Technology MATTERS™

Presentation to USNRC
Feb. 8th 2007

Resolution of GSI 191
CCI Head Loss test with chemical effects
Long Time Test

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CCI AG Switzerland

Basic layout of MFT loop

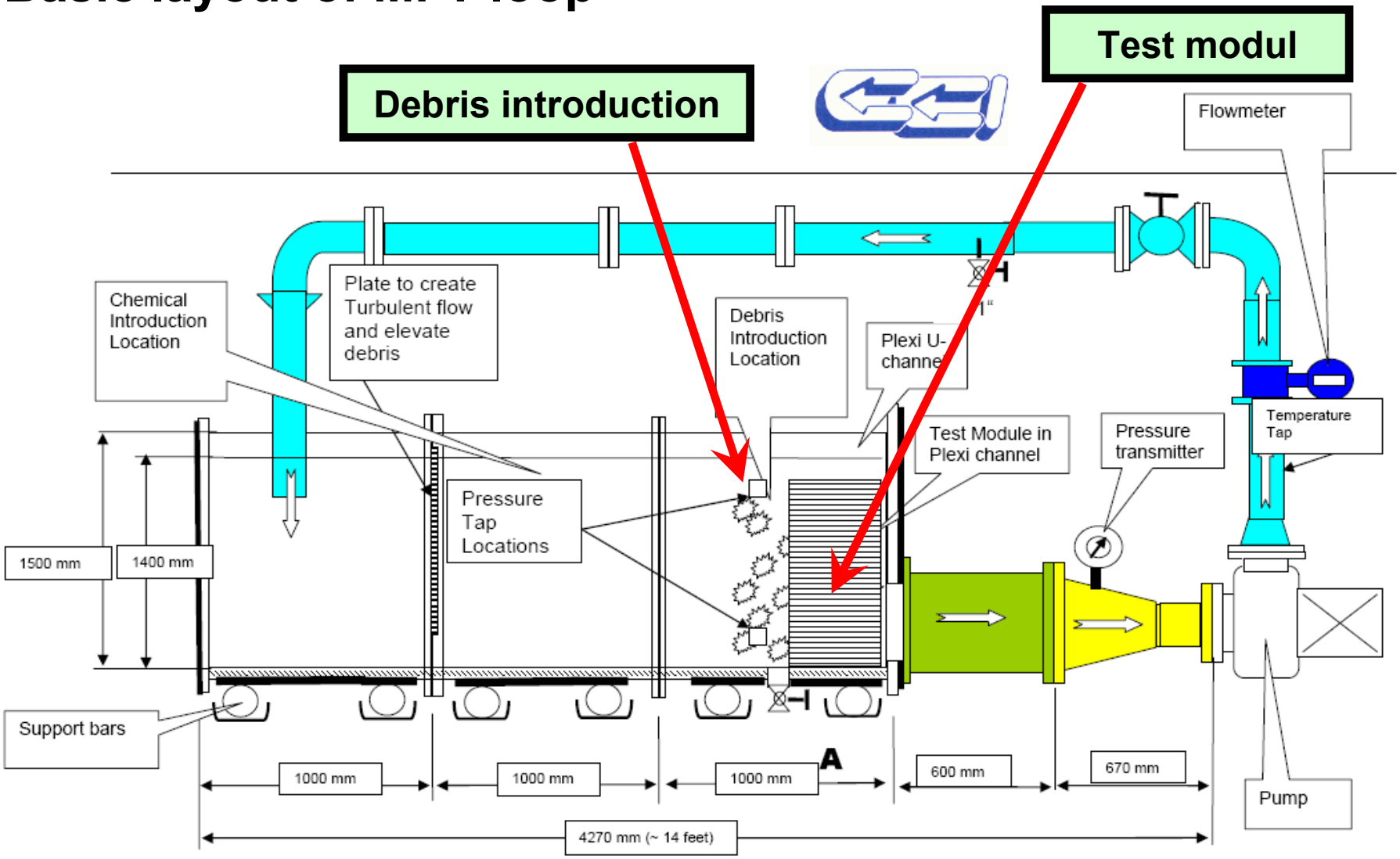
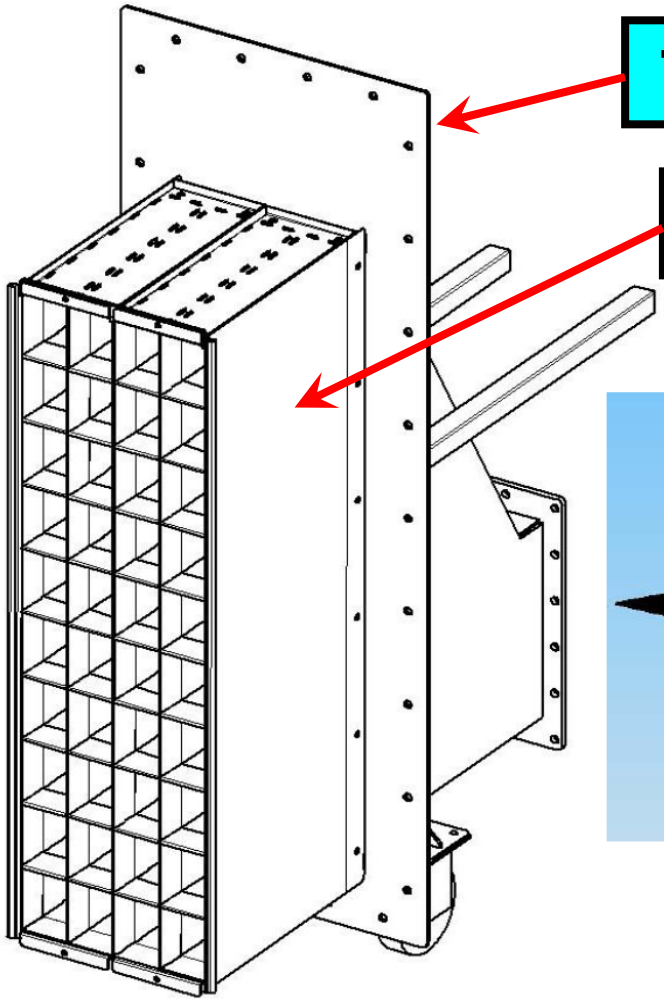
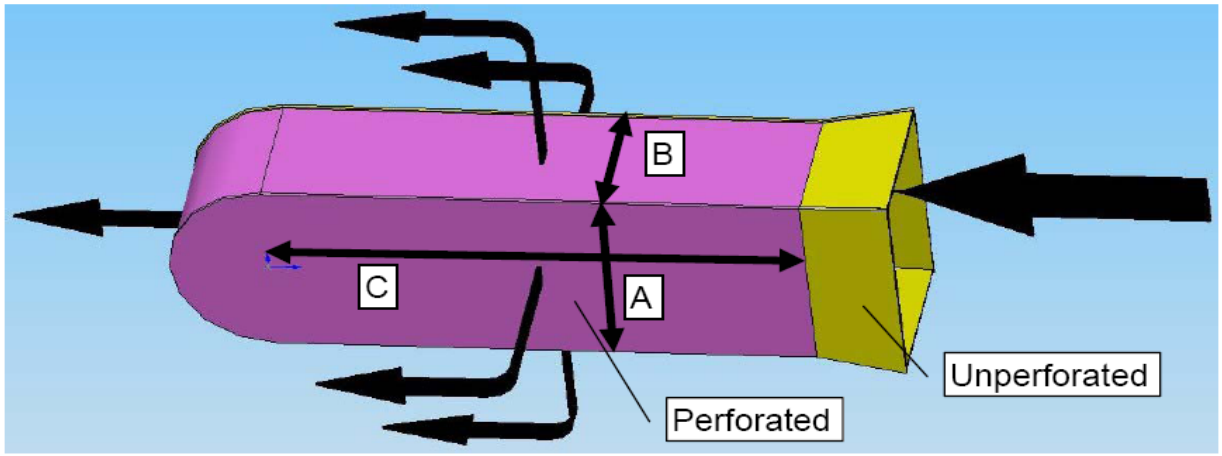


