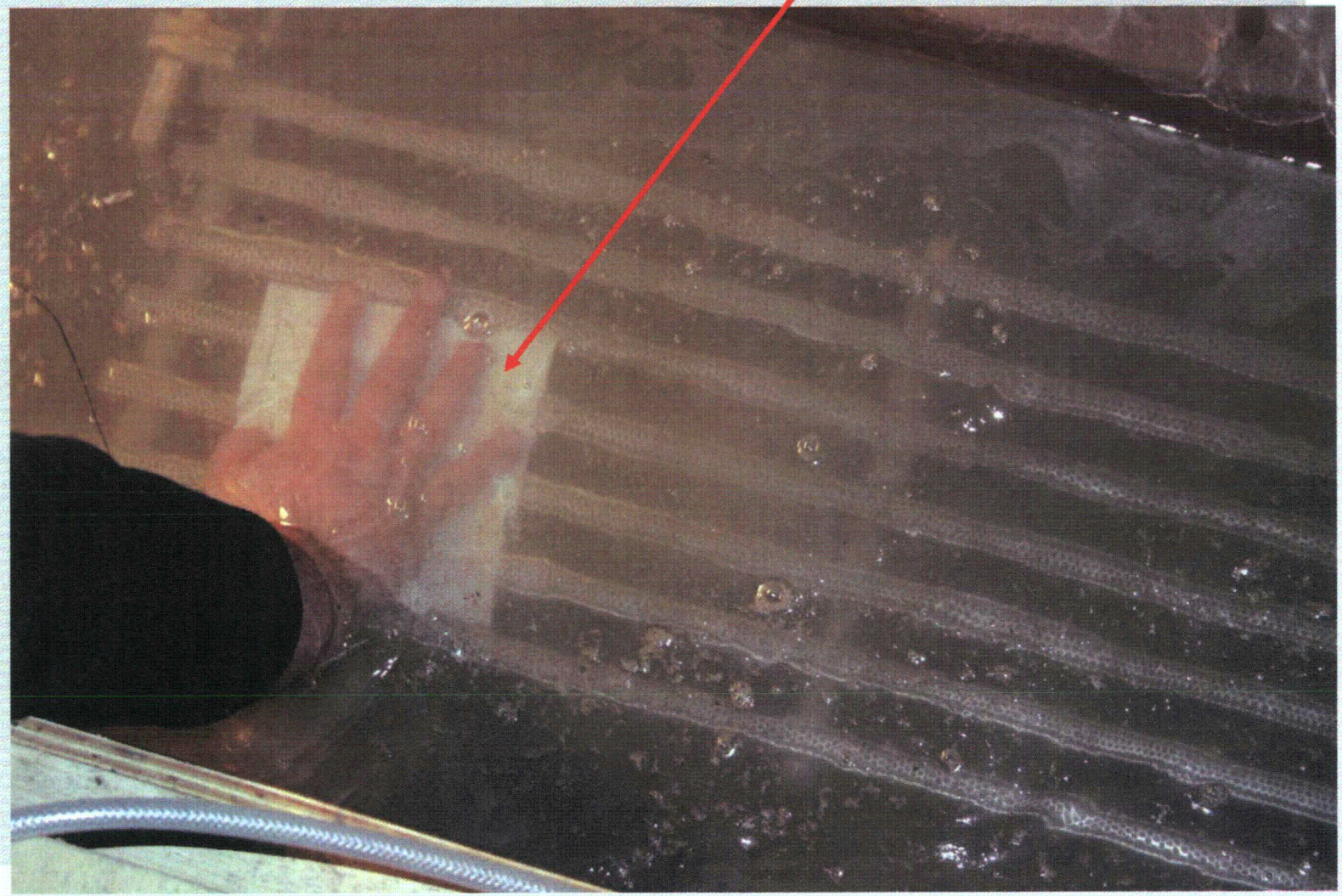
Series 1000 Electromark labels – 6"x6" white vinyl

