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Performance Impact of Fast Flow Paths Through Grout Monoliths Used for Radioactive Waste Disposal – 13224

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Session #36



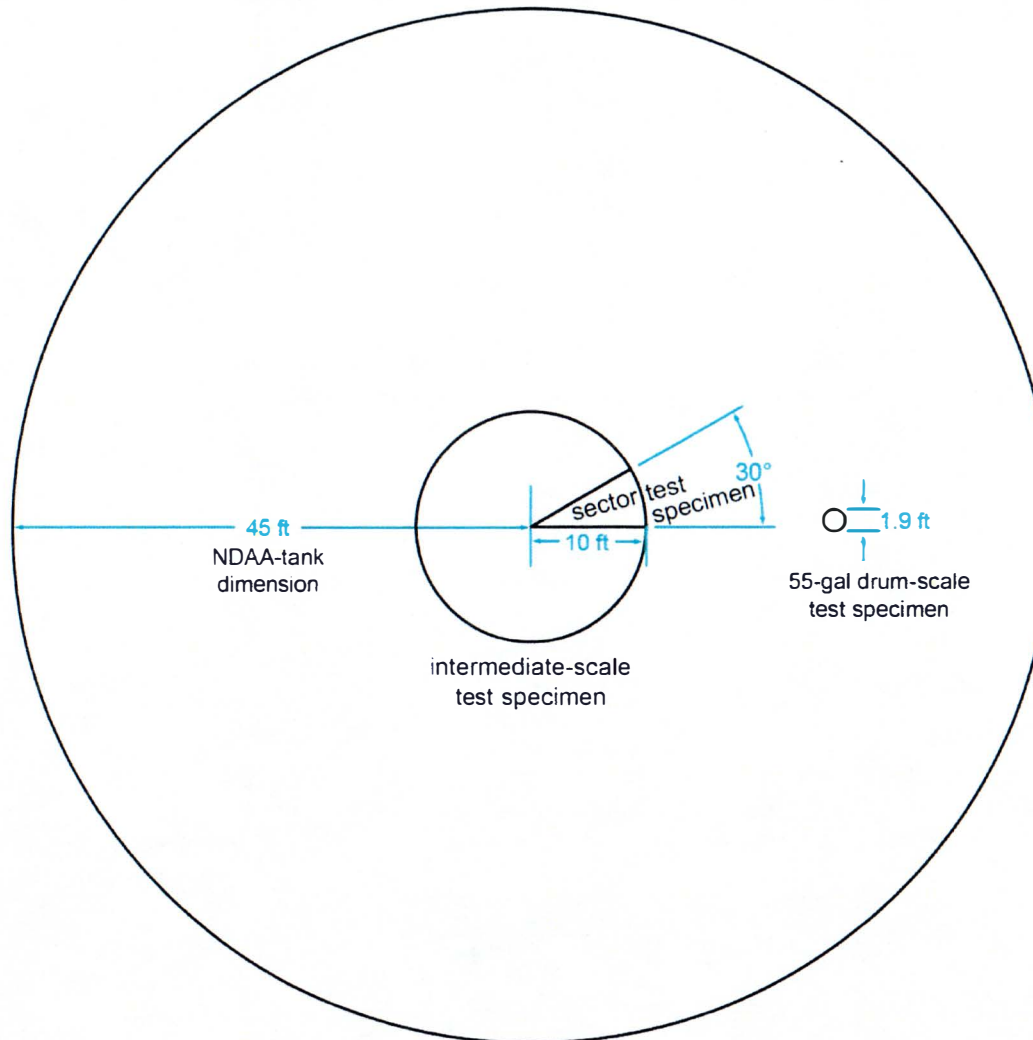
Overview

- ◆ **Key Concern:** Fast pathways (e.g., annuli, shrinkage gaps at grout flow lobe and lift interfaces, cracks and faults) through grout could allow rapid transfer of water to the contaminated zone at the base of WIR tanks
- ◆ **Project Purpose:** Develop insights into risk-significant aspects of grout properties and behavior affecting performance in stabilizing WIR tank waste; provide an improved technical basis for evaluating performance assessments and monitoring activities
- ◆ **Scope:** Perform experiments to evaluate *temporal evolution* of grout properties as WIR-like grouts cure and mature:
 - Grout shrinkage at flow lobe boundaries
 - Annulus apertures around steel tank liners, pipes, cooling coils, etc.
 - Crack growth
 - Bulk permeability

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Grout Monolith Specimen Dimensions



