



# 14<sup>th</sup> Annual LMOP Conference and Project Expo



## **FC Landfill Energy** Frederick County, Maryland

Presented by:

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# FC Landfill Energy, LLC

A project to design, construct, own, operate and maintain a 2.1 megawatt landfill gas to energy facility located at Reichs Ford Sanitary Landfill in Frederick County, Maryland





# Reichs Ford Road Sanitary Landfill

- Began accepting waste in 1969
- 530-acre site with a design capacity in excess of 2.75 million tons of MSW over two sites
  - Site A – closed and capped, with an LFG collection and control system installed in 1998
  - Site B – currently open and expected to meet the County's disposal needs through 2045
- Two previous attempts to build/operate a landfill gas to energy (LFGTE) project were unsuccessful



# Reichs Ford Road Sanitary Landfill



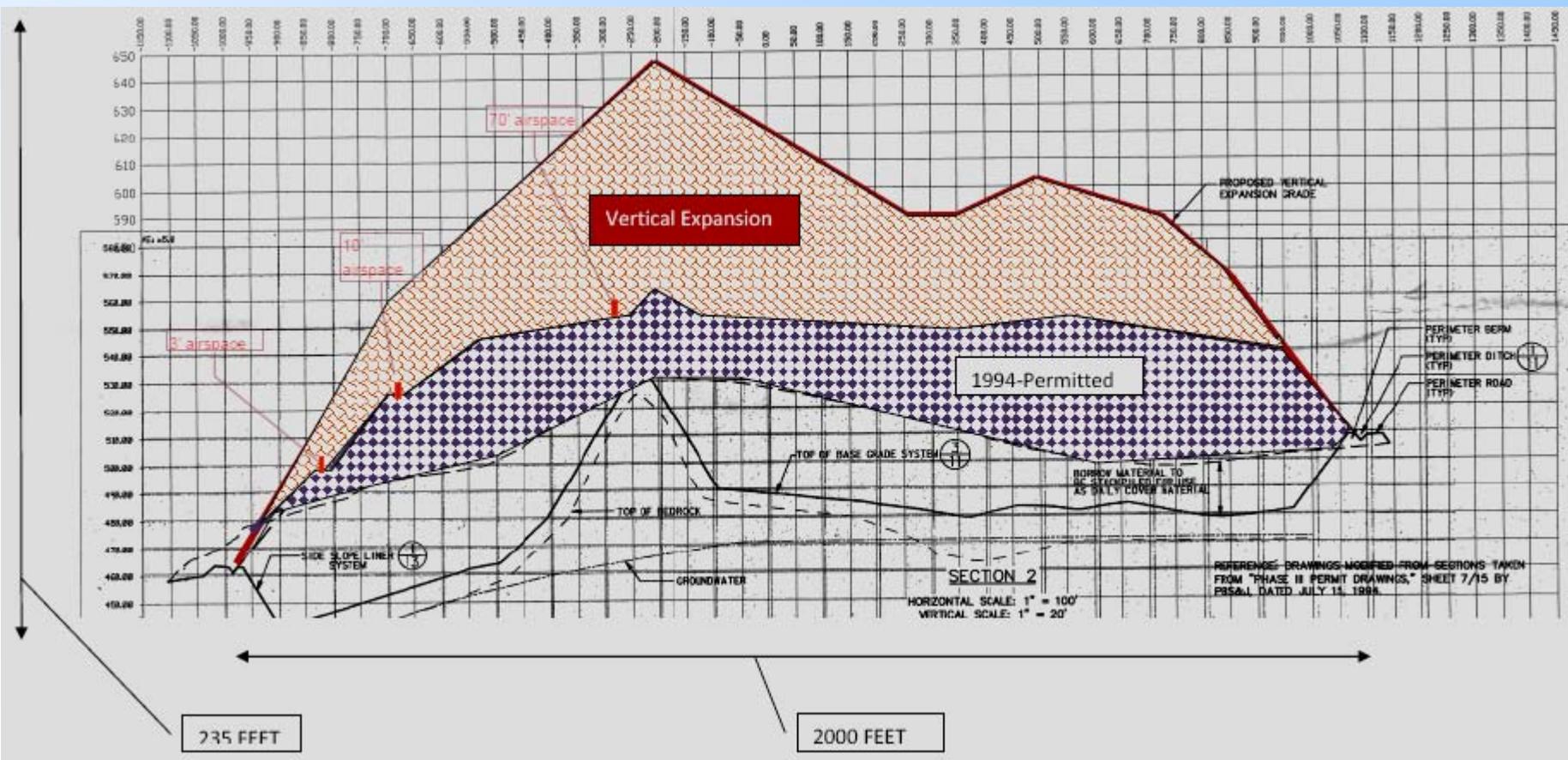
Area A - Closed

Area B - Active

Existing Flare /  
New LFGTE Site



# Construction



Site B Vertical Expansion airspace and 28 wells





# Design, Construction: Lessons Learned

- As built drawings, periodic aerial surveys help locate
  - Liner limits, waste depths
  - Leachate collection system
    - Laterals, headers
    - Trenches
    - Cleanouts
- Integrate 12 year old Site A LFGCC
  - 72 extraction wells in good condition, were balanced in-house
  - Blowers, flare – upgrades were necessary





# Landfill Gas Project History

- Apr. 1997 – Letter from DPW Director: EPA's preliminary results find Reichs Ford promising candidate for LFGTE
  - Could generate 2.2 MW of electricity
- Dec. 1998 – Site A's LFG system in place
  - Actual construction cost = ~\$1M; Annual O&M = <\$5K; no revenue
- Aug. 1999 – County issued RFP for Feasibility Assessment for LFGTE
  - Evaluate the generation and recovery potential
  - Potential end uses
  - Approximate costs





# Landfill Gas Project History

- Jul. 2001 – **Final Report**
  - Identified 3 nearby gas end users/sales
  - Electricity generation up to 3Mw, local utility could be purchaser
