
COST EFFECTIVE TECHNOLOGY FOR BENEFICIATION AND RECOVERY OF FINE COAL

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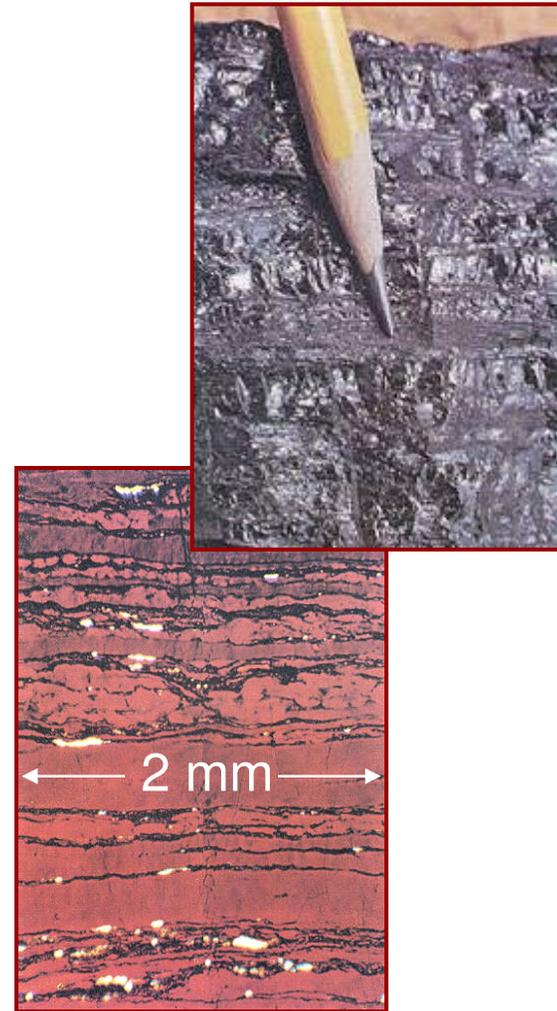
Indian Coal

❑ Problem

