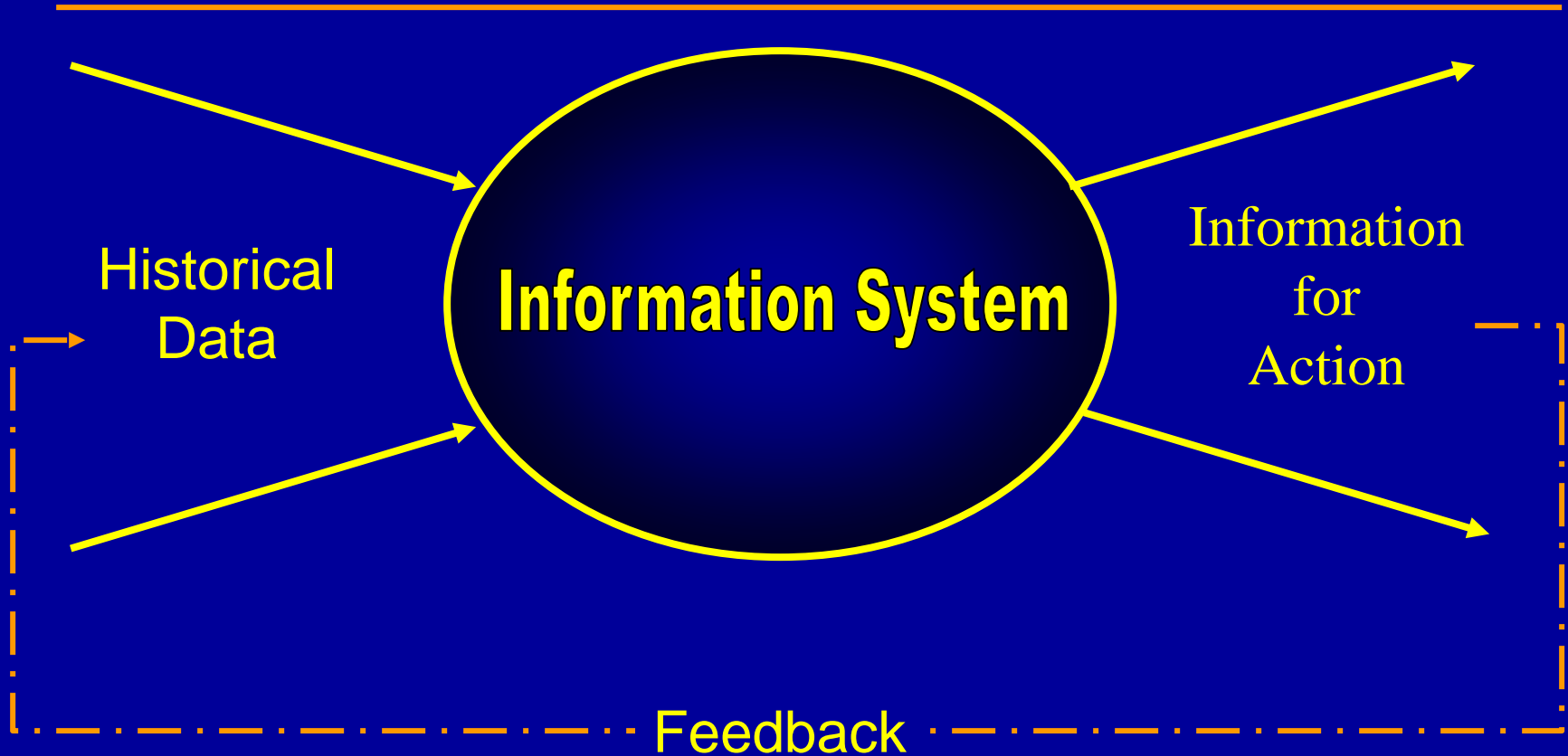

Kennecott Utah Copper's Information System

A.E. Lamb, D.J. Sonntag, W.P. Wride
2000 OSI Software Users' Conference
April 2 - 5, 2000
San Francisco, California



