AREVA

PCI PERFORMANCE CONTRACTING INC

ENGINEERED SYSTEMS

ALDEN

Solving Flow Problems Since 1894

Public Presentation for NRC / GSI-191 Meeting

October 19, 2006

Chemical Trials at ARL - October 2006

- **Tests were conducted using the WCAP recipe for AlOOH chemical precipitates**
  - **AlOOH is considered to be bounding as a chemical precipitant debris surrogate for sodium aluminum silicate chemical precipitants**
- **Concentration levels > 550 mg / L were tested with NUKON debris**
- **The 4 disk SFS prototype was oriented with it's flow control tube vertical; disks are horizontal**

Chemical Trials at ARL - October 2006

> **Test 1**

- **Form a fibrous debris bed in clean water over time**
- **Measure the change in head loss with each addition of fibers until the screen is covered with fibers. In this test, the equivalent of 1" of fibrous debris was required to "cover the screen". Max HL measured was ~0.25'**
  - **Equates to ~ 205 ft^3 of fiberglass on a 2,500 ft^2 screen**
- **Incrementally add into recirculation AlOOH chemical precipitants over time until reaching a concentration of ~556 mg / L**
  - **Equates to ~ 509 lbs of AlOOH precipitates on a 2,500 ft^2 screen**
- **Measure the stabilized head loss after each increment of AlOOH precipitate**

