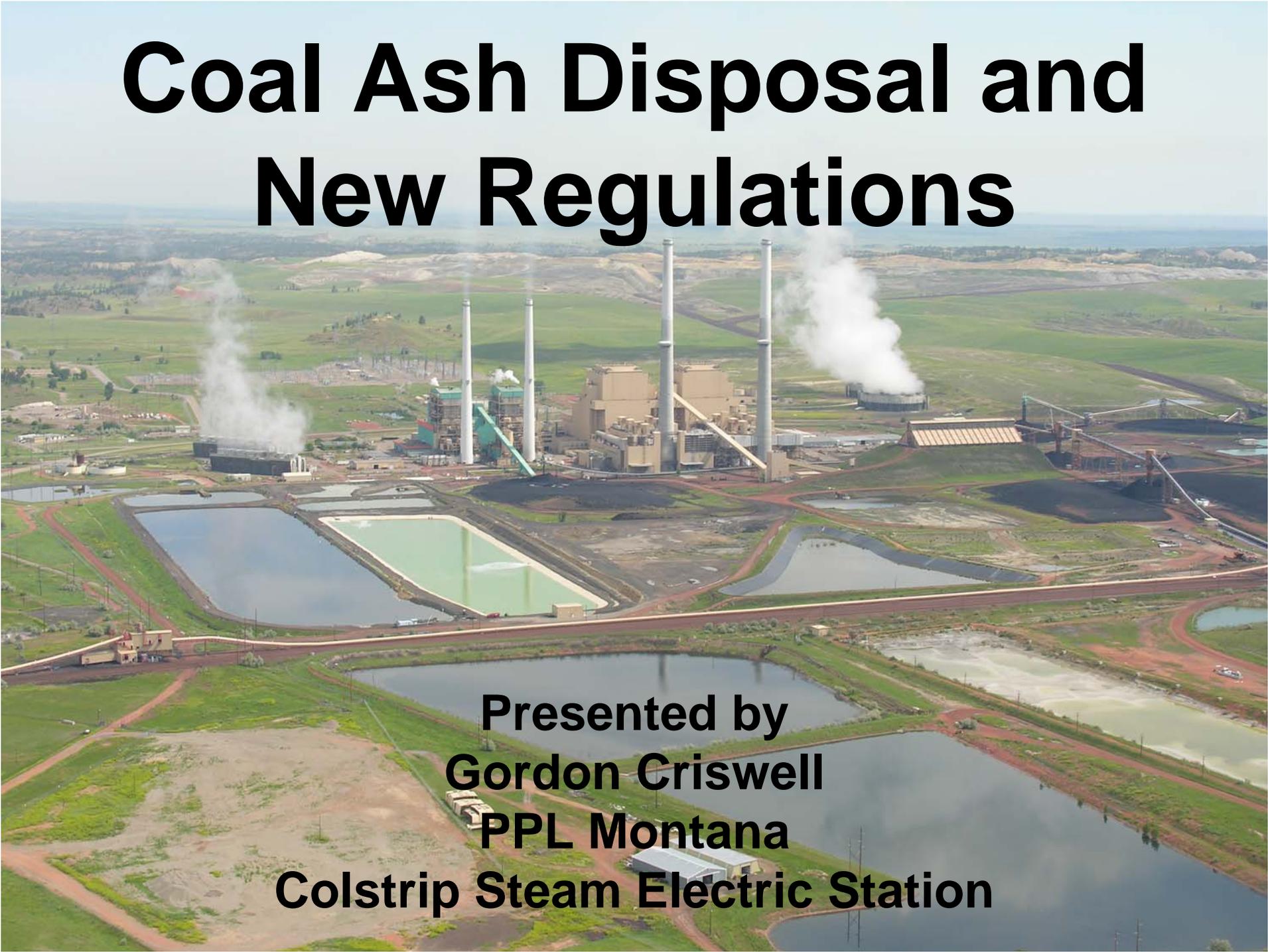
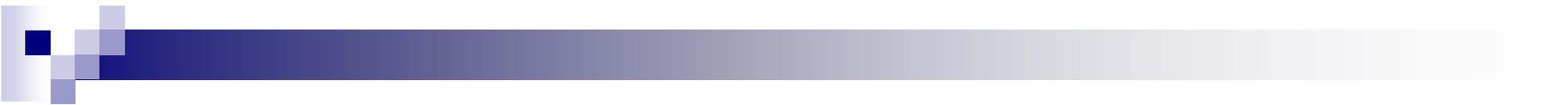