Kennecott's Foundation for Excellence



KUC Information System

General Information

PI System

Uses



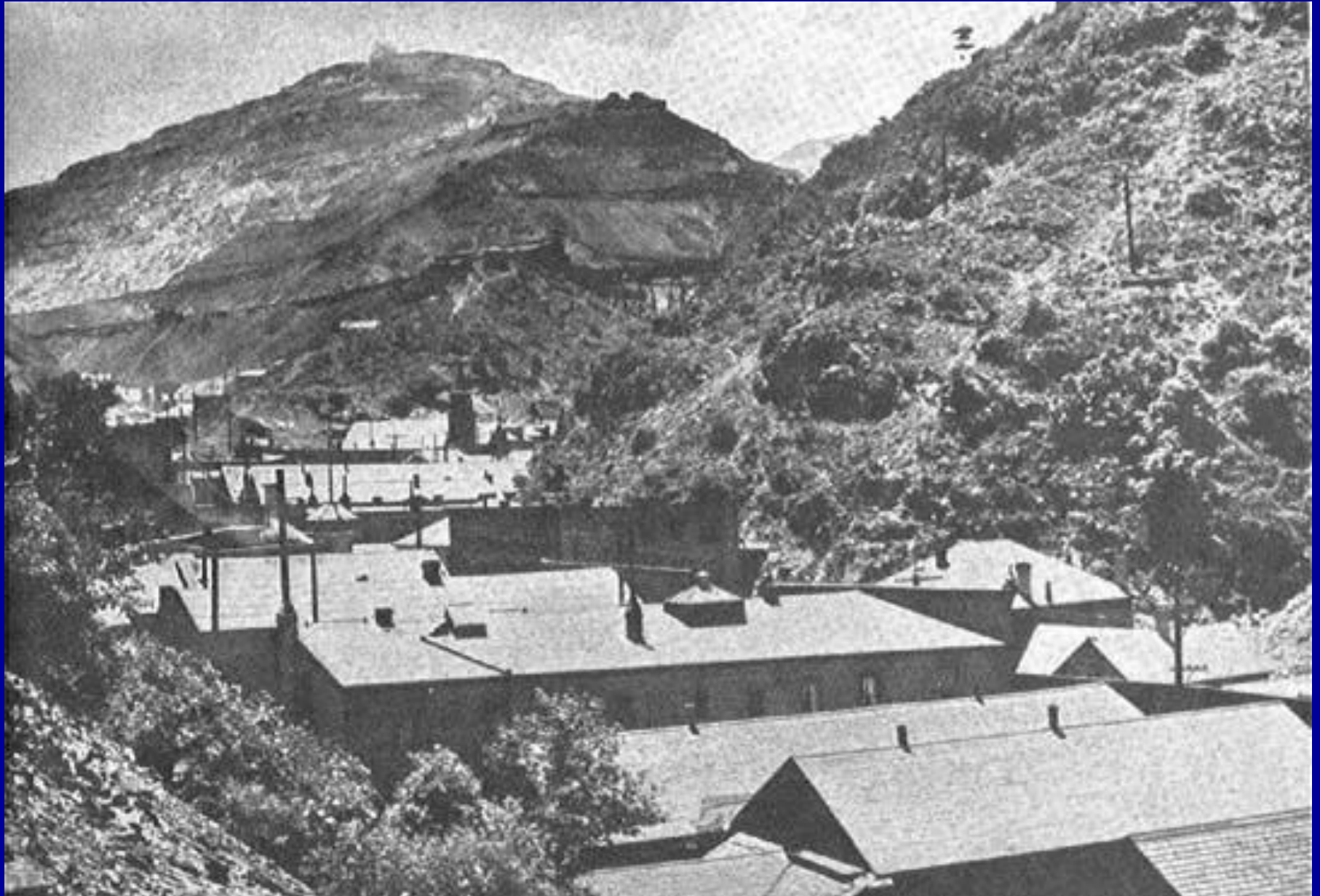
General Information

- Historical (The Hill)
- Current (The Pit)
- KUC Process



The Hill

General Information



General Information

- Historical (The Hill)
- Current (The Pit)
- KUC Process

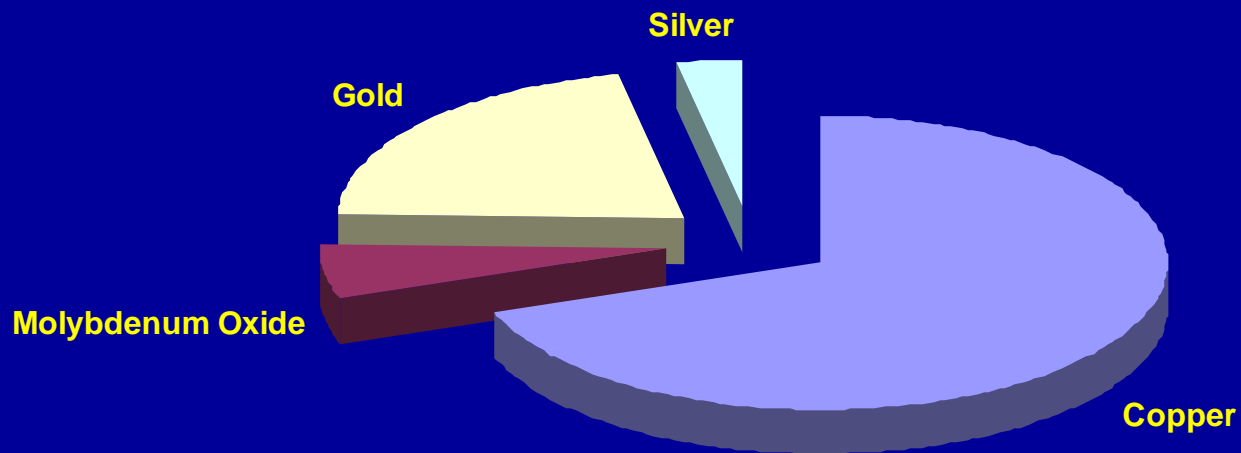


The Pit

General Information



