

B.2. Geochemical Assessment of The Silver
Standard Mine

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Geochemical Assessment of The Silver Standard Mine

B.C. Metal Leaching and ARD Workshop

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Outline

- The Problem and Approach
- Silver Standard Mine Site Description
- Controls on Underground Water Quality
- Tailings Characteristics and Water Quality
- Conclusions



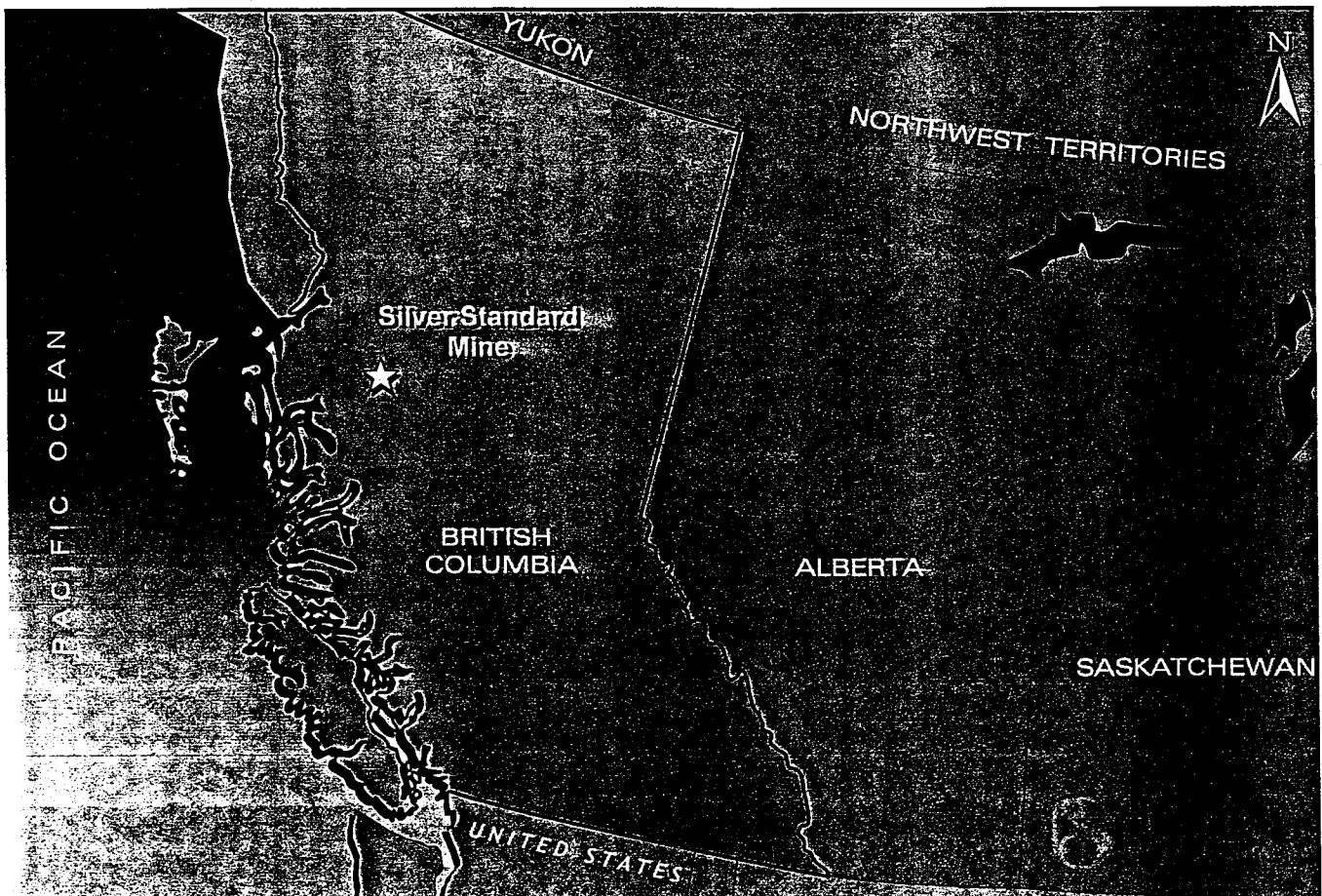
The Problem/Approach

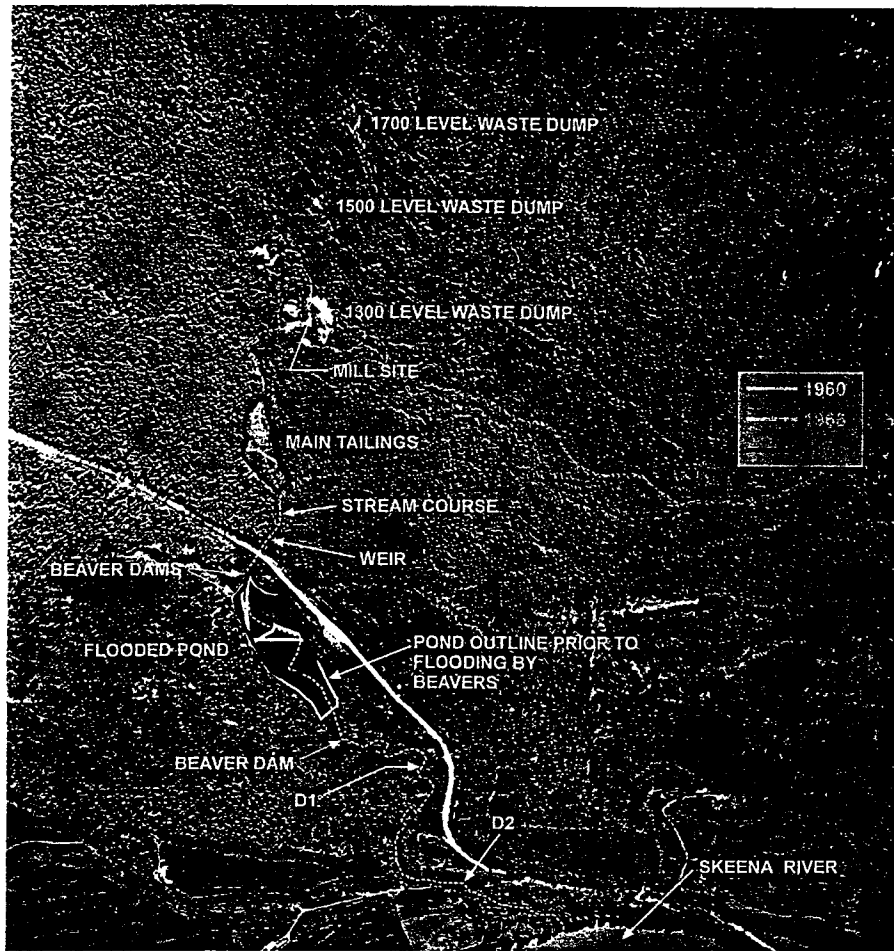
•The Problem

- Historic Mine Workings and Environmental Legacy