  - On-site use – gas up to \$13K/Yr, electric up to \$75K/Yr
  - Green power, greenhouses
- Jul. 2001 – **Summary of Findings: Reichs Ford good LFGTE candidate**
- Dec. 2001 – **Attended LMOP Conference; solicited expressions of interest from attendees**
- Jan. - Jul. 2002 – **Received 16 responses**
- Oct. 2002 – **Drafted RFP for internal review**
- Project put “on hold” – **a low priority**





# Landfill Gas Project History

- Nov. 2003 – County issued RFP for design/build services
- Jan. 2004 – Technical Proposals opened and selection made
- Apr. 2005 – First design progress meeting
- Sept. 2005 – Contractor walks away from negotiations
- Feb. 2007 – Curtis Engine, a contractor partner, planned to pick up contract but waits for another RFP to be issued
- Sept. 2007 – Northeast Maryland Waste Disposal Authority issues RFP for development, ownership, operations, and purchase; no award
- 2008 – Northeast Maryland Waste Disposal Authority issues another RFP for development, ownership, operations, and purchase
- March 2008 – Northeast Maryland Waste Disposal Authority initiates Interconnection Study
- Feb. 2009 – FC Landfill Energy, LLC awarded contract





# Project Team

- Frederick County Division of Utilities & Solid Waste Management – owner/operator of Reichs Ford Sanitary Landfill
- Northeast Maryland Waste Disposal Authority – joint project sponsor with Frederick County – procurement and contract administration
- Energenic, LLC – Sole owner of FC Landfill Energy, LLC
- FC Landfill Energy, LLC – special purpose company created to own and operate energy generating facility
  - Energenic, LLC – Project Developer, Project Manager
  - EA Engineering, Science, and Technology, Inc. – environmental permitting
  - South Jersey Energy Solutions, LLC – power and environmental attribute marketing
  - DCO Energy, LLC – EPC/O&M contractor
    - Industry and Energy Associates, LLC (now part of Stantec) – civil, structural, mechanical, electrical and control design
    - EA Engineering, Science, and Technology, Inc. – gas collection system design