Kennecott Annual Production Revenue

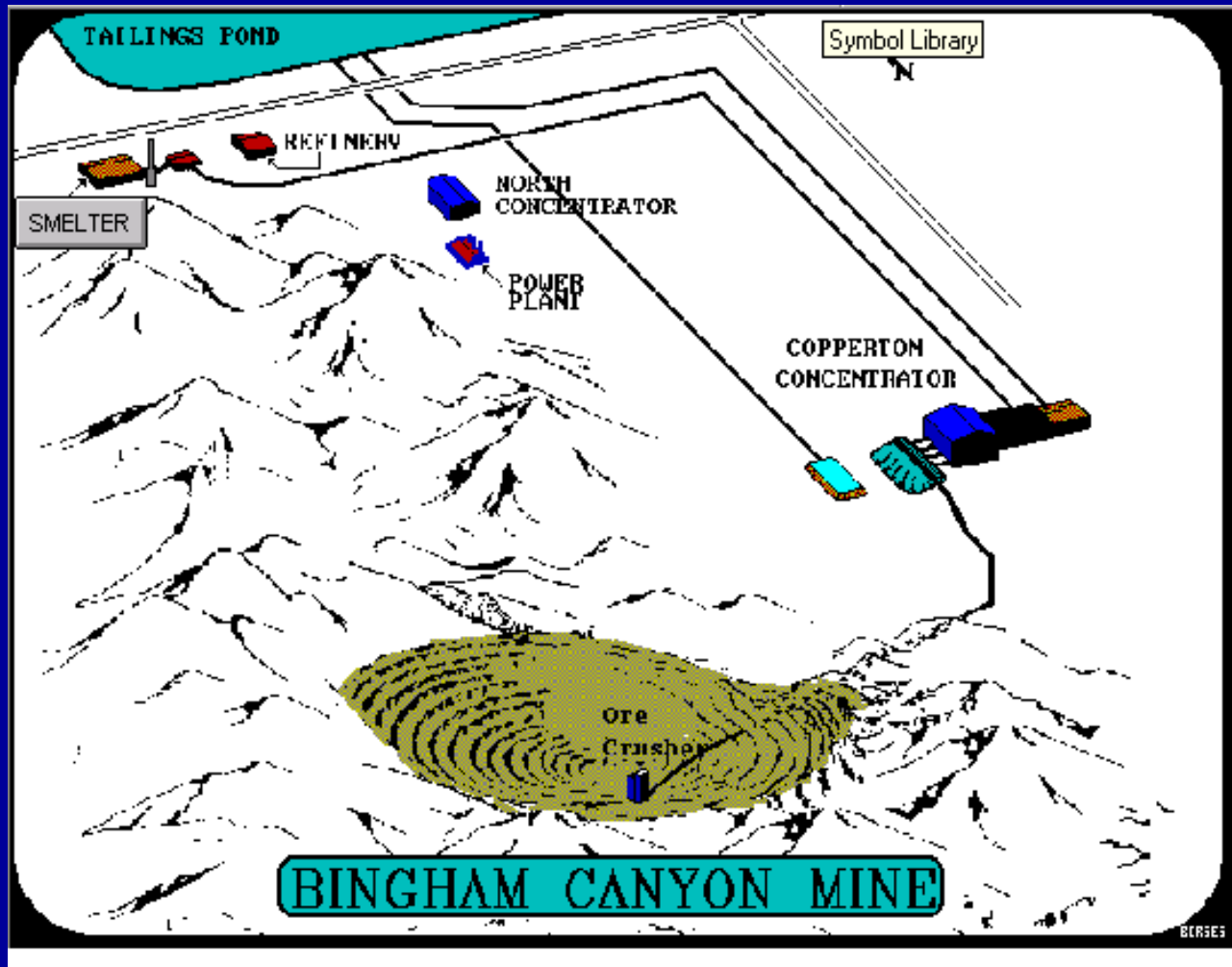


General Information

- Historical (The Hill)
- Current (The Pit)
- KUC Process

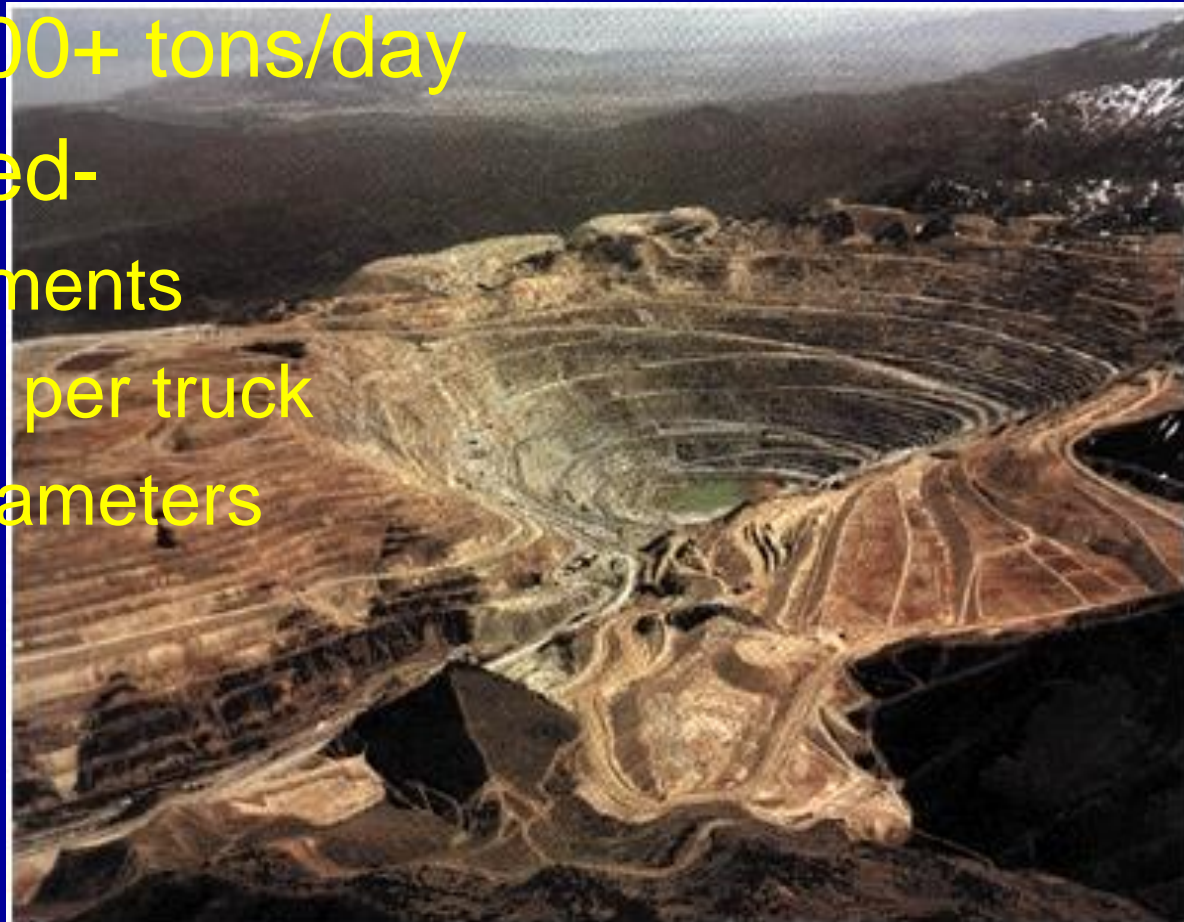


KUC Process



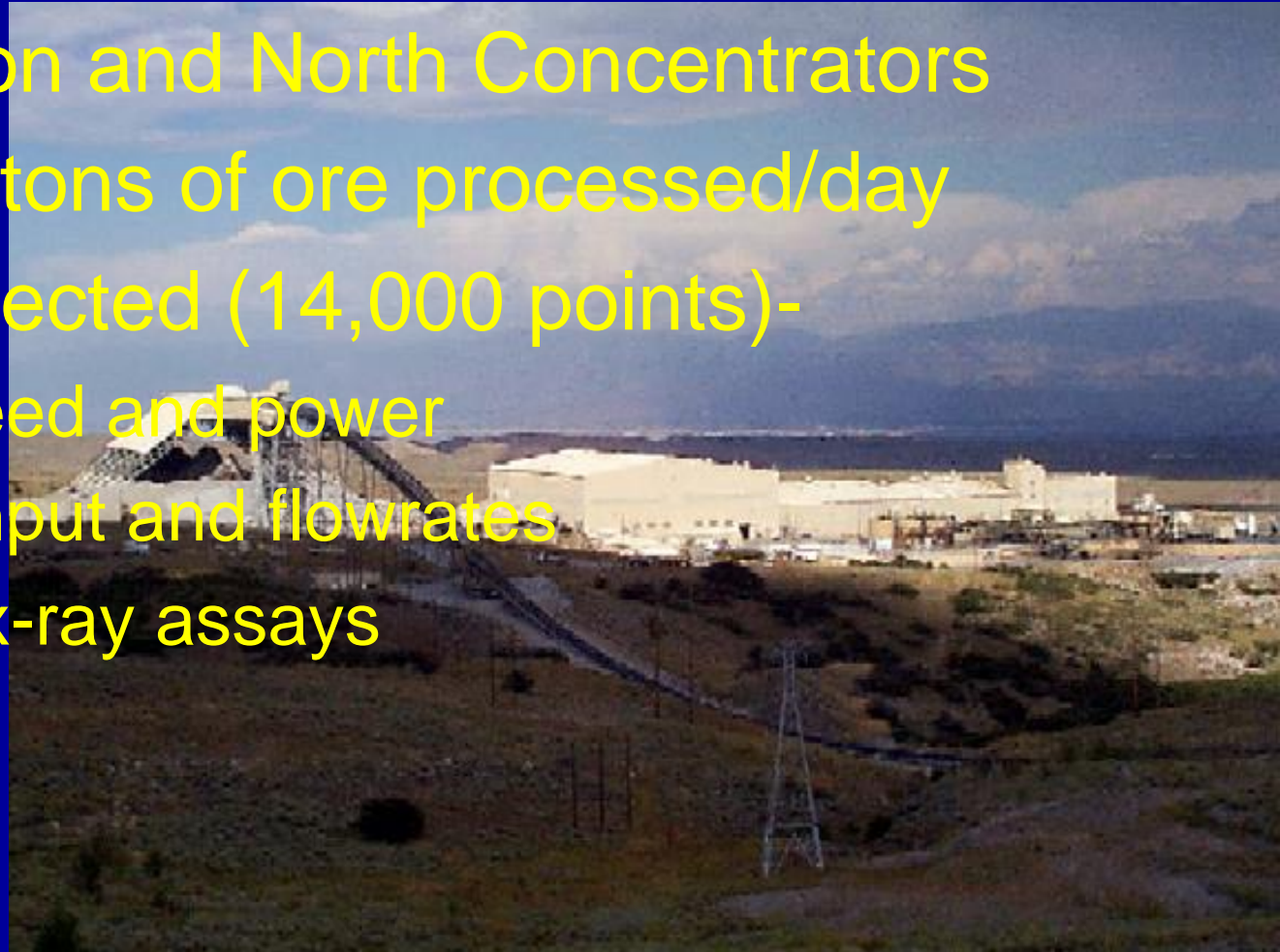
The Bingham Canyon Mine

- Move 300,000+ tons/day
- Data collected-
 - truck movements
 - tons hauled per truck
 - crusher parameters