- Discontinuous Records

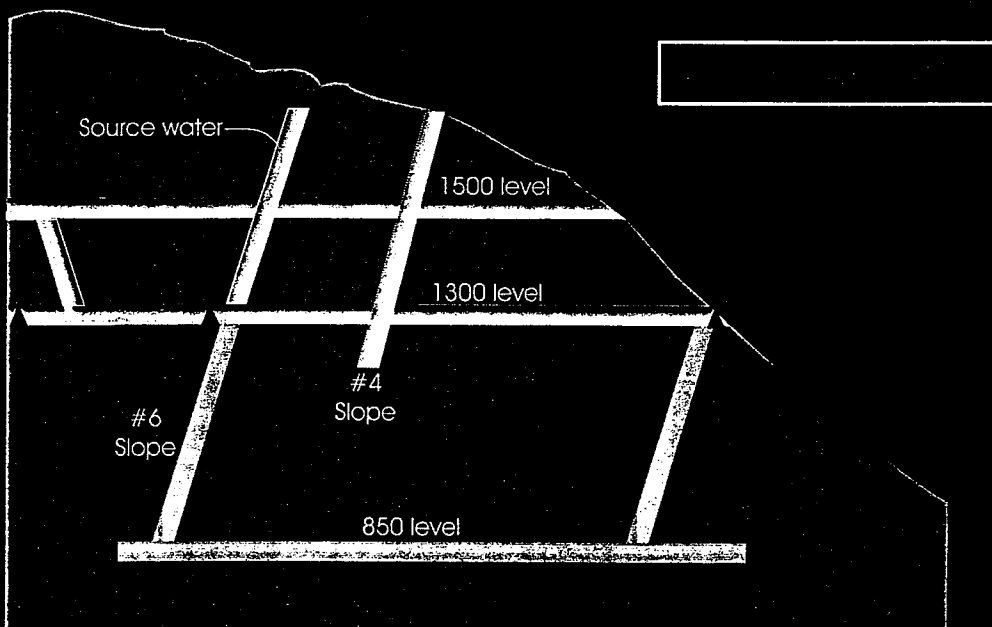
•The Approach

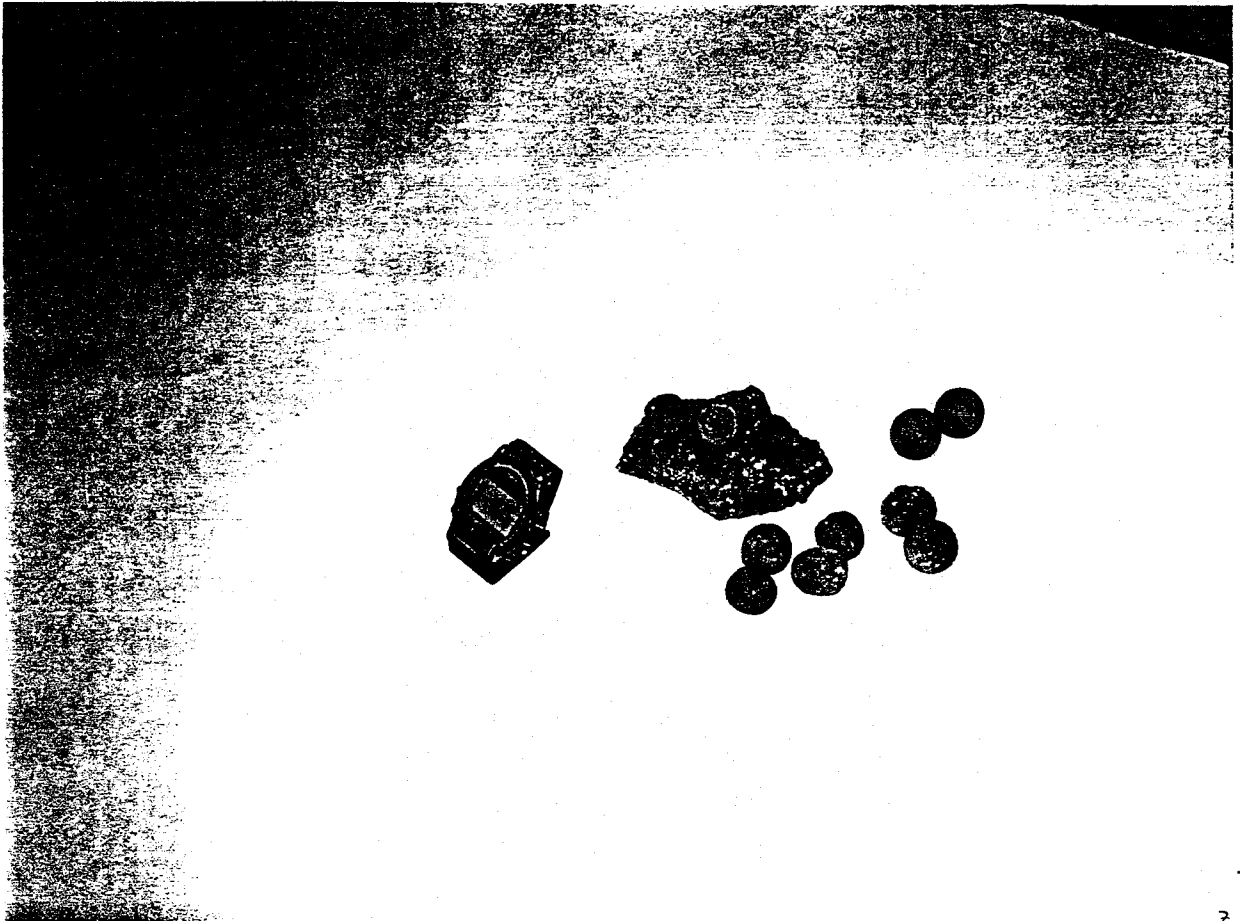
- Available Data
- Geochemical Modelling
- Define Controls on Reactivity and Metal Release
- Explore Closure Options (*i.e.*, Flooding, *etc.*)