Chemical Trials at ARL - October 2006

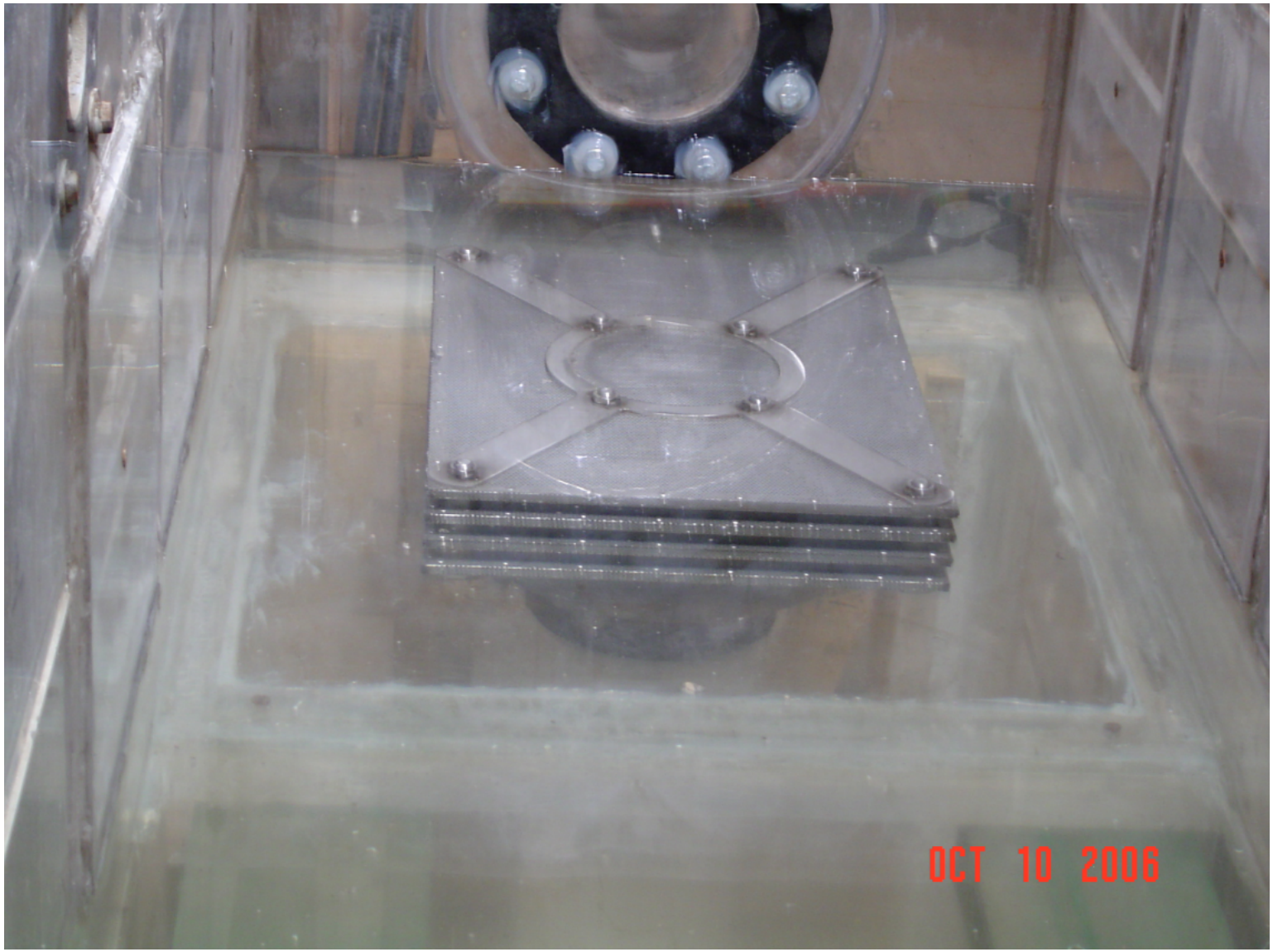
> **Test 2**

- **Place into recirculation AlOOH chemical precipitants until reaching a concentration of ~602 mg / L**
  - **Equates to ~ 565 lbs of AlOOH precipitates on a 2,500 ft^2 screen**
- **Incrementally add fibers over time**
- **Measure the change in head loss with each addition of fibers. Total fiber debris to be equivalent to 1" of fibrous debris; same quantity as used in Test 1**
  - **Equates to ~ 205 ft^3 of fiberglass on a 2,500 ft^2 screen**
- **Measure the stabilized head loss after each increment**

