COPC SCREENING FOR RISK ASSESSMENT

INORGANICS

Molycorp Site
Questa, NM

November 24, 2003

SCREENING APPROACH
(HHRA and ERA)

- Top Down, RI Database (Oct. 21, 2003)
  - Tier 1 (done-inorganics)
  - Tier 2 (done-inorganics)
  - Tiers 1 and 2 (organics - to follow)
  - Tier 3 (all - to follow)

Eliminate Non-Toxic/Minimally Toxic Chemicals(Ca, Mg, K, Na)

View non-reference RI data by media (SW, SED, SS, GW)

ERA

Compare Max Conc to ECO SVs (dissolved SW)

HHRA

Compare Max Conc to HHRA SVs (total SW)

TIER 1

Retain all COPCs w/ HQ>1 (and 0.1 HHRA)

View Tier 1 COPCs by Major Exposure Areas (Mine Site, Tailings Facility)

Retain Tier 2 (Area-specific) COPCs w/ HQ>1 (and 0.1 HHRA)

TIER 2

Refine Tier 2 COPCs as necessary

Retain Tier 3 COPCs w/ HQ>1 (and 0.1 HHRA)

FINAL COPCs FOR ERA AND HHRA

TIER 3

TIER 1 APPROACH

- Assessment By Major Media
  - SW (HHRA and ERA)
    - Combined river, seeps, springs
    - Dissolved for ERA, Total for HHRA
  - SED (HHRA and ERA)
    - Instream sediment
  - SS (HHRA and ERA)
    - Combined all locations and depths
  - GW (HHRA)
    - All wells

TIER 1 SURFACE WATER
(minus reference / historical location data)

- Gross Media SW dissolved metals results, compared to ECO screening criteria
-
- Gross media SW total metals results compared to HH with HQ of 1, screening criteria
- Gross media SW total metals results compared to HH with HQ of 0.1, screening criteria

TIER 1 GROUNDWATER

- Gross media GW total metals results compared to HH with HQ of 1 screening criteria
- Gross media GW total metals results compared to HH with HQ of 0.1 screening criteria

TIER 1 SOILS

- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) metals results compared to ECO soil screening criteria
- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) metals results compared to HH with HQ of 1 screening criteria
- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) metals results compared to HH with HQ of 0.1 screening criteria

TIER 1 SEDIMENT

- Gross media SE metals results compared to ECO freshwater sediment screening criteria
- Gross media SE metals results compared to HH with HQ of 1 screening criteria
- Gross media SE metals results compared to HH with HQ of 0.1 screening criteria

TIER 2 APPROACH

- No Reference and Historical Data
- Only Tier 1 COPCs assessed
- Data Evaluated by Major Area
  - Mine Site
    - includes Red River adjacent to and DS of mine
  - Tailings Area

TIER 2
SURFACE WATER

- Gross Media SW in mine area dissolved metals results, compared to ECO screening criteria
- Gross Media SW in tailings area dissolved metals results, compared to ECO screening criteria
- Gross media SW in mine area total metals results compared to HH with HQ of 1, screening criteria
- Gross media SW in tailings area total metals results compared to HH with HQ of 1, screening criteria

TIER 2 SURFACE WATER
(Continued)

- Gross media SW in mine area total metals results compared to HH with HQ of 0.1, screening criteria
- Gross media SW in tailings area total metals results compared to HH with HQ of 0.1, screening criteria

TIER 2
GROUNDWATER (HHRA)

- Gross media GW in mine area total metals results compared to HH with HQ of 1 screening criteria
- Gross media GW in tailings area total metals results compared to HH with HQ of 1 screening criteria
- Gross media GW in mine area total metals results compared to HH with HQ of 0.1 screening criteria
- Gross media GW in tailings area total metals results compared to HH with HQ of 0.1 screening criteria

TIER 2 SOILS

- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) in mine area metals results compared to ECO soil screening criteria
- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) in tailings area metals results compared to ECO soil screening criteria
- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) in mine area metals results compared to HH with HQ of 1 screening criteria
- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) in tailings area metals results compared to HH with HQ of 1 screening criteria

TIER 2 SOILS (Continued)

- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) in mine area metals results compared to HH with HQ of 0.1 screening criteria

- Gross media soils (S1, S2, S3, S4, combined 0-24 inches) in tailings area metals results compared to HH with HQ of 0.1 screening criteria

TIER 2 SEDIMENT

- Gross media SE in mine area metals results compared to HH with HQ of 0.1 screening criteria
- Gross media SE in tailings area metals results compared to HH with HQ of 0.1 screening criteria

TIER 2
SEDIMENT (Continued)

- Gross media SE in mine area metals results compared to ECO freshwater sediment screening criteria
- Gross media SE in tailings area metals results compared to ECO freshwater sediment screening criteria
- Gross media SE in mine area metals results compared to HH with HQ of 1 screening criteria
- Gross media SE in tailings area metals results compared to HH with HQ of 1 screening criteria

TIER 1 RESULTS

HHRA

TIER 1 RESULTS HHRA

- SW COPCs (Total)
  - HQ>1 = Al, As, Ba, Cr, Fe, Pb, Mn, Mo, Tl, Va
  - HQ>0.1 = As above + Sb, Be, Cd, Cu, Ni, Se, Zn
  - Det but no SV = Co

TIER 1 RESULTS HHRA (cont.)

- SED COPCs (Instream)
  - HQ>1 = As, Fe, Mn, Mo
  - HQ>0.1 = As above + Al, Sb, Ba, Be, Cd, Cu, Ni, Tl, Va, Zn

TIER 1 RESULTS HHRA (cont.)

- SS COPCs (All Depths)
  - HQ>1 = As, Cu, Fe, Pb, Mn, Mo, Va
  - HQ>0.1 = As above + Al, Ba, Cd, Hg, Tl

TIER 1 RESULTS HHRA (cont.)

- GW COPCs (All Wells)
  - HQ>1 = Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Mo, Ni, Tl, Zn
  - HQ>0.1 = As above + Ba, Se, Va
  - Det but no SV = Co

TIER 1 RESULTS

ERA

TIER 1 RESULTS ERA

- SW COPCs (Dissolved)
  - HQ >1 = Al, Ba, Be, B, Cd, Cr, Cu, Fe, Mn, Mo, Ni, Ag, Zn
  - Det but no SV = Va

TIER 1 RESULTS ERA (cont.)

- SED COPCs (Instream)
  - HQ>1 = Al, Sb, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn
  - Det but no SV = Ba, Be, B, Co, Mo, Tl, Va

TIER 1 RESULTS ERA (cont.)

- SS COPCs (All Depths)
  - HQ>1 = Sb, As, Ba, B, Cd, Cr, Co, Cu, Pb, Mn, Hg, Mo, Ni, Se, Ag, Tl, Va, Zn
  - Det but no SV = Al, Fe, Ti

TIER 2 RESULTS

HHRA

TIER 2 RESULTS HHRA

Chemicals Eliminated – All Media

- Ca, Cl_2, Mg, Ortho Phosphate, P, K, Na

TIER 2 RESULTS
HHRA SW COPCs (from Tier 1)

Tailings Area

- HQ 1 = Fe, Mn, Mo
- HQ 0.1 = As above + Al, Sb, Cd, Ni

Mine Site

- HQ 1 = Al, As, Ba, Cr, Fe, Pb, Mn, Mo, Tl, Va,
- HQ 0.1= As above + Sb, Be, Cd, Cu, Ni, Se, Zn

DET but No SV = NH_3, Co, F, SO_4

TIER 2 RESULTS
HHRA GW COPCs (from Tier 1)

Tailings Area

- HQ 1 = Al, Cr, Fe, Pb, Mn, Mo
- HQ 0.1 = As above + Ba, Ni, Tl, Va, Zn

Mine Site

- HQ 1 = Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, NO_3, Tl, Zn
- HQ 0.1= As above + Ba, CN, Mo, Se, Va

DET but No SV = NH_3, Co, F, SO_4

TIER 2 RESULTS
HHRA SED COPCs (from Tier 1)

Tailings Area

- HQ 1 = As, Fe, Mn, Mo
- HQ 0.1 = As above + Al, Ba, Cd, Cu, Tl, Va

Mine Site

- HQ 1 = As, Fe, Mn
- HQ 0.1 = As above + Al, Sb, Ba, Be, Cd, Cu, Ni, Tl, Zn

DET but No SV = NH_3, F, NO_3, SO_4

TIER 2 RESULTS
HHRA SS COPCs (from Tier 1)

Tailings Area

- HQ 1 = As, Fe, Mo
- HQ 0.1 = As above + Al, Mn

Mine Site

- HQ 1 = As, Cu, Fe, Pb, Mn, Mo, Va
- HQ 0.1= As above + Al, Ba, Cd, Hg, Tl

DET but No SV = NH_3, F, NO_3, SO_4

TIER 2 RESULTS

ERA

TIER 2 RESULTS ERA

Chemicals Eliminated – All Media

- Ca, Cl_2, F, Mg, NO_3, Phosphate, P, K, Na, SO_4

TIER 2 RESULTS ERA

- SW COPCs (from Tier 1)
  - Mine Site = Al, Ba, Be, B, Cd, Cu, Fe, Mn, Mo, Ni, Ag, Zn
  - Tailings Area = Al, Ba, B, Cd, Cu, Mn, Mo, Ni, Ag, Zn
  - DET but No SV = Va

TIER 2 RESULTS ERA (cont.)

- SED COPCs (from Tier 1)
  - Mine Site = Al, Sb, As, Cd, Cu, Fe, Pb, Mn, Hg, Ni, Ag, Zn
  - Tailings Area = As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Ag, Zn
  - DET but No SV = NH_3, Ba, Be, B, Co, Mo, Se, Tl, Va

TIER 2 RESULTS ERA (cont.)

- SS COPCs (from Tier 1)
  - Mine Site = NH_3, Sb, As, Ba, B, Cd, Cr, Co, Cu, Pb, Mn, Hg, Mo, Ni, Se, Ag, Tl, Va, Zn
  - Tailings Area = NH_3, Ba, B, Cd, Cr, Cu, Pb, Mn, Hg, Mo, Se, Va, Zn
  - Det but No SV = Al, Fe, Ti

TIER 3
Criteria to Refine COCs

- Those compounds with 95% UCL concentrations below the appropriate screening values can be considered for exclusion.
- Consider excluding COCs with maximum concentrations that are below media specific alternate screening values
- Bioaccumulative chemicals must be carried through to the BRA.

TIER 3

- Nutrients such as Se, Cu, Mo, and B can transition from essential to toxic at only slightly higher concentrations and therefore must be evaluated prior to consideration for exclusion.

- Frequency of detection (FD) threshold is 5%. This will be weighted by the magnitude of detection (e.g., if these 5% or greater detect data are within 30% of an appropriate benchmark/screening value, then we can drop it). Must weigh the sample design into this decision (i.e., random vs. biased sampling) and the spatial and temporal patterns of the detects.

TIER 3

- If FD <5%, but one or more samples are “whopper” concentrations, then treat that spot separately (i.e., removal area, hot spots). Must weigh the sample design into this decision (i.e., random vs. biased sampling) and the spatial and temporal patterns of the detects.

- Frequency of exceedance—use detect-only data; if less than 5% of detects exceed benchmarks, consider dropping the compound. However, if there are “whopper” concentrations, then treat that spot separately (i.e., removal area, hot spots).

TIER 3
Other Mitigating Factors Important to Refinement

- Bioavailability assumption vs. literature reported % bioavailability (assimilation efficiencies, too)
- Technical considerations for chemicals with no screening levels

TIER 3

- We will consider background as additional line of evidence later in the RI/FS. Background will not be used to exclude a compound. Risk will be evaluated for both site-related compounds and those associated with background and/or anthropogenic activity. As indicated in the background policy document, background can be used to propose that a specific compound may not require cleanup after risks have been determined.

SUMMARY

- Tiers 1 and 2 are complete for inorganics
- Tiers 1 and 2 for organics (mine site) will follow
- Tier 3 for inorganics will follow