State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
NO. Z 288 500 795

JUN 27 1996

C. Scott Eves
Vice President of Environmental Services
Shieldalloy Metallurgical Corporation
P.O. Box 768
Newfield, NJ 08344

Re: Draft Final Feasibility Study
Draft Final Ecological Risk Assessment

Dear Mr. Eves:

NJDEP is in receipt of the Draft Final Feasibility Study (FS Report) and the Draft Ecological Risk Assessment (ERA) both dated April 1996. The FS Report is divided into three separate volumes as follows:

- Volume I Background Information
- Volume II Soil Feasibility Study
- Volume III Surface Water and Sediment Feasibility Study

A technical meeting was held on 7 May 1996 to review the data presented in this FS Report and discuss the remedial proposals to address contamination in the soil and surface water/sediment matrices. The meeting was attended by representatives of the NJDEP Case Management team, USEPA, TRC, SMC, US Department of Interior, the Region II Biological Technical Assistance Group (BTAG), and the NJDEP Natural Resource Damage Office. General consensus was reached among the regulatory members on the remedial approach at the site. This strategy, as presented to SMC/TRC, varies slightly from the proposed remedial action in the FS Report.

The documents are acceptable to the agencies, pending incorporation of the technical modifications and supplementation of the outstanding issues as discussed in the enclosures.

In accordance with paragraph 31 of the 1988 Administrative Consent Order, within forty-five (45) calendar days of receipt of this letter, SMC shall submit a revised Feasibility Study and Ecological Risk Assessment that addresses the comments set forth in this letter.

If you have any questions, you may contact me at (609) 633-1494.

Sincerely,

Donna L. Gaffigan

Donna L. Gaffigan, Case Manager
Bureau of Federal Case Management

Enclosures

C: George Nicholas, BGWPA
John Boyer, BEERA
Joseph Gowers, USEPA
Robert C. Smith, TRC

Draft Final
FEASIBILITY STUDY REPORT - VOLUME I
Background Information

1. On-Site Surface Soils, Section 1.8.1

   Surface and subsurface soil samples are compared to the non-residential direct contact soil cleanup criteria (NRDCSCC) and the impact to ground water soil cleanup criteria (IGWSCC). Current NJDEP policy requires soil delineation using the residential direct contact soil cleanup criteria (RDCSCC). This constitutes a variance from policy. NJDEP takes no exception to this request. However, SMC will be required to establish a declaration of environmental restriction (DER) since the soil contaminants will exceed the RDCSCC values.

2. Stream Sediments, Section 1.8.5

   This section of the Background Information Report (Volume I) discusses the results of the remedial investigation and ecological risk assessment (RA) sampling along the Hudson Branch. The NJDEP has generated extensive comments on the Ecological RA. Any changes necessary to address the Department's technical comments for the Ecological RA must be reflected in the summary information contained in §1.8.5 of Volume I and elsewhere in the three volume FS Report.

3. Federal ARARs, Section 2.0

   Because the United States Nuclear Regulatory Commission (NRC) has jurisdiction over certain aspects of the site, including eventual decommissioning and cleanup, the requirements of 20CFR and 40CFR are to be considered (TBC). Consideration must be given to how the remediation of the non-radioactive (i.e. metals, PCBs) contamination and eventually any radioactive contamination can be accomplished with minimal disruption or interference with the other.

4. New Jersey ARARs/TBCs - Soil, Section 2.2.1

   The Hazardous Site Remediation Act, N.J.S.A. 58:10B (HSRA) must be considered a New Jersey applicable or relevant and appropriate requirement (ARAR) for this site. This is important since subsection 35.d(1) stipulates the use of the one in one million additional cancer risk value for developing residential and non residential soil remediation standards for carcinogenic contaminants.

5. New Jersey ARARs/TBCs - Sediment, Section 2.2.3, Volume I

   The NJDEP has recently started utilizing the Ontario Ministry of the Environment's Lowest Effect Level (LEL) and Severe Effect Level (SEL) criteria for assessing sediment quality based on chemical results. Therefore, *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*, August 1993, must be referenced as a chemical-specific TBC for sediments.

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FEASIBILITY STUDY REPORT - VOLUME II
Soil Feasibility Study

1. General

NJDEP's Guidance Document for the Remediation of Contaminated Soils dated June 1994 contains information on capping as a remedial action. Of particular importance is the section on post-capping operation, maintenance and monitoring since such actions will be required after implementation of the remedy.