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55-Gallon Drum Specimens

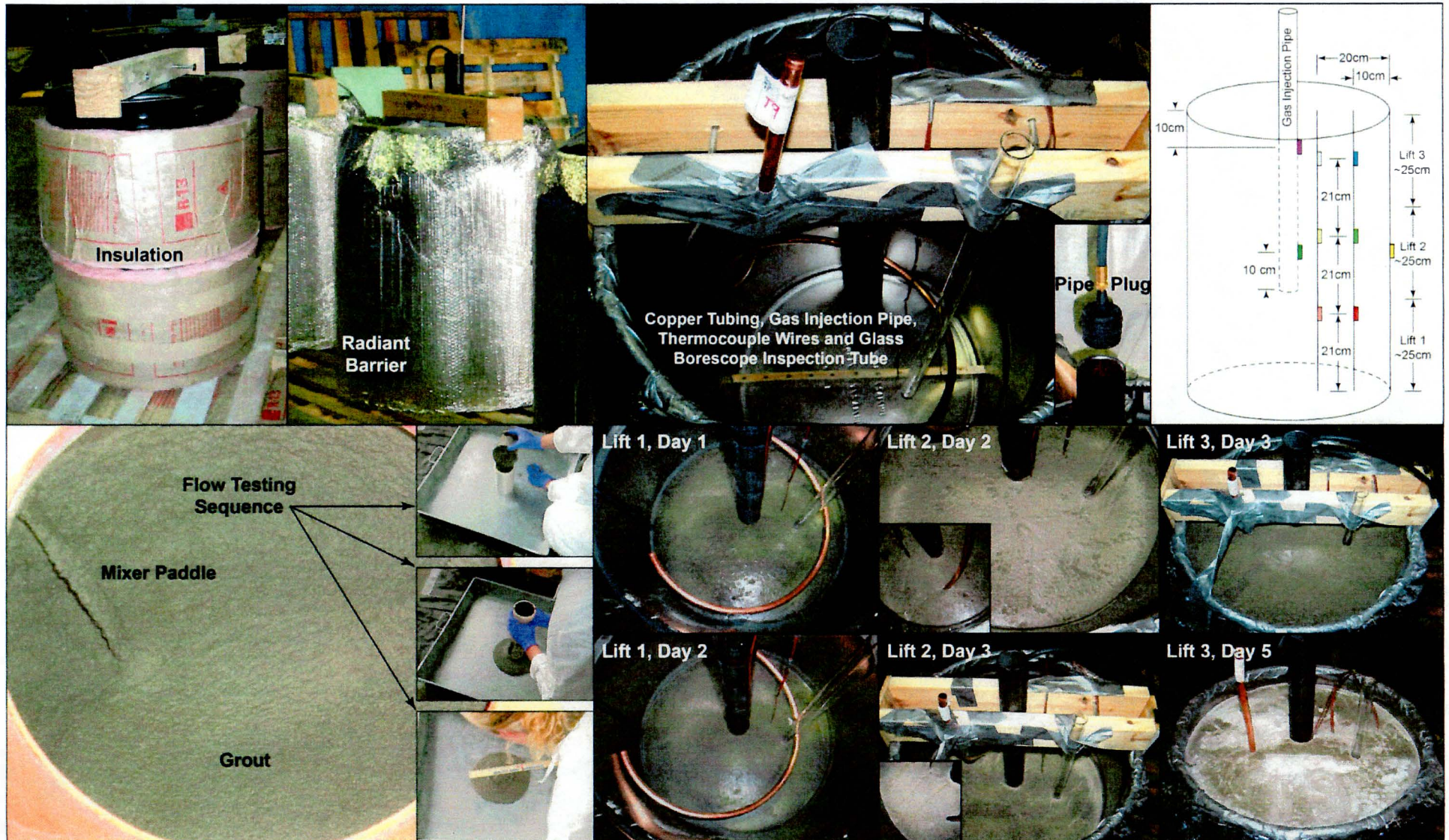


Test Specimen	Grout Formulation		
	Lift 1	Lift 2	Lift 3
T1	SRS Strong		
T2	SRS Reducing	SRS Strong	
T3	SRS Reducing		
T4	SRS Alternative 1		
T5	SRS Alternative 2		
T6	INL Heel		
T7	INL CLSM		
T8	INL Heel	INL CLSM	
T9	SRS Strong		
T10	INL CLSM		
T11	SRS Alternative 1		
T12	SRS Alternative 2		