Figure 1: CCI Strainer Test Loop

CCI pocket strainer design





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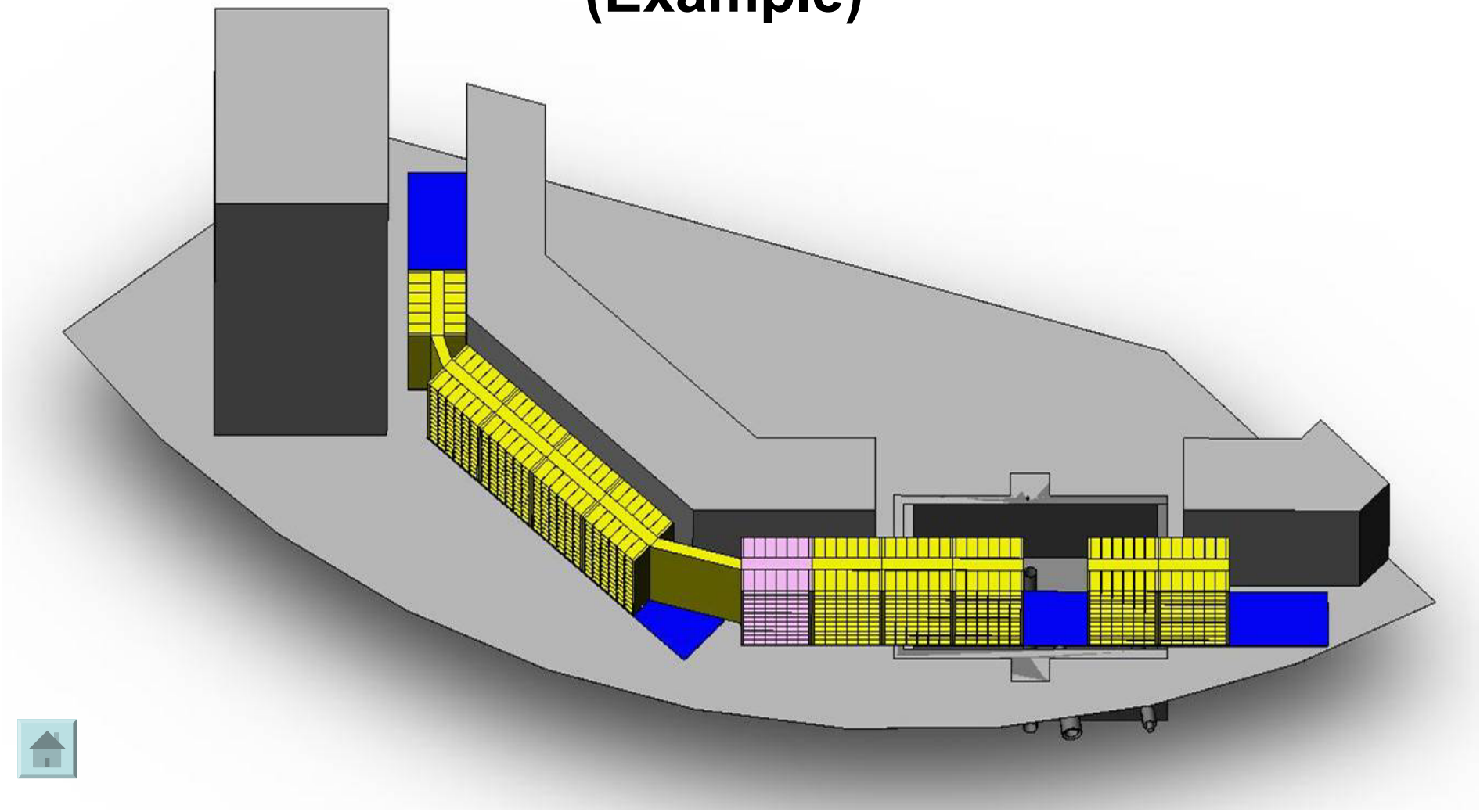
Strainer Layout on Containment floor (Example)