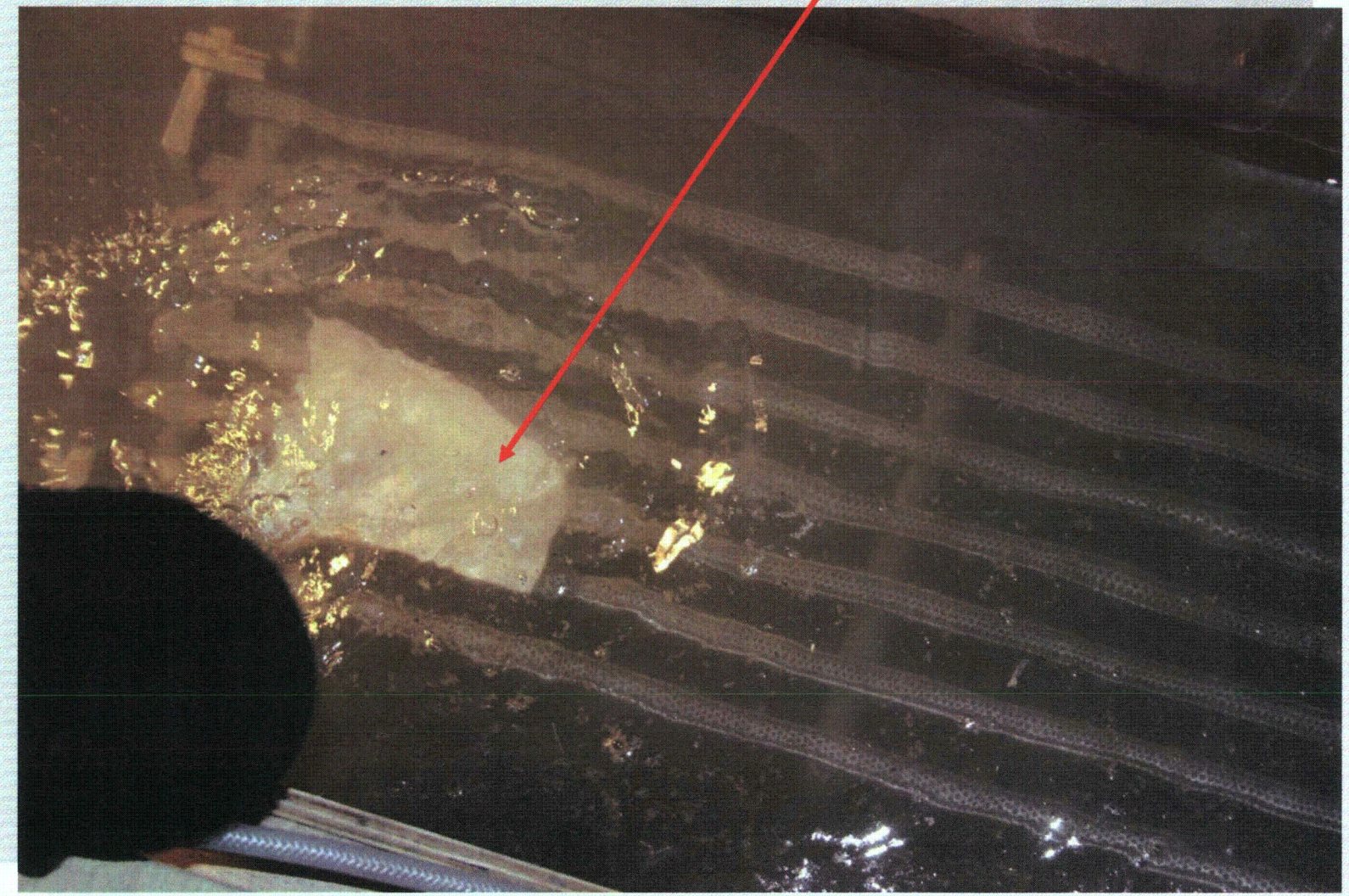
Test 3 Labels

Series 1000 Electromark labels – 6”x6” white vinyl



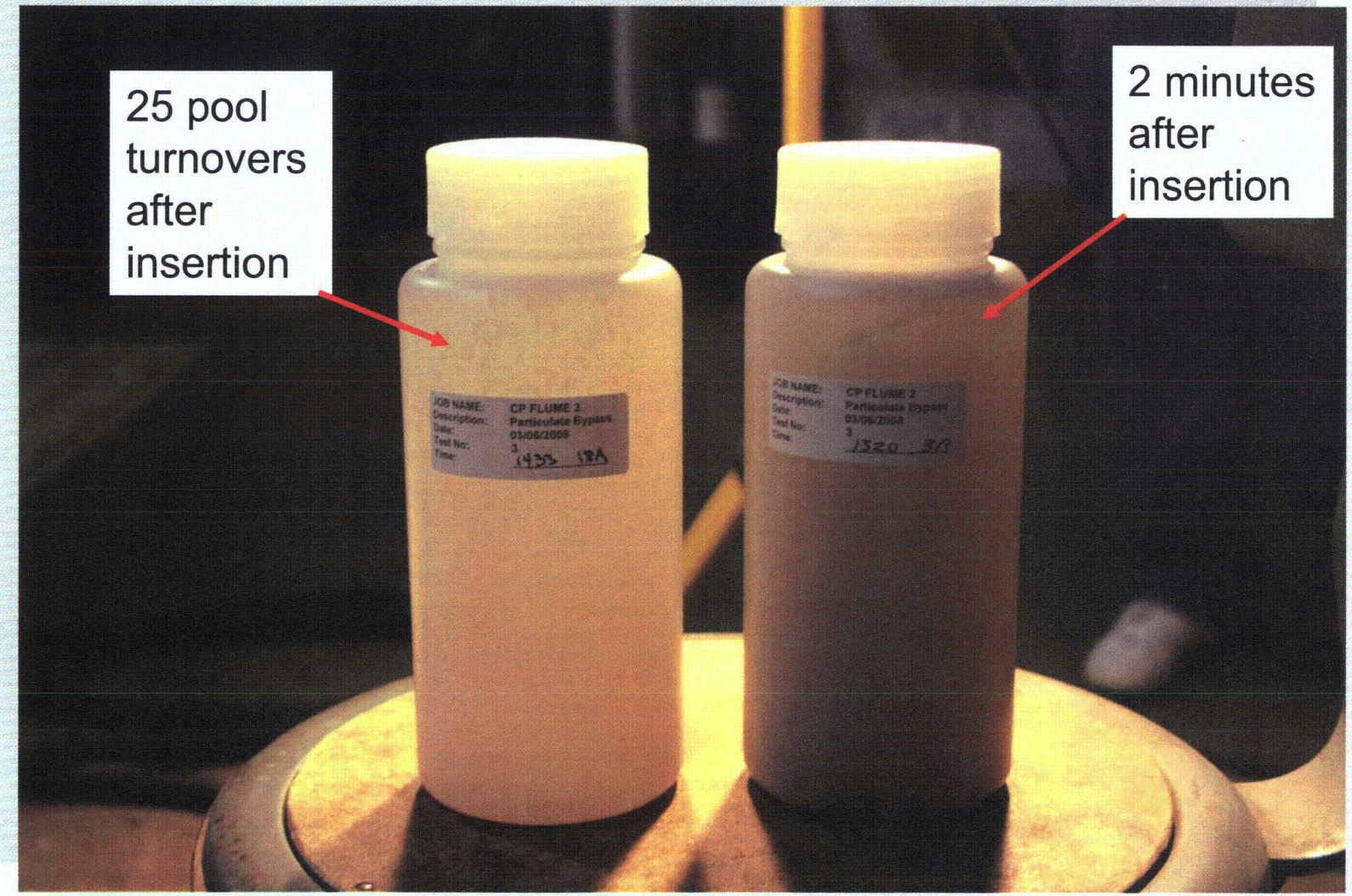
Test 3 Labels

Series 1000 Electromark labels – 6"x6" white vinyl



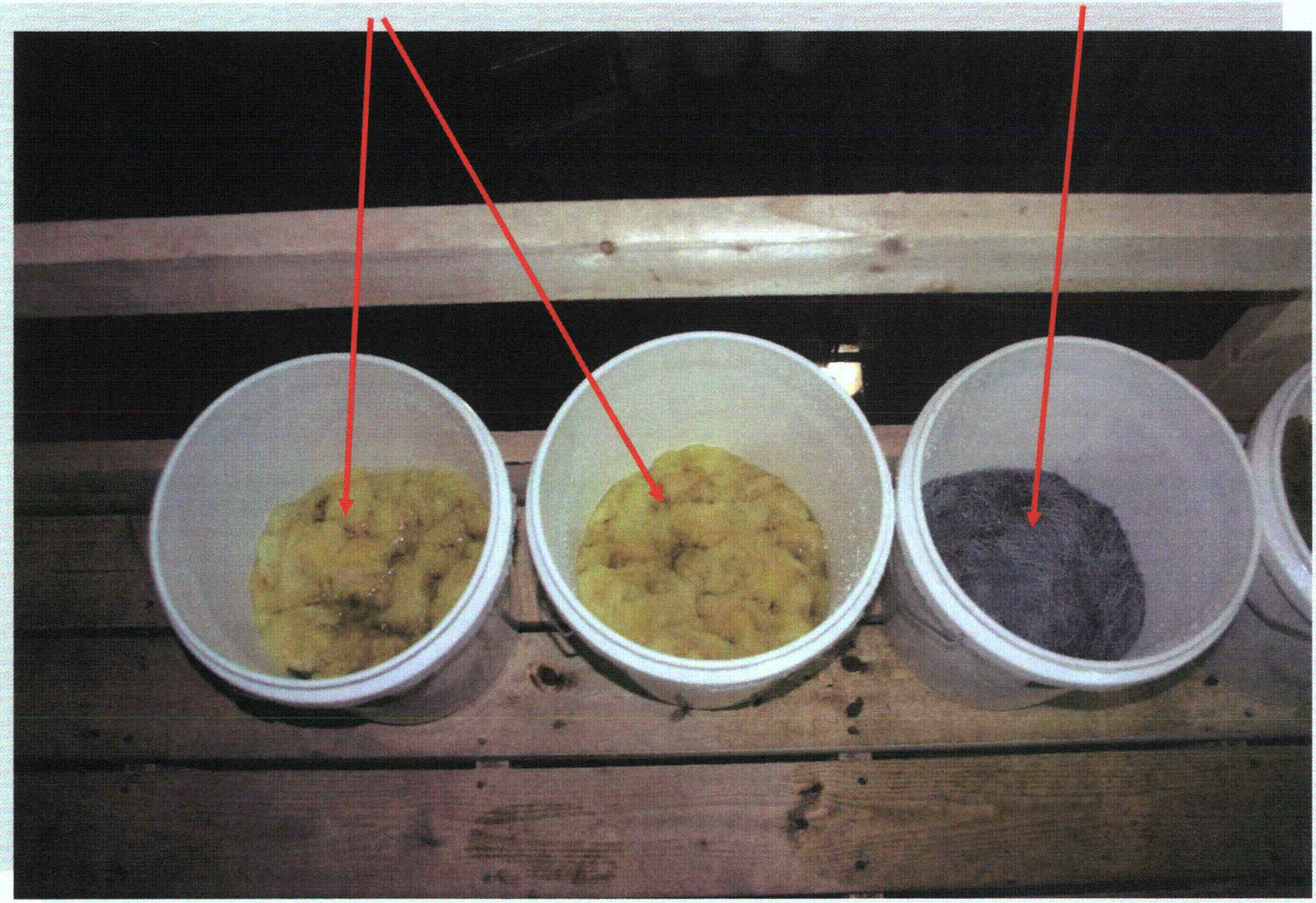
Test 3 Labels

Precipitate only bypass – 6 mil chips



Test 3 Particulate Only

LDFG (Nukon) large (0.660 lbm) and lead blanket cover (0.97 lbm)

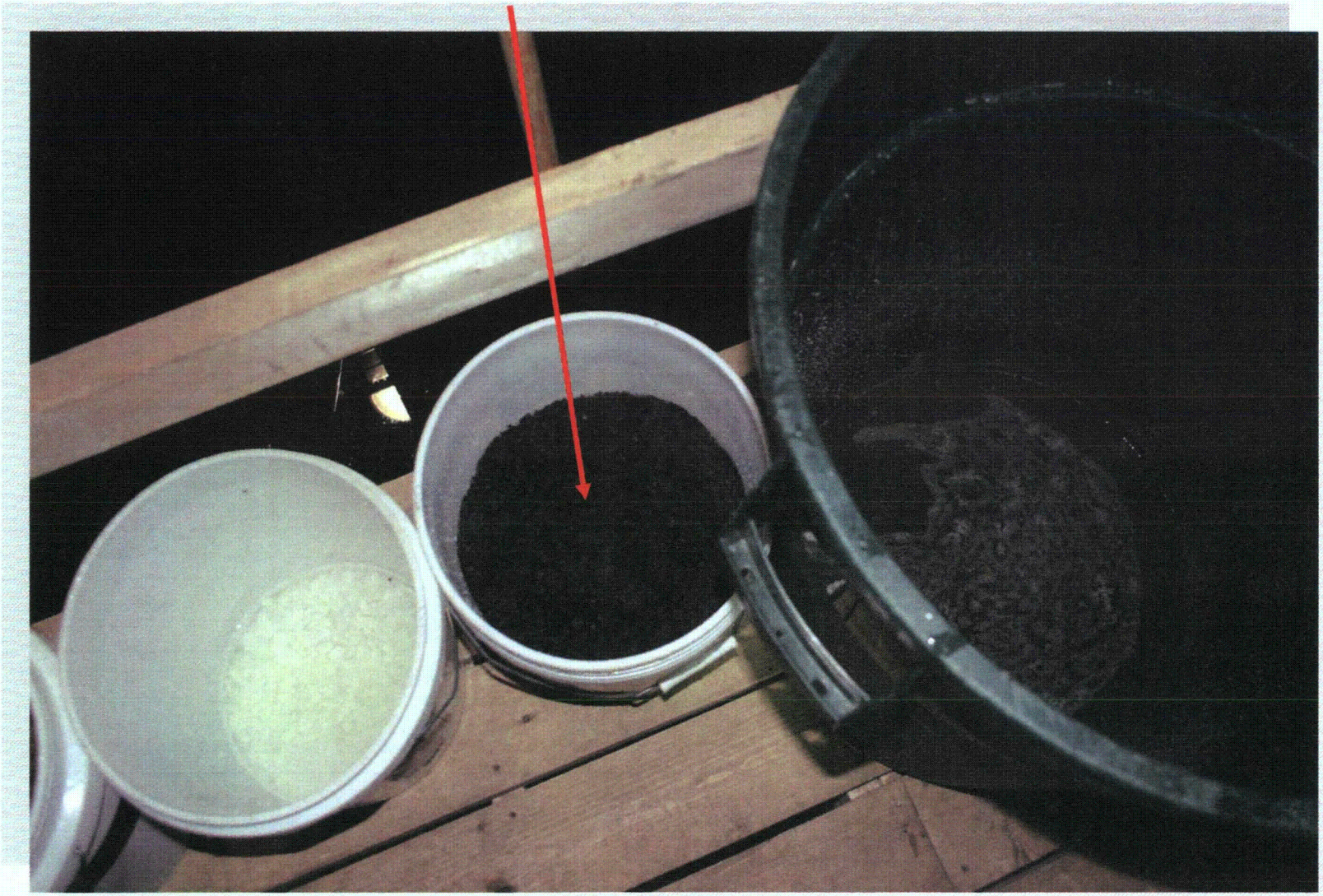


Test 4 Headloss

LDFG (Nukon) smalls (3.24.lbm) and Min-K fiber fines (0.025 lbm)

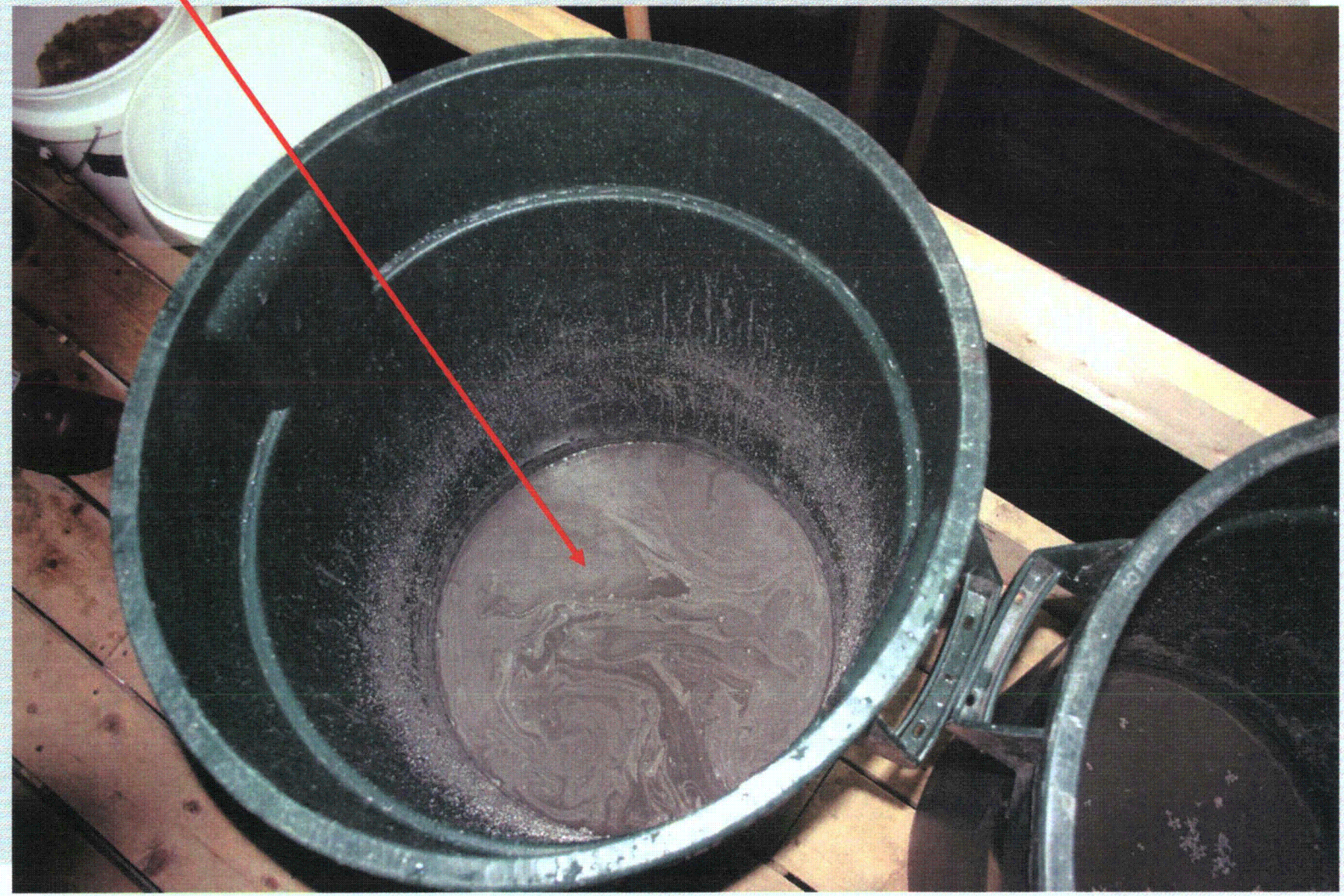
Test 4 Headloss

Coatings chips 1/8 inch to ¼ inch (6.54 lbm)