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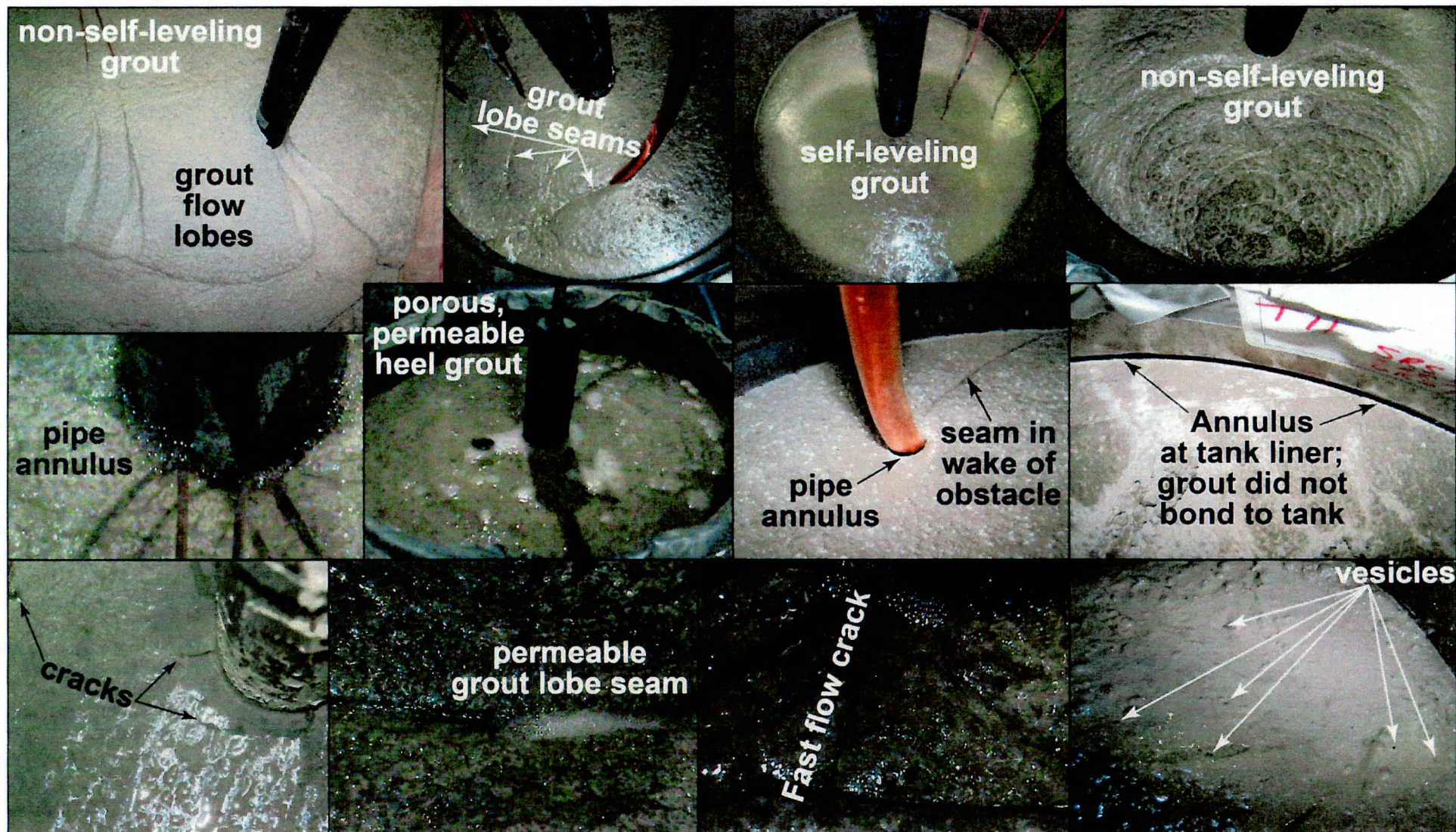
Drum Grout Specimen Preparation



