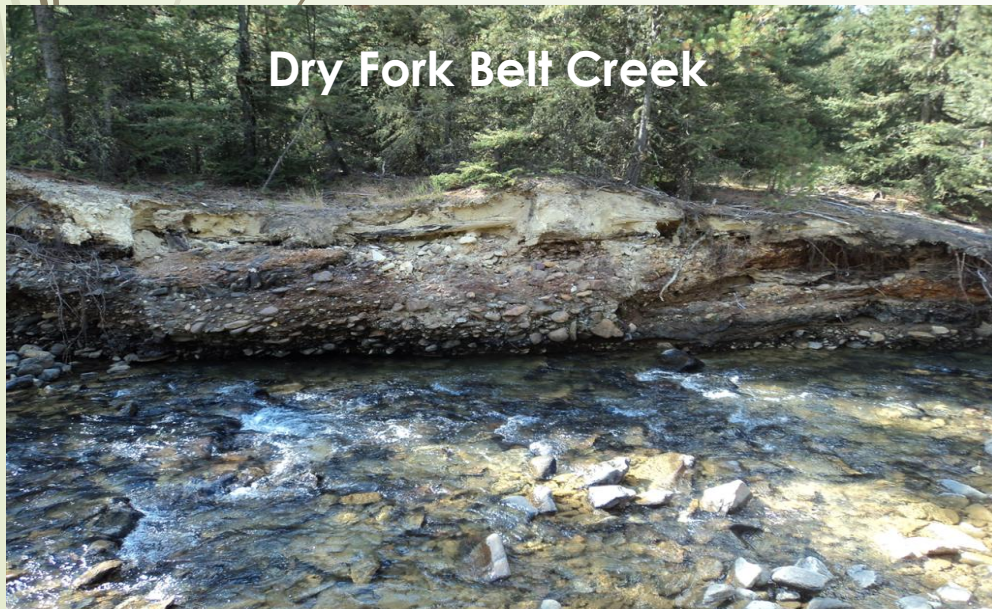


Collaboration and Partnerships with the Private Sector to Address Cleanup Challenges at Abandoned Mine Sites

Liberty Mine



Dry Fork Belt Creek



Galena Creek



Barker Hughesville and Carpenter Snow Creek Mining Districts

Sites located within Lewis and Clark-Helena National Forest System

Area renowned for silver, zinc, lead deposits

Ore discovered in 1879

Worked rich silver deposits near surface

Carted by oxen to Fort Benton then by steamboat to Nebraska for smelting

First phase of mining lasted until 1883

Hampered by transport costs and fluctuating silver prices



Underground mining began in the 1890s with the construction of rail lines and nearby smelters

Followed rich veins of zinc/lead underground

Lots of small scale mine operators
Not possible in the developed world's economy

Mining discontinued around turn of 20th century with drop in metal prices

Some underground mines encountered groundwater that became acidic when exposed to sulfides and air