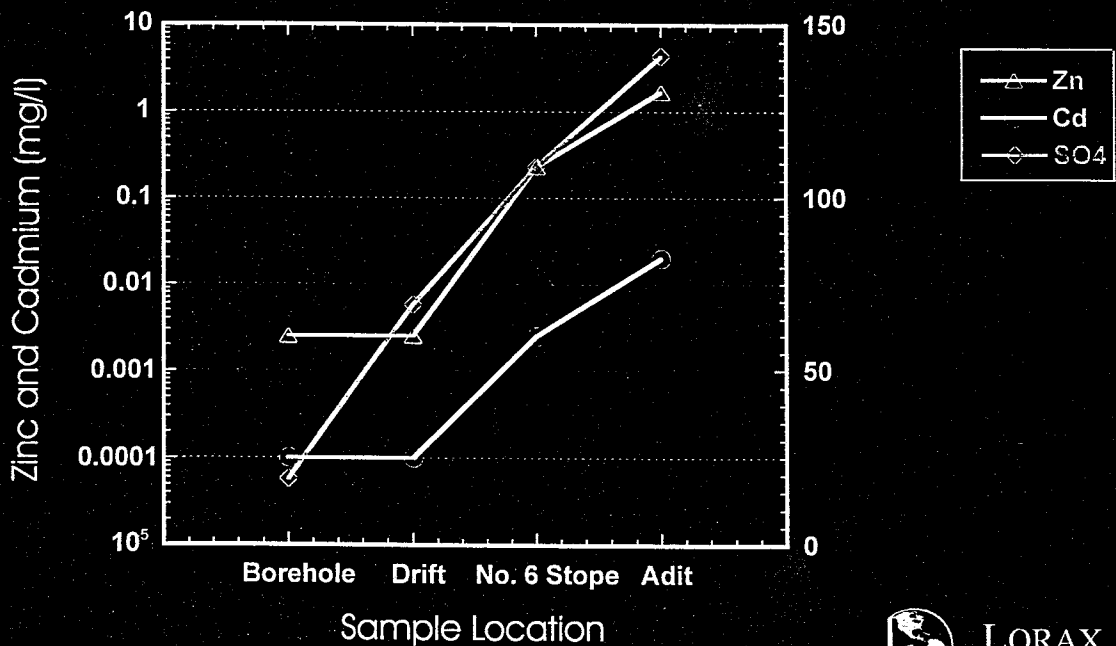
Schematic of Underground Workings



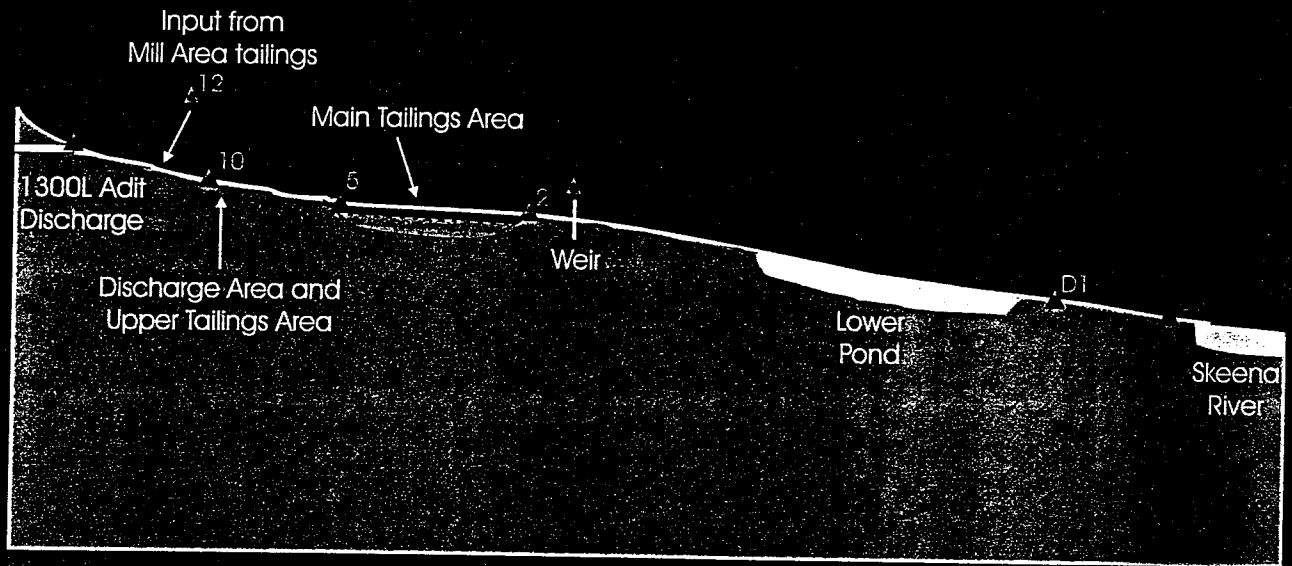


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Zinc, Cadmium and Sulphate Concentration In Underground Workings