The Concentrators

- Copperton and North Concentrators
- 172,000 tons of ore processed/day
- Data collected (14,000 points)-
 - mill speed and power
 - throughput and flowrates
 - online x-ray assays



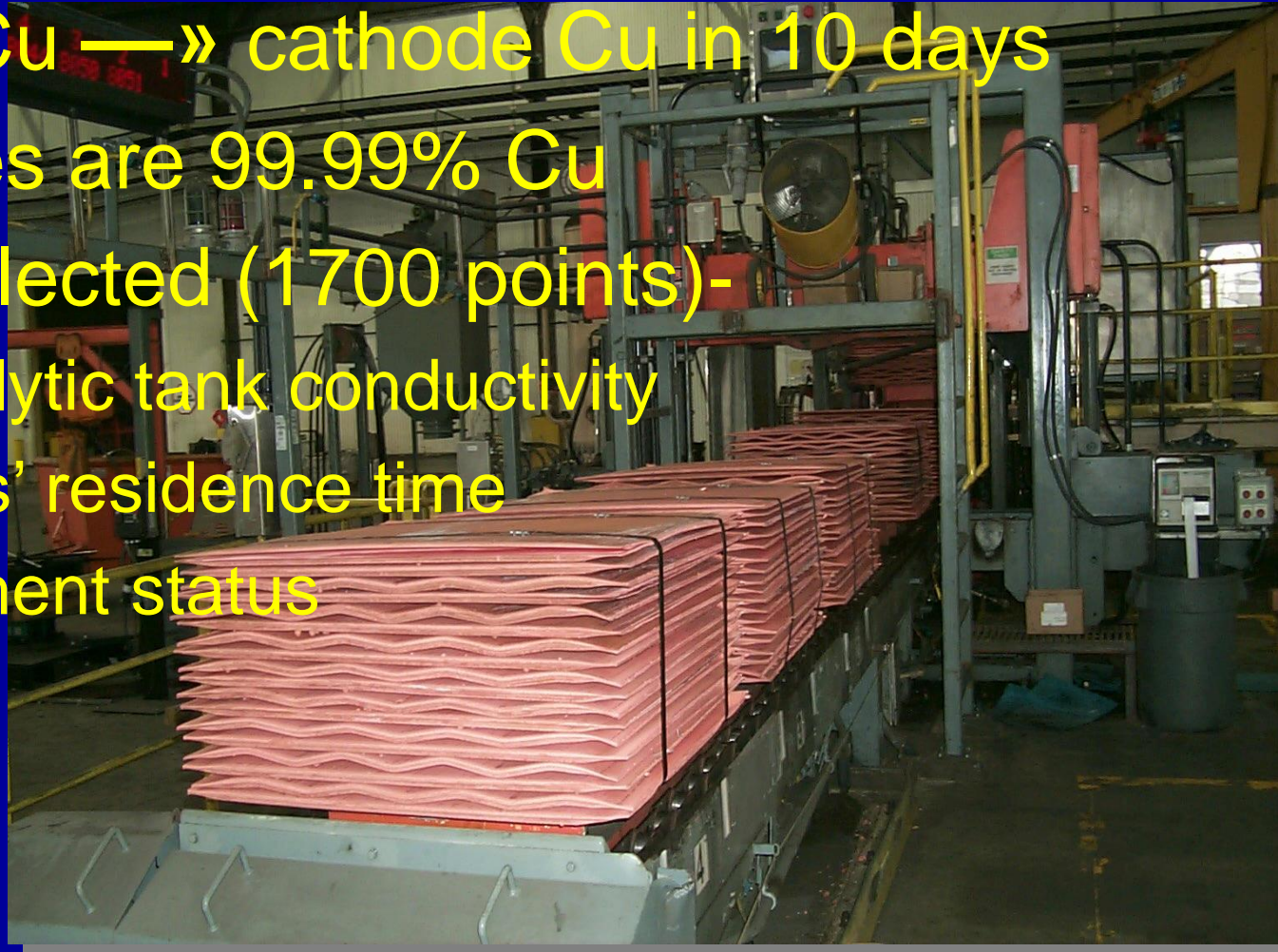
The Smelter

- Flash smelting, flash converting technology
- 720-lb, 99.5% Cu anodes
- Data collected (13,000 points)-
 - furnace temperatures
 - flowrates
 - assays



The Refinery

- Anode Cu —» cathode Cu in 10 days
- Cathodes are 99.99% Cu
- Data collected (1700 points)-
 - electrolytic tank conductivity
 - anodes' residence time
 - equipment status



KUC Information System

General Information

PI System

Uses



PI System

- Instrument Interface
- Compression Algorithm
- User Interface
- Plants Operating With PI



KUC Information System

General Information

PI System

Uses



Uses

- Operations / Maintenance Troubleshooting
- Process Optimization
- Process Online Monitoring
- Creating Production Reports
- Maintenance Scheduling