# Contract Details and Project Specifications

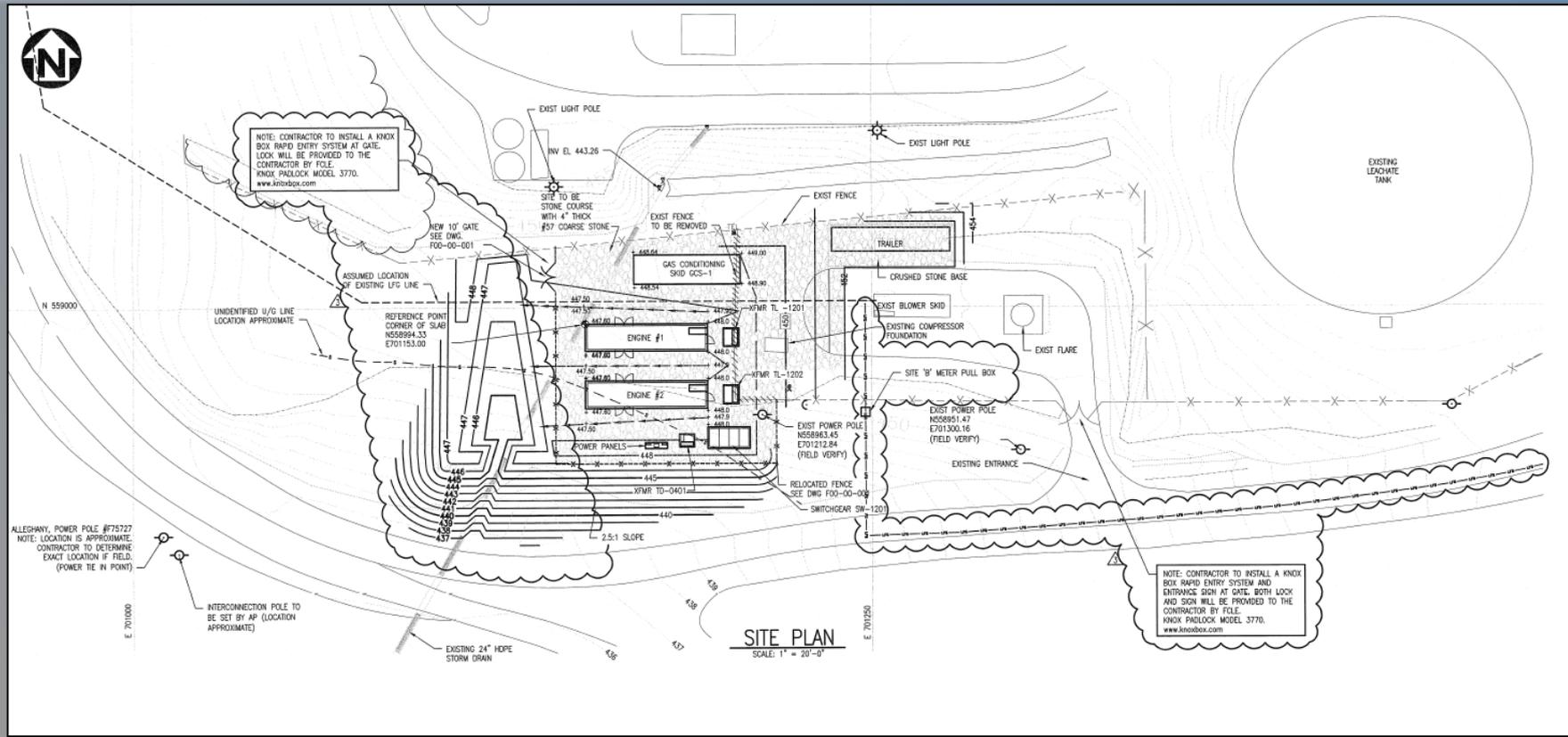


- **FC Landfill Energy, LLC**
  - Wholly owned subsidiary of Energenic, LLC, a partnership between long-term business partners South Jersey Energy Solutions, LLC and DCO Energy, LLC
  
- **Major Design/Build Elements**
  - New LFG collection system for uncapped and active Area B
  - Integration of the new Area B collection system with the existing Area A system and flare
  - Upgrades to existing flare system
  - New LFG conditioning systems and blowers
  - Two containerized reciprocating internal combustion engine-driven generators
    - Equipped with exhaust silencers and housed in sound-absorbing enclosures to suppress noise propagation beyond the fence line
  - Power transformation equipment and utility interconnection