2. Risk Commission Report

TRC has elected to support its proposal to use a one in one hundred thousand (1×10^{-5}) cancer risk endpoint based on a draft report issued by the Environmental Risk Assessment and Risk Management Study Commission. This Commission was established in 1994 pursuant to a provision in HSRA. The NJDEP's cancer risk endpoint is currently 1×10^{-6}. The Commission's proposal to modify the cancer risk value for developing soil remediation standards is still only a draft recommendation. Until such time that a new risk level is promulgated by the New Jersey legislature, the Department will continue to require the 1×10^{-6} value.

3. Compliance Averaging, Section 2.1

It should be noted that although "guidance" has been developed for compliance averaging, the concept and the particular conditions for implementing compliance averaging have a regulatory basis and are contained in the *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E-4.9(c)3i).

4. Compliance in Manufacturing Area - Dept 102, Section 2.1.1

Elevated chromium and hexavalent chromium contamination has been detected in the Department 102 area. Based on the minimum exceedances, TRC has proposed no further action. This is acceptable provided the existing containment (pavement) is properly maintained as part of the remedial action and the subsequent O&M phase.

5. Compliance in Manufacturing Area - RR Siding, Section 2.1.1

Elevated arsenic contamination has been detected in one sample collected in the Railroad Siding area. Based on the minimum exceedances, TRC has proposed no further action. This is acceptable provided the existing containment (pavement) is properly maintained as part of the remedial action and the subsequent O&M phase.

6. Compliance in Manufacturing Area - Beryllium, Section 2.1.1

a. The FS states that the compliance averaging ceiling for beryllium is 2 ppm. While this is true using the RDCSCC, SMC is utilizing the NRDCSCC values for the interior of the site (not off-site). Since the health-based criteria for beryllium at non-residential sites is 0.7 ppm,

the compliance averaging ceiling is 7 ppm. This adjusted many of the calculations for beryllium and thus reduced the total area of soil requiring remediation. This issue was discussed at a meeting held on May 19, 1996 between NJDEP and TRC. The agreements reached will be summarized in a letter from TRC, however, they must be reflected in the FS as well, unless superseded by the results of the bioavailability study discussed below.

b. There have been discussions with TRC/SMC regarding an Alternate Cleanup Standard (ACS) application for beryllium based on bioavailability. At NJDEP recommendation, SMC submitted a work plan on May 24, 1996 outlining how they proposed to determine site-specific bioavailability percentages. This data will assist the NJDEP in making a risk management decision based on the strength of evidence surrounding the beryllium contaminant levels at the site and the appropriateness of an ACS.

7. Compliance - Former Material Storage Area, Section 2.1.2
PCB contamination in excess of the NRDCSCC values has been discovered in the Former Material Storage Area. The FS Report must include this area of concern (AOC) as an area requiring remediation. Pre-design sampling can be employed to further define the limits of contamination.

8. Compliance - North/South Subsurface DDT Areas, Section 2.1.2
Due to the depth of the reported contamination and the inability to reconfirm the results, the DDT contamination in these two AOCs is either very limited or non-existent. Therefore, the existing soil "cap" is sufficient and SMC may consider no further action for these. However, the "presence" of these AOCs must be documented in the DER.

9. Compliance - On-Site Delineated Wetlands Area, Section 2.1.2
Elevated contaminant levels at RA-12 were compared to the SCC values in the FS Report. Since this area is within the delineated wetlands, it can be questioned whether these results should be compared to soil or sediment criteria. It is recommended that the results should be compared to both criteria. When compared to the SCC, there are exceedances for several inorganic parameters, therefore, the recommendation on page 2-12 with respect to no further action in this area is not acceptable. Further, this statement is inconsistent with Section 2.4.3 (page 2-43) which defers the remediation of this area to Volume III of the FS (Surface Water and Sediment) and is also inconsistent with Volume III, itself.

10. Compliance - Other Areas of Concern, Section 2.1.2
Due to the depth of the reported contamination and the inability to reconfirm the results, the beryllium contamination at SB-25 and SB-12 is either very limited or non-existent. Therefore, the existing soil "cap" is sufficient and SMC may consider no further action for these areas. However, the "presence" of these AOCs must be documented in the DER.

12. Compliance - Off-Site Delineated Wetlands Area, Section 2.1.5, p. 2-25
Elevated contaminant levels at RA-13 and RA-14, located on SMC's property boundary, were compared to the SCC values in the FS Report. Since this area is within the delineated

wetlands, it can be questioned whether these results should be compared to soil or sediment criteria. It is recommended that the results should be compared to both criteria. Two issues are involved here, the on-site and the off-site areas adjacent to the site.

a. On-site - Based on the SCC, there are exceedances for several inorganic parameters. Therefore, the on-site portion of this area requires remediation, but is not discussed in the document. This is inconsistent with Volume III which show that remediation of this area is proposed.

b. Off-site - Based on the RDCSCC no further action is acceptable, but it may not be acceptable based on the sediment criteria and may be inconsistent with Volume III of the FS Report (see Figure 3-2 of Volume III).