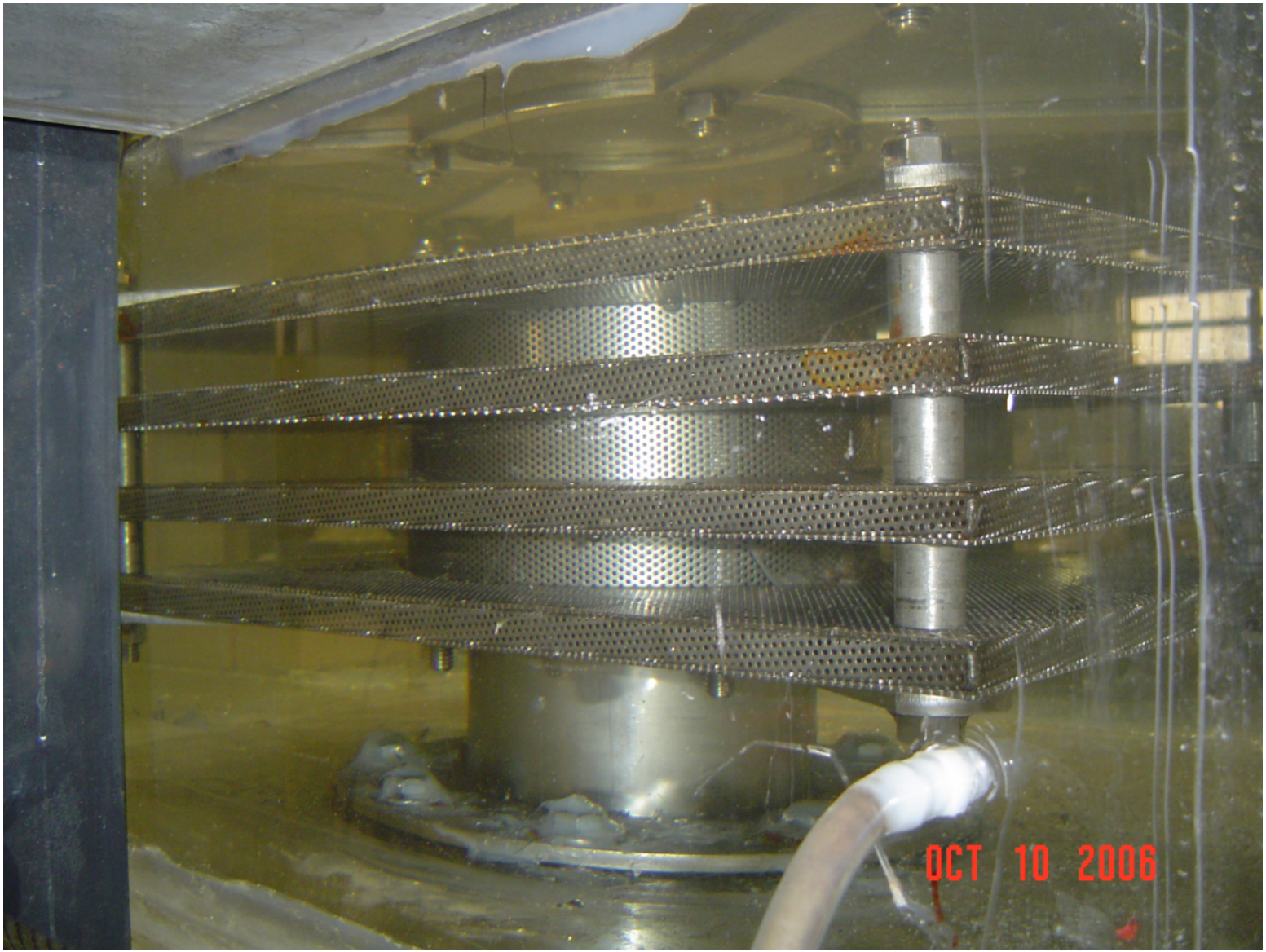
Generating AlOOH Precipitants

Generating AlOOH Precipitants