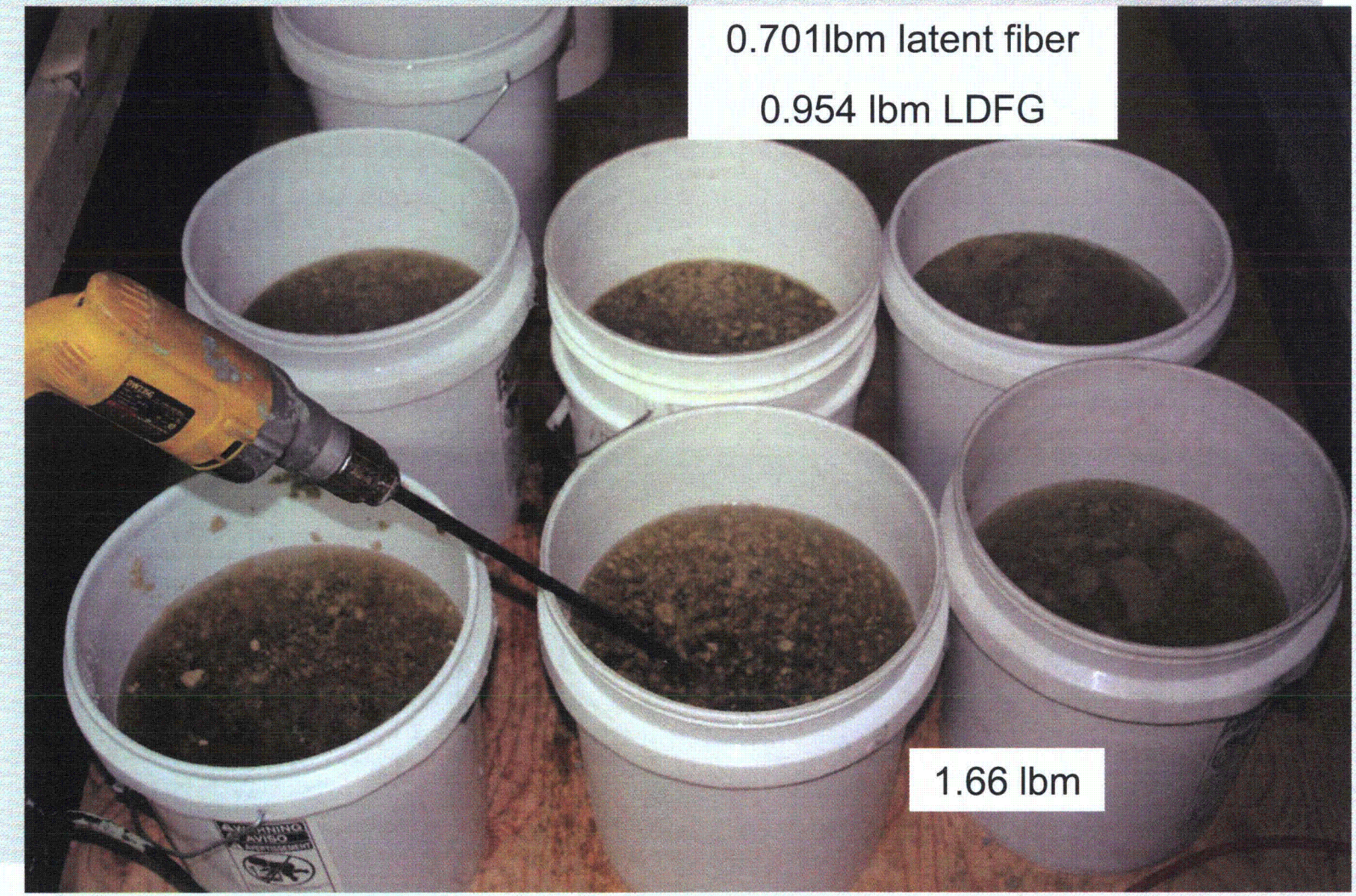
Test 4 Headloss

Tin Powder – surrogate for inorganic zinc coatings (510 lbm)



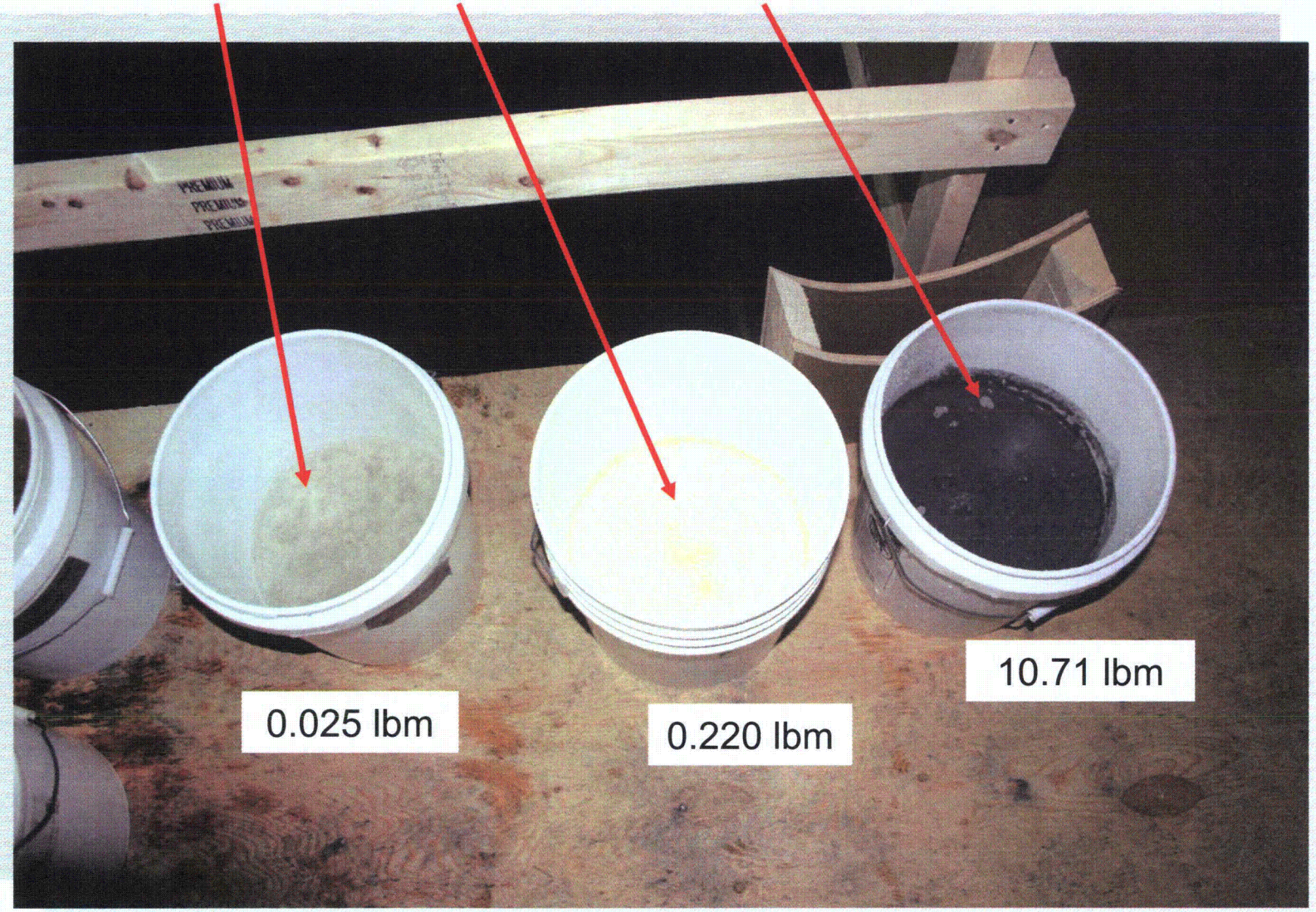
Test 4 Headloss

Nukon LDFG fines – from chipper to blender, stirred in water



Test 4 Headloss

Min-K fiber and particulate, Coatings fines – pulverized acrylic chips



Test 4 Headloss

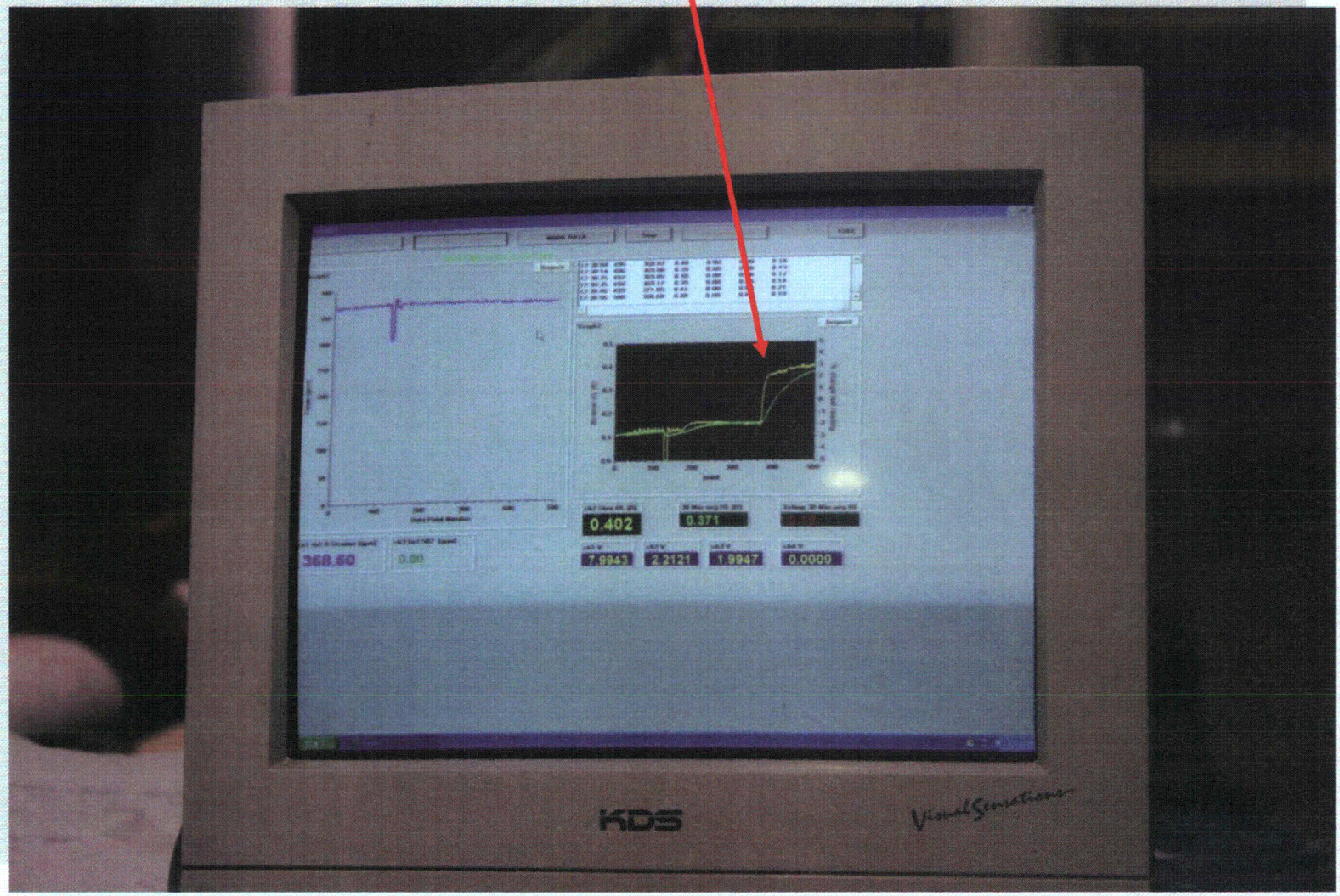
Paint chips – 1/64 inch (69.96 lbm)

