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Mr. Chris Eustice, AOC Project Manager
Groundwater Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

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Dear Mr. Eustice:

Re: Chino Comments on the Smelter/Tailing Investigation Unit Human Health Risk Assessment Workplan

Chino Mines Company (Chino) appreciates the opportunity to provide comments on the Smelter/Tailing Investigation Unit (IU) Human Health Risk Assessment (HHRA) Workplan, dated January 19, 2005. Chino's general comments are as follows:

1. Chino requests citations and values for the uptake of metals from soil to poultry and from poultry to humans, including the chicken tissue and egg pathways.
2. Chino requests that Ecological IU data be incorporated into the exposure point concentrations, particularly data for subsurface but also for surface soil. Subsurface soil is less affected than surface soil, as indicated in New Mexico Environment Department's (NMED) workplan; however, this information should still be incorporated in the evaluation of plant uptake pathways since root zone depth for fruit and vegetable plants are typically deeper than one inch.
3. The beef ingestion pathway should be evaluated qualitatively based on the memorandum provided in Appendix F of the Smelter/Tailing IU Remedial Investigation (RI) Proposal (SRK 2004). The evaluation of the chicken and egg ingestion pathways is more conservative and thus will provide information on indirect ingestion pathways.
4. Stock pond water is typically ephemeral but the few ponds that hold water all year are usually covered with an algal mat and are highly turbid which deters human receptors. In addition, stock ponds are unappealing targets for human receptors because they are usually surrounded by cattle trampled mud and dung. Therefore, the exposure pathway should be referred to as wading and since incidental ingestion of surface water and sediment is limited, a 24 day per year exposure duration for surface water based on 2 days per year for 12 weeks (i.e., 3 months) is overly conservative. Chino recommends a surface water exposure duration of 5 days per year.

5. Chino suggests that dermal exposure to groundwater and surface water be evaluated qualitatively since these pathways typically are not risk drivers (USEPA Region VIII, 1995). However, if NMED chooses to evaluate these pathways quantitatively, then the U.S. Environmental Protection Agency's (USEPA) most current guidance should be used (USEPA 2004).

Chino's specific technical comments are as follows:

1) Background

Chino requests clarification on statistical tests that will be used to compare site-related concentrations to background concentrations. For example, on page 6, the equation cited for comparison to background is an equation to estimate minimum sample size (n); however, on page 16, the text indicates that mean EPCs will be compared to mean background to determine which COCs are likely site-related. In addition, constituents present in exposure areas within the range of background should be excluded as COPCs. In the Hurley Soils IU HHRA, a number of metals were not carried through the risk assessment because their concentration in site soils was determined to be likely significantly less than reference soils (page 131, Gradient 2000). In the Smelter/Tailing IU HHRA workplan, however, page 17 indicates that all of the COPCs will be carried through the HHRA, but page 33 indicates that some metals may be eliminated based on comparison to background.

2) Exposure Point Concentration (EPC) Calculations

The Ecological IU RI report should be included as a source of data, both for surface and subsurface soil samples. This is particularly relevant for the plant uptake conceptual site model. Chino agrees with the text on page 11 that constituents are not elevated in the subsurface; however, root zone depth for vegetable and fruit-bearing plants are deeper than 0 – 1 inches and, therefore, applying a plant uptake factor to soil representative of shallow soil depths is an overestimate of actual exposure conditions which can be as deep at 3 feet. In addition, the text does not explicitly indicate what soil depth will be used to determine plant EPCs for the ingestion of homegrown vegetable pathway.

Chino requests one half the sample quantitation limit (SQL) should be used to calculate EPCs, not one half the method detection limit (MDL). If the MDL cannot be achieved for a sample, then it is not a representative surrogate value and the SQL is more accurate (as recommended by USEPA, 1992).

Chino recommends that soil and sediment data be combined for an evaluation of the adolescent recreator and trespasser incidental soil/sediment ingestion exposure scenario because the ingestion rate is based on daily exposure, i.e., 100 milligrams soil per day and, thus, it is an overestimate to consider the two media separately.

3) Risk Calculations

Chino requests that NMED update the copper exposure equation per Gradient's Hurley Soils IU Human Health Risk Assessment Addendum, dated June 2004

For the ingestion of homegrown vegetables pathway, wet weight/dry weight conversion factors as well as explicit descriptions of their use need to be specified for plant EPCs. In addition, Chino requests clarification on what plant uptake values will be used for beryllium, chromium (III and VI) and molybdenum which are not summarized in Table 3-2.

Chino requests that NMED evaluate the beef ingestion pathway qualitatively based on the memorandums provided in Appendix F in the Smelter/Tailing IU RI Workplan (SRK 2004). The memos regarding Trespassers and Cattle Management Practices support minimal exposure via the beef ingestion pathway. If NMED chooses to evaluate the pathway quantitatively, then Chino requests clarification on the plant uptake portion of the algorithm. Since both agricultural and grass species make up the datasets used to develop Bechtel regressions for plant uptake, Chino recommends that the soil-to-grass concentration ratio be based on the same methods proposed for plant uptake under the ingestion of homegrown produce pathway.