Coal Ash Disposal and New Regulations



**Presented by
Gordon Criswell
PPL Montana
Colstrip Steam Electric Station**

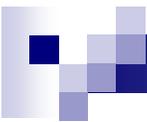


Colstrip Steam Electric Station

- **2276 Megawatts, 2nd largest coal fired power plant west of Mississippi River**
- **350 employees**
- **10 million tons of coal per year**
- **Wet scrubber - 99.5% particulate control and 95% SO₂ control**
- **Final disposal of ash/scrubber slurry in surface impoundment**

Project Location





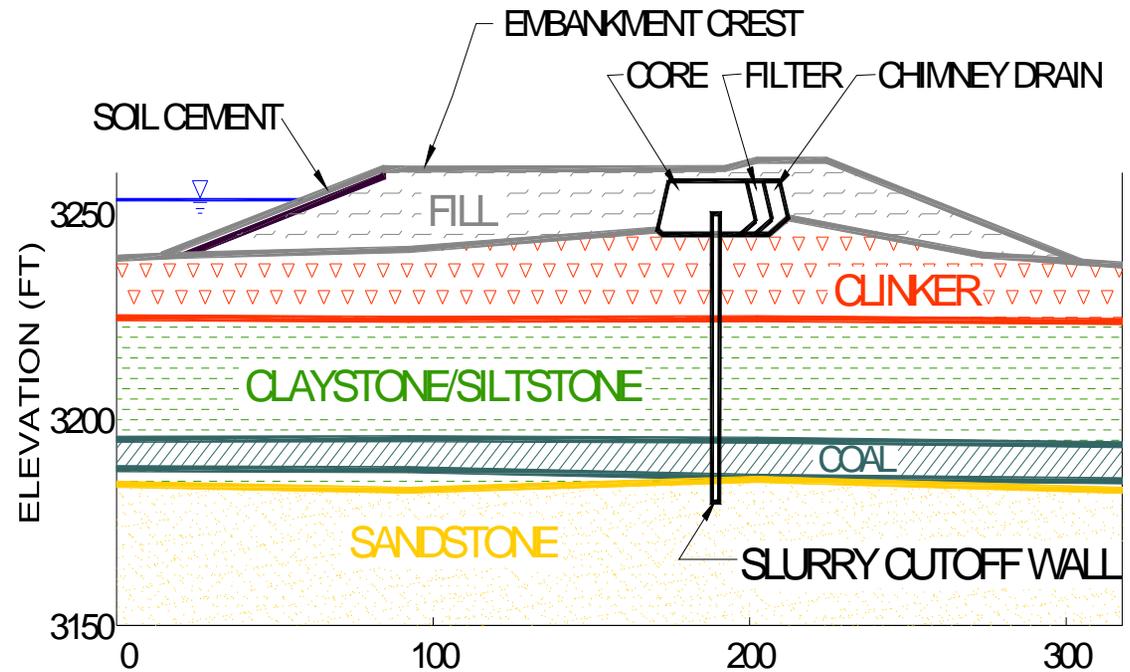
Coal Ash/Scrubber Slurry

- **85% ash**
 - Silica oxide, aluminum oxide, calcium oxide
 - Trace amounts of metals (ppm/ppb range)
- **15% scrubber slurry**
 - Calcium sulfate (gypsum), magnesium sulfate
 - Boron
- **Not a hazardous waste**
 - TCLP tests typically non-detectable
 - Mercury levels non-detectable
 - Arsenic levels below Drinking Water Health Standards
 - Lower than Missouri & Yellowstone rivers
 - Lead levels below Drinking Water Health Standards
 - Would normally meet Bottled Drinking Water Standard

Original Impoundment Design



Original Impoundment Design



Original Impoundment Design



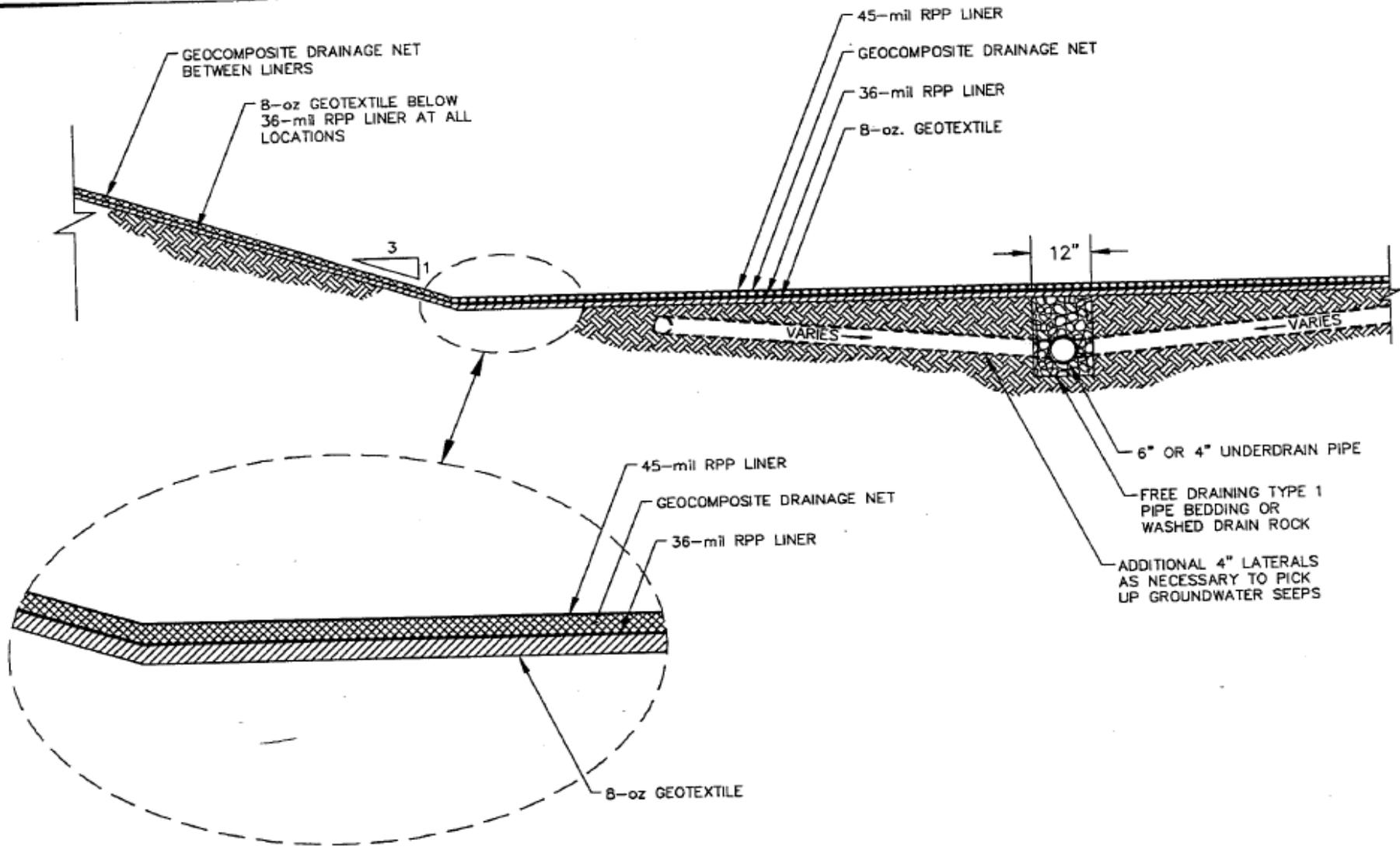
Current Disposal Process

■ Paste Disposal

- 100 tons per hour, 65% solids, 10.5" slump, (700,000 tons/year)
- 95% reduction in seepage potential
- Clearwater returned to plant for re-use



Recent Lining Practice



1 **TYPICAL CROSS SECTION**
D5 NOT TO SCALE

Recent Lining Practice





Recently Lined Ponds

- Since 2004, six ponds lined, ~130 acres
- Two ponds composite lined
 - At least 3' low permeability material
 - Leachate collection
 - 45 mil RFP liner
- Four ponds double lined
 - Under-liner leachate collection
 - 35-mil RFP lower liner
 - Between-liner leachate collection
 - 45-mil RFP upper liner
- Cost ~\$200,000 per acre

Most Recent Liner installation (2011)



Most Recent Liner Installation (2011)



Most Recent Liner Installation (2011)

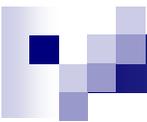


Most Recent Liner Installation (2011)



Most Recent Liner Installation (2011)





EPA Proposed Regulations

- **Subtitle C – Treat as hazardous material**
 - Potential elimination of beneficial re-use of ash
 - Need for landfills in states where hazardous waste landfills have not been permitted
 - Significant plant retrofits for handling material as hazardous
 - Up to 5 years to meet new impoundment requirements
 - Convert to dry handling
- **Subtitle D – Treat as non-hazardous material**
 - Continued beneficial re-use of ash
 - Up to 5 years to meet new impoundment requirements
 - Convert to dry handling



Future Ash Disposal at Colstrip

- Expect final regulation or legislative action by end of this year
- Likely need to re-line all ash ponds with latest technology
 - Using current footprint with structurally stable material would be least environmental impact
- Likely need to convert to dry disposal systems
 - Result in material handling issues including dusting

QUESTIONS?