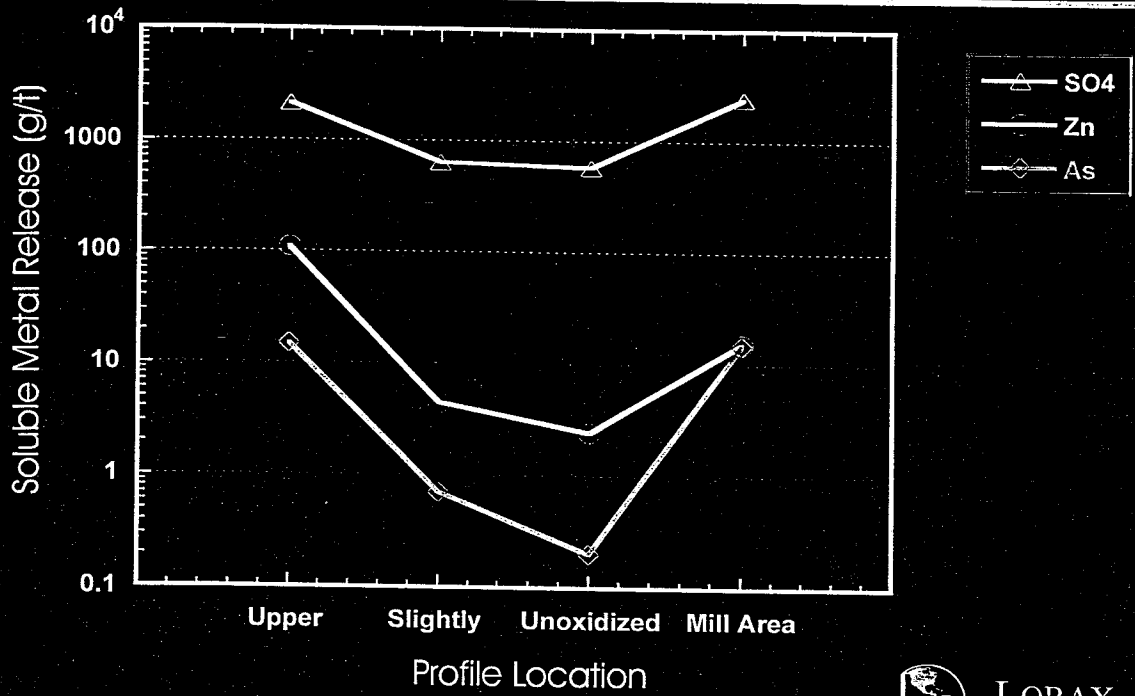
Site Drainage Overview



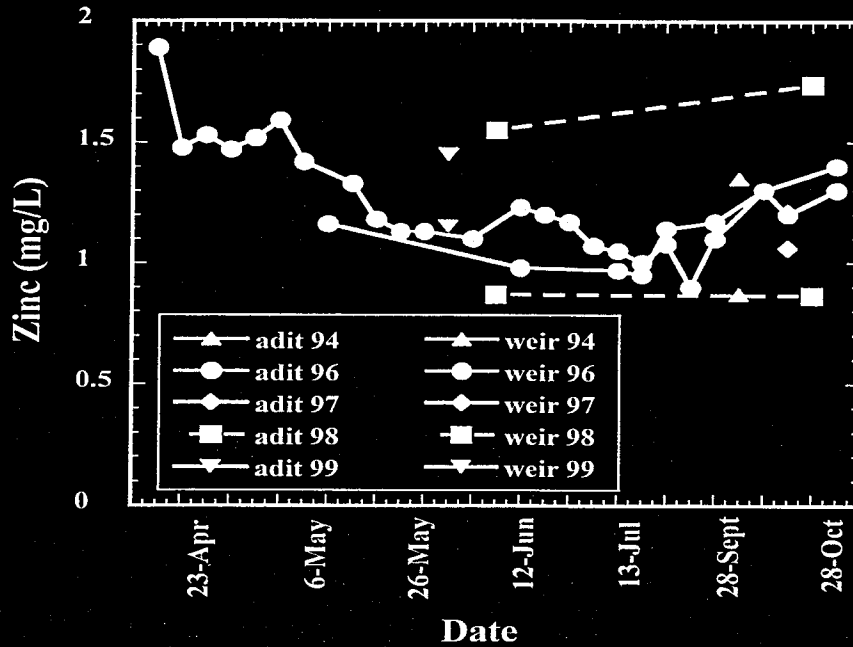
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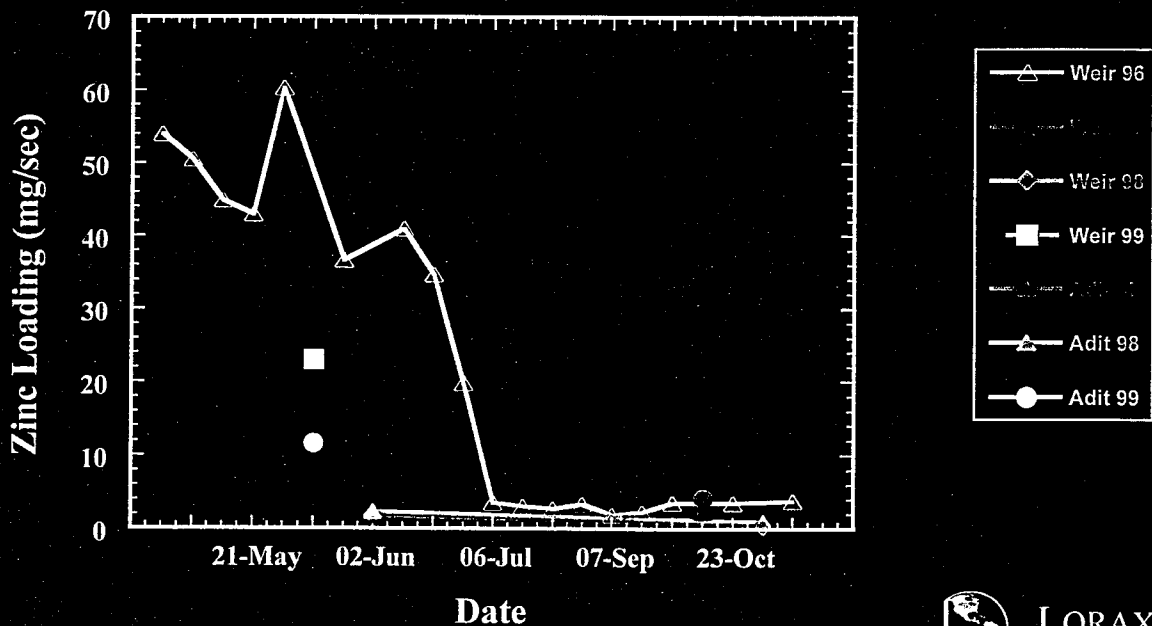
Shake Flask Extraction - Soluble Metal Release