Test 4 Headloss

Paint chips – 1/64 inch

Test 4 Headloss

Head loss data – increase from fines

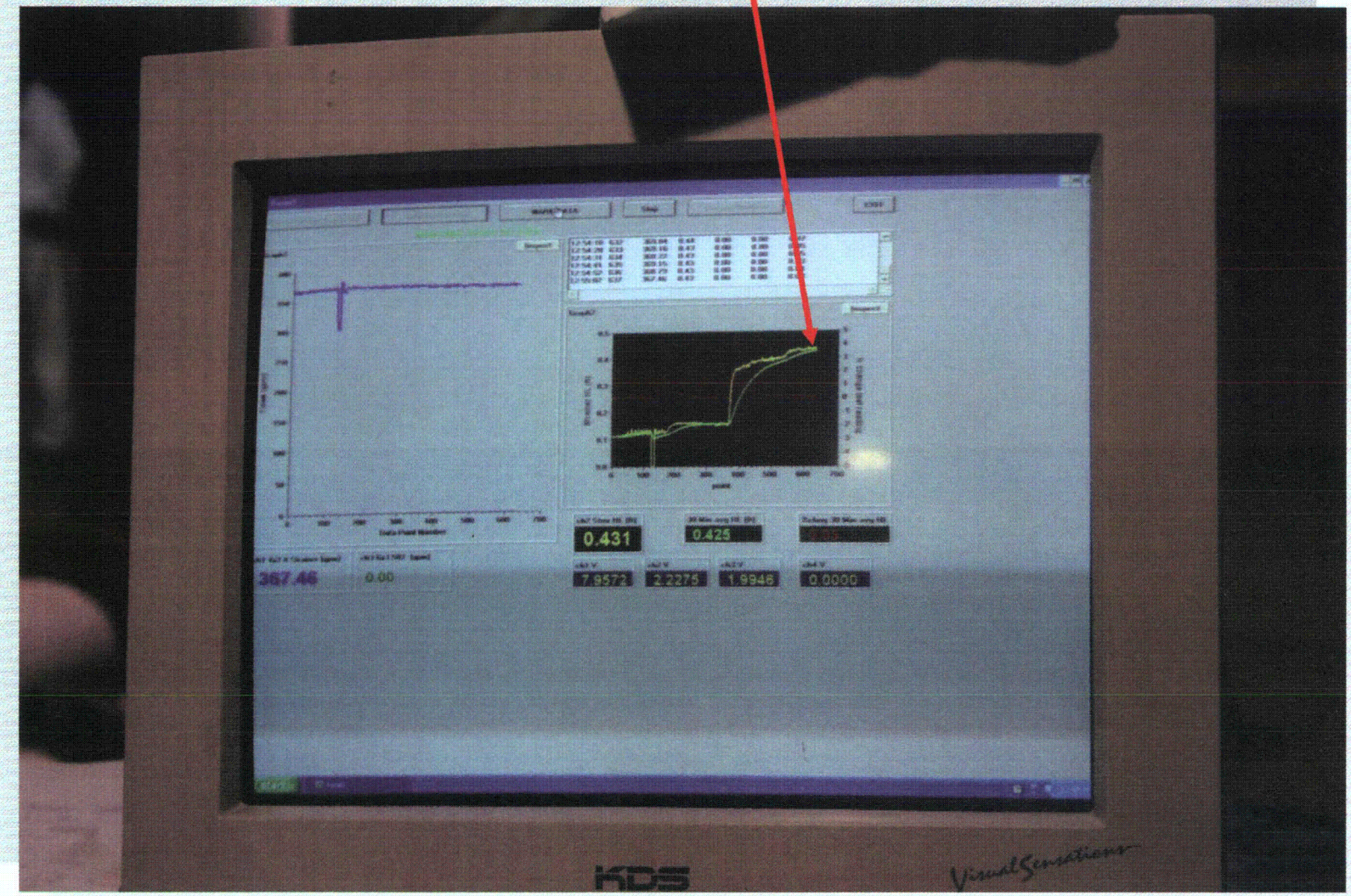


Test 4 Headloss

LDFG (Nukon) Large Pieces

- The upper picture illustrates the dry large fibrous debris
- The lower picture illustrates the "soaked" large fibrous debris

Head loss data – increase from large



Test 4 Headloss

WCAP surrogate production - particulate generator used to create prototypical solid chemical products (precipitates) for sump screen performance testing

Test 4 Headloss

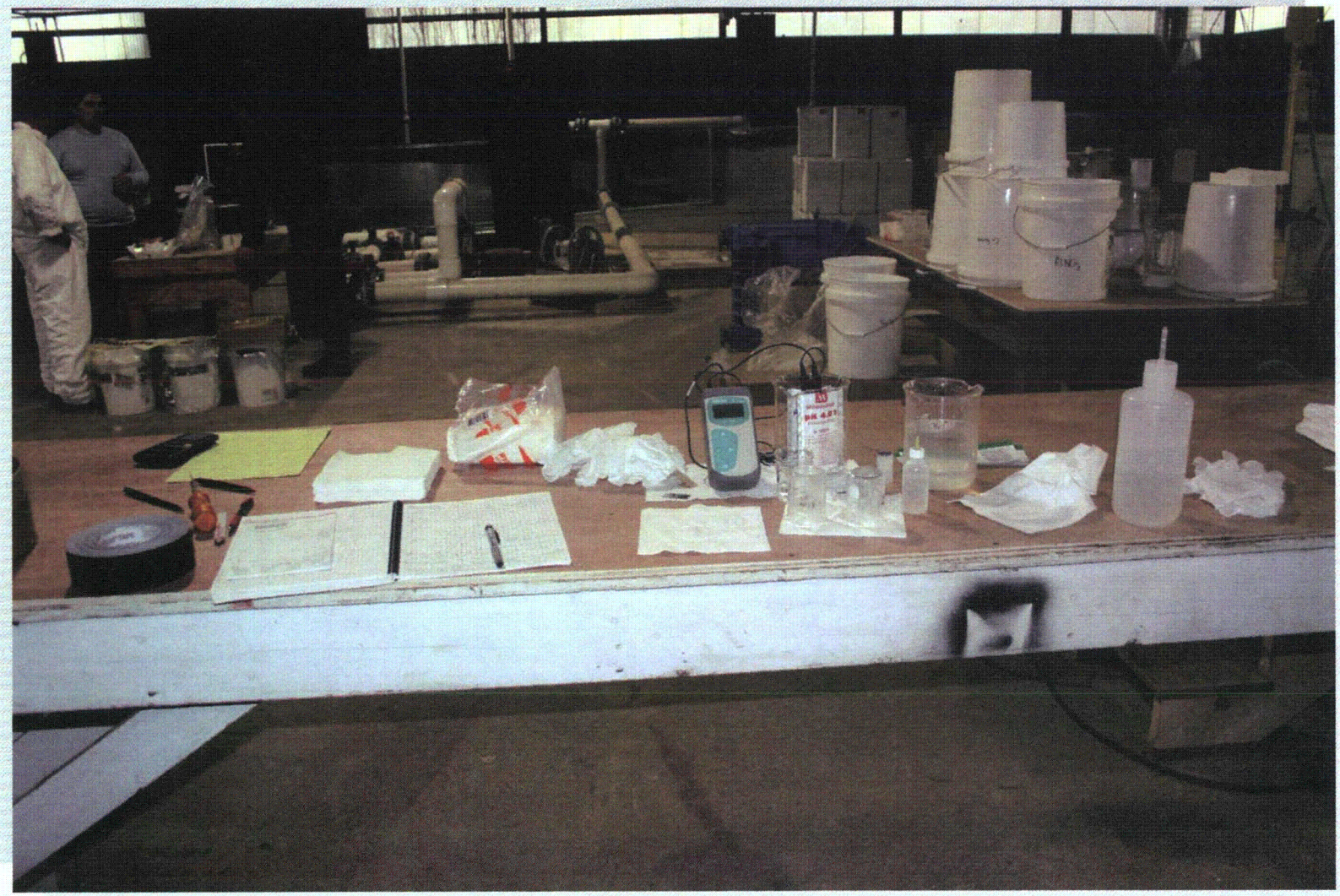
For aluminum oxyhydroxide precipitate, aluminum nitrate ($Al(NO_3)_3 \cdot 9H_2O$) is combined with sodium hydroxide (NaOH).

Test 4 Headloss

Aluminum oxyhydroxide also used in lieu of sodium aluminum silicate which avoids use of sodium silicate, which may be considered hazardous.

