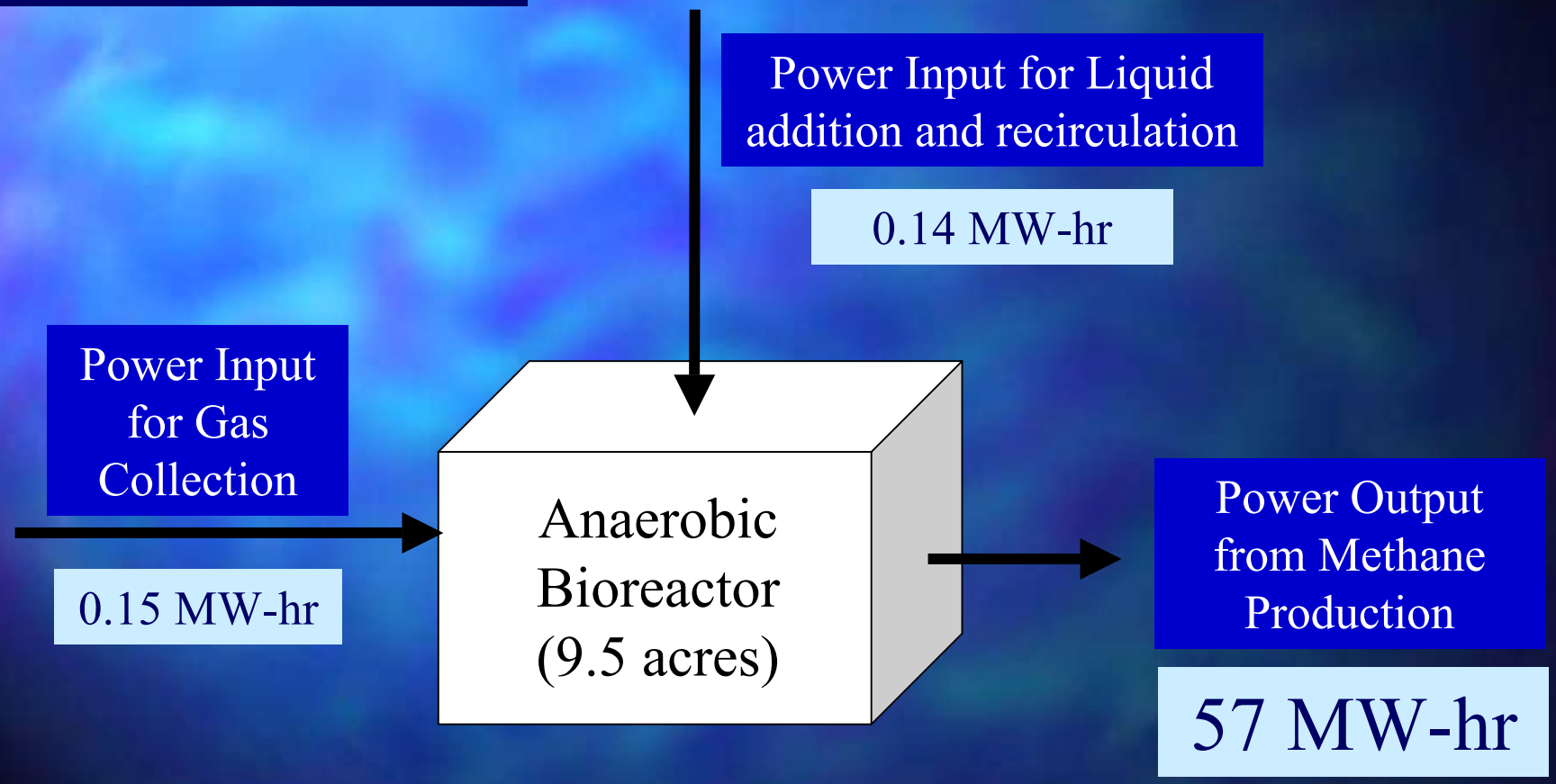
Total Mass Balance for Anaerobic Bioreactor