Head Loss testing with Chemical Effects

- Test Filter surface — 26,8 ft^2
- Filter surface approach velocity — 0,0046 resp. 0,0026 ft / s
- pH — 8,0 – 8,4
- Debris bed thickness — 1,6 in
- Fiber – Particulate ratio — 0,74
- Water turnovers per hour — 6,3 resp. 3,6
- Test performed at ambient temperature

Debris	
Nukon	7.582 ft3
Kaowool	2.600 ft3
Min-K	0.542 ft3
Coating + Particulate	14.52 lb

Chemicals		
Boric Acid		2500 ppm
Sodium Aluminat	4.38 lb	0.10 %
Sodium Silicate	6.58 lb	0.15 %

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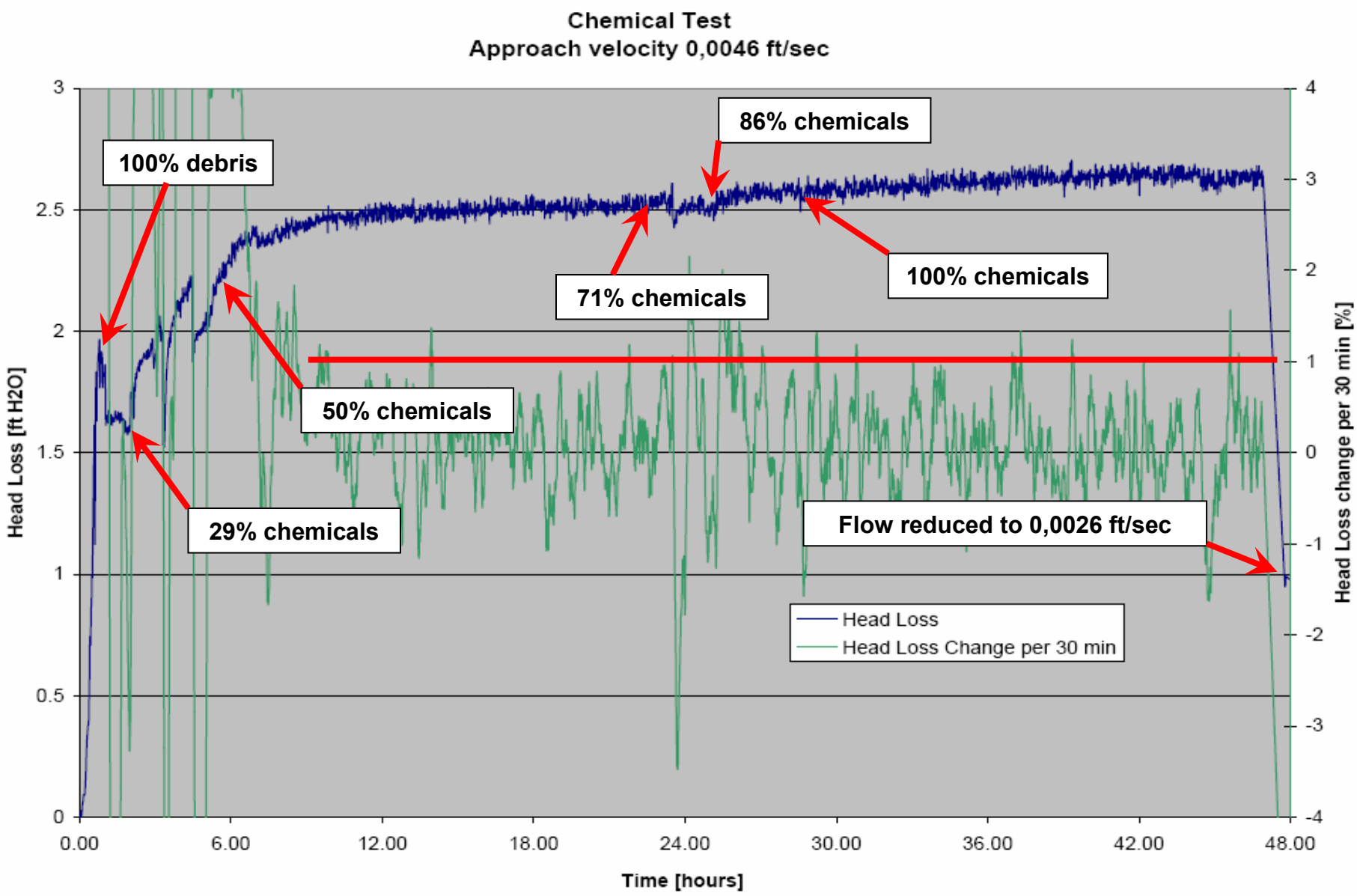
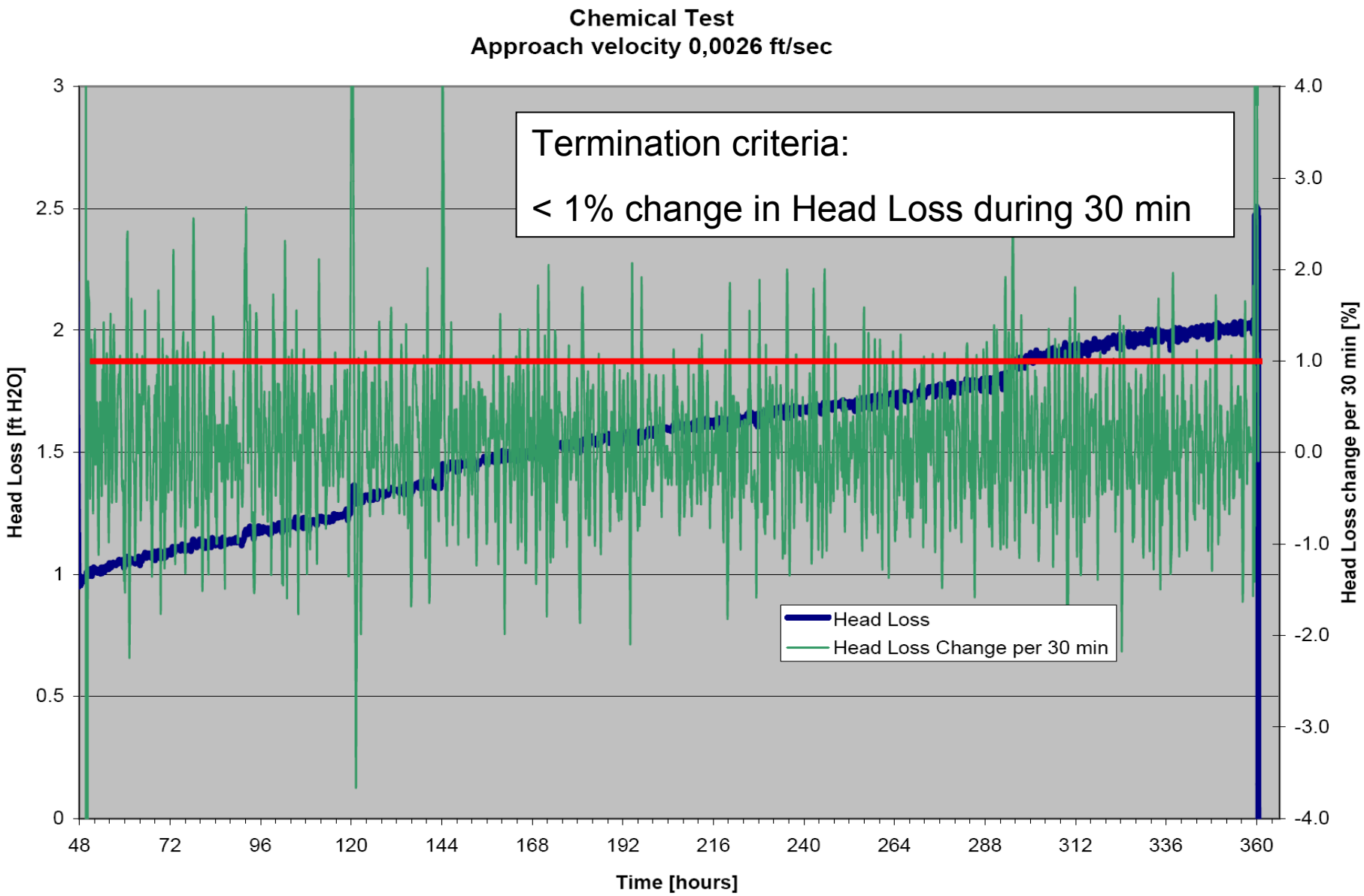
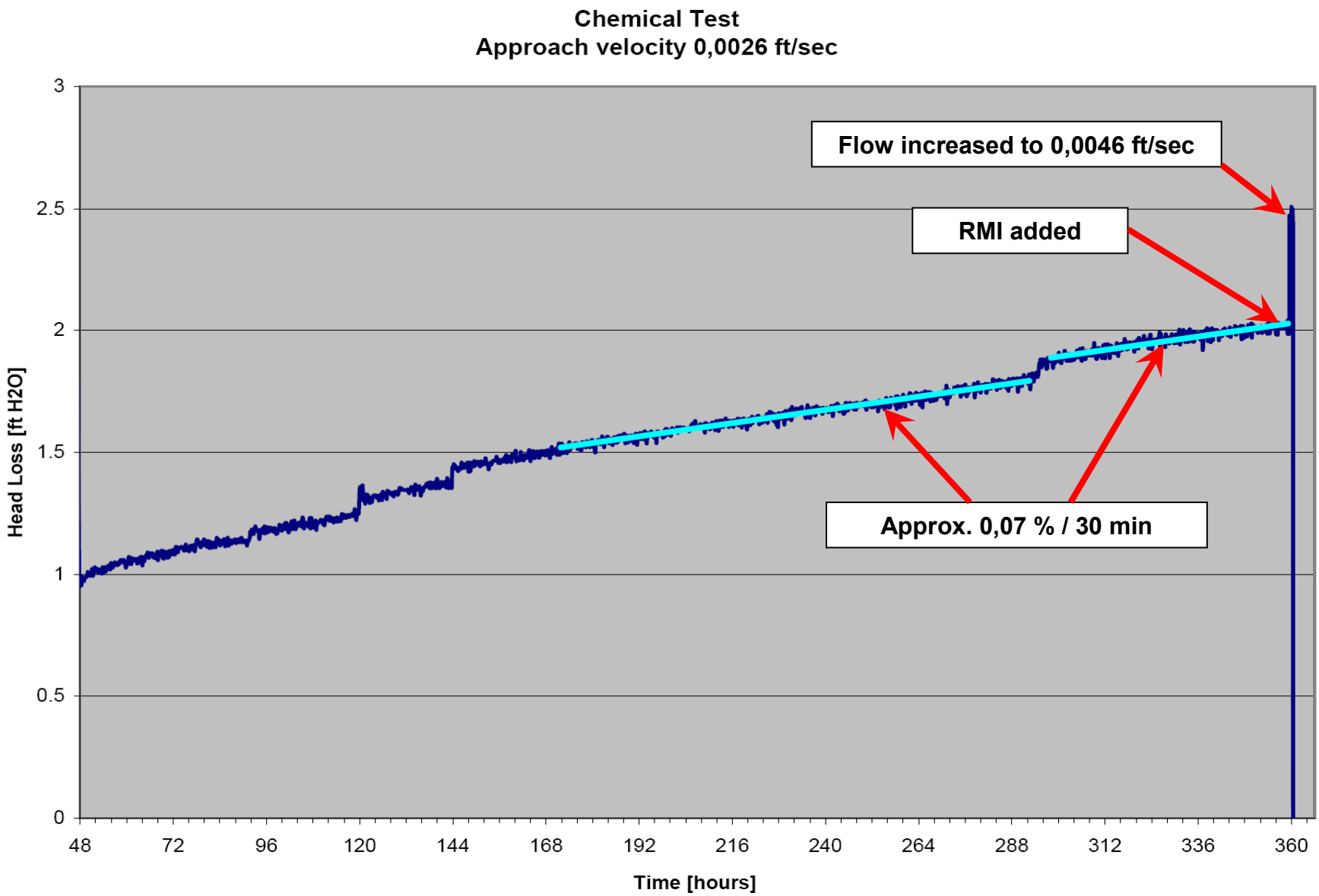
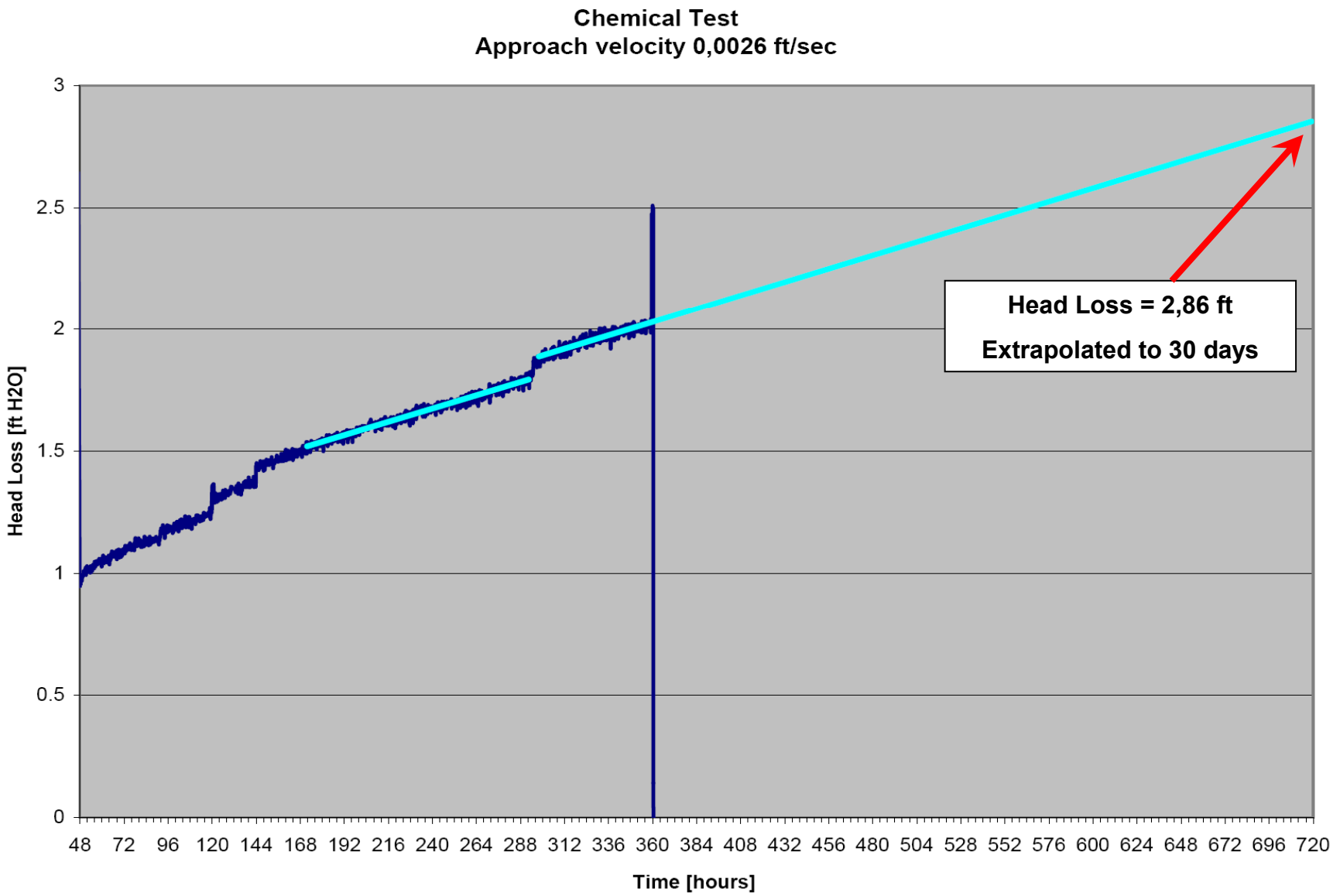
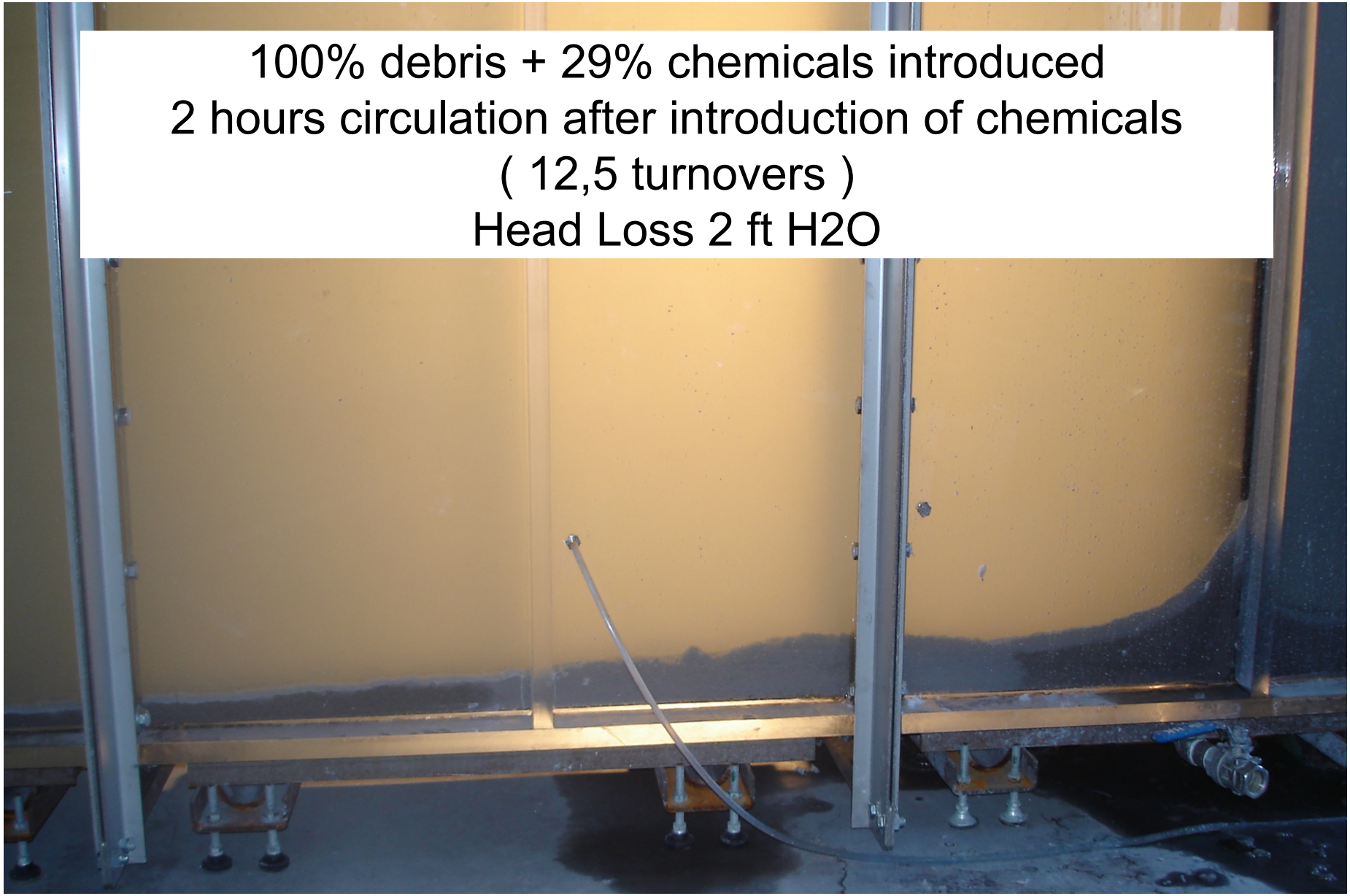