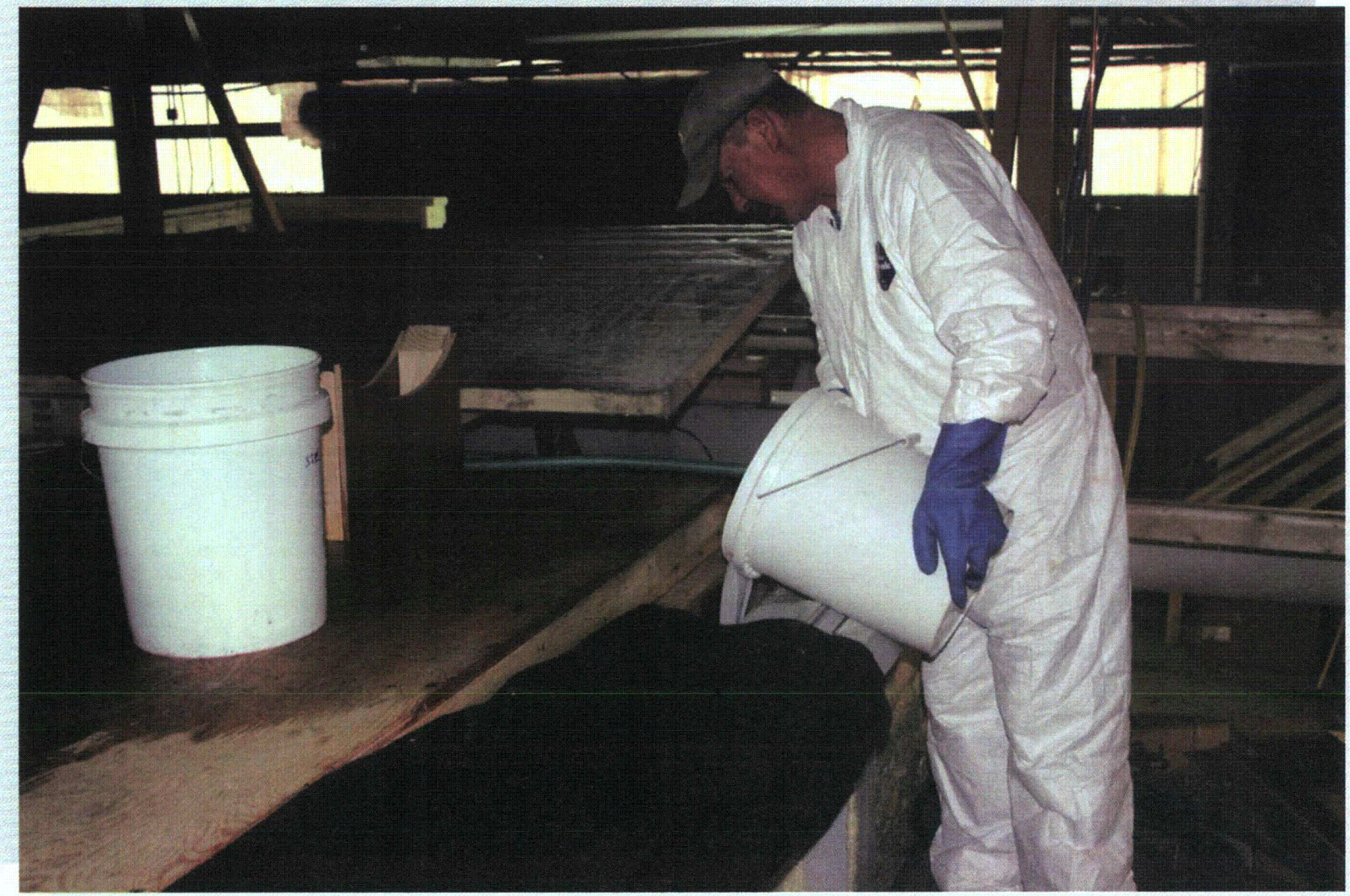
Test 4 Headloss

WCAP surrogate characteristics verified prior to use



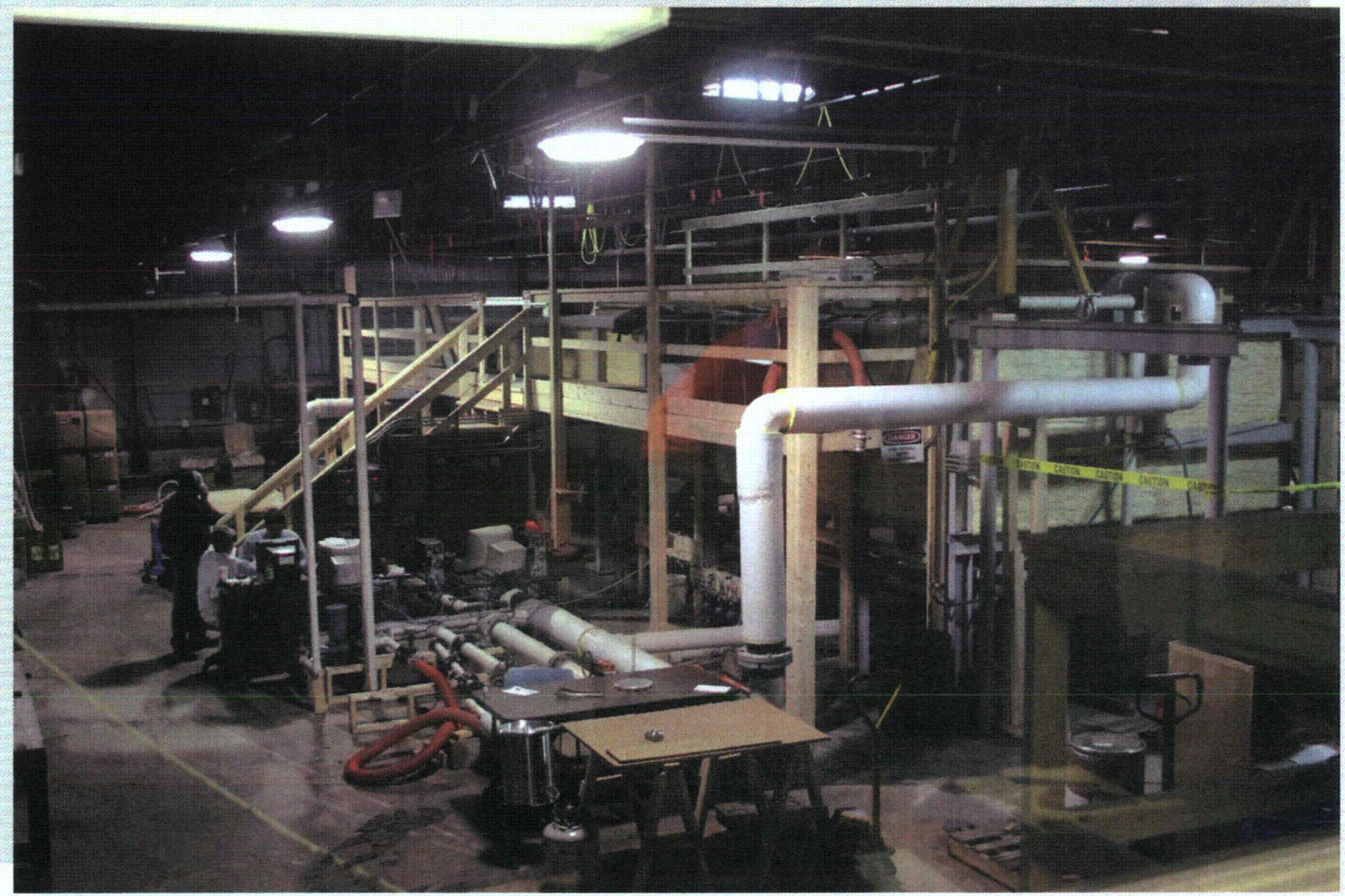
Test 4 Headloss

WCAP surrogate insertion – batched to maintain ppm

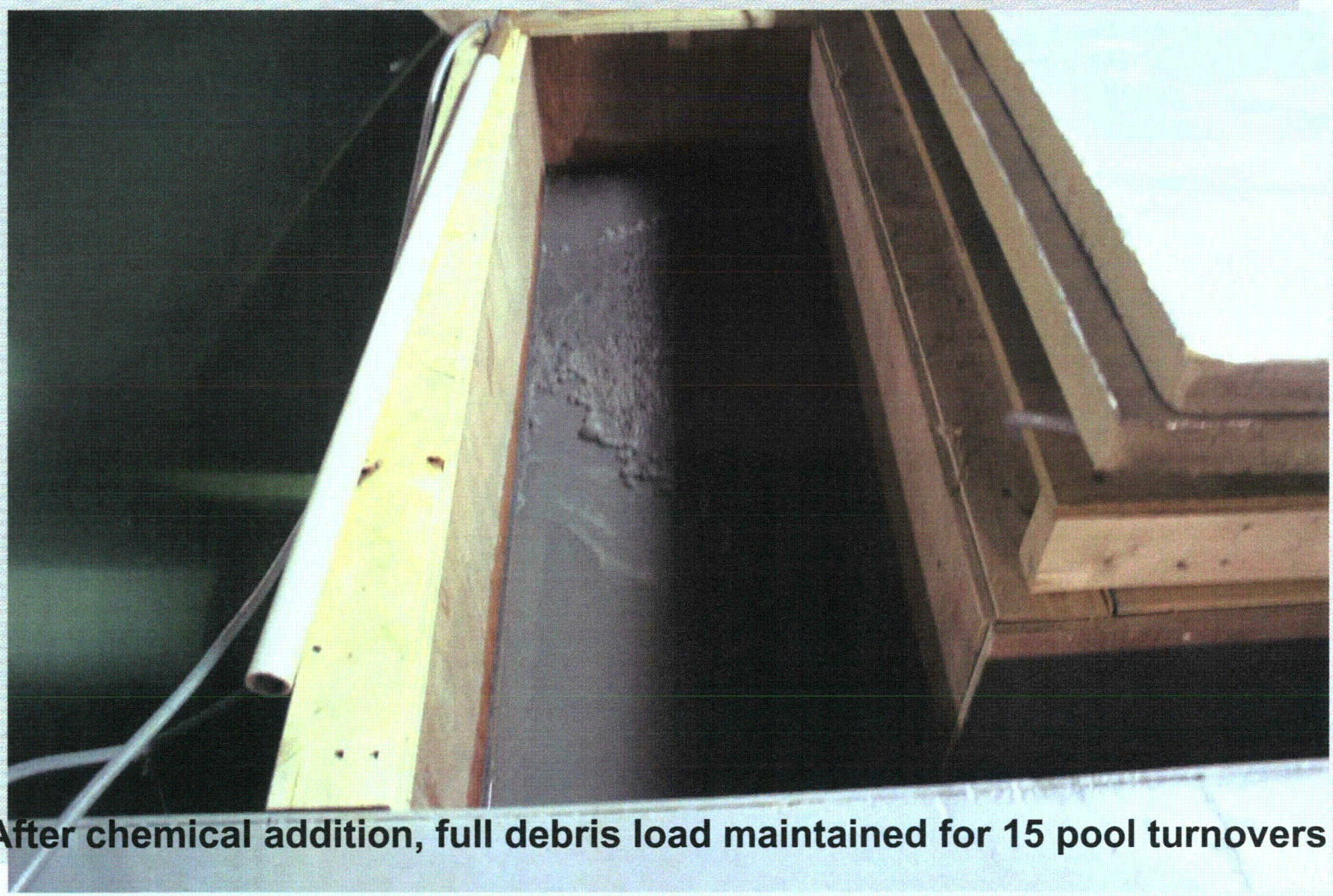


Test 4 Headloss

Chemical precipitate introduction every 2 pool turnovers



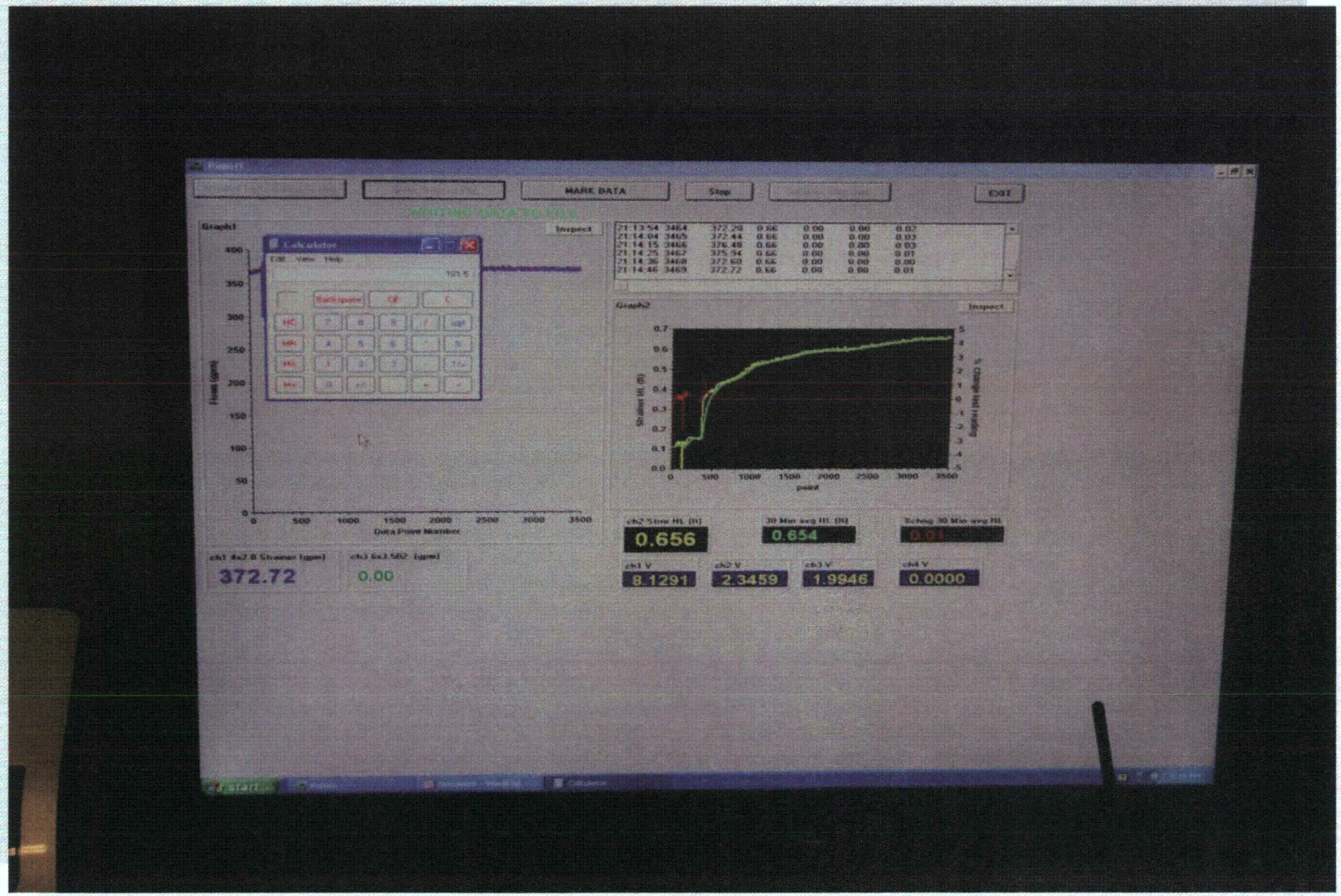
Test 4 Headloss