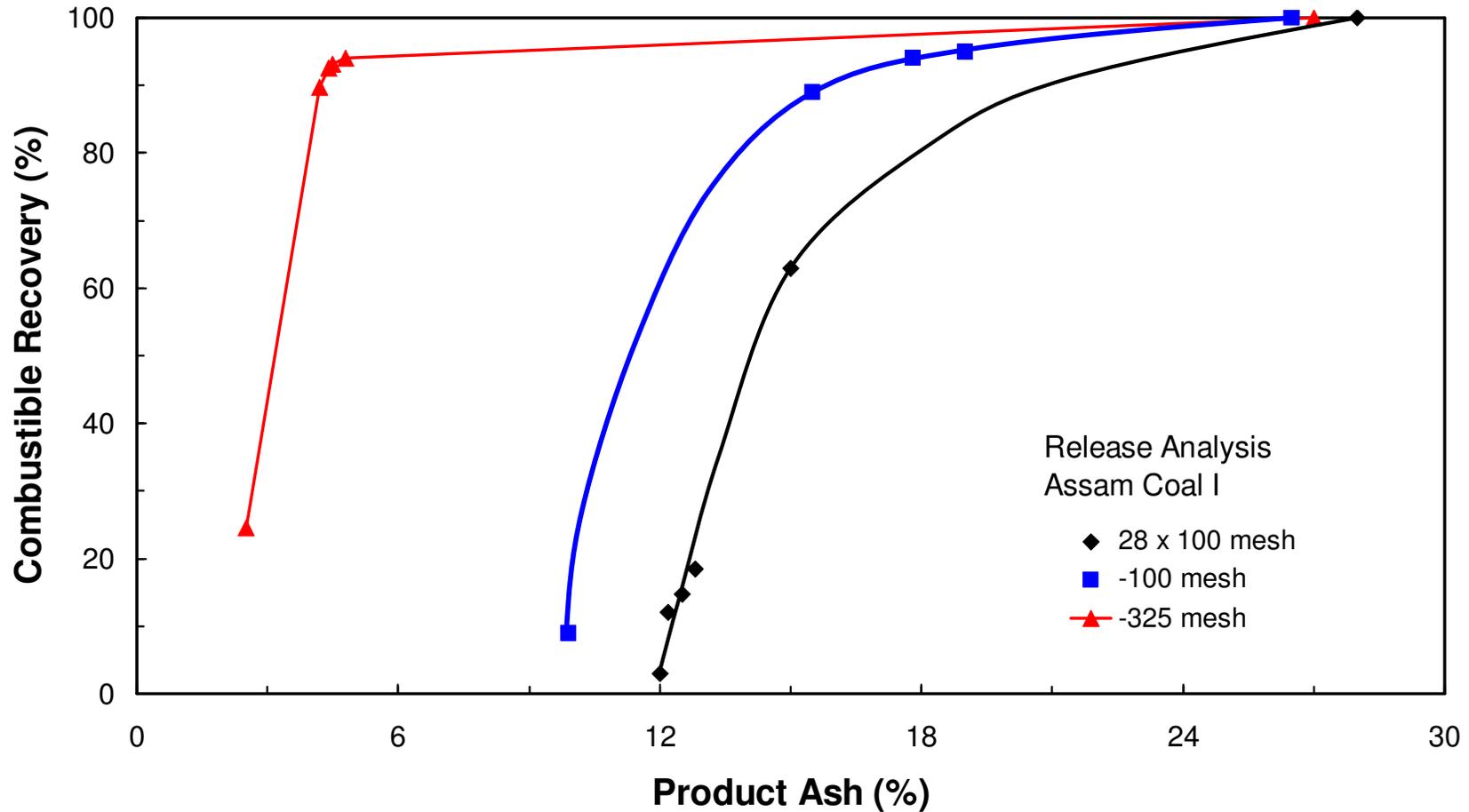
- *Difficult to clean*
 - *Finely disseminated mineral matter*
- *Coking coal requires low ash coal*
 - *<8% ash*
 - *Imported coal is used as sweetener*
 - *High cost*