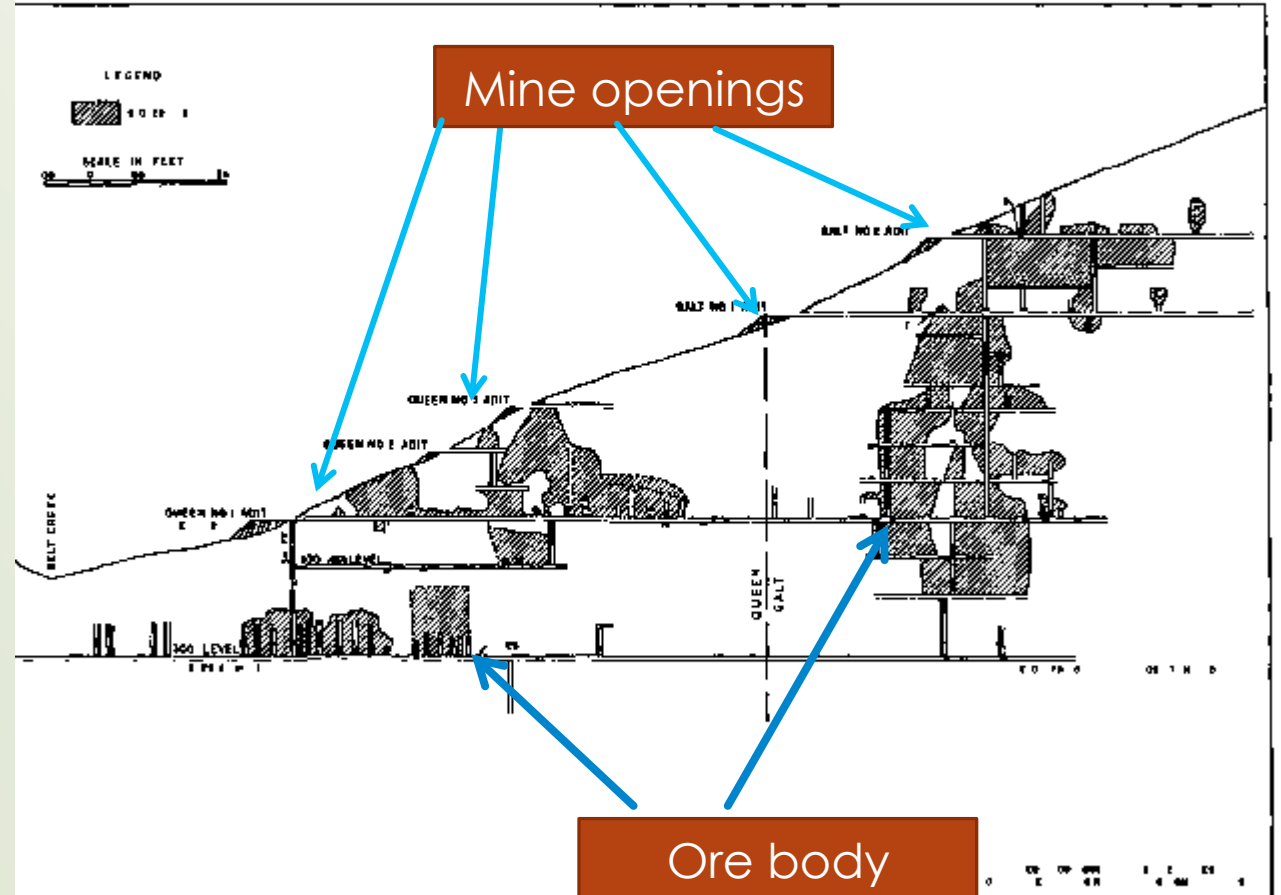
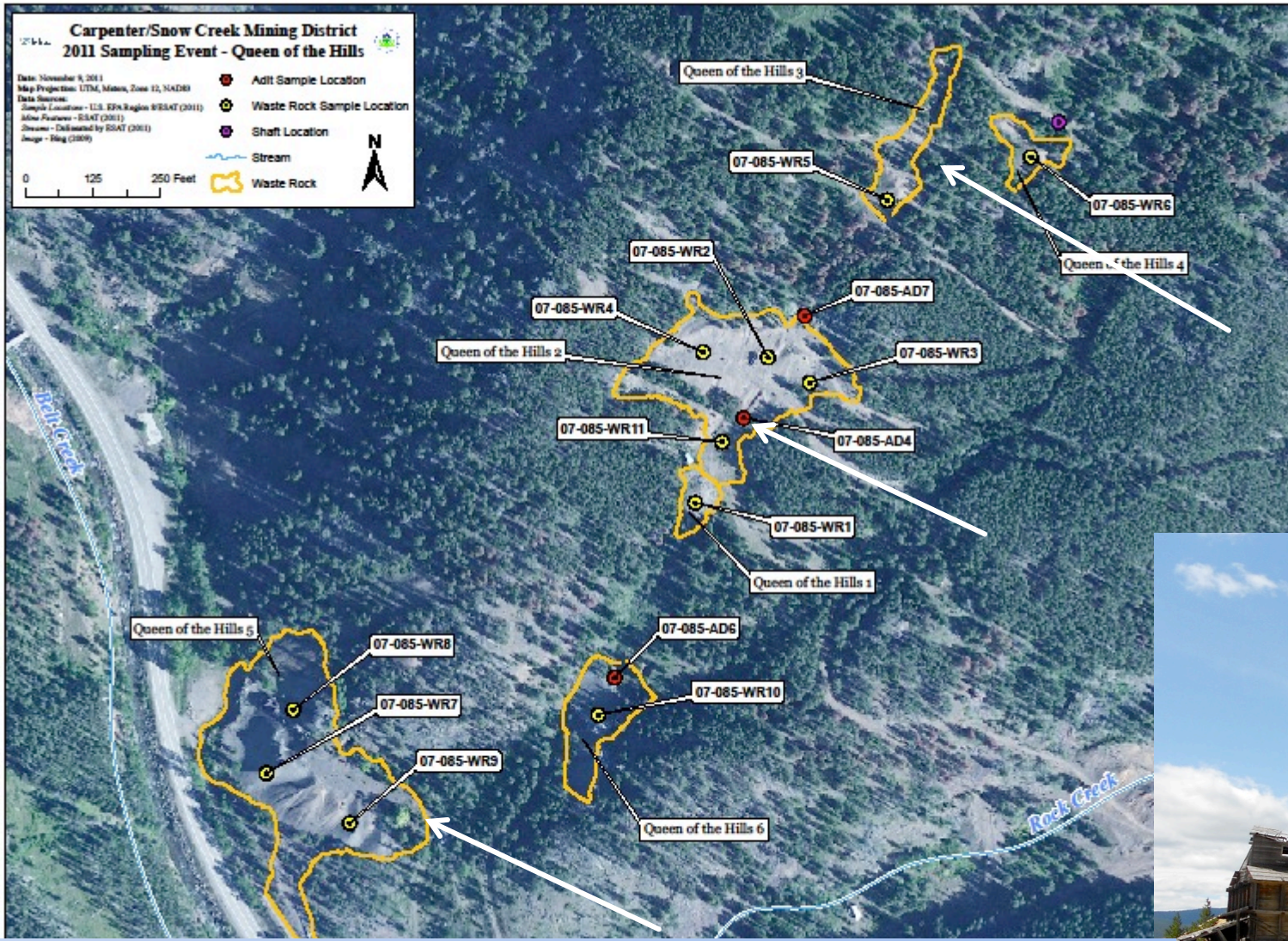