After chemical addition, full debris load maintained for 15 pool turnovers

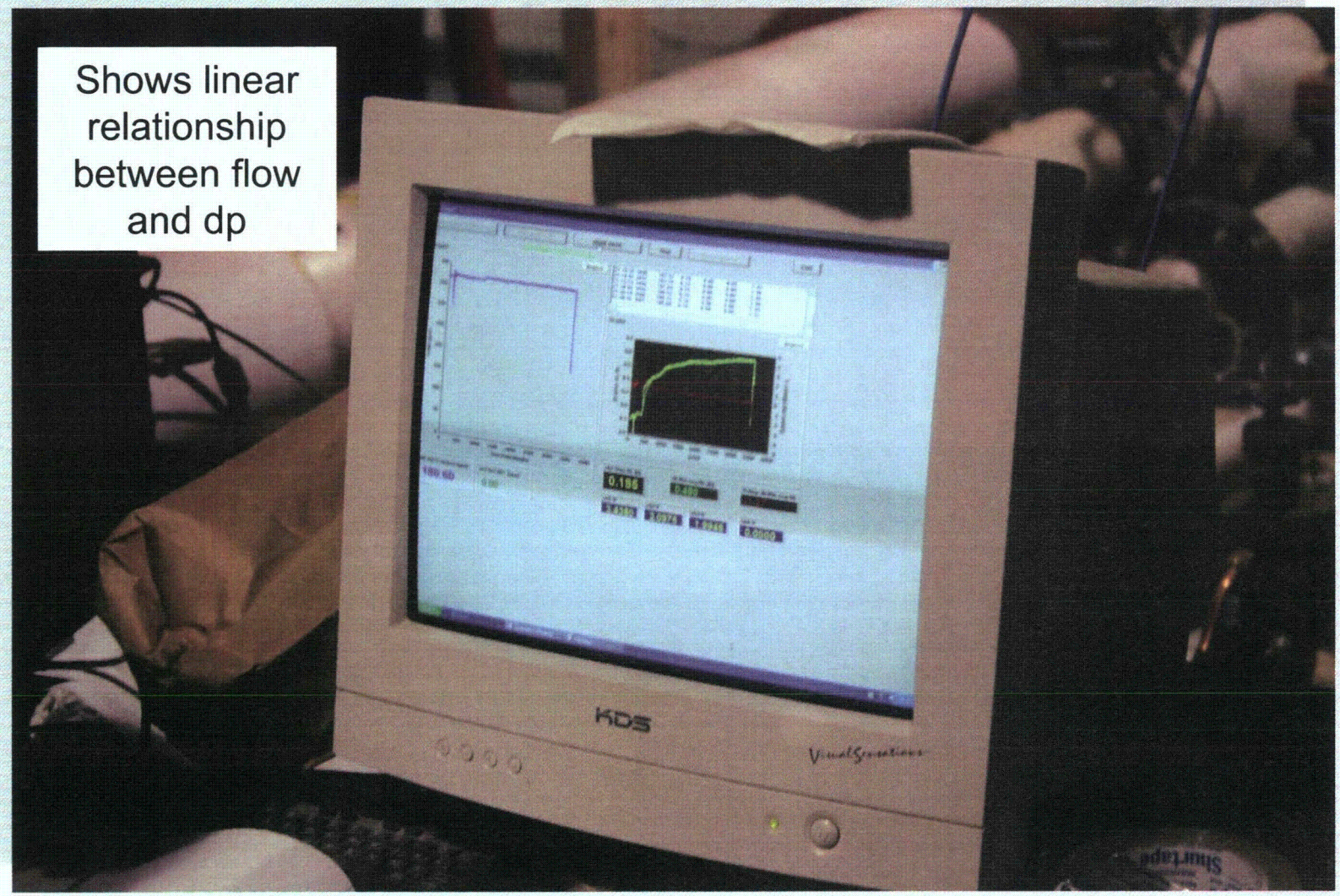
Test 4 Headloss

Headloss test – near completion



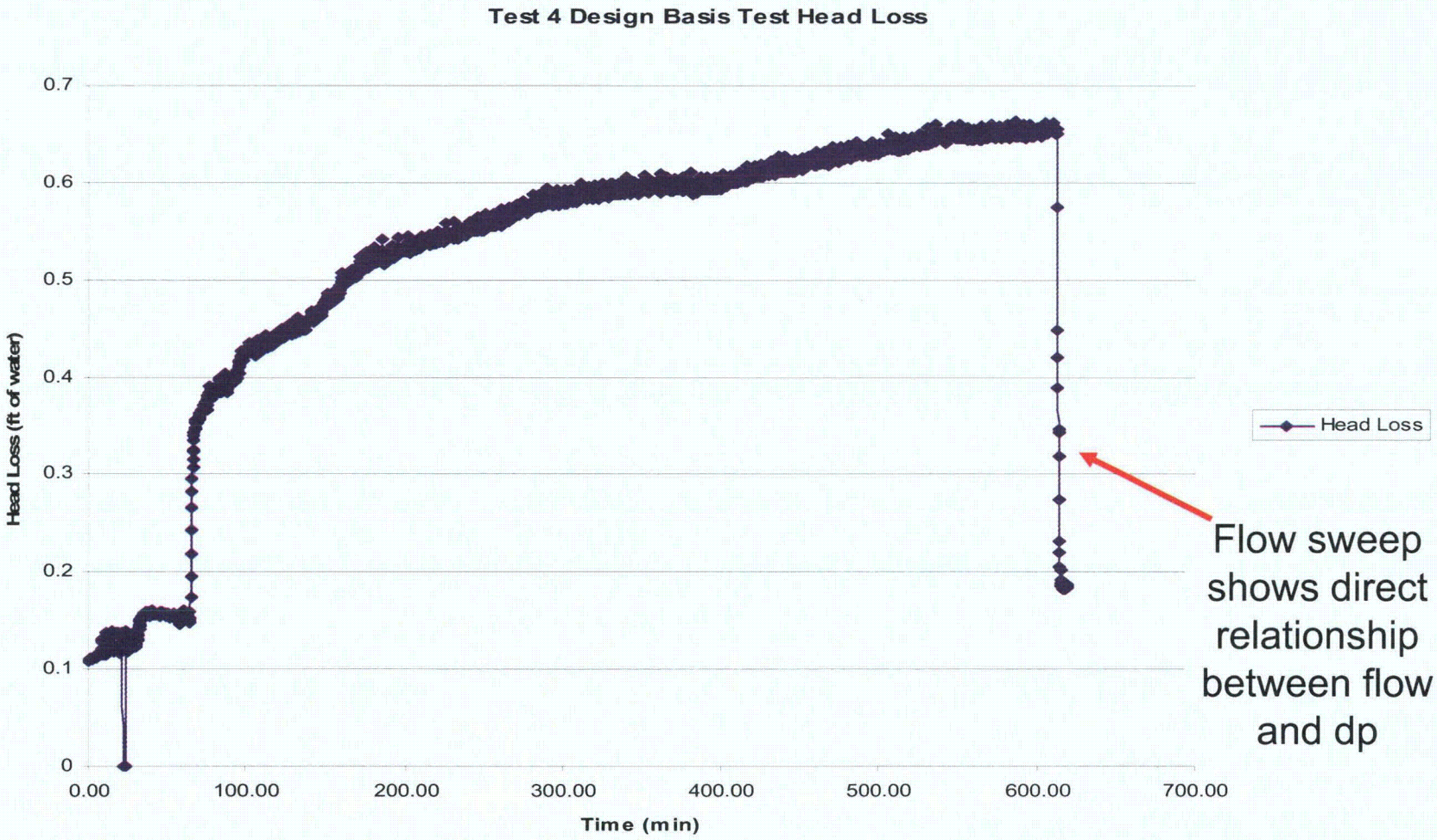
Test 4 Headloss

Headloss test – completion flow sweep

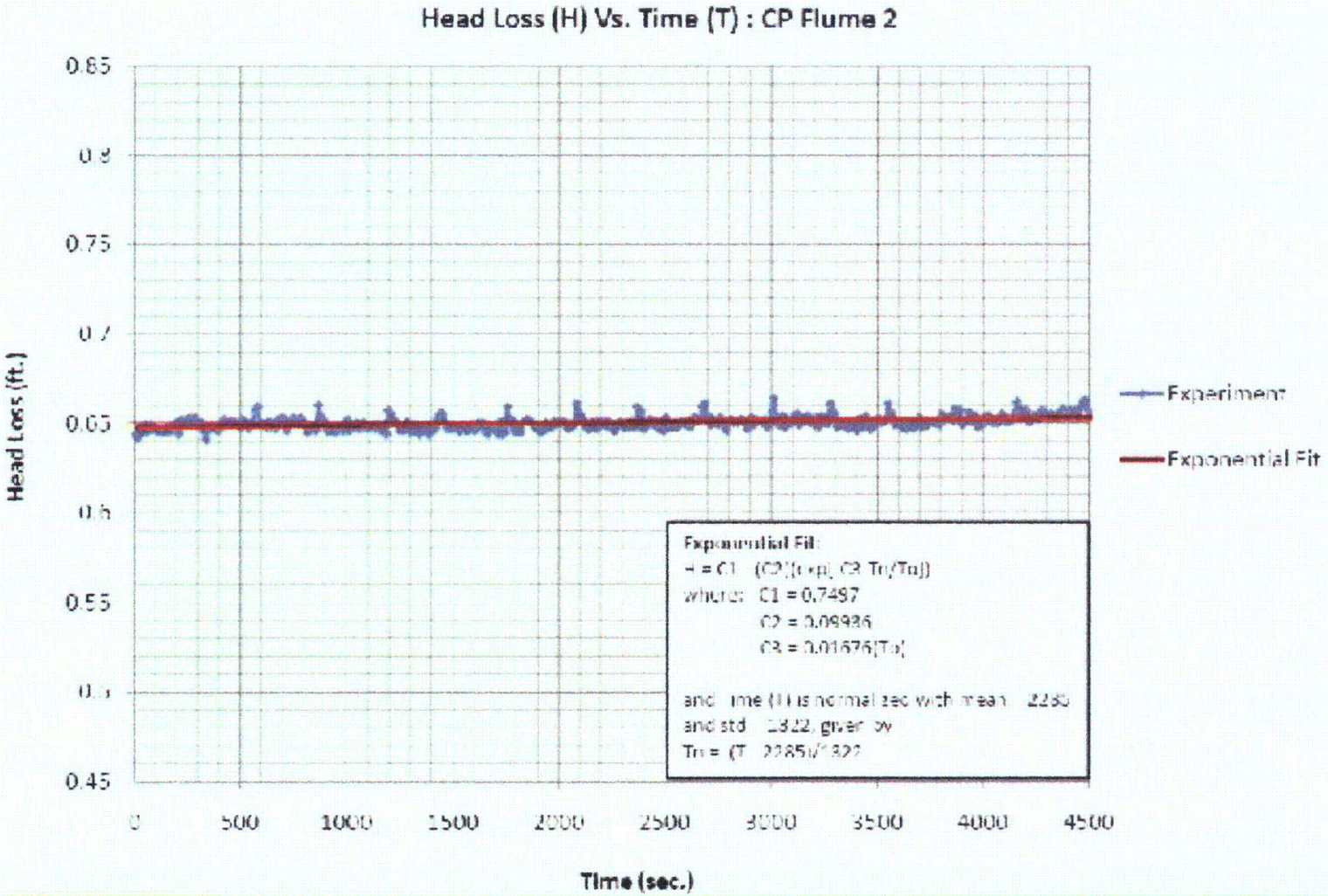


Test 4 Headloss

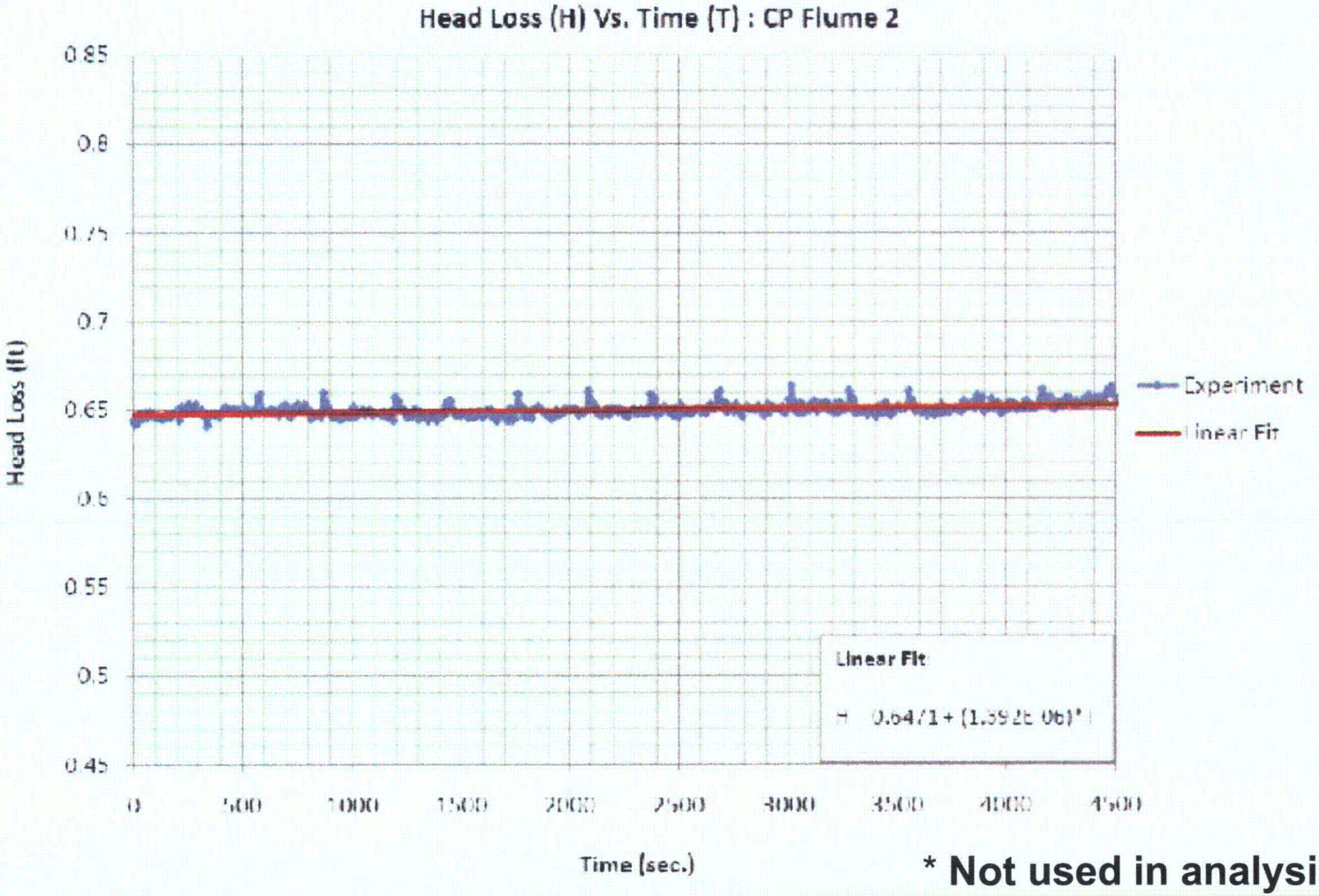
Headloss test – Debris head loss stable at approximately 0.6 ft



