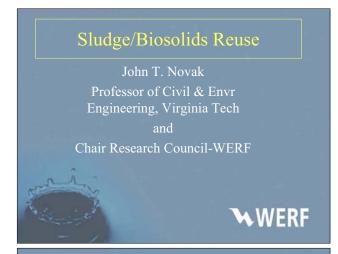
Sludge/Biosolids Reuse

汚泥/バイオソリッドの再利用

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Does Land Application Lead to Stream Pollution?

- Phosphorus in biosolids is it too much?
- Do contaminants move off site? Under what conditions?
- Do pathogens move off site? Under what conditions?
- What is the fate of estrogenic compounds and other pharmaceuticals?



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WERF Research in Biosolids In-plant processes that may affect sludge

- Membrane Bioreactors for Anaerobic Treatment of Conventional and Medium Strength Wastewater (02-CTS-4)
 - Develop and Demonstrate Fundamental Basis for Selectors to Improve Activated Sludge Settleability (01-CTS-4)
- Effects of Solids Properties on Membrane Bioreactors and Solids Processing 01-CTS-19UR)



Biosolids Issues in the United States - Land Application - Pathogen issues - Odor issues - Heavy Metals - Nutrients - Toxins - costs - Incineration - Public opposition - costs - Landfilling - Acceptable but will that continue? - costs

Land Application

- Questions
 - Are our current regulations protective of human health?
 - Can we overcome the problem of public perception that land application is inappropriate?
 - Can we develop processes to reduce or eliminate odor?
 - Can we reduce the costs of processing and transportation?

Can we improve dewatering?

- Dewatering impacts all ultimate disposal costs
 - Cost of polymer or other conditioning agents
 - Less volume (drier cakes) result in lower hauling costs and more effective incineration and drying
 - Dewatering can generate odors, resulting in the need for more costly alternative disposal sites of eliminating land application



WERF Research in Biosolids

Processes to improve the quality or acceptability of biosolids

• Enhanced Digestion for Biosolids Odor Removal (Phase 3 of original Project 00-HHE-5) (03-CTS-9)

Fate of EDCs in Biosolids During Stabilization and Dewatering (04-HHE-?)



WERF Research in Biosolids

- Mechanisms of Conditioning, Thickening and Dewatering (01-CTS-1)
- A New Tool for Measuring Biosolids Floc Strength (01-CTS-32-ET)

of Dewatered Sludges (02-CTS-3)

Optimizing Thickening and Dewatering
Operations Through Automation (98-REM-3)



WERF Research in Biosolids

Assessment of technologies

- Minimizing Biomass Production from Biological Treatment (00-CTS-10)
- Biosolids Management: Assessment of Innovative Processes (96-REM-1)



The Biosolids Summit

- Purpose Bring together a wide variety of stakeholders to address questions about the land application of treated sewage sludge and to develop a multi-year research agenda that included public input.
- have an interest in or may be impacted by biosolids disposal practices



Topics and Interest

participants	I-9	N-20	A-21	R-9	U-11
Pathogens	22%	10%	14%	22%	9%
Human Health	22%	40%	9%	44%	27%
Treatment, odor, Mgt.	44%	10%	29%	11%	36%
Econ, social, pol.	11%	20%	5%	0	9%
Fate & transport	0	10%	24%	22%	9%
Risk Assess	0	10%	19%	0	9%

I is industry, N is non trad, A is academic, R is

WERF research in Biosolids

Evaluation of Potential health Effects

- A Safety Assessment Tool for Land Application of Biosolids (00-PUM-6)
- Assessing the Fate of Emerging Pathogens in Biosolids (01-HHE-3)
- Quantification of Airborne Biological Contaminants From Land Application of Biosolids (02-PUM-1)

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WERF Research in Biosolids

- Reactivation and/or Growth of Indicator and Pathogenic Bacteria During Centrifugal Dewatering of Anaerobically Digested Sludge (02-CTS-2)
- Examination of Reactivation of Fecal Coliforms in Anaerobically Digested Biosolids (03-CTS-13)

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Top 6 projects recommended from the biosolids summit

- Targeted characterization of pathogens in sludge and biosolids
- Characterization of bioaerosols associated with land application

 Characterize the odor compounds emitted from sludge
- through the entire process

 Cost/benefit analysis for use and disposal of sludge/biosolids

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Summary

- Interest in human health fate of pathogens and processes to destroy them
- Much less interest in chemicals except for EDCs and other pharmaceuticals
- Interest in odors
- Interest in better dewatering