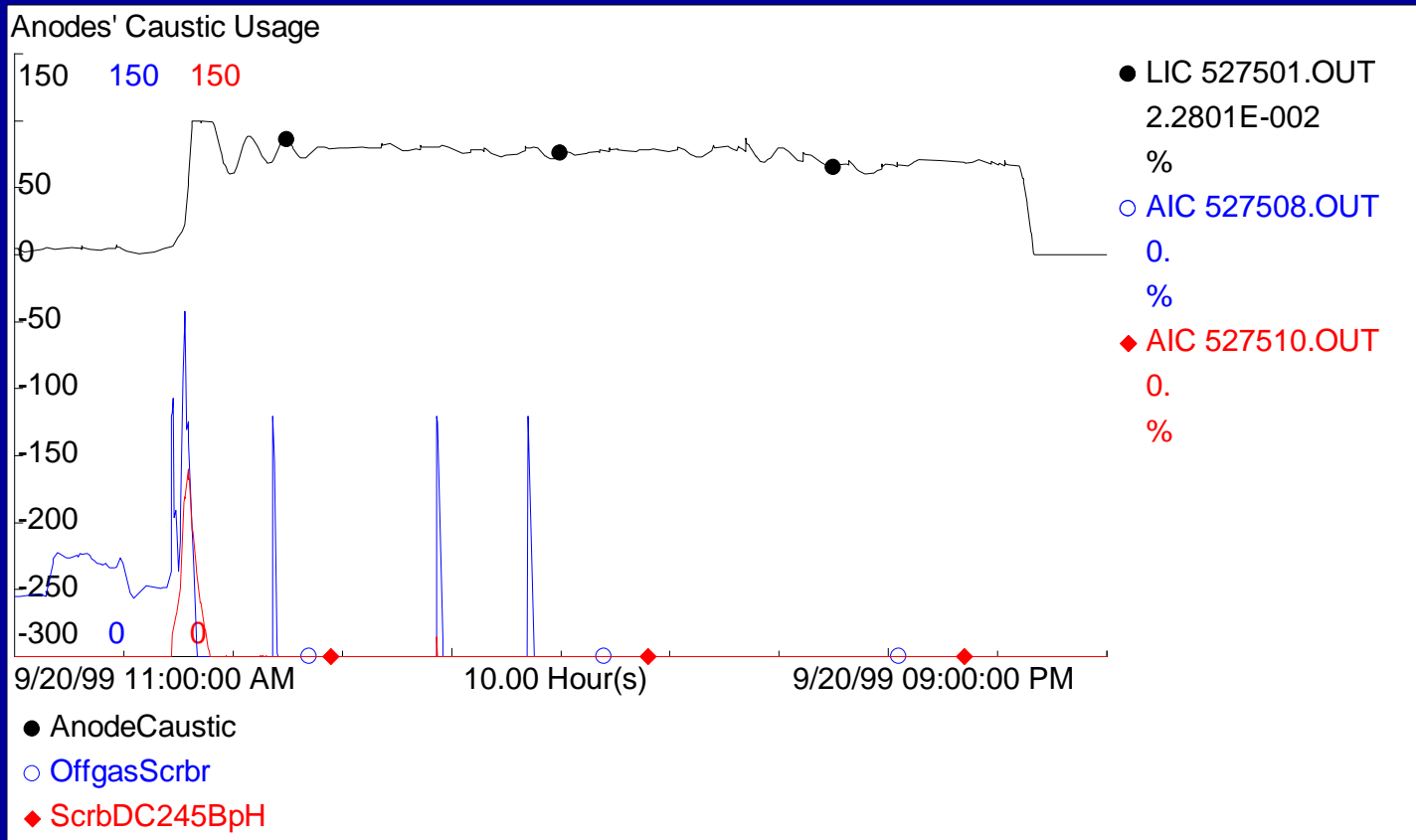


Operations / Maintenance Troubleshooting

- Unusual Caustic Usage
- Oxidation-Reduction Potential (ORP)
Control Problem



Caustic Valve Operation



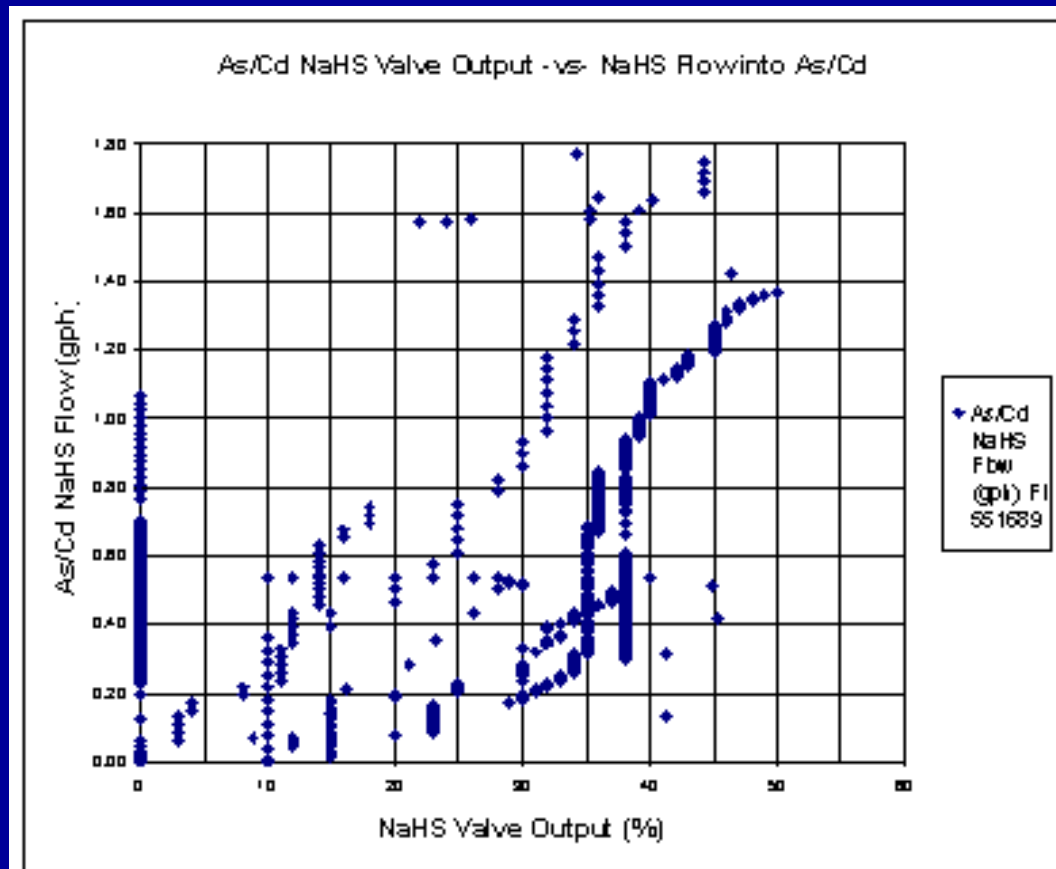
Operations / Maintenance Troubleshooting

Uses

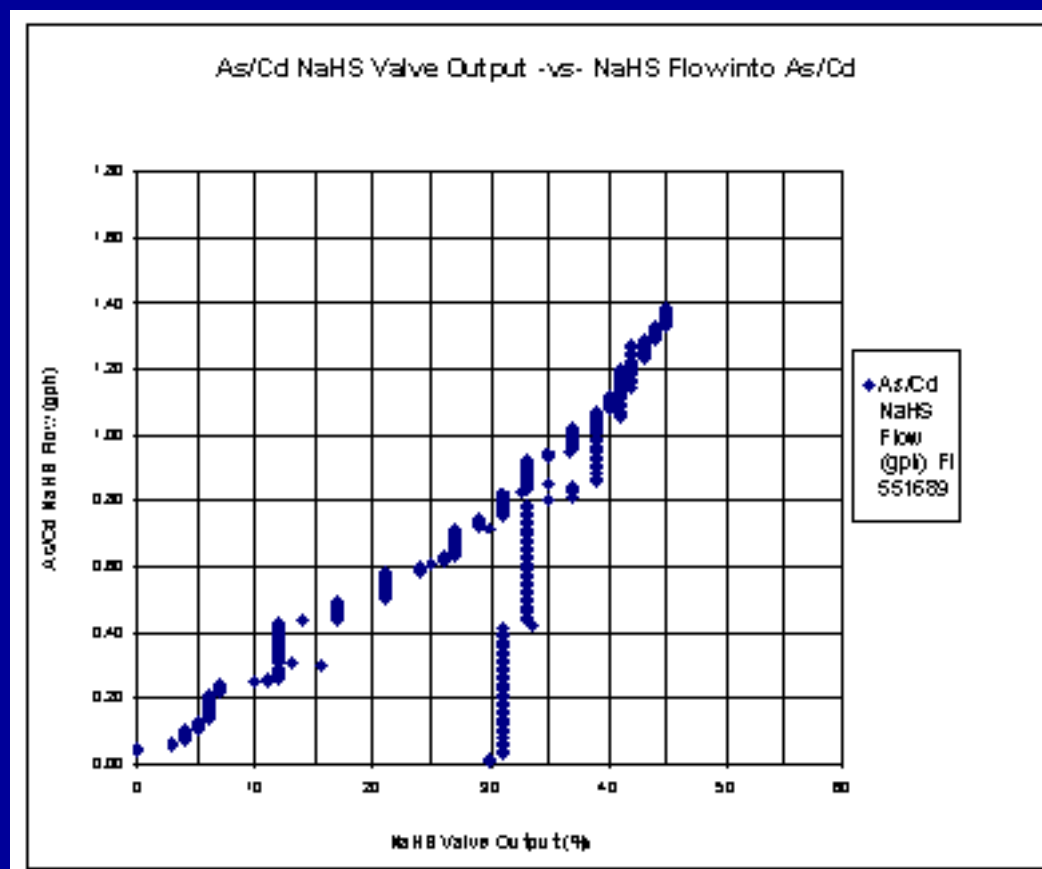
- Unusual Caustic Usage
- Oxidation-Reduction Potential (ORP)
Control Problem



Faulty Reagent Valve



Working Reagent Valve



Uses

- Operations / Maintenance Troubleshooting
- **Process Optimization**
- Process Online Monitoring
- Creating Production Reports
- Maintenance Scheduling



Process Optimization

- Monitoring Boiler Pressure Increase
- Furnace Process Control Issues



Holman Boiler Warm-up Curve

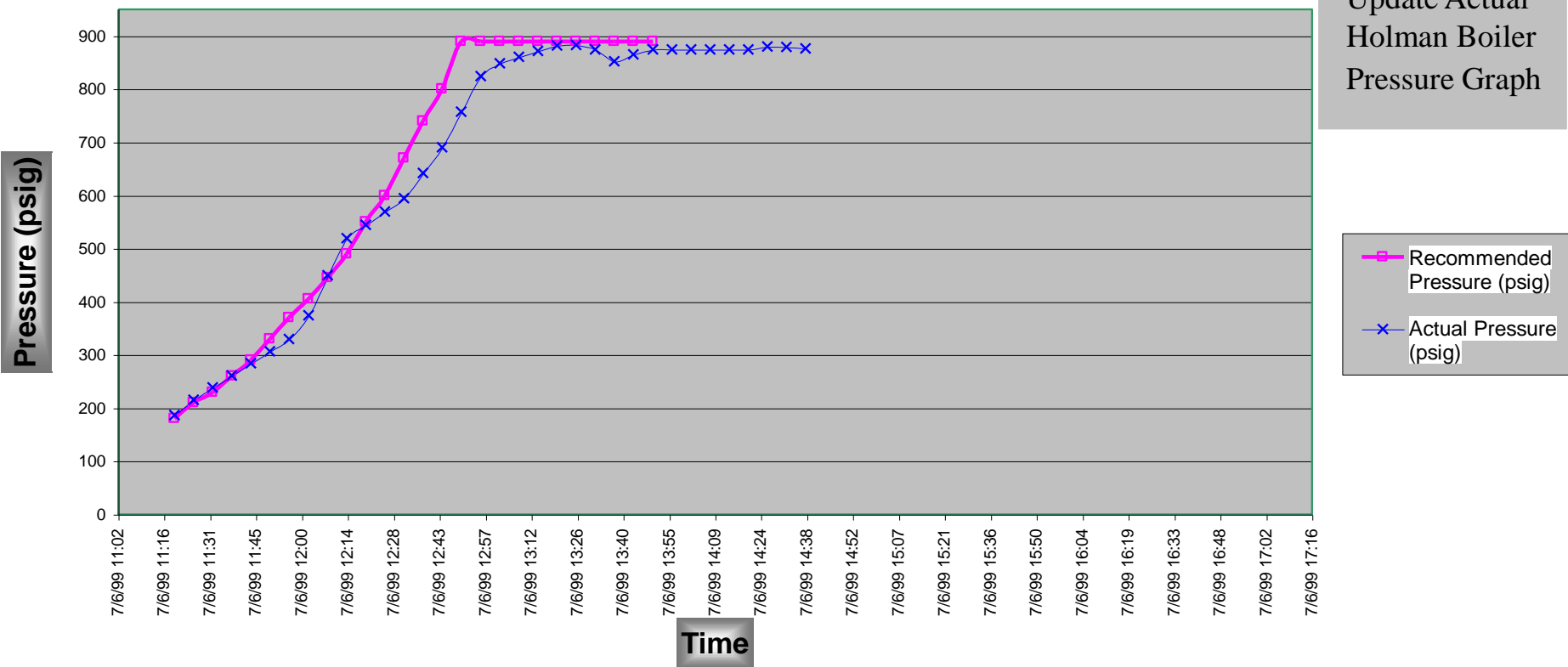
Enter Starting Date:

7/6/99

Enter Starting Time:

11:20

Holman Boiler Pressure - Warm Up Curve



Process Optimization

- Monitoring Boiler Pressure Increase
- Furnace Process Control Issues

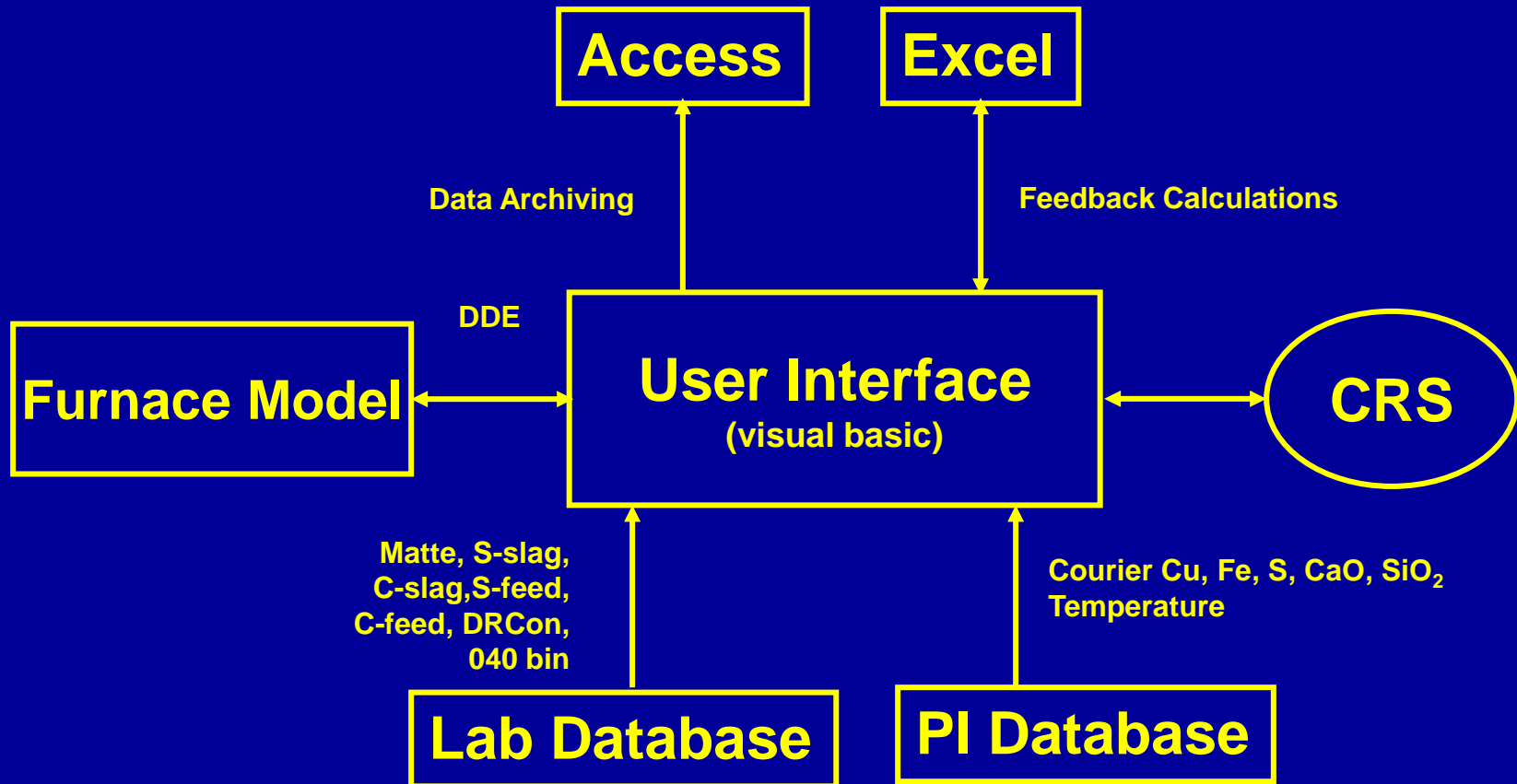


FSF/FCF Process Control Issues

- Sampling and Process Data Availability
- Lack of Feedback Control on both furnaces
- Concentrate & Matte Grade Variations to the FSF/FCF



Furnace Interface Logic



Uses

- Operations / Maintenance Troubleshooting
- Process Optimization
- **Process Online Monitoring**
- Creating Production Reports
- Maintenance Scheduling



Process Online Monitoring

- Smelter Hot Metals Operation
- Powerhouse Operating Parameters

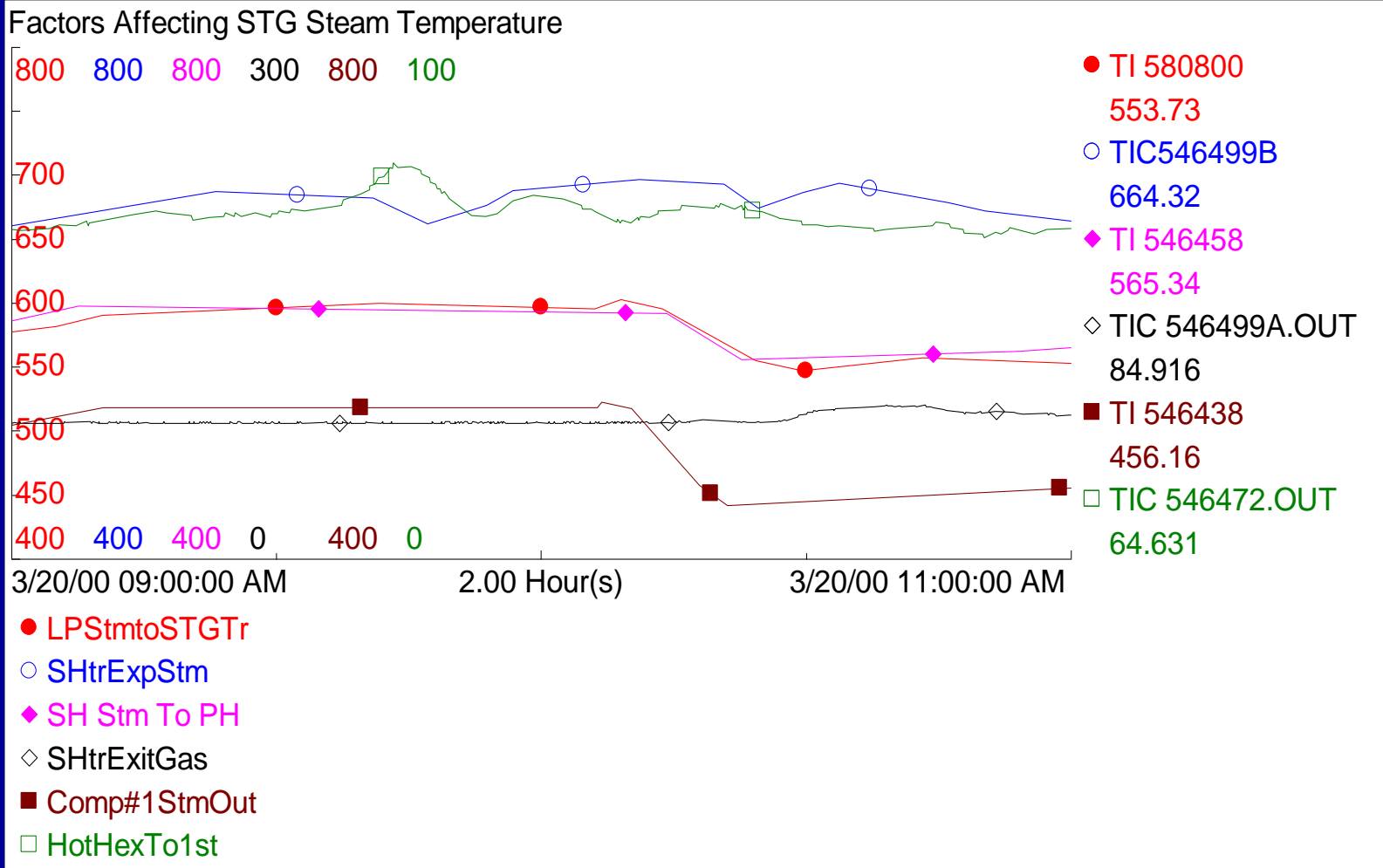


Process Online Monitoring

- Smelter Hot Metals Operation
- Powerhouse Operating Parameters



Powerhouse Operating Parameters



Uses

- Operations / Maintenance Troubleshooting
- Process Optimization
- Process Online Monitoring
- **Creating Production Reports**
- Maintenance Scheduling