Test 4 Head Loss Extrapolation Curve Exponential – 0.7497 ft.



Test 4 Head Loss Extrapolation Curve Linear – 4.2552 ft.*



* Not used in analysis

Head Loss Margins

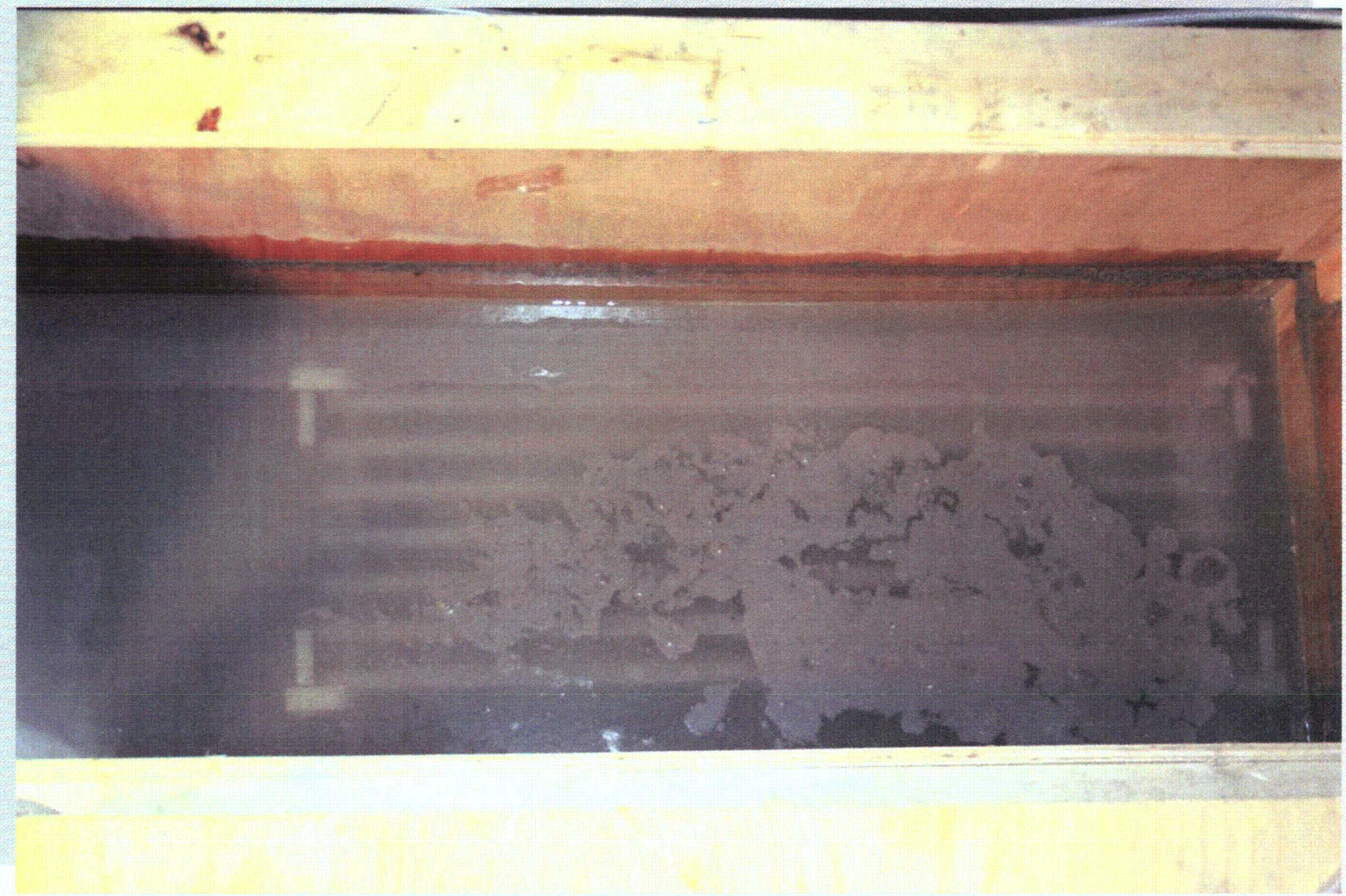
- **Exponential – Net Positive Suction Head margin 5 Ft. at 30 days**
- **Linear**

	Days	Extrapolation	NPSH Margin
Non-Harsh	14	2.331 ft	3.63 ft
Ambient	25	3.654 ft	2.306 ft

