

Who We Are



We put our energy behind sustainability.™

Integrated Environmental Solutions

- Reduce - environmental footprint
- Recycle - E&P waste materials
- Reuse – Identify beneficial uses for recycled materials
- Dispose - Provide responsible disposal options

Recycled Drill
Cuttings Beneficial
Reuse
Demonstration
Projects – OGRC
Proposal



May 26, 2015
Bismarck, ND



Summary of Previous Research



- Drill cuttings collection from 4 wells across the Williston Basin with assistance from Naset Consulting
- Simulated treatment system with bench-scale apparatus
- Characterization of treated drill cuttings and evaluation of potential beneficial use applications
- Submitted beneficial use approval request to the North Dakota Department of Health

Nuverra's Terrafficient Process



- Removes and recovers residual hydrocarbons
- Reduces naturally occurring salt content
- Resulting recycled drill cuttings material have many potential reuse applications, including three being pursued with this proposal:
 - Road surfacing
 - Road fill
 - Landfill daily cover



Beneficial Use Project Team



- Nuverra Environmental Solutions (Nuverra)
- Energy & Environmental Research Center (EERC)
- University of North Dakota Civil Engineering Department
- Upper Great Plains Transportation Institute of North Dakota State University
- McKenzie County
- North Dakota Department of Health

Project Components



- Integrated combination of:
 - Laboratory characterization
 - Bench-scale studies
 - Field-scale studies
- Collaboration with the North Dakota Department of Health to obtain regulatory approval for these beneficial reuse strategies



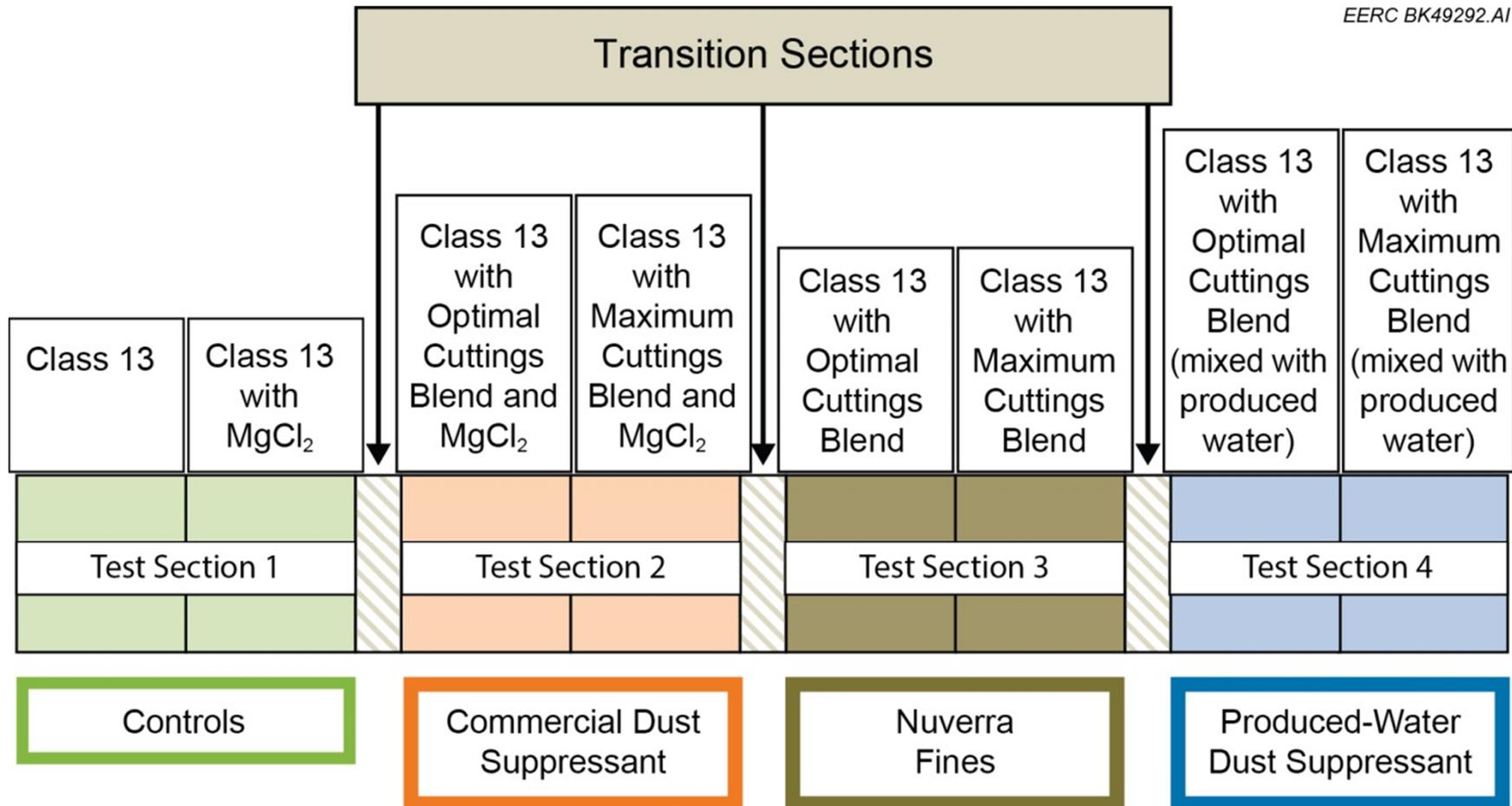
Demonstration Sites



Road-Surfacing Test Sections



EERC BK49292.AI



Road-Surfacing Demonstration



- Evaluate the geotechnical and environmental performance of the reuse product as a gravel road surfacing additive
- Resurface test sections with blends of aggregate and treated drill cuttings with and without dust suppressants
- Assess road performance through routine visual inspections for corrugation and rutting
- Daily traffic monitoring
- Dust emissions testing
- Stormwater runoff sampling and analysis from up to three storm events from each of the test sections