Figure 6 - Longitudinal section of the Queen-Galt vein Montana district Cascade County Mont



Waste rock usually placed on steep hillsides where it can easily erode



Unsecured mine waste affects aquatic and terrestrial organisms



- Third phase of mining occurred in the 1920s.
 - Constructed flotation mills to serve the mining districts
 - Allowed for mining of lower grade ores at greater depths
 - Milling operations left fine grained byproduct once metals had been extracted
- Minimal mining and exploration occurred after WWII
 - Former mining companies have discrete liability within the districts

It's all about the water



**Silver
Dyke**



Lower Carpenter Creek Tailings



Ripple



Block P

Regulatory Involvement

- ▶ Abandoned mine surveys completed by state of Montana in 1990s
 - ▶ Identified over 50 priority mines at both mining districts with approximately 40 discharging adits of varying water quality
- ▶ National Priorities Listing (Superfund) in 2001
- ▶ Currently in Remedial Investigation/ Feasibility Study phase
 - ▶ Solid media at 15% of the priority mines have been addressed using removal authority
 - ▶ Contemplating deferral of aqueous source media remedy

Proposed Collaborative Remediation Strategy (excerpts from Doe Run Resources white paper)

- Work together collaboratively in a remediation effort that applies adaptive management principles for future actions;
- Address solid media and source control alternatives first, making every reasonable effort to control the mine waste impacts to surface water and groundwater prior to consideration of any groundwater or surface water treatment systems;
- Where waste is to be removed complete waste removal starting up-stream and work progressively down-stream;

**Mt Emmons Mining Company (subsidiary of Freeport-McMoRan Inc) and EPA agreed to conduct Biologically Based Passive Remediation Systems Treatability Studies
Administrative Order on Consent**

Collected 1500 gallons from two mines in July 2017 to run laboratory test for one year

**Interested in being engaged in Superfund process
EPA HQ and Regional folks visited Arizona facilities in February**