Test 1



Test 1



Test 1

Test 1

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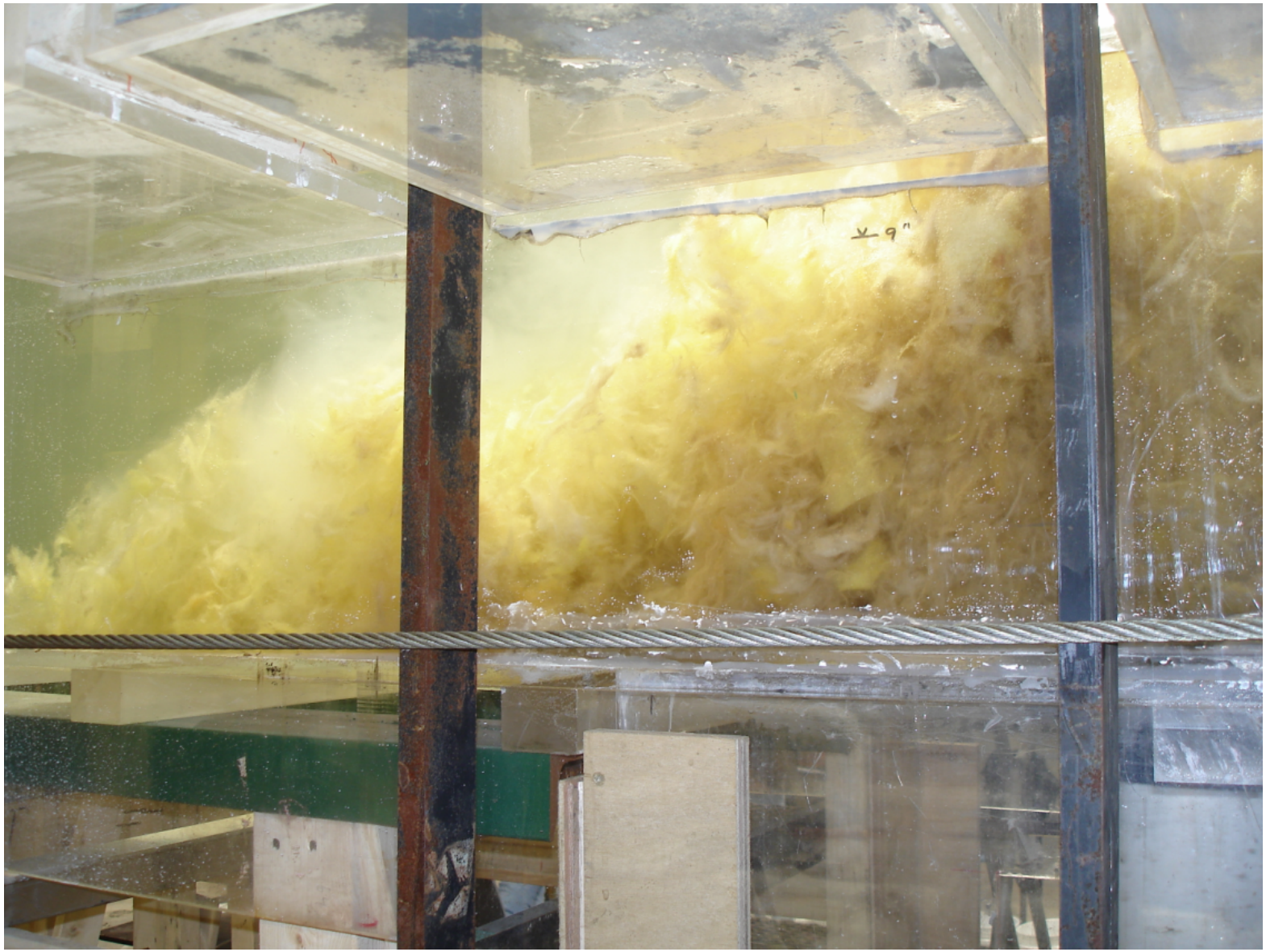
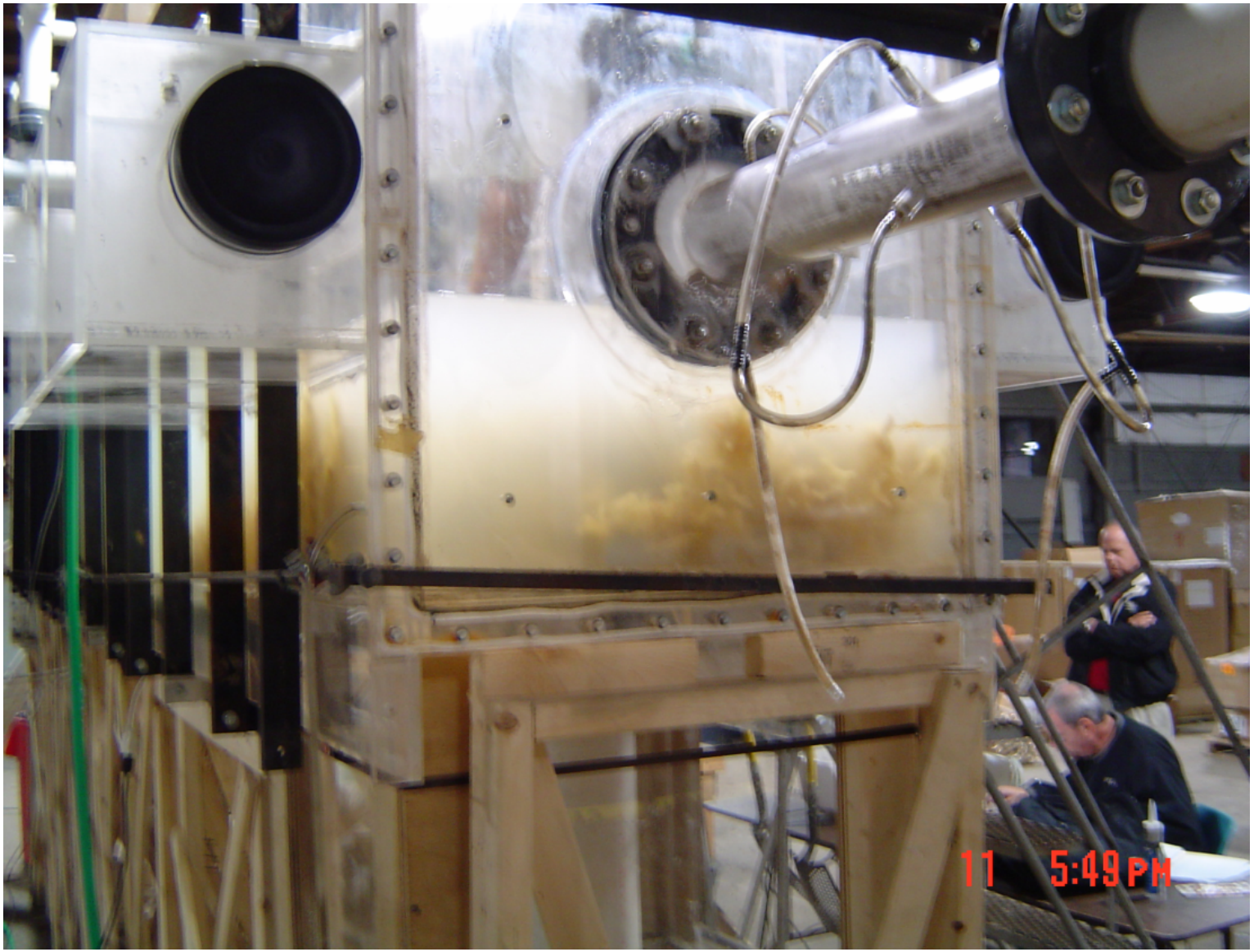