Road Fill Demonstration



- Blend of treated cuttings and native fill as fill for a road to be constructed on Nuverra's Environmental Treatment Center landfill property
- Drainage ditch surface water collections and analysis prior to and following construction



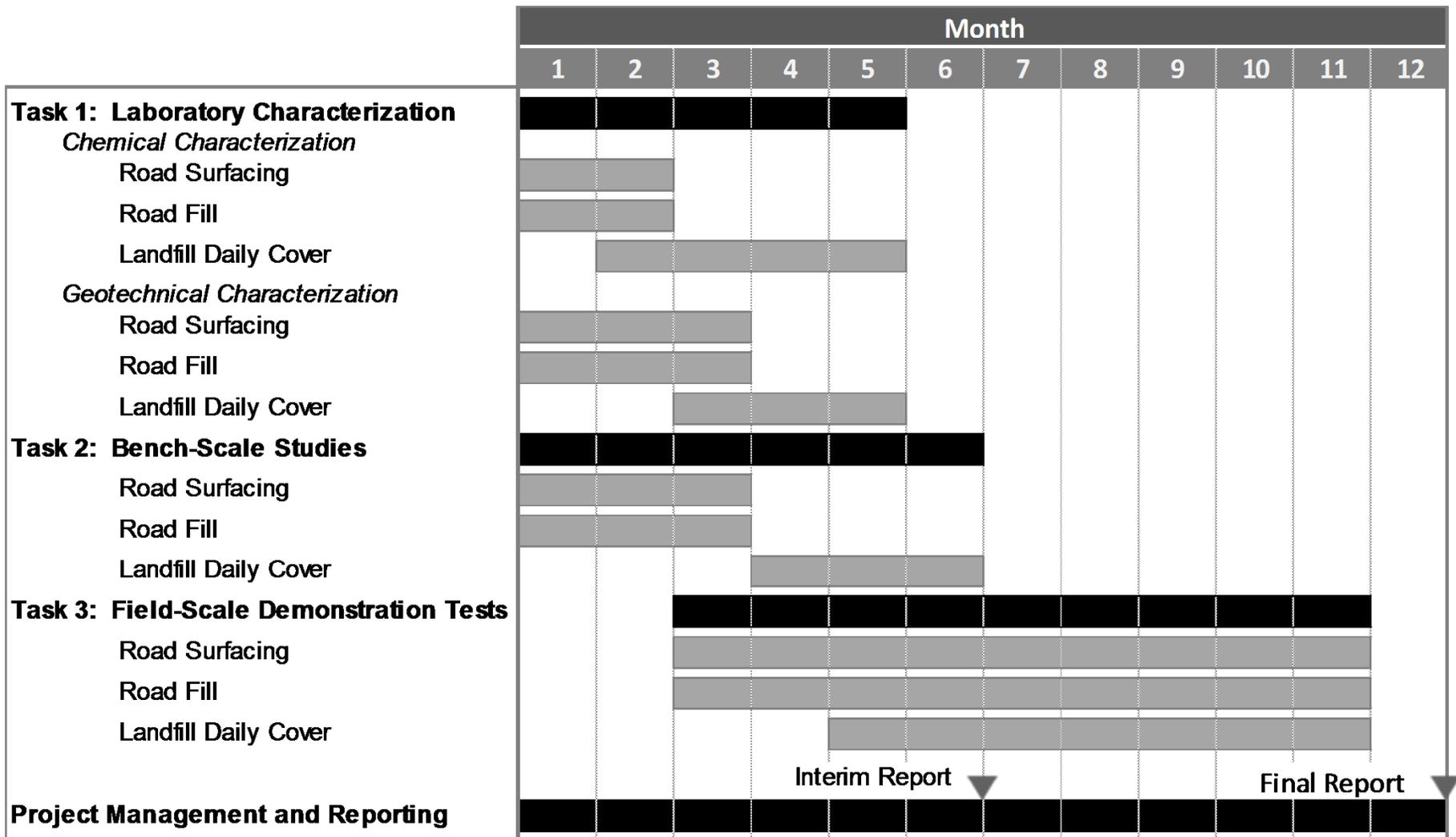
Landfill Alternative Daily Cover



- Evaluate geotechnical suitability of treated drill cuttings as a daily cover
- Assess potential effects to the landfill leachate through chemical characterization prior to and during the demonstration
- Evaluate surface runoff quality during the demonstration



Timeline



Budget



Project Associated Expense	NDIC's Share	Nuverra's Share (In-Kind and Cash)	McKenzie County's Share (In-Kind)	Total Project
Project Administration	\$130,000	-	-	\$130,000
Equipment Use and Operating Fees	\$154,183	-	\$16,600	\$170,783
Material Costs	-	\$158,496	\$167,433	\$325,929
Subcontract to UND	\$475,677	\$420,995	-	\$896,672
Total:	\$759,860	\$579,491	\$184,033	\$1,523,384

Anticipated Results



- These demonstrations will show that treated drill cuttings can be beneficially reused in applications typically requiring native resources
- Provide data to establish standards for regulatory approval for beneficial reuse applications

Contact Us



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