# Site General Arrangement





# Project Permitting

- Site development permitting
  - Frederick County Site Plan Approval and Stormwater Approval
  - Catoclin and Frederick Soil Conservation District (E&S) Approval
- EA anticipated a new Site Plan would not be required for the project and it would be covered under the existing Plan
- County Planning and Zoning determined part of the project covered under existing Plan and part required a new Site Plan – development/approval required 3-4 months
- Lessons learned
  - Meet with permitting staff earlier in the project process
  - Ask for written concurrence of permitting pathway
  - Communicate with all stakeholders frequently





# Permit Summary

- **County**
  - Site Plan, Forest Resource and Adequate Public Facility Ordinance
  - Site Improvement Plans, Zoning/Landuse
  - SWM Plans, Easements
  - Grading Permit, Soil Conservation
  - Building Permits (Electric, Mechanical, Plumbing)
- **State, Federal**
  - Permit to Construct – Flare, Engines
  - Operating Permits – Title V, Refuse Disposal
  - Green House Gas Reporting





# Overview of Project Timeline

- Feb. 2009 – Construction, Operations & Maintenance Agreement Executed
- May 2009 – MDE Permit Application
- Design of collection system (EA Engineering, Science, and Technology) and electrical generation equipment (DCO) occurred in parallel
- Jan. 2010 – All Permits Approved; Start of Construction Activities
- Mar. 2010 – Completion of Well Field Construction
- Apr. 2010 – Substantial Completion
- May 2010 – Commercial Operations
- Aug. 2010 – Final Completion





# Operations Begin

- May 31, 2010 – Operations began
- Sept. 9, 2010 – Frederick County Commissioners, the Maryland Energy Administration and the EPA recognized the plant

**Look Who's Energizing the Community**

By developing a landfill gas energy project, Frederick County, Northeast Maryland Waste Disposal Authority, and Energenic are:

- Reducing greenhouse gas emissions
- Improving local air quality
- Encouraging economic development and job creation
- Developing a local, renewable source of energy

The U.S. Environmental Protection Agency congratulates Frederick County as well as LMOP Partners Northeast Maryland Waste Disposal Authority and Energenic for their efforts to improve the community and the environment by utilizing landfill gas to create energy. Frederick County worked cooperatively with the Northeast Maryland Waste Disposal Authority and Energenic to develop a project that captures landfill gas from the Hecks Ford Road Stationary Landfill in Frederick, Maryland to fuel two GS-320 reciprocating engines manufactured by LMOP Partner GE Energy - Jenbacher. The facility generates and sells 2 megawatts of power into the grid. Using landfill gas for energy helps the environment by reducing fossil fuel emissions, helps the economy by providing a stable source of alternative energy, and benefits the community by improving local air quality. The annual reduction of greenhouse gases attributable to this project is approximately the same as the annual greenhouse gas emissions from more than 10,000 passenger vehicles, the carbon dioxide emissions from nearly 150,000 barrels of oil consumed, or the carbon sequestered annually by more than 45,000 acres of pine or fir forests.

For more information on the benefits of landfill gas energy, contact the Landfill Methane Outreach Program at [www.epa.gov/lmop](http://www.epa.gov/lmop)





# Current Operations

- Since Commercial Operation in May 2010 till Dec 2010:
  - Total Generated Electricity: 9,830,215 kW
  - Plant Availability: 91.8%
  - Total Landfill Gas Utilized: 258,996,689 ft<sup>3</sup>





# Key Project Aspects

- Successful team effort between developer, the Authority, and the County
- Early initiation of the Interconnection Study by the Northeast Maryland Waste Disposal Authority
- Land GEM models created by Energenic during development phase meet the gas demands of engines
- Gas conditioning designed to remove moisture and particle contaminants and chill the LFG before entering engines
- Controls interface with landfill's existing LFG collection and flare system
- High plant availability
  - Well-field balancing at startup
  - Remote monitoring and data storage capabilities



# Questions ???