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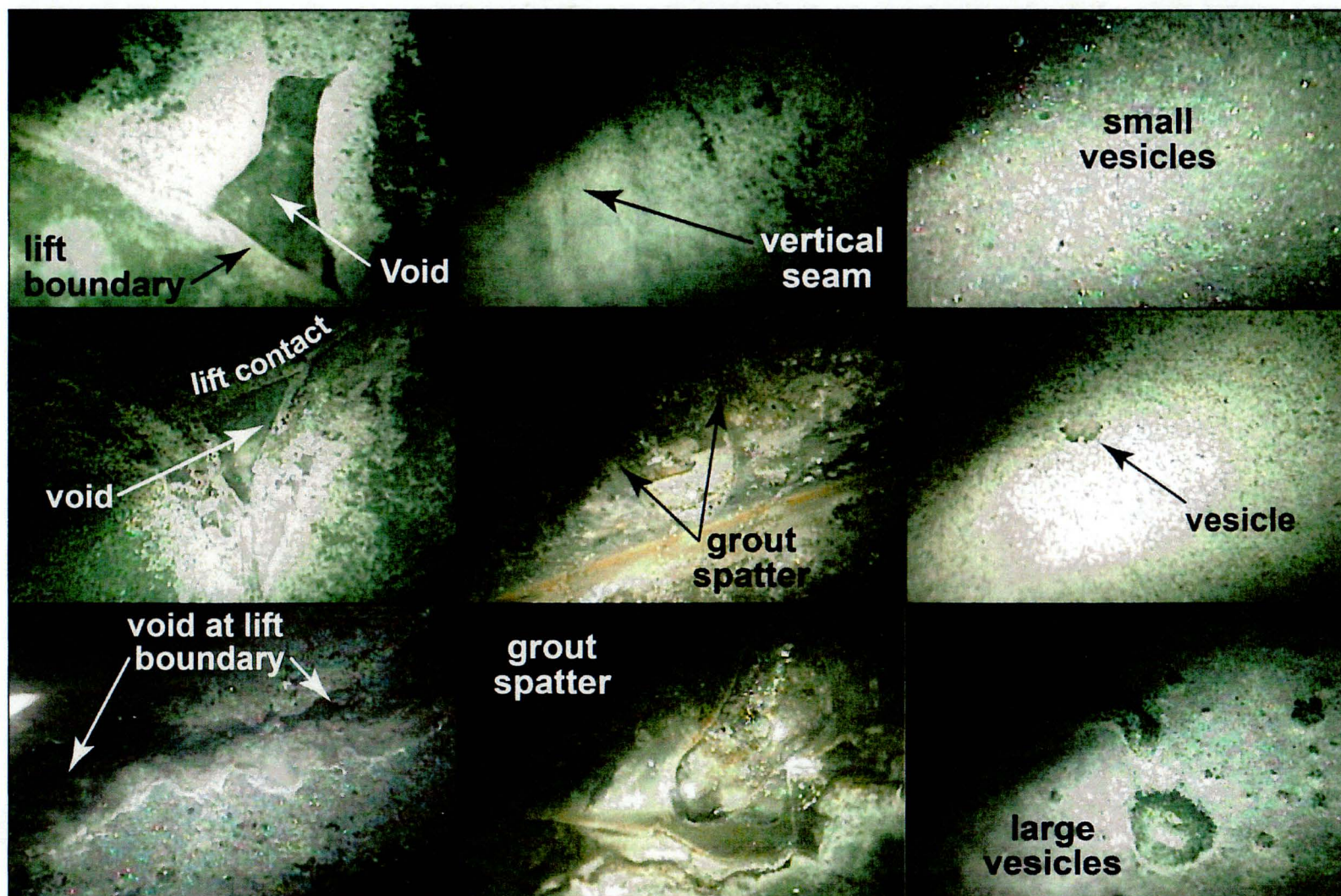
Grout Surface Features