❑ Solution

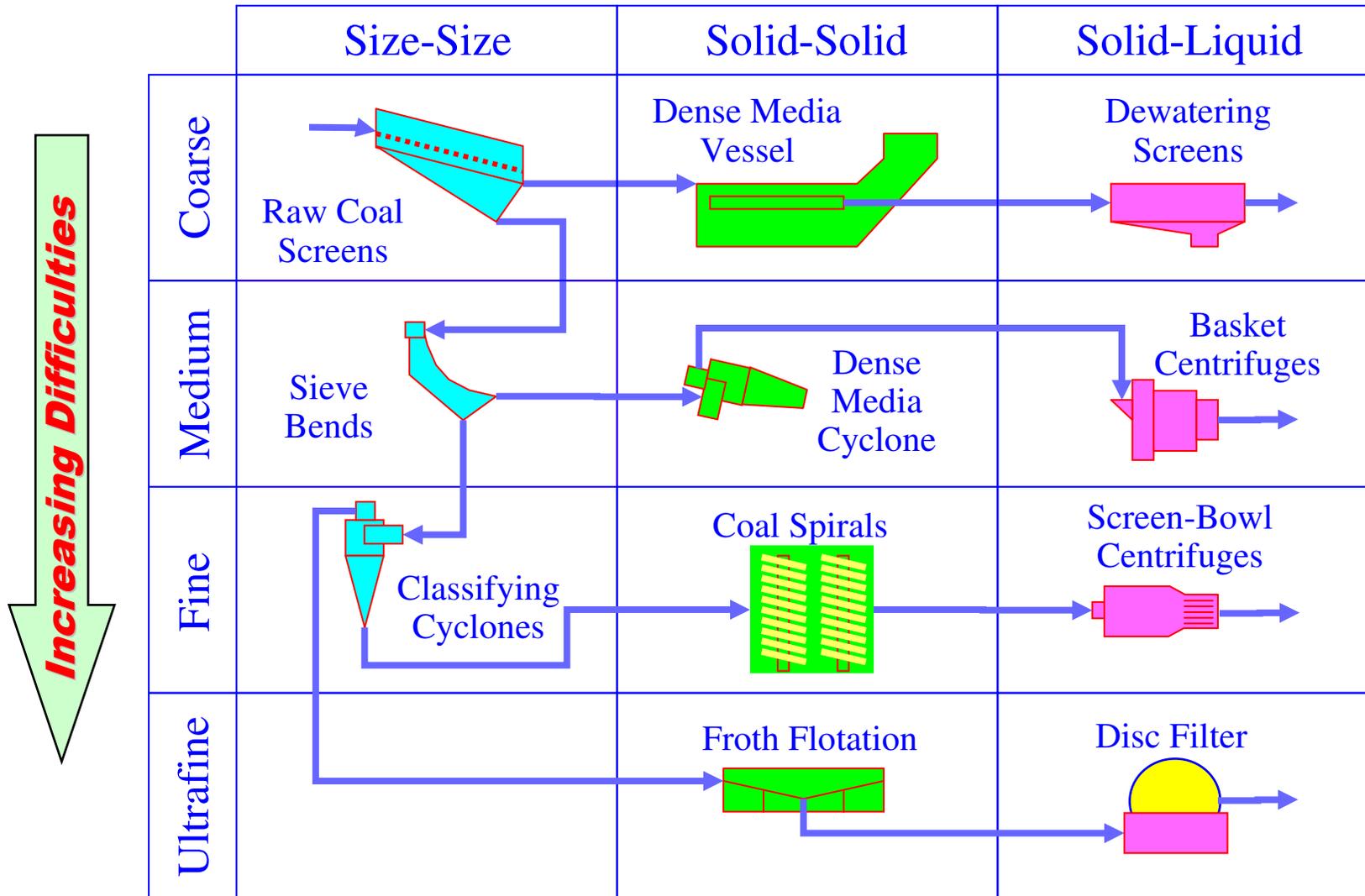
- *Fine grinding for improved liberation*
- *Fine coal cleaning*
- *Fine coal dewatering*