13. Department 106, Section 2.1.1

There is no discussion regarding the Department 106 building and the level of contamination coating the building materials. As identified in NJDEP's letter dated November 3, 1995, SMC must discuss the need to remediate the building as a source of chromium contamination to soil and/or groundwater.

Alternative S-4-1 (Glass Stack), Section 4.2.7

a. There is concern about the proposal under recommended Soil Alternative S-4-1 to remediate potential chromium contaminated soil in the Department 101(b) Glass Stack Area. The Glass Stack was determined to be eligible for inclusion in the National Register of historic Places and is, therefore, subject to National Historic Preservation Act (NHPA) requirements. The proposal is to raze the stack and to excavate the soil in its footprint. The need for remedial action in this area seems to be based primarily upon the results of one soil sample (RA-64) collected from the tunnel adjacent to the stack. Additional soil samples should be collected from beneath the stack to show that the remedial action proposed is justified as discussed in the May 7 meeting.

b. It is indicated on page 4-16 that the cultural resource survey was submitted to the New Jersey State Historic Preservation Office (SHPO) with a request for determination of Historic American Building Survey (HABS) documentation required prior to the stack's demolition. It should be noted that the National Park Service (NPS) makes the determination of what level of documentation is required and whether HABS or Historic American Engineering Record (HAER) criteria are appropriate. Furthermore, it is the function of EPA to request a HABS/HAER determination from the NPS. The Soil FS shall be revised to reflect that the ARAR requirements with respect to the NHPA have not yet been completed.

14. Remedial Alternative Recommendation, Section 4.5

NJDEP partially concurs with TRC's recommendation for the remediation of soils at the SMC site. Alternative S-4-1 (Remediation of Chromium Source Areas and Landfill Containment with Institutional Controls) will adequately address soil contamination at the site. However,

Option A (10^{-6} risk-based) is dictated by HSRA and must be employed instead of the recommended Option B (10^{-5} risk-based).

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FEASIBILITY STUDY REPORT - VOLUME III
Surface Water and Sediment Feasibility Study

1. Environmental Risk-Based Considerations, Section 2.1.3, p. 2-6
The text should reference the source of the lowest observed effects levels (LOEL) discussed in the paragraph.

2. Sediment Evaluation Criteria, Section 2.2.1, p. 2-13
Clarification should be provided in the text as to why some of the elevated ecological hazard quotient (EHQ) values for aluminum, selenium, cobalt and zinc indicate a slight potential for ecological effects while other elevated EHQ values indicate a low potential for these effects.

3. General Response Actions - Unnamed Pond, Section 2.4.2 p. 2-39
The FS Report concludes that the area of the unnamed pond that would require any remediation would be the western half of the pond. The Ecological Risk Assessment, supported by the chemical, sediment toxicity and benthic community results, suggests that the entire pond (with the possible exception of the extreme eastern fringe) will require remediation.

4. Delineation of Sediment Remedial Action
One of the major agreements reached at the 7 May 1996 technical meeting was the decision to define the limits of sediment removal based on qualitative parameters related to vegetative cover types and not ecological cleanup criteria. This was a consensus reached among the regulatory officials present as a mechanism to limit the widespread removal of valuable forested wetland communities, while still permitting the removal of high levels of sediment contamination.

In addition, despite this decision, it must be recognized that contamination above human health-based sediment criteria can not remain on off-site properties without a DER.

5. General Response Actions - West to Weymouth, Section 2.4.5 p. 2-43
The FS Report concludes that the area from West Boulevard to Weymouth Road (the vicinity of sediment sample SD-17) does not require remedial action. While the agencies concur that the mature growth palustrine forest should be protected from extensive remediation, it is clear that the contaminant concentration and the sediment sink that exists in this area necessitates some remediation of this "hot spot" along the stream corridor.

6. Definition and Screening of Alternatives, Section 3.2 p. 3-3
a. The Surface Water and Sediment FS Report states that a five-year review of the remedial action decision is not considered necessary for any of the alternatives undergoing evaluation. Even though there will be no DER established along the stream (from human exposure),

excessive exposure to ecological receptors will still exist. Any remedial decision as it relates to the Hudson Branch will have to be a balance between removing contaminated sediments and avoiding destruction of valuable wetlands habitat. Invariably, some contaminated sediments will remain that may represent some level of potential ecological impact. Therefore, a five-year review of the remedial action must be conducted.

b. In addition, it must be noted that, at a minimum, at least one five-year sampling event and subsequent review of the chosen remedial action will be necessary before the site can be delisted from the National Priorities List. Therefore, the costs associated with this sampling and review shall be included in the remedial alternatives evaluated in the FS.