Temporal Distribution of Zinc at the Weir and Adit

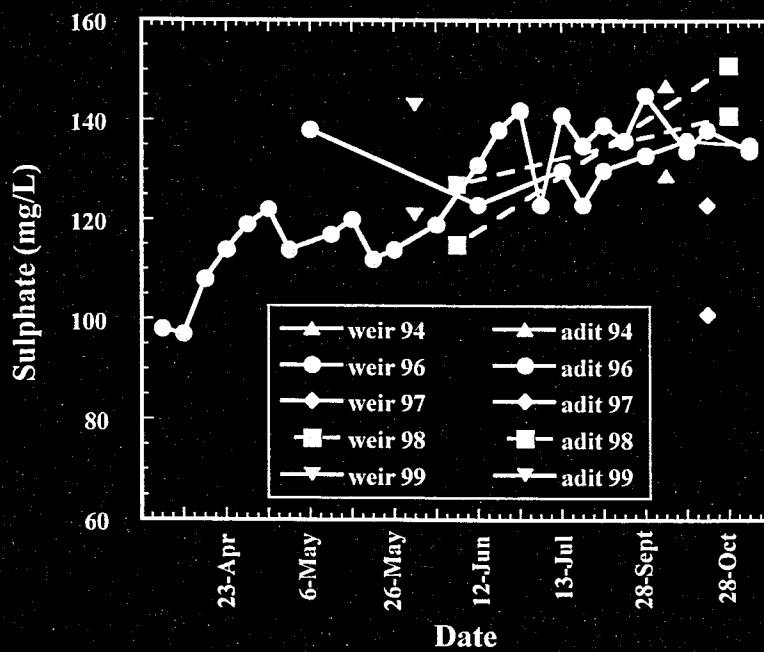


Zinc Loading at Stations 1 (Weir) and 6 (1300 Level Adit)





Temporal Distribution of Sulphate at the Weir and Adit



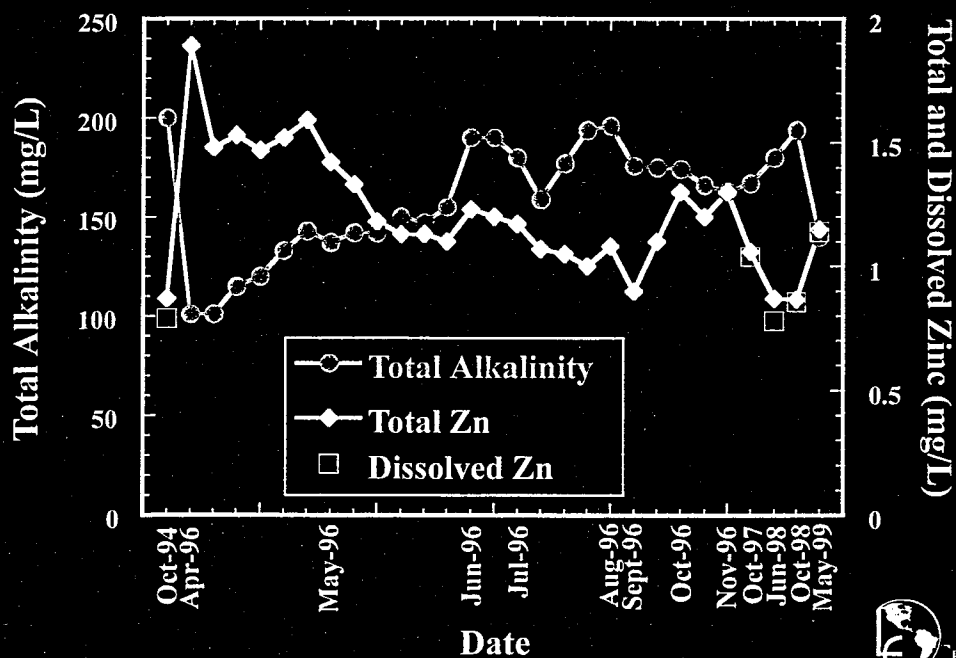
Saturation Index Values of Zinc and Cadmium Carbonate Minerals in Weir and Adit Drainage Water