Fine coal produces lower-ash coal.



But fine coal cleaning is costly and difficult.



Advanced Fine Coal Cleaning Technologies Developed at Virginia Tech

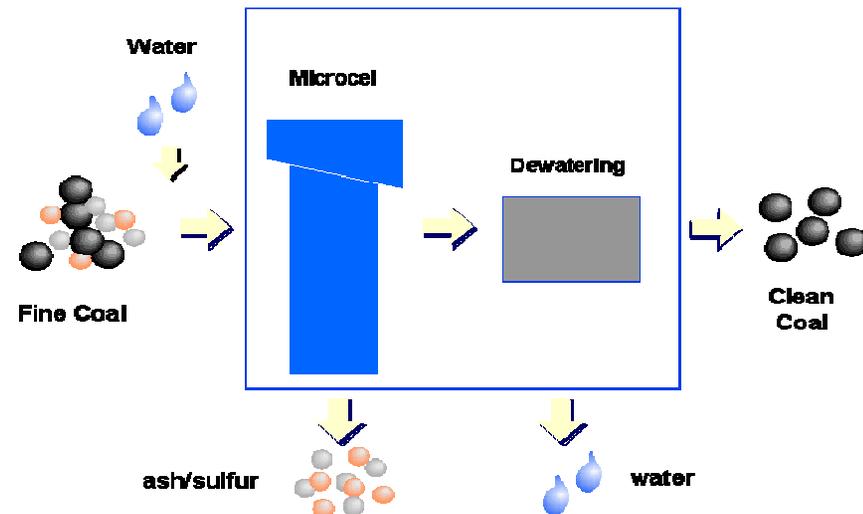
Under DOE Sponsorship

□ Advanced Flotation

- *Microcel technology*
- *New FLS technology*

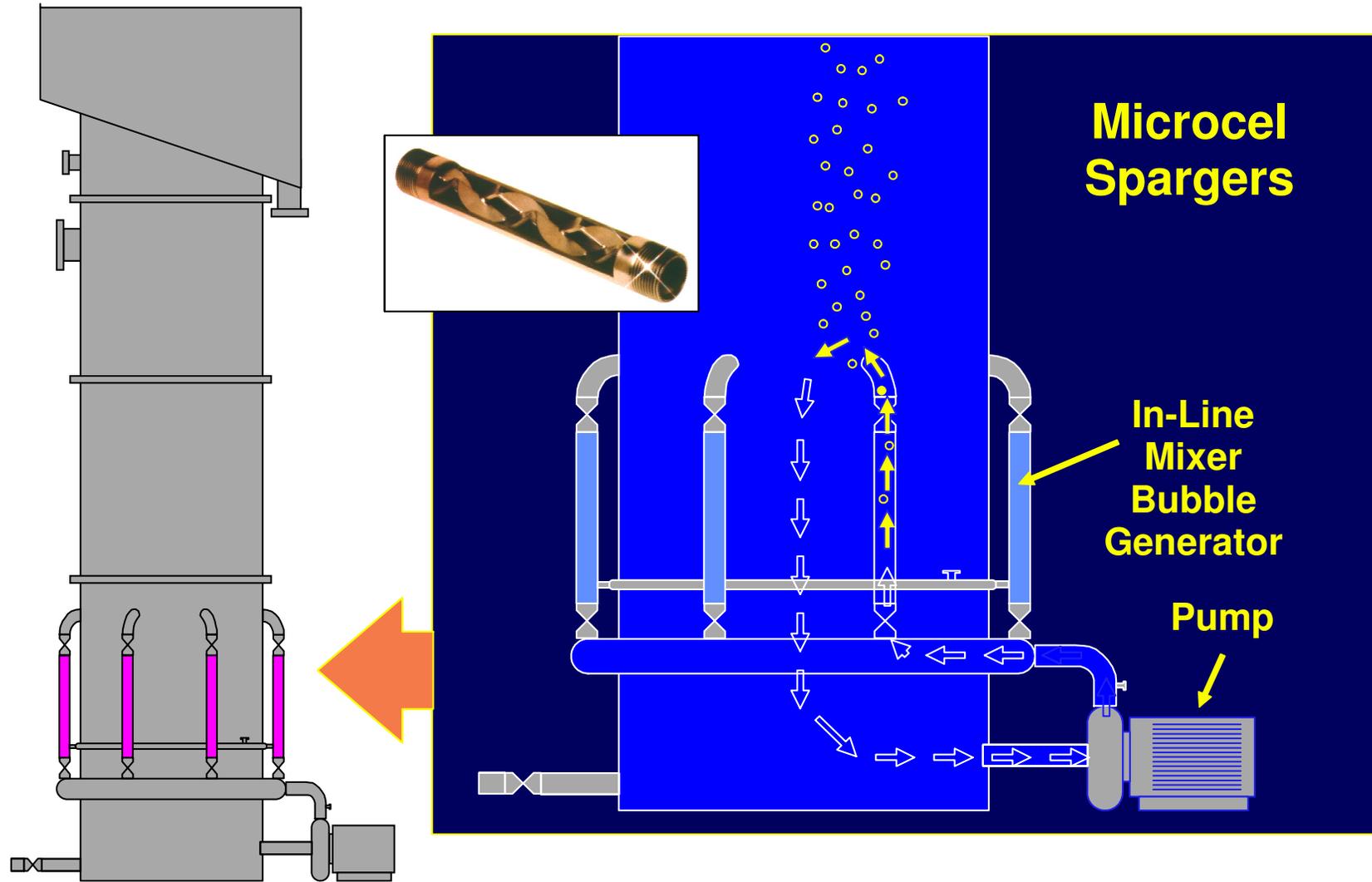
□ Advanced Dewatering

- *Dewatering aids*
 - *Licensed to Nalco*
 - *Pinnacle pond recovery*
- *Hyperbaric centrifuge*
 - *Licensed to Decanter*
 - *Field tests are ongoing*



***All of the technologies are
commercially available.***

Bubble Generation in Microcel



Microcel Column Installation

Red Mountain (BHP Billiton)



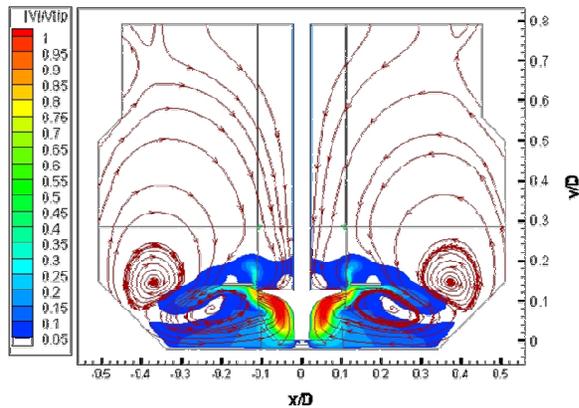
Advanced Flotation



*Pilot-Scale Test Unit
Installed at Virginia Tech*



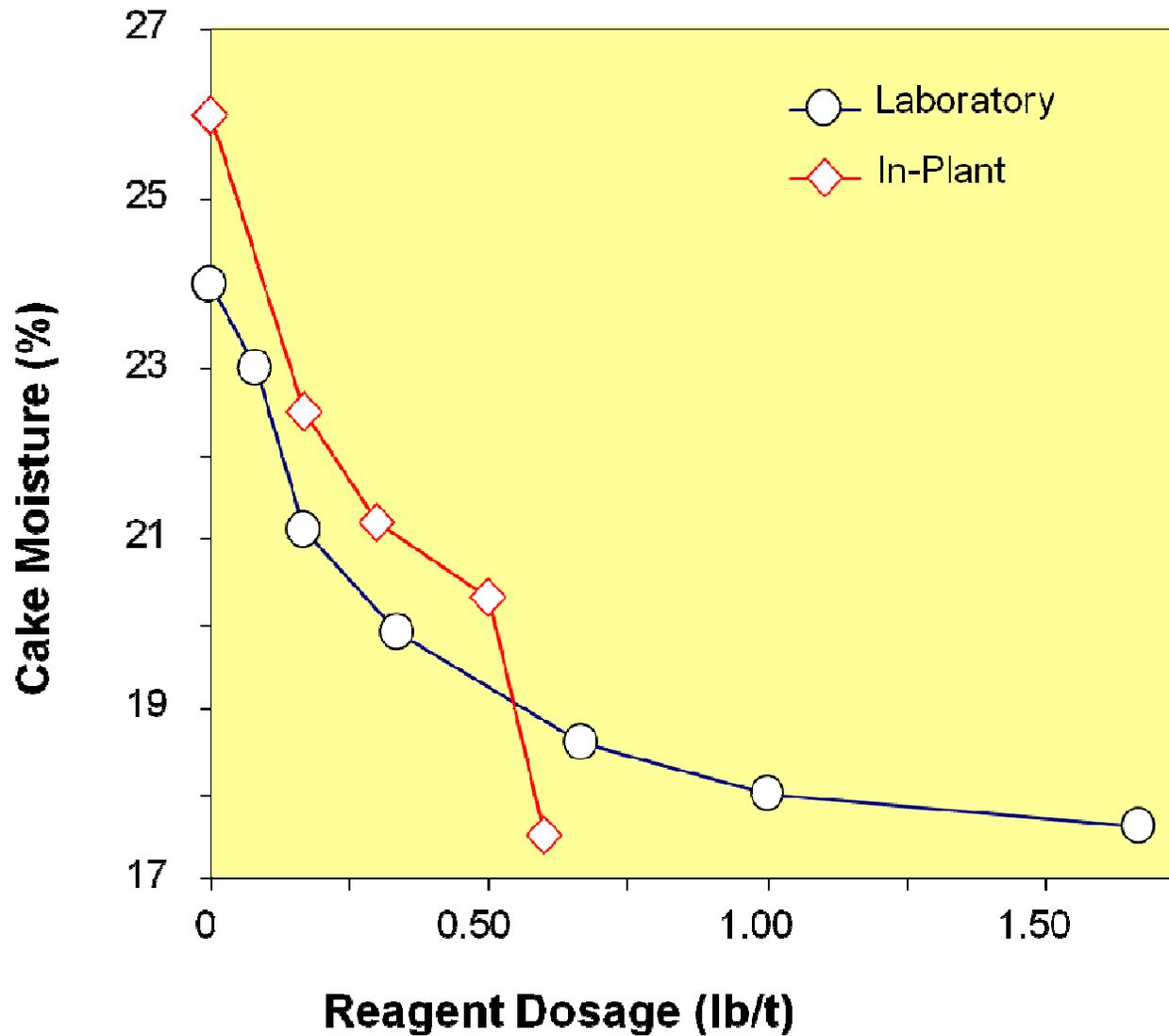
*World's largest and most
efficient flotation machine
(located at Kennecott).*