Current Mass Balance for Anaerobic Bioreactor

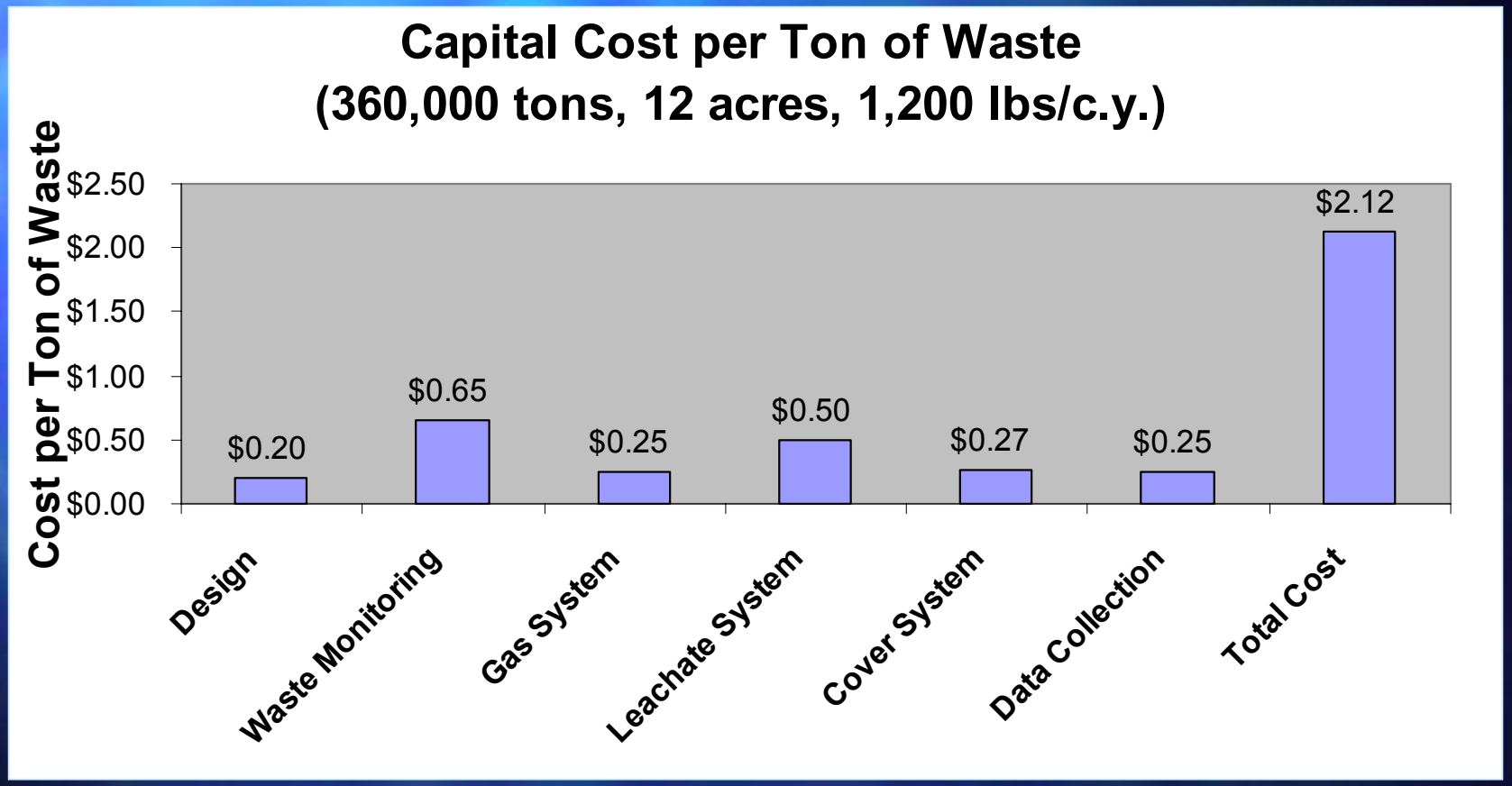


Total Energy Balance for Anaerobic Bioreactor

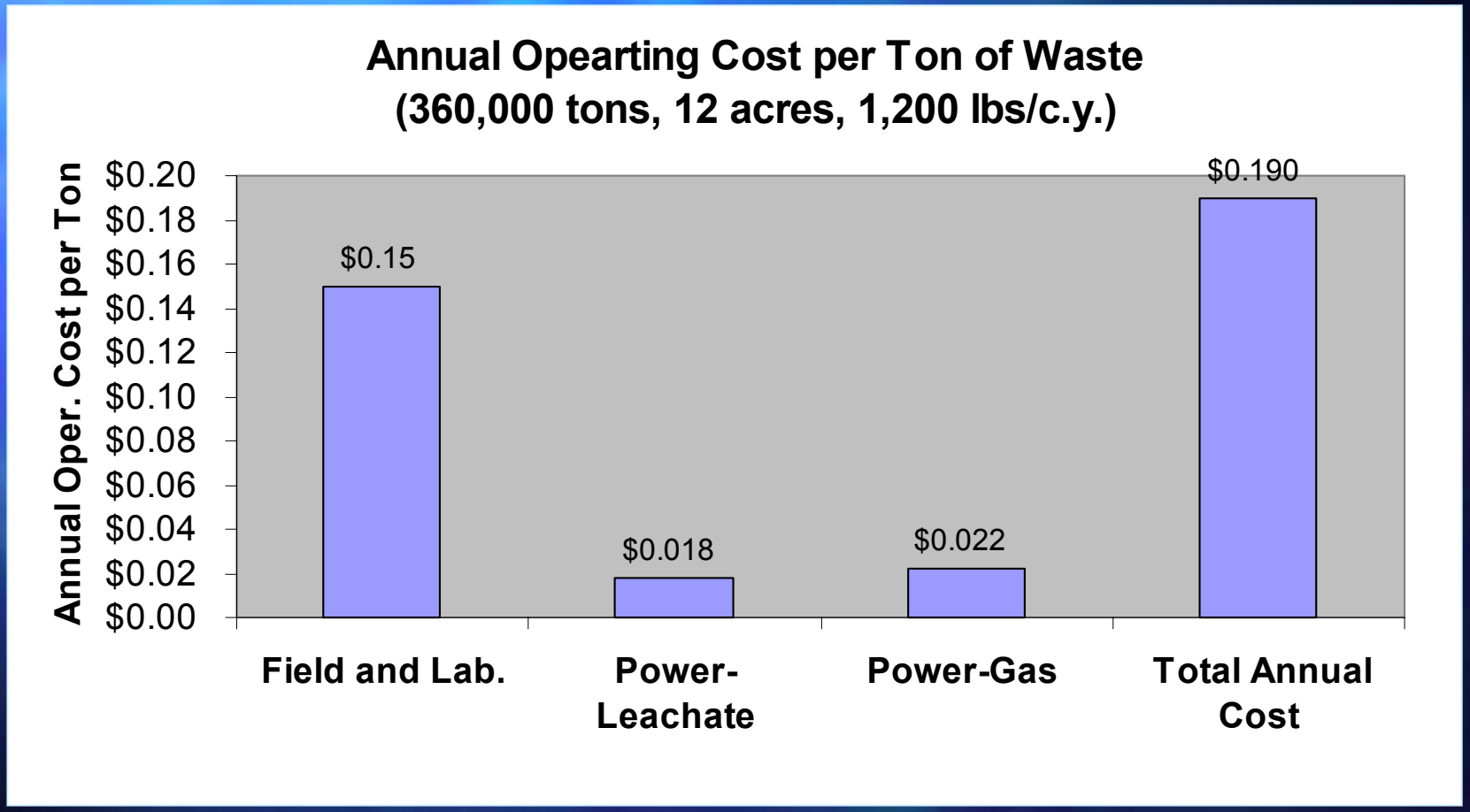


Parasitic Losses = 0.51% ~ < 1 %

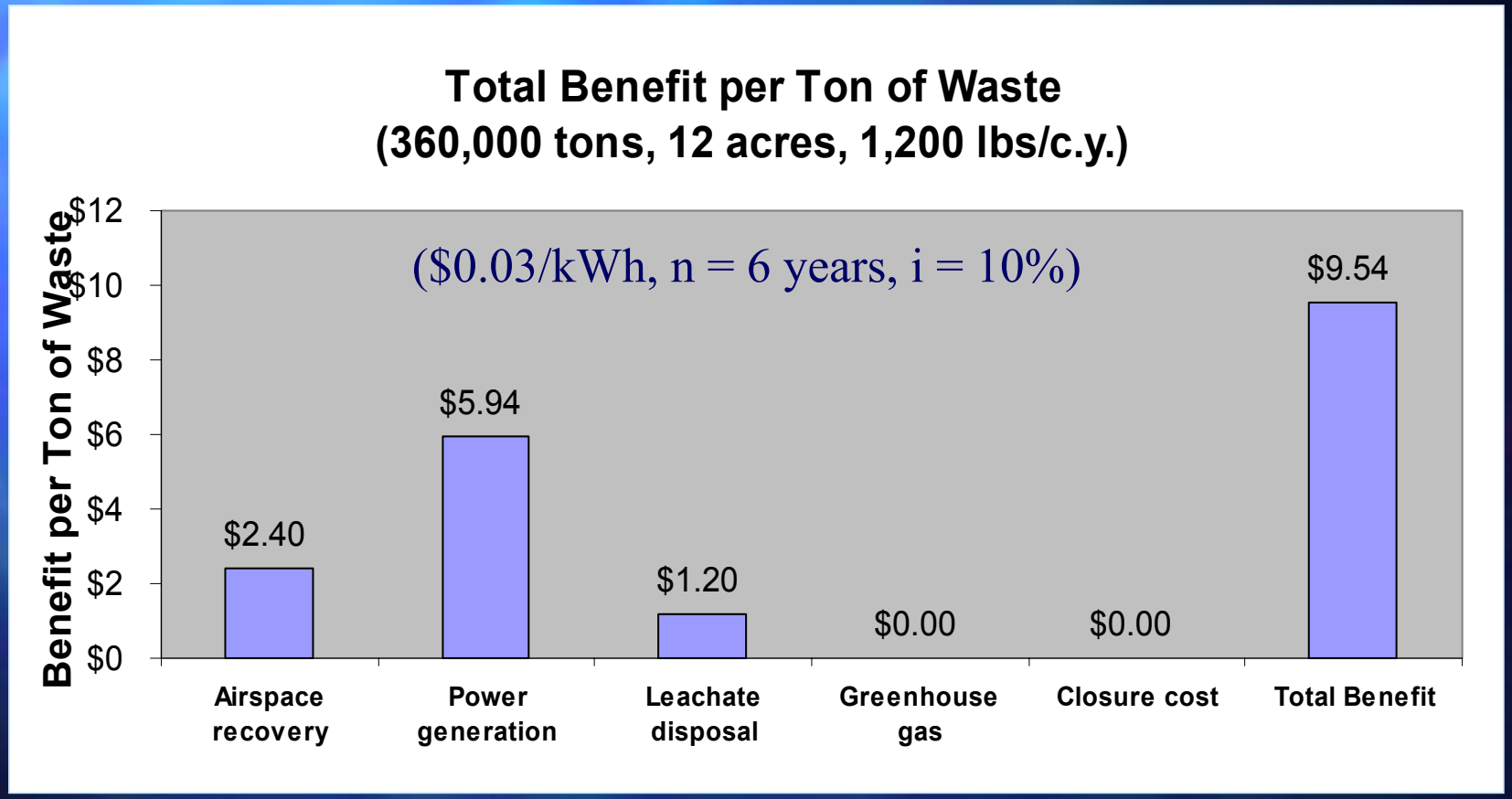
Full-scale Project Economics



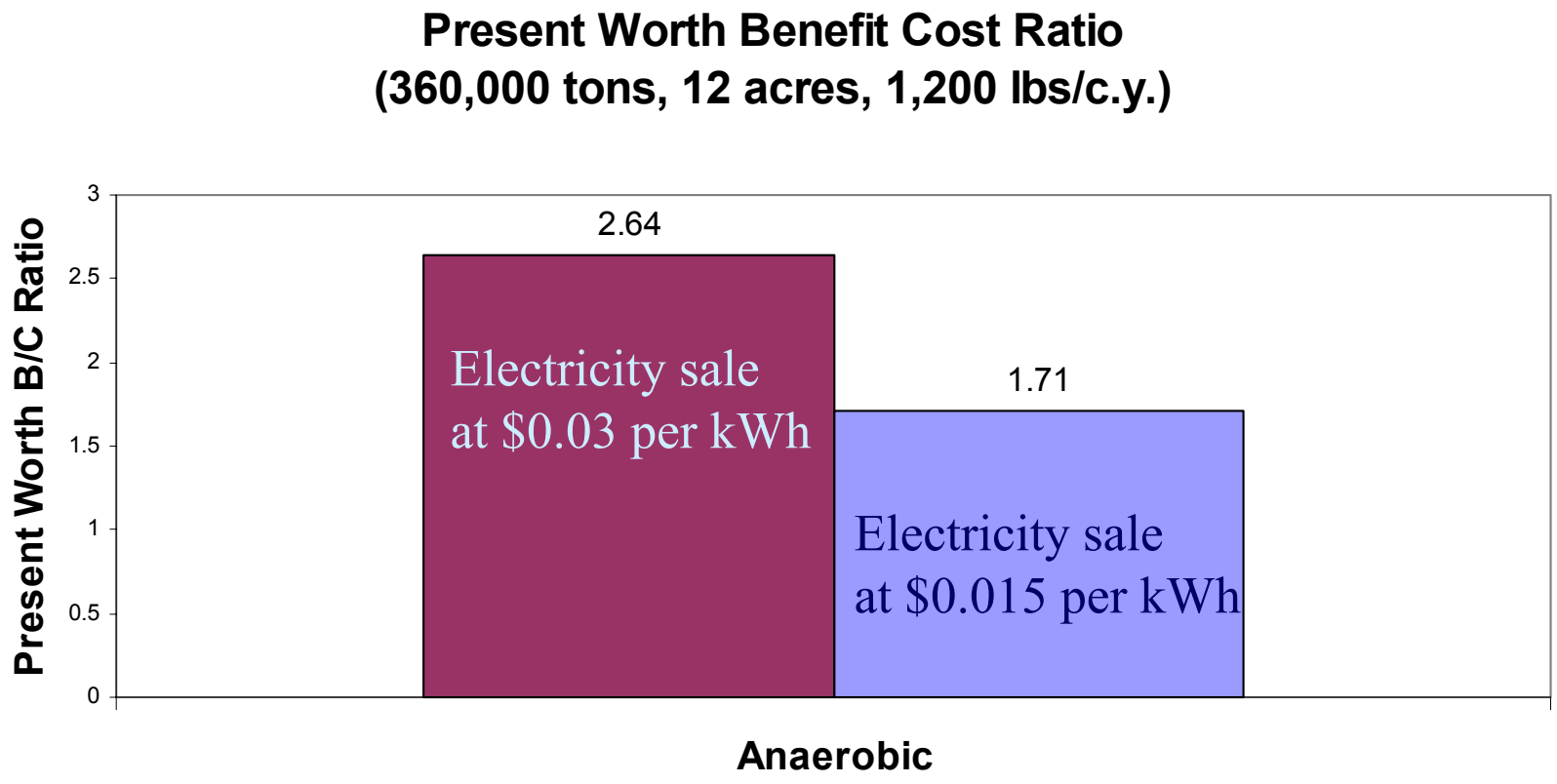
Full-scale Project Economics



Full-scale Project Economics



Full-scale Project Economics



Design, Construction, and Operation Challenges

- Liner cap design and construction
- Installation of instrumentation after waste filling
- Securing installed liner and penetration of pipes through the cap
- Leachate injection system & precipitation of calcium carbonate
- HDPE Injection lines-drilling and installing fittings
- Pressurized (liquid) Leachate injection system-inspection for leaks

Conclusions

- Bioreactors can:
  - Be constructed with normal landfill equipments
  - Be operated in a safe manner
  - Be instrumented during waste filling phase
  - Collect landfill gas under cover to reduce fugitive emissions via horizontal gas collection system
  - Be operated to slowly inject leachate and prevent hydrostatic head build up over the base liner

Conclusions

- Bioreactors can:
  - Be operated to inject leachate horizontally to distribute moisture uniformly
  - Be designed to be operated by a SCADA system
  - Be designed Collect real-time field data for monitoring, control, and data collection
  - Be have a master database for data management and reporting
  - Be economical to construct and operate

THE END

QUESTIONS?

Thank You!