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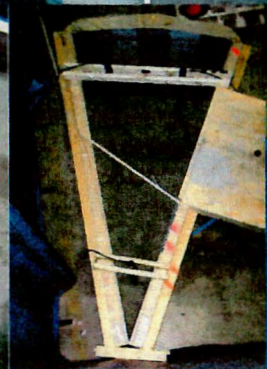
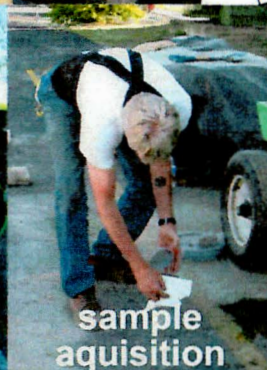
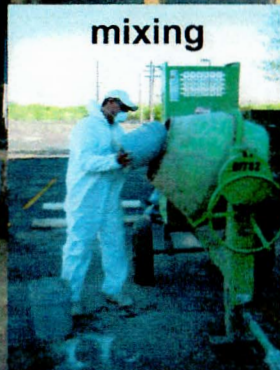
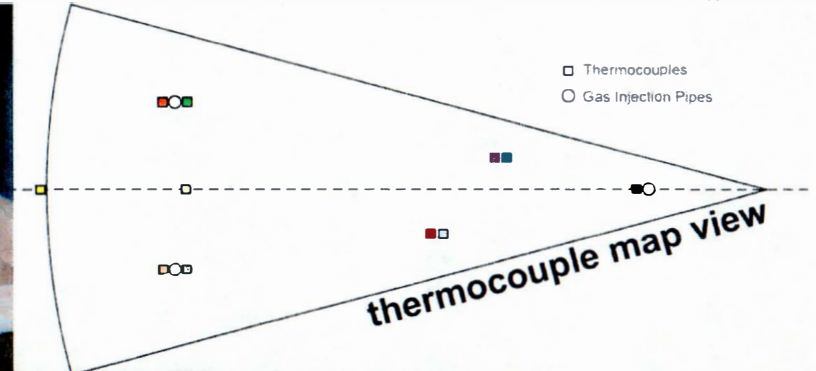
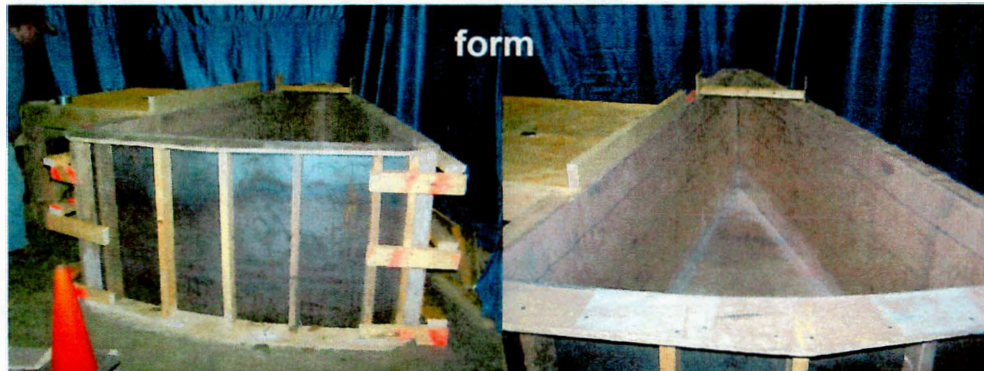
Borescopic Observations



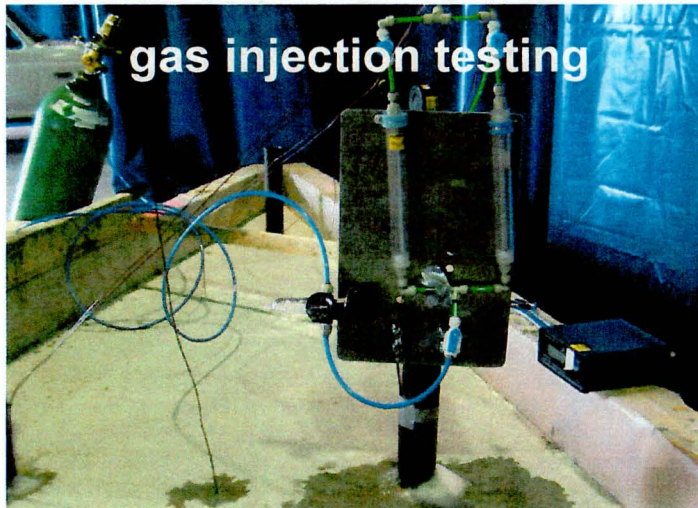
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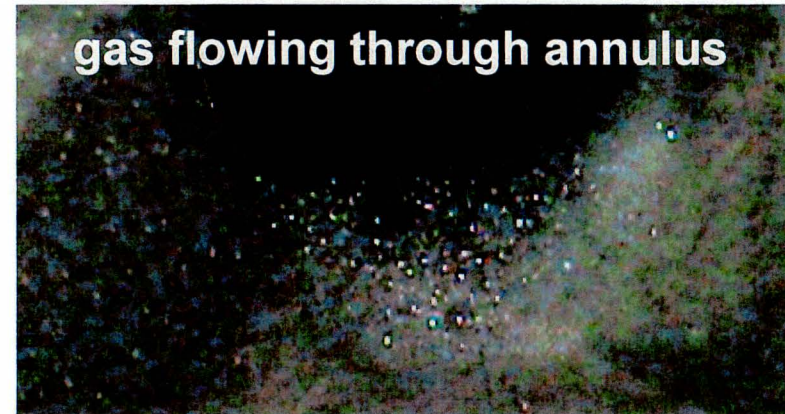
Sector Grout Specimen Preparation



Evolution of Pipe Annulus Apertures



gas injection testing



gas flowing through annulus

- Annuli surrounding embedded objects are fast flow paths that generally increased in size with time post-placement
- Grout formulation and monolith scale play significant roles in determining the sizes of annuli