Chemical Test
Approach velocity 0,0046 ft/sec
100% debris
86% chemicals
71% chemicals
100% chemicals
50% chemicals
29% chemicals
Flow reduced to 0,0026 ft/sec
Head Loss
Head Loss Change per 30 min
Head Loss [ft H2O]
Head Loss change per 30 min [%]
Time [hours]
0.00
6.00
12.00
18.00
24.00
30.00
36.00
42.00
48.00
0
0.5
1
1.5
2
2.5
3
-4
-3
-2
-1
0
1
2
3
4

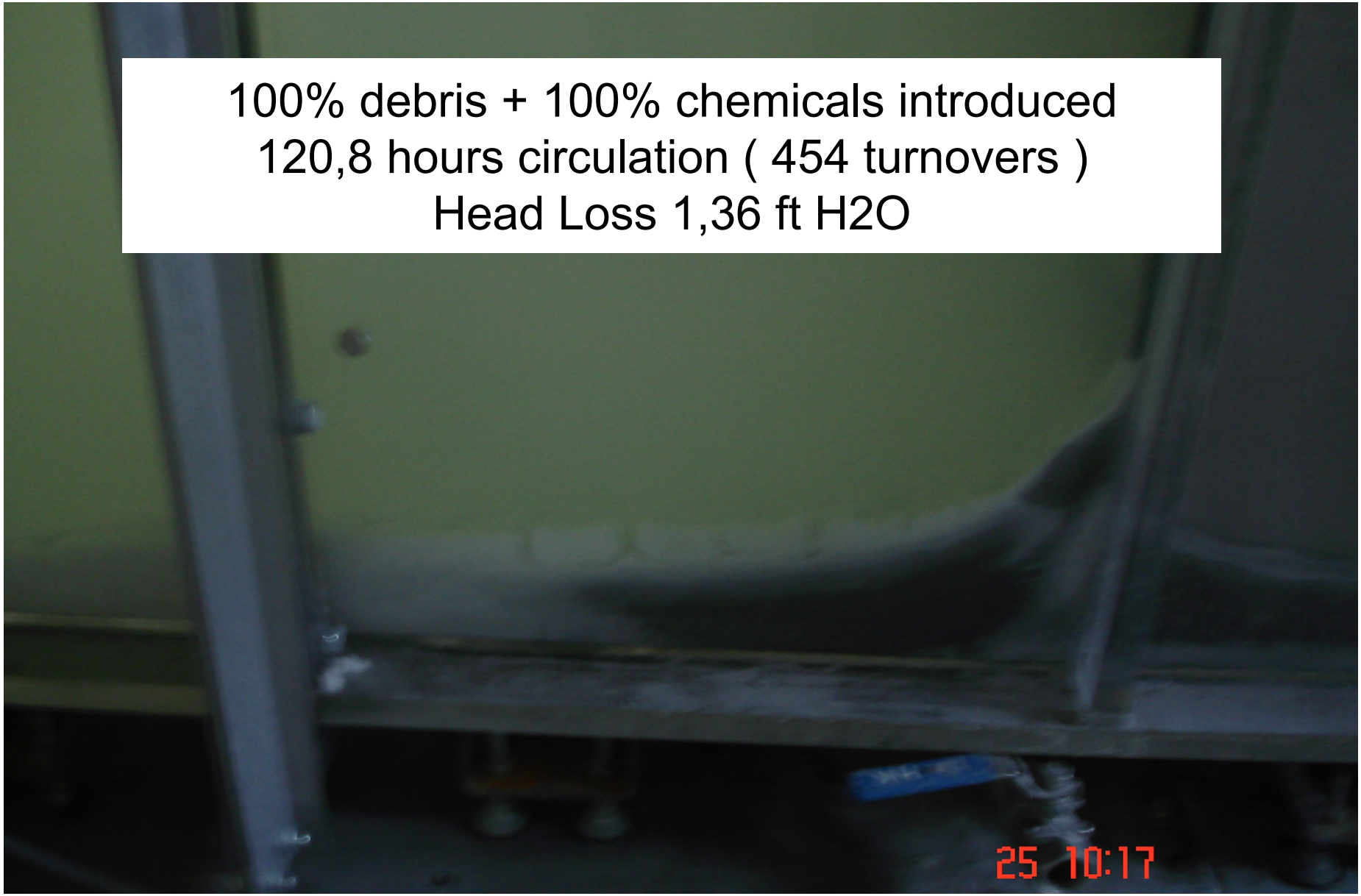

Chemical Test
Approach velocity 0,0026 ft/sec
Termination criteria:
< 1% change in Head Loss during 30 min
Head Loss
Head Loss Change per 30 min
Head Loss [ft H2O]
Head Loss change per 30 min [%]
Time [hours]
3
2.5
2
1.5
1
0.5
0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
48
72
96
120
144
168
192
216
240
264
288
312
336
360


Chemical Test
Approach velocity 0,0026 ft/sec
Flow increased to 0,0046 ft/sec
RMI added
Approx. 0,07 % / 30 min
Head Loss [ft H2O]
Time [hours]
0
0.5
1
1.5
2
2.5
3
48
72
96
120
144
168
192
216
240
264
288
312
336
360