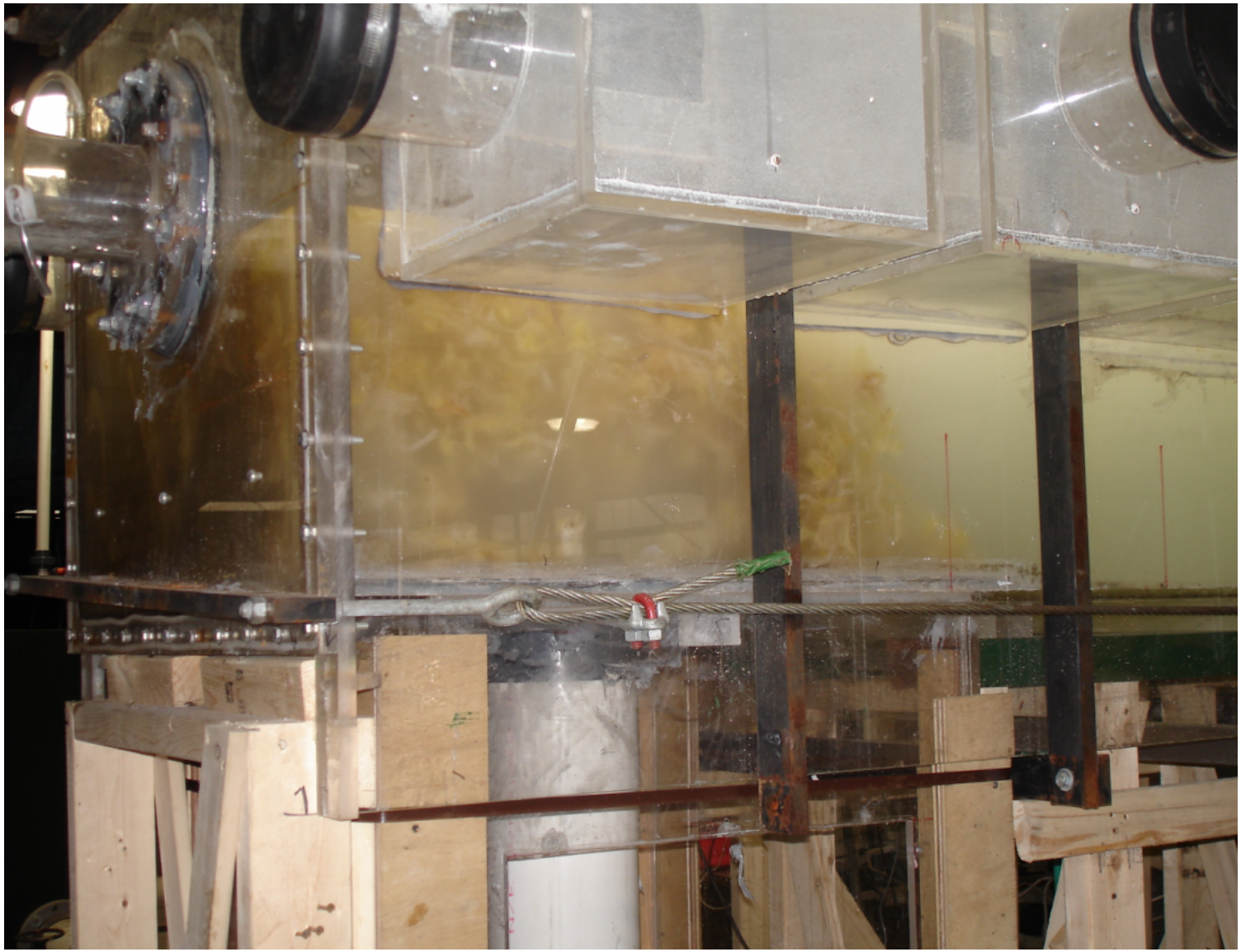
Test 1

Test 1

Test 2



Test 2



Test 2

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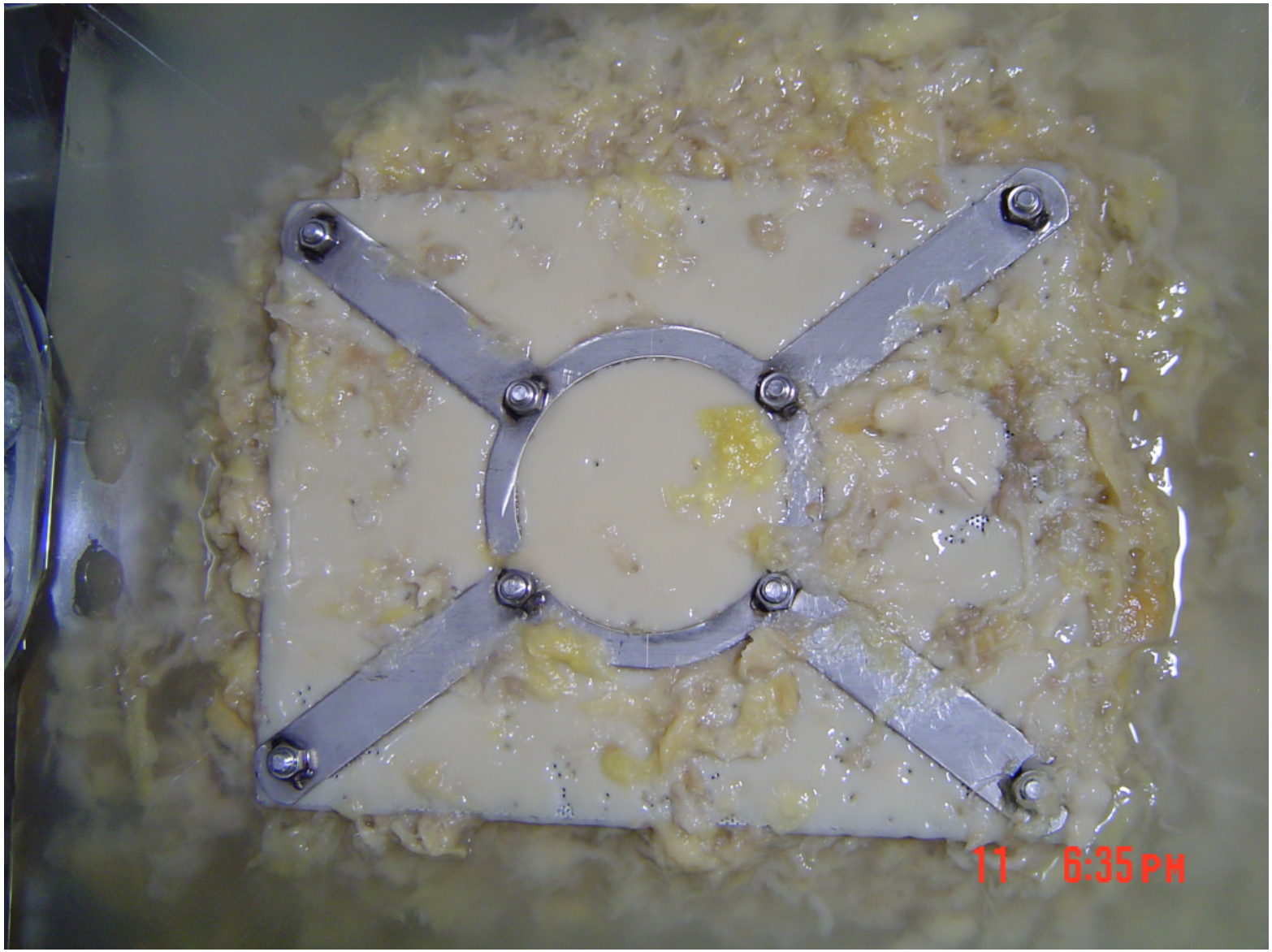

Chemical Debris Trials – October 2006
Preliminary Data

Description	U/M	Test 1 Data 10/10/2006	Test 2 Data 10/11/2006
Target flume / pump flow	gpm	76.7	76.7
Area of screen with 0.066"Ø holes	ft^2	12.20	12.20
Flow thru screen	feet / sec	0.0140	0.0140
Water in the flume	gal	535	549
NUKON debris	lbs	2.4	2.4
AlOOH precipitate	lbs	2.483	2.759
AlOOH precipitate concentration	mg / L	556	602
Water temperature start to finish	°F	61 - 76	60 - 67
Maximum Head Loss Measured	Feet	4.185	4.068

Chemical Trials at ARL – October 2006 Observations

- **There was no significant difference in adding chemical precipitants over time to a formed debris bed versus adding fibrous debris over time in a pool recirculating with chemical precipitants**
- **Lower approach velocities will diminish the affect of the chemical precipitates to head loss**
- **Lower concentrations of chemicals will diminish the affect of the chemical precipitates to head loss**
- **Chemical precipitants can settle over time; even in relatively high flow streams**

Path Forward

- Review the results with our clients to help guide each client on a path forward
- Evaluate and implement (as appropriate) realistic modeling, testing and calculations to remove excess conservatism from the overall methodology
- Actions going forward may be generic for all SFS Users and / or site specific; however, resolutions are expected to be plant specific. This is under review with our clients.

SUMMARY

END OF PRESENTATION