*Simulation of fluid flows
using Computational Fluid
Dynamics (CFD)*

Dewatering Aid

Comparison of Lab and Plant data



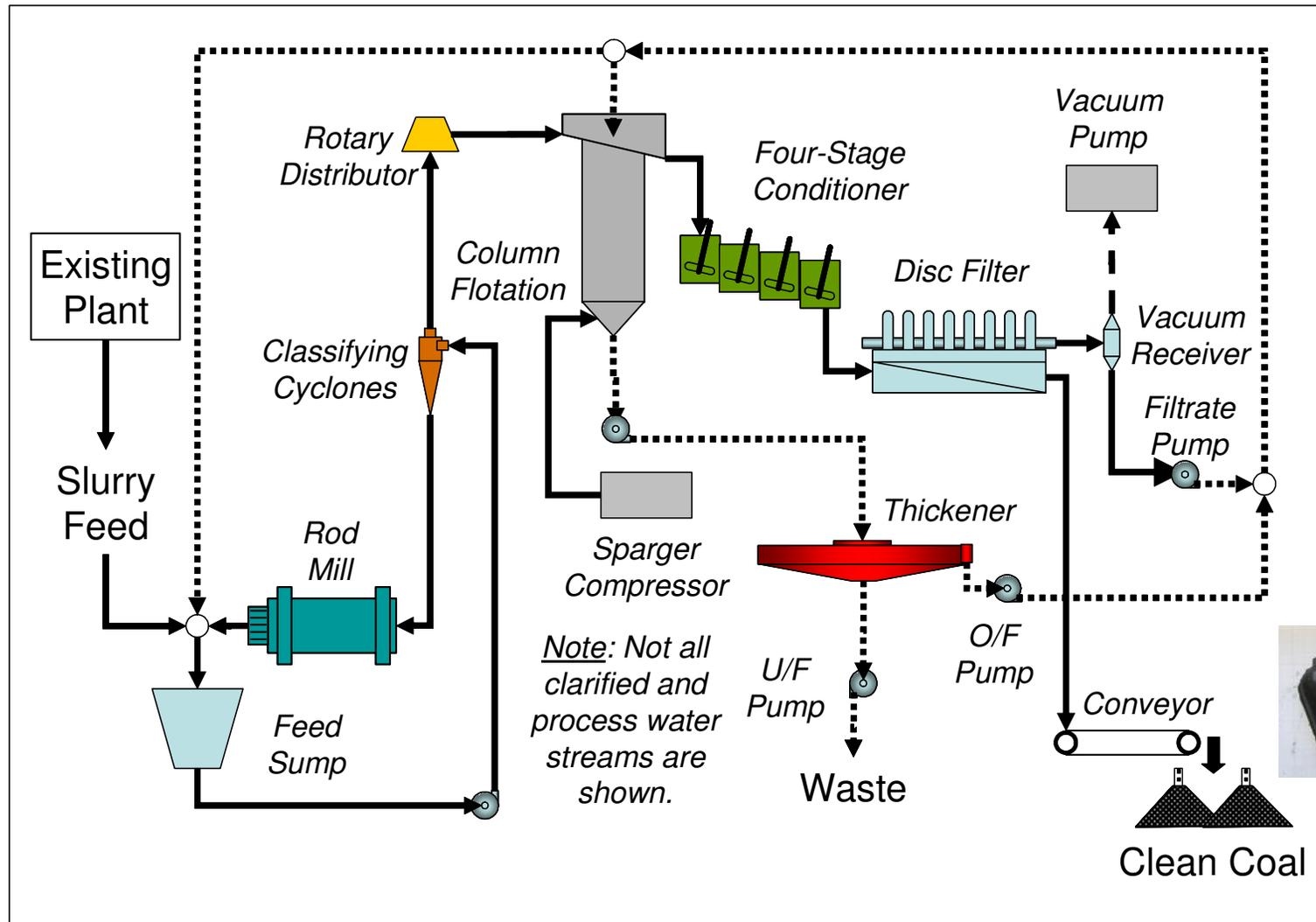
Hyperbaric Centrifuge

□ Pilot-scale tests

- *Moisture reduction*
 - *≈50% using conventional filter*
 - *13.4% using hyperbaric centrifugation.*
 - *>97% recovery on a coal with 90% -325 mesh*
- *Marketed by Decanter Machine Inc.*



Proposed Flowsheet for Indian Coking Coal



Summary

- ❑ India can increase the domestic production of coking coal.
 - *fine grinding to improve liberation,*
 - *advanced flotation to remove ash, and*
 - *advanced dewatering to remove moisture.*
- ❑ Advanced technologies:
 - *Microcel flotation*
 - *Novel dewatering aids*
 - *Hyperbaric centrifugation*
- ❑ Demonstration plant
 - *75 -100 tonnes/hour*
 - *Virginia Tech design*
 - *Contract is being negotiated.*