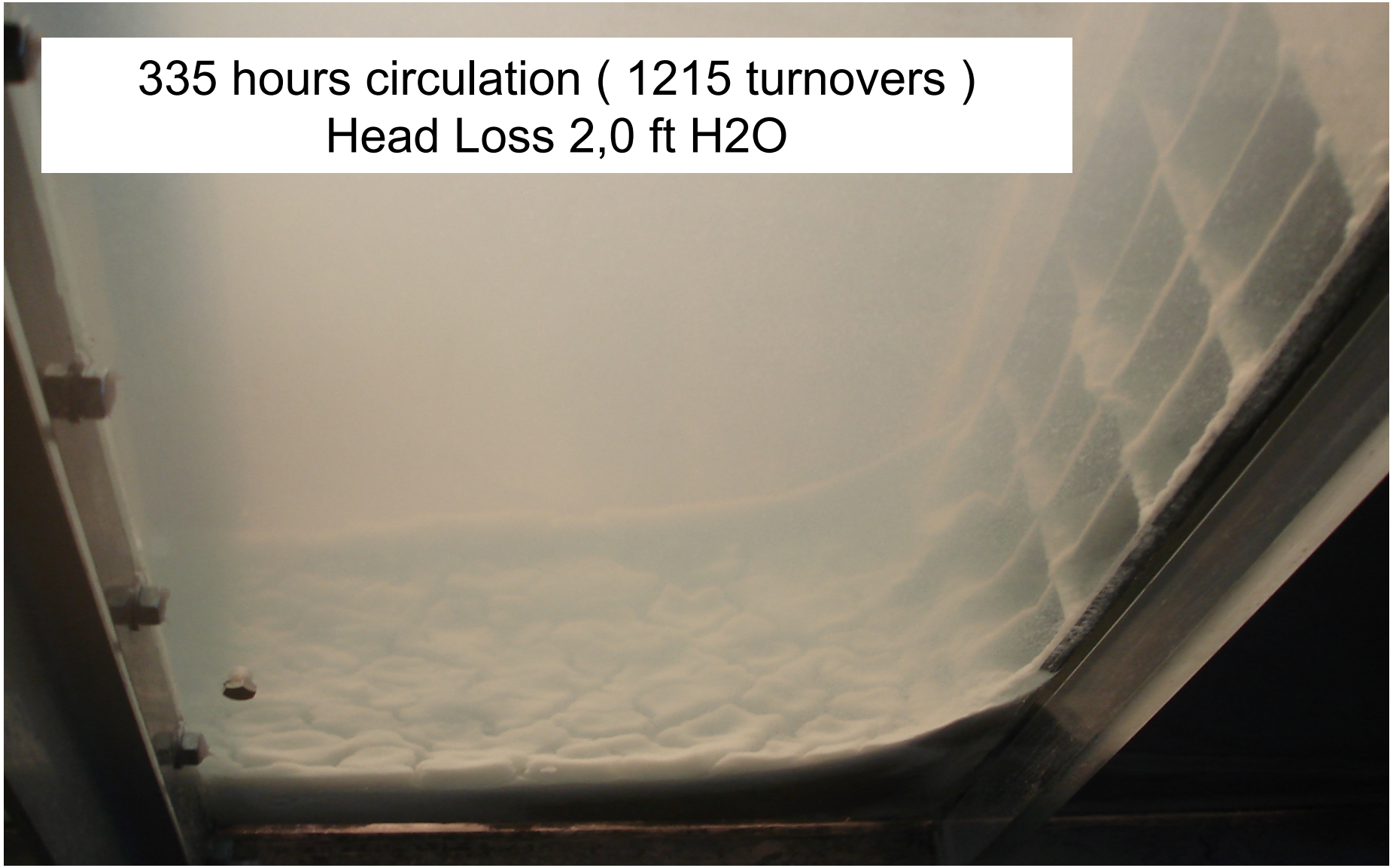

Chemical Test
Approach velocity 0,0026 ft/sec
Head Loss [ft H2O]
3
2.5
2
1.5
1
0.5
0
48 72 96 120 144 168 192 216 240 264 288 312 336 360 384 408 432 456 480 504 528 552 576 600 624 648 672 696 720
Time [hours]
Head Loss = 2,86 ft
Extrapolated to 30 days



100% debris + 29% chemicals introduced
2 hours circulation after introduction of chemicals
(12,5 turnovers)
Head Loss 2 ft H2O



100% debris + 100% chemicals introduced
120,8 hours circulation (454 turnovers)
Head Loss 1,36 ft H2O



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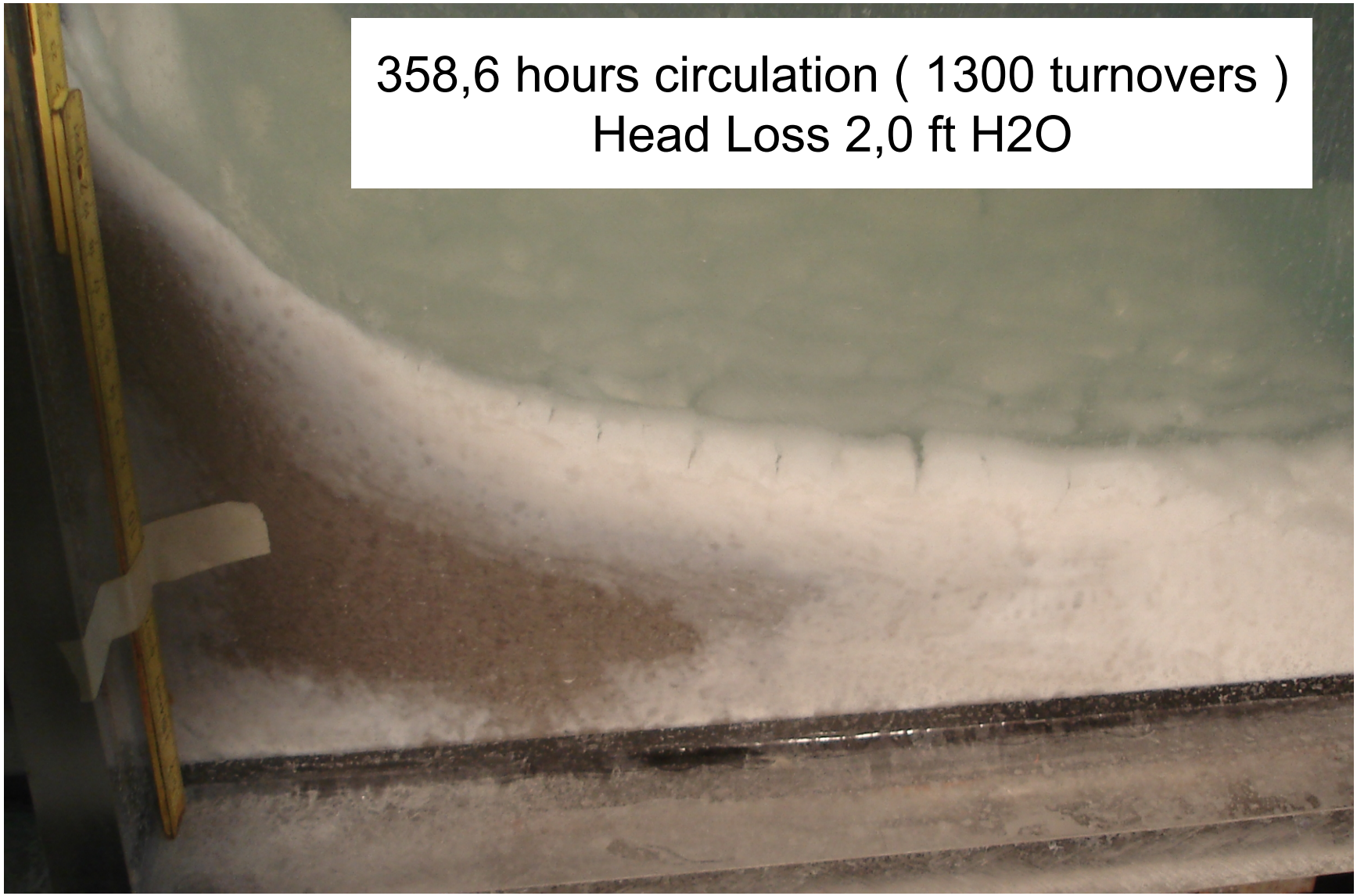

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RMI added at the end

View into the pockets after test

View into the test loop after test

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Head Loss test with Chemical Effects

Summary

- Head Loss increased from 1,0 ft to 2,0 ft during 15 days of circulation
- A higher Head Loss increase was avoided due to un-even distribution of the debris in the pockets
- After 15 days the Head Loss was still increasing, but on a low rate of about 0,15% per hour
- Adding RMI at the end of the test had no effect at the Head Loss
- Reduction of flow from 0,0046 ft/sec to 0,0026 ft/sec reduced Head Loss from 2,6 to 1,0 ft
- Increasing of flow at the end from 0,0026 ft/sec to 0,0046 ft/sec increased the Head Loss only from 2,0 ft to 2,5 ft

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