| Phase | Weir - Oct 98 | Adit - Oct 98 | Adit - May 99 |
|--------------------------------------|---------------|---------------|---------------|
| ZnCO ₃ · H ₂ O | -0.32 | -0.10 | -0.14 |
| CdCO ₃ | -0.44 | -0.10 | -0.12 |



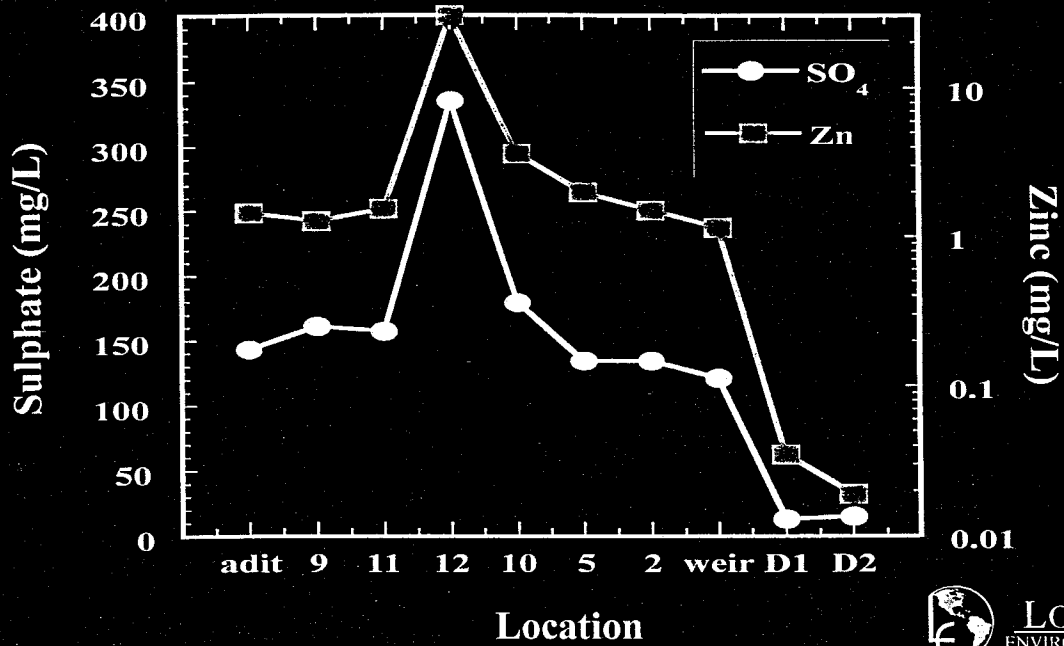
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Alkalinity and Zinc Concentrations at Stations 1 (Weir)



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Spatial Distribution of Sulphate and Zinc May, 1999



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Closure Options

- **Issues** - low NPR Tailings
- elevated metal content in adit drainage
- Flood Main Tailings
- Excavate Mill Area Tailings



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Conclusions

- Secondary Mineral Solubility Controls Metals in Underground
- Mill Tailings Influence Surface Waters
- Metals Removed Downstream
- Implement Closure Option to improve long term water quality



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