Headloss test – drain down with flow

Test 4 Headloss

Headloss test – drain down with flow



Test 4 Headloss

Headloss test – drain down with flow

Test 4 Headloss

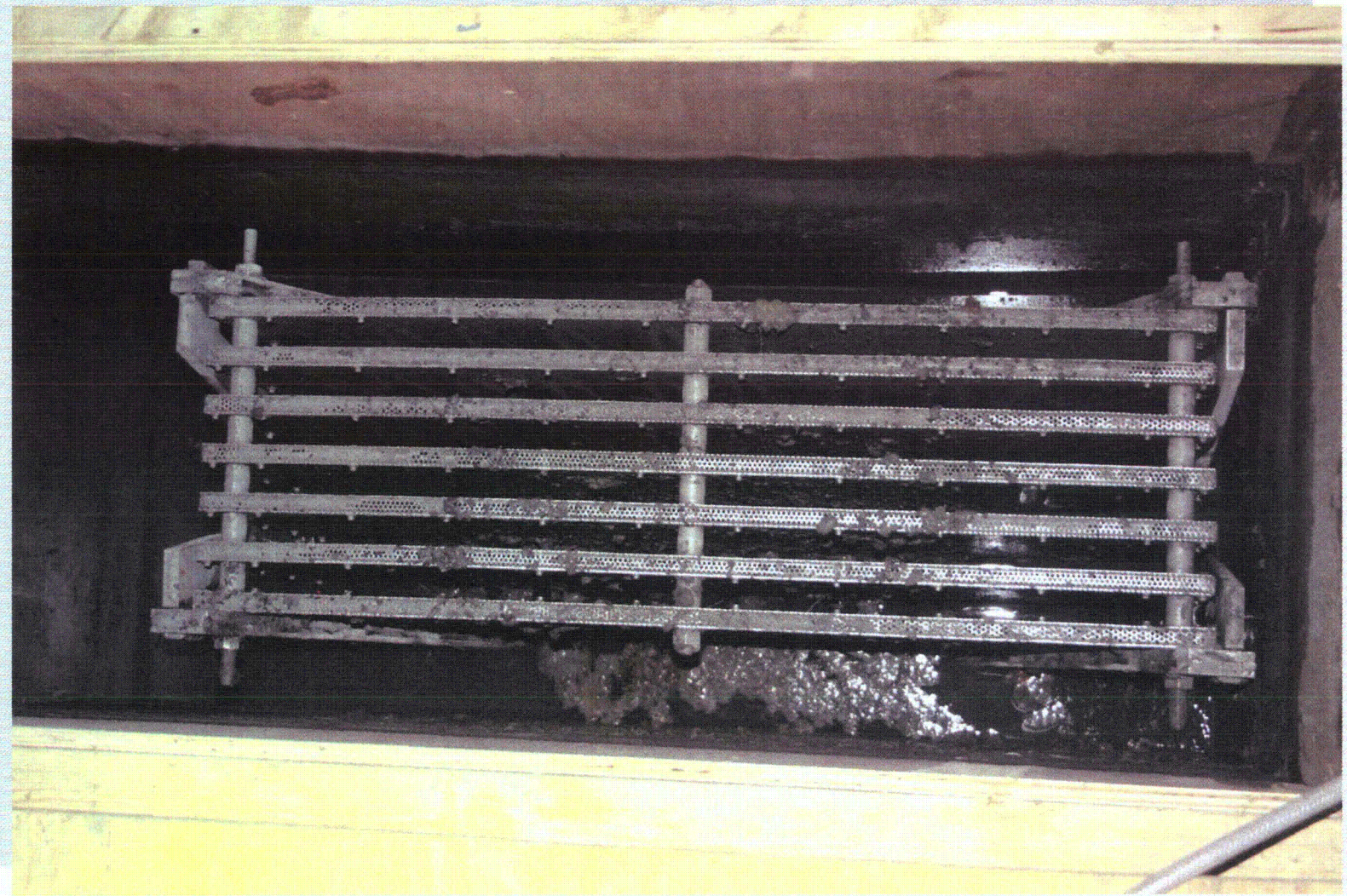
Headloss test – drain down with flow

Test 4 Headloss

Headloss test – drain down with flow

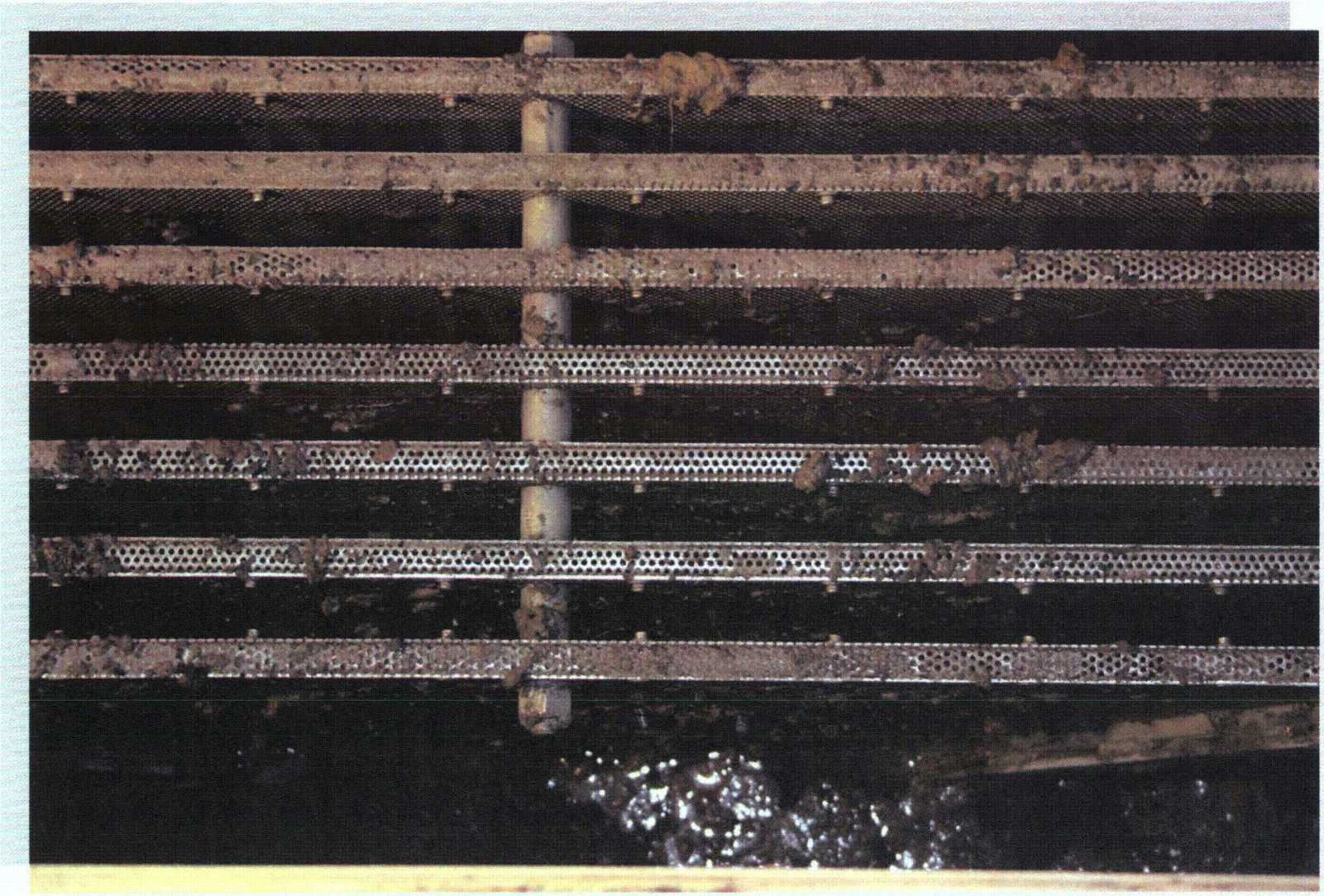
Test 4 Headloss

Headloss test – drain down after pump stop



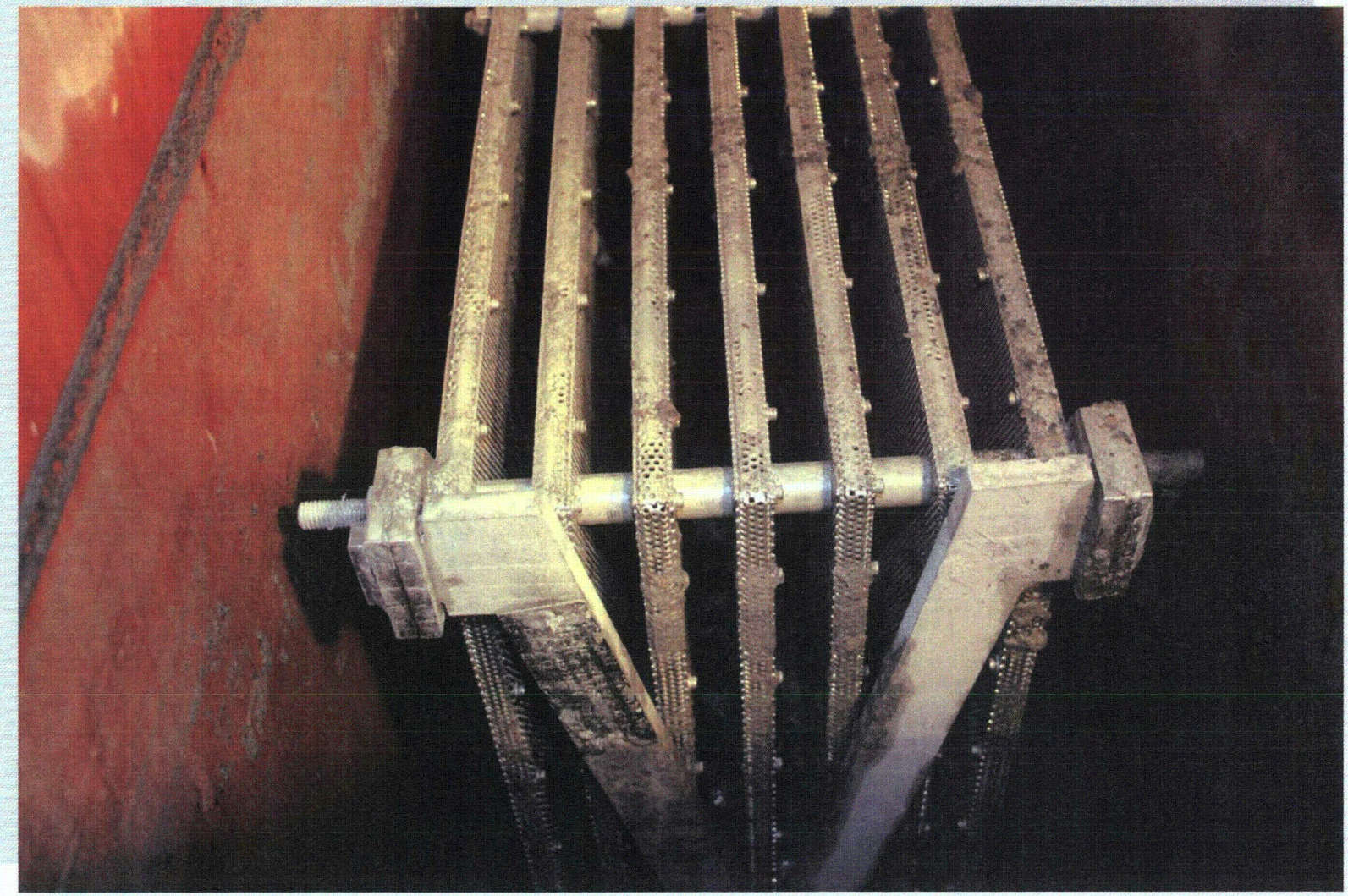
Test 4 Headloss

Headloss test – drain down without flow



Test 4 Headloss

Headloss test – drain down without flow



Test 4 Headloss