7. Remedial Alternative Recommendation, Section 4.5, p. 4-56

a. As discussed at the May 7, 1996 meeting, the remediation of the area of sample SD-19 will require remediation along with the rest of the identified sediment areas, and not as a contingency as proposed.

b. While post-construction monitoring of the sediment and surface water is included in the recommended alternative, it is indicated that the monitoring program will be conducted for two years. Based on the fact that some contaminated sediments will remain that may represent some level of potential ecological impact and that a five-year review of the remedy is now required, SMC shall revaluate the proposed monitoring program.

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ECOLOGICAL RISK ASSESSMENT

1. General: The interpretation of the sediment and surface water data presented in the ecological risk assessment (ERA) is based primarily upon on e reference stream sample and one reference pond sample. It is concluded throughout the ERA that there does not appear to be significant differences between the reference pond and the Hudson Branch sampling locations based on habitat assessment and toxicity testing. Furthermore, it is stated that because certain inorganics are detected in the reference pond, these inorganics are not site-related contaminants. I should be noted, however, that the maximum levels of contaminants detected in the samples collected from the Hudson Branch are significantly higher than the maximum levels detected in the reference areas and that the reference pond may be impacted from other sources and may not reflect ambient conditions.

2. General: It is stated on page 5-3 that criteria/effect levels or three times the mean reference level are used to evaluate constituent concentrations at sample locations along the Hudson Branch. It is further stated on page 6-10 that Ecological Hazard Quotients (EHQs) similar to background and/or due to uncertainties are not considered significant in this ERA. The use of an arbitrary level such as three times the reference level or background for comparison of site contaminants levels is a procedure which is not appropriate for the assessment of ecological risk.

3. General: The Shannon-Weiner diversity index was used to calculate species diversity in the sediment. The diversity index is based on quantitative sediment sampling while the sampling design was qualitative. Therefore, it may not be appropriate to rely on the results of species diversity in this assessment.

4. p.2-2 (paragraphs 1 and 2): It is stated that the treated ground water is presently discharged to the on-site pond.

   The process(es) by which pond sediment received the high metals concentrations (prior to treatment) shall be briefly discussed in this section.

5. p.2-4 (Upland Habitats): Acreage totals are provided for Grassland Areas #1 and #2 but not for the Forested Upland. Therefore, the acreage shall be provided for the Forested Upland.

6. p.2-11 (Surface Water, - 3rd paragraph): It is stated that the 1995 Hudson Branch SW samples are depicted on Figure 2-4. However, the figure is not included and shall be provided.

7. p.2-20 (paragraph 3): It is stated that contaminant levels are compared to 3 times mean background (indicator of contaminant site specificity). It is further stated that this is EPA Region II policy.

The above procedure is not EPA Region II, BTAG, nor NJDEP policy for distinguishing site versus non-site related contamination in ecological evaluations and assessments. However, since contaminants were not dropped from the assessment or EHQ calculations, risk levels are not affected. The above procedure may, however, affect risk interpretation/management decisions. Therefore, means and maxima greater than reference area means and maxima shall be assessed via a "weight of evidence"/professional judgment approach versus exclusion via a "3 times" approach. Also see the comment for p.5-2 for the use of a "weight of evidence" approach and the comment for p. 6-10 regarding the "3 times" approach.

8. p.3-2 (Incorporation of Contaminants of Concern (COC) into Fish): It is stated that fish BAFs were obtained from Barnthouse et al. (1988) and reflect uptake from food and water.

It shall be clarified if this reference reports BAFs for sediment associated (worst case) fishes, water column fishes, or both. Fishes present in the on-site pond and Hudson Branch are likely to be highly sediment associated due to the shallow nature of both pond and stream. BAFs provided for water column species only (or predominantly) would bias fish BAFs low and subsequently bias risk low for piscivorous species (kingfisher). Depending on the clarification, this issue may need to be incorporated in the uncertainty section.

9. p.3-4 (last paragraph): It is stated that Beef Biotransfer Factors (BBTFs) are utilized to model COC uptake into white-footed mouse. The reference cited for BBTFs is Baes et al. 1984.

a. The cited reference provides BBTFs for inorganics. It shall be clarified if organic BBