Coal Basin History; Geology, Mining, Reclamation

You have to know the past to understand the future

- Carl Sagan
Welcome to planet Earth, a wonderful but not entirely stable place to live."
-Craig Childs

- Mancos Shale; Cretaceous deep ocean, fine grained sediment;

- MesaVerde Formation
  - Late Cretaceous inter-continental and near coast inter-bedded coal, sandstone shale development

- Nearby Elk Mountains mountain building pushes sediments upwards
Geology and Coal Basin

- Physical geography and geology are inseparable scientific twins. *Sir Roderick Murchison*, 1857

- Following mountain building episodes, erosion and mass wasting become dominant land-forming processes in Coal Basin.
  - Dutch Creek debris flows
  - Incised creeks
  - Sediment laden runoff
Coal Basin History

• Late 1800’s
  – John Osgood develops Coal Basin Mine
    • Located near headwaters of Coal Creek

– Coal Basin Mine operates until about 1908
  • Rail and town site remnants still visible
  • Coal refuse located in and adjacent to Coal Creek floodplain
Coal Basin History

- 1956 Mid Continent Coal and Coke Company begins operations;
- Underground mining and coal cleaning operations;
- Five underground mines developed over span of about 10 years;
- Operations cease in 1991
Coal Basin History

• Each mine built at about 10,000 elevation;

• Each mine had about 4 entries and fan entries;

• Entry areas (face-up) developed by excavating mountain to create highwalls;
  – waste downcast over slope;

• Coal mined by room and pillar and longwall methods;
Coal Basin History

• Coal hauled from entries to preparation plant for cleaning;

• Need for facilities space and coal refuse deposition results in channelization of Dutch Creek;

• About 15 miles of haul roads;

• Over-the-road hauling substantially replaced by Rock Tunnel beltline system in mid-’80’s;
Coal Basin History

• Continued coal cleaning requires construction of (second large) Sutey Coal Refuse Disposal Facility;

• Mine makes water. In later years mine water discharged at Rock Tunnel entry to treatment ponds;
Coal Basin History

• 1977 Federal Surface Mining Control and Reclamation Act (SMCRA) enacted;
  – State Primacy;
• About 1984 Mid-Continent Resources issued a permit by Colorado;
• Numerous operational and environmental issues;
• Numerous citizen complaints
Coal Basin History

• From late ‘80’s through 1993, lots of Federal / State / Company / Local Public Interest Group jostling to resolve site issues.

• A story unto itself, the upshot is:
Coal Basin History

- MCR files bankruptcy in February, 1992;
- The operating permit is revoked in August, 1992, MCR ordered to complete reclamation;
- Reclamation bond is forfeit by Colorado in September, 1993;
- First of a number of lawsuits between State and MCR initiates in September, 1993;
Coal Basin Environmental History

Environmental Issues Driving Reclamation

• Sedimentation from Mining Related Facilities
  – Road System
  – Facilities Area (Confluence Coal and Dutch Creeks)
  – Mine Bench Outslopes
  – Coal Basin Town Refuse
Coal Basin Environmental History

Environmental Issues Driving Reclamation

• ‘Contaminants’
  – Underground Storage Tanks
  – Diesel Stained Soils;

• Old Refuse Pile Instability (Confluence Coal and Dutch Creeks);

• Dutch Creek Diversion Instability
Coal Basin Environmental History

- Road Reclamation
Coal Basin Environmental History

- Mine Entry Area Reclamation
Coal Basin Environmental History

- Mine Bench Outslope Reclamation
Coal Basin Environmental History

- Facilities Area and Dutch Creek Diversion Reclamation
Coal Basin Environmental History

• Refuse Pile and Other Sediment Control Reclamation Projects
Reclamation Funding

Primary Reclamation Funding
• Reclamation Bond @ $2.5 Million
• Work in Lieu of Cash @ $500,000

• TOTAL @ $3,000,000

Supplemental Funding
• OSM Civil Penalty Grant (Dutch Creek Diversion) @ $110,000;
• AML Fund (Old Refuse Pile) @ $437,000;
• AML Fund (Coal Basin Town Refuse Pile) @ $135,000;
• CWA (319) Fund (Outslopes) @ $196,000;
• USFS, WRNF (Outslopes) @ $50,000;
• Colo. Dept. Ag (Weed Control) @ $ 6,000

• TOTAL @ $934,000
Coal Basin Environmental History

• My Soap Box (What I’ve Learned):

  – Understand the Environment at Coal Basin and Work With its Unique Character;

  – Exceptionally Dynamic and Mobile System;

  – Graze Only After Substantial Maturity and Diversity Established;
Coal Basin Environmental History

• My Soap Box (What I’ve Learned), Cont’d:

  – Build Micro Climates;

  – Disperse Water at Every Opportunity;

  – “Soils” and Remnant Refuse Respond to Addition of Organic Matter;