Chino requests that NMED consider the memorandum regarding trespassers provided in Appendix F in the Smelter/Tailing IU RI Workplan (SRK 2004). The memo supports minimal exposure to trespassers. In the workplan, NMED proposes both recreators and trespassers, but recreators are only to be evaluated for Exposure Areas 1 and 5. However, for Exposure Area 5, any recreator would essentially have to trespass in order to gain access to the upland area east of the smelter operational area. Furthermore, adolescent recreators are assumed to be present onsite 50 days per year (for soil contact pathways), with 24 days per year swimming (water pathways). These exposure parameters are overly conservative. The swimming pathway should be changed to wading because the stock ponds are highly unappealing for swimming; they typically have cattle trampled mud and dung surrounding the perimeters. The stock ponds dry out for many months of the year but the few ponds that hold water all year are typically covered with an algal mat and are highly turbid which deters human contact. Therefore, the exposure pathway should be referred to as wading and since incidental ingestion of surface water and sediment is limited, 24 days per year exposure duration for surface water based on 2 days per year for 12 weeks (i.e., 3 months) is overly conservative. Chino recommends using a reasonable maximum exposure duration for surface water of 6 days per year and an onsite exposure duration of 14 days per year which is similar to the trespasser.

Chino suggests that dermal exposure to groundwater and surface water be evaluated qualitatively since USEPA Region VIII indicates this pathway is not significant. For example, as discussed in the Smelter/Tailing IU RI Proposal, dated October 2004, EPA Region VIII (1995) indicates that total intake of metals via the dermal exposure pathway is not significant compared to potential uptake via soil ingestion. However, if NMED chooses to evaluate these pathways quantitatively, then the U.S. Environmental Protection Agency's (USEPA) most current guidance should be used (USEPA 2004).

There are several references to exposure factors taken from USEPA 2001, the Interim draft Risk Assessment Guidance for Superfund (RAGS) for dermal risk assessment (e.g., ABSd, ABSgi, Kp). This document was finalized in 2004 and, therefore, should be cited preferentially for dermal pathway evaluation, rather than USEPA Region VI guidance from 1995, because it represents the state of the art in dermal pathway evaluation. For example, regarding oral absorption factors, the workplan indicates a value of 0.95 for arsenic, 0.3-0.8 for selenium, and "variable" for zinc. USEPA (2004) provides these values in their table of absorption efficiencies, but generally recommends that if gastrointestinal (GI) absorption is greater than 50 percent then do not adjust (i.e., ABSgi equals 1 or 100 percent). The workplan indicates values of 5 percent for cobalt and molybdenum, because they are not on the USEPA list; however, USEPA (2004) clearly recommends using an ABSgi of 1 or 100 percent for inorganics not on the list.

Dermal absorption factors are not provided for metals other than arsenic and cadmium. USEPA (2004) only provides values for these two metals, and states that there are too little data to extrapolate a reasonable default value for inorganics. In the absence of absorption data for metals, Chino agrees that NMED consider a default value of 0.10 based on USEPA Region VI. In addition, permeability coefficients (Kp) should be obtained from USEPA (2004). USEPA (2004) includes a Kp value for cobalt (i.e., $4x10^{-4}$ centimeters per hour (cm/hr)), and specifies that all other inorganics not specifically listed should be assigned a Kp value of $1x10^{-3}$ cm/hr.

Regarding the adolescent recreator and trespasser sediment adherence factor, the workplan indicates a value based on the child resident soil adherence factor. The child soil value is inappropriate, because the scenario of a teenager walking around in a streambed is not equivalent to a small child playing in their front yard. The adult value used for soil ingestion is more appropriate. Although increased conservatism (i.e., a higher soil adherence factor) may be considered for periods of time when sediments are moist, these times are likely correlated with the presence of water in the stock ponds, which will likely wash sediments from skin limiting adherence. In other words, it is anticipated that either the stock pond and sediment are dry and the rate of adherence to skin will be similar to that of soil or the sediment will be covered in water, which may limit adherence by washing sediment from skin after contact. Both scenarios suggest that additional conservatism in the soil adherence factor is unwarranted.

Chino requests that NMED provide the reference for the 4.3 (mg/kg-day)-1 oral cancer slope factor for beryllium since USEPA IRIS database only recognizes beryllium as a carcinogen via the inhalation route. There is no oral cancer slope factor for this metal in Table 4-1, but oral and dermal values appear in Table 4-5.

Chino requests clarification for the cadmium reference dose (RfD). Both dietary and water-based cadmium RfDs are provided in Table 4-3, but then only the water-based RfD is shown in Table 4-5 for assessing all pathways. However, the dietary ABSgi is proposed to estimate the dermal RfD. The dietary RfD should be used for oral exposure and the dietary ABSgi should be used to adjust this value for a dermal RfD.

Lastly, Chino requests clarification for the ingestion rates for locally-raised food items. The values in Tables 3-5 and 3-6 do not coincide with those provided in Tables 3-3 (a-f) or 3-4

(a-f). In addition, Chino requests clarification regarding the rancher consumption rates. It is not clear why consumption rates would differ from a resident.

Chino appreciates the opportunity to submit these technical comments. Please contact Mr. Robert Quintanar at (505) 537-4228 with any questions.

Very truly yours,

Ned Hall

E. L. (Ned) Hall, Manager
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