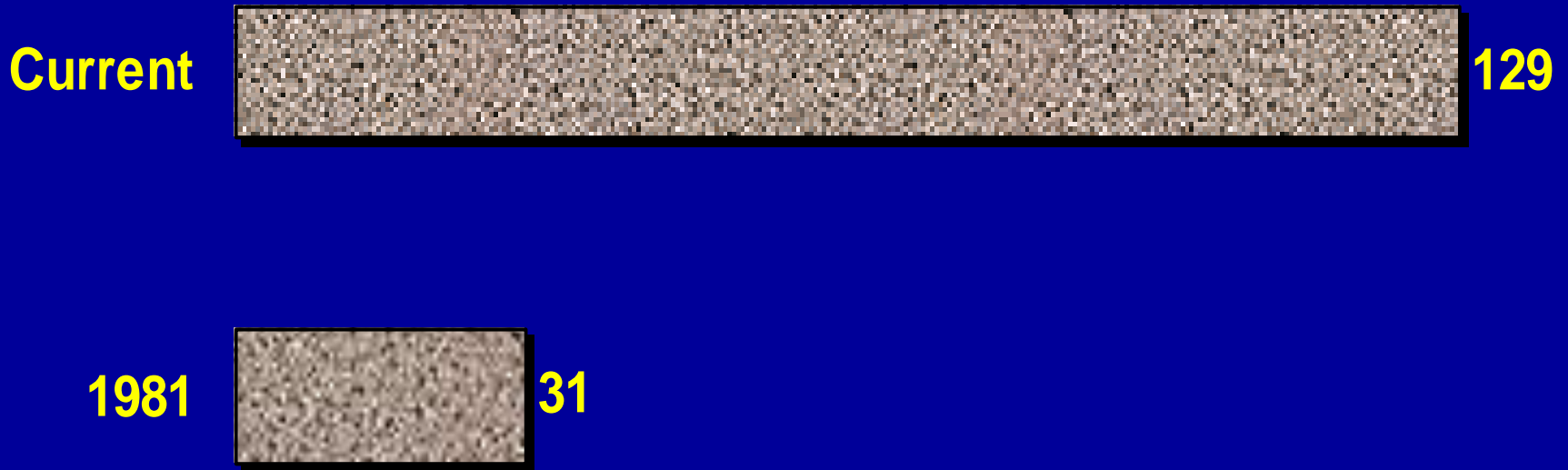


Creating Production Reports

- Efficient Use of Manpower
- Timely Decision Making



Kennecott Productivity Increase Since 1981 (Tons Copper Produced/Employee)



Creating Production Reports

- Efficient Use of Manpower
- Timely Decision Making



Uses

- Operations / Maintenance Troubleshooting
- Process Optimization
- Process Online Monitoring
- Creating Production Reports
- Maintenance Scheduling



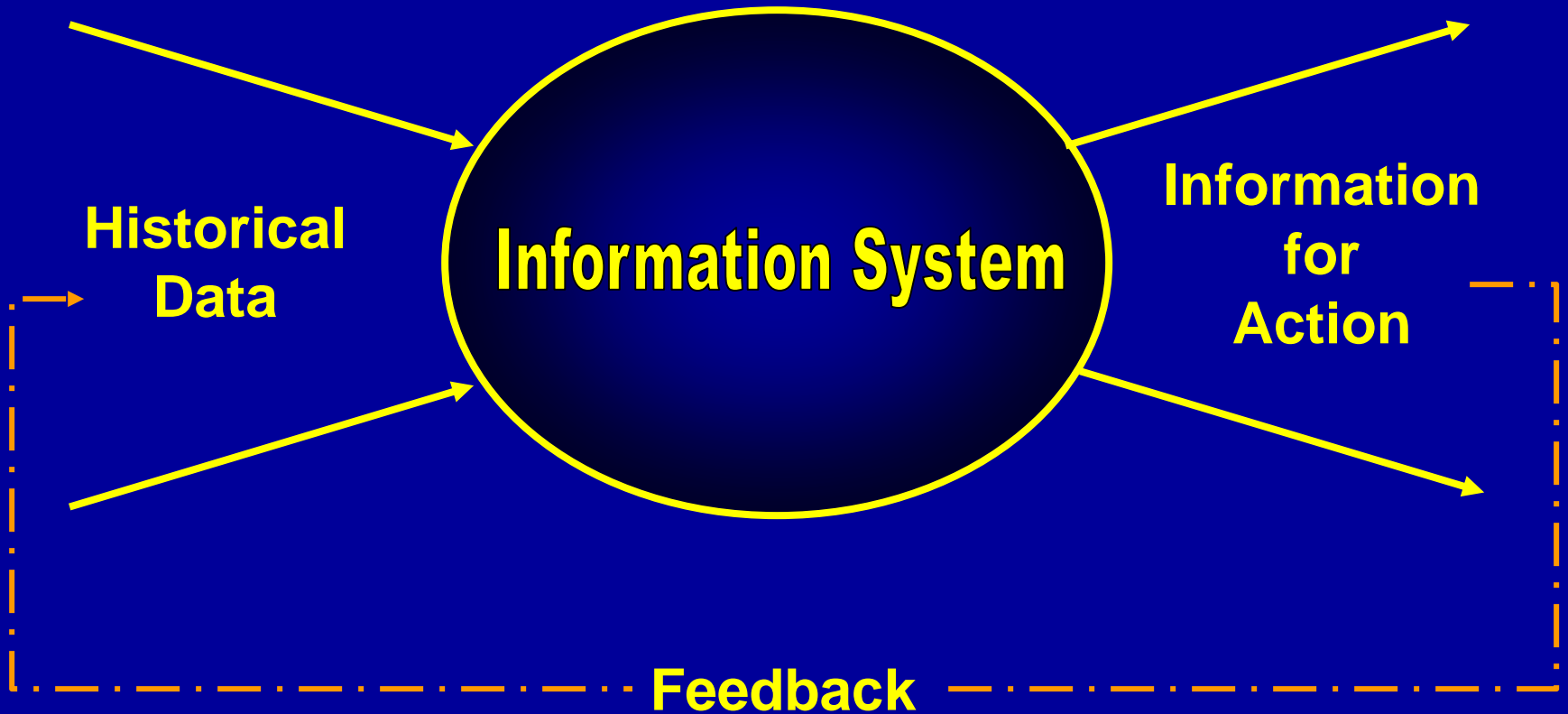
KUC Information System

General Information

PI System

Uses





Kennecott's Foundation for the Future



Questions?

