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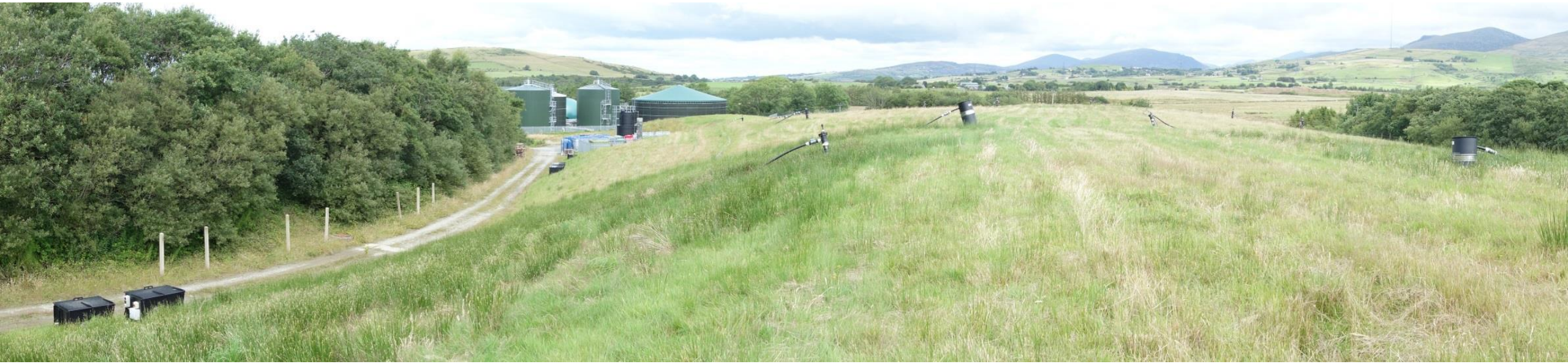
Focus Session II. Central Hall
THE FUTURE OF LANDFILLS: SUSTAINABLE STRATEGIES, EU DIRECTIVES, AND LONG-TERM ROLES

Robert Gregory



England Pre-Landfill Directive

- In England there have been 21,453 known landfill sites in use since 1900
- Today there are there 1,841 landfills which have a permit
- 360 are still accepting waste
- Older landfills were mostly small and unlined. They operated under “dilute and attenuate” rules
- Larger landfills were developed in the clay belt around London, to “natural containment and attenuation” rules
- Through the 1980s/90s we built “containment” landfills using natural or PE based barrier systems
- We experimented with leachate recirculation/bioreactor approaches to enhance stabilisation
  - in reality we just kept the leachate in the site longer and saved on leachate disposal costs for a while
- and of course we practiced co-disposal of hazardous liquid wastes in municipal solid waste

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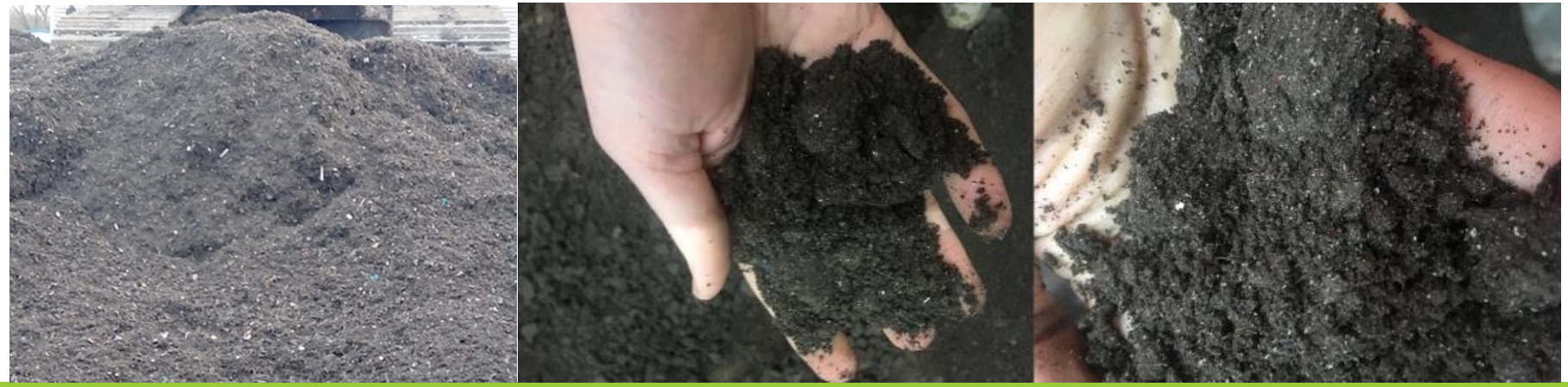
Hazardous Waste Co-Disposal: Natural attenuation in municipal waste

England Post-Landfill Directive

- We have had problems with co-mingling of gypsum (plasterboard) waste with municipal household waste since we started waste diversion in earnest in 2005
- In 2009 we banned co-disposal of massive forms of gypsum with municipal waste
- In the quest for more waste diversion and a move towards a circular economy, we produced trommel fines. **EWC Code 19 12 12.** In 2023, **7.8 million tonnes** of this stream were landfilled in the UK, up from 38% of municipal landfill waste in 2010 to **70% of municipal landfill waste in 2023.** This waste stream can be technically challenging, producing landfill gas and H_2S very quickly



Circular Economy Residues: The Forgotten Fractions

- The circular economy is often presented as a pathway to "zero waste" — but in practice, circular processes generate significant by-products that still require disposal. Landfill remains the destination of last resort for many of these secondary wastes:
  - Digestate rejects: Oversize, plastic-contaminated, or non-hygienised material from AD plants
  - Compost oversize: Screenings from IVC and open windrow sites that are too coarse or contaminated
  - Fines from MRFs and MBT: Moisture-laden, biologically active materials with high variability
  - Residuals from WEEE, textiles, and furniture dismantling: Mixed polymers, shredded foams, or mineral wool
  - Rejected recyclate: Bales of paper, card, or plastic returned from export or MRFs due to contamination
  - EWC Waste stream 19 12 12 — residues from mechanical treatment. Whilst considered “non-hazardous”, 19 12 12 can be chemically reactive, biodegradable, and difficult to stabilise, especially when fine-grained and mixed with sulphate, metals, and residual organics. It is a perfect example of how circular success creates new landfill challenges
- Landfill is also required for emergency disposal routes – Foot and mouth, BSE, Bird Flu outbreaks. And it is the preferred route for waste disposal when incineration plants are out of action for maintenance

My vision for the future of landfill (with a little help from my friends)

- There is no waste management process that does not result in residual wastes going to landfill
- Industry continues to innovate but within that there will be some technology failures
- There will also inevitably be policy decisions that can limit waste management treatment routes (RDF for example)
- Landfill provides an option that no other waste management solution provides. It is a buffer to enable above ground technologies to function, and to absorb policy changes
- Landfill mining has shown that disaggregated materials are currently too costly to recover, but monofilling of similar waste types could make future recovery more cost effective. And could potentially make current environmental management challenges easier. **This will inevitably come with an additional cost, but no more than the new technologies we are adopting.**
- Hazardous waste disposal already adopts monocell disposal for e.g. asbestos, and certain industrial wastes
- Instead of pretending landfill does not exist in the circular economy world, I would love to see landfill return as a responsible “grown up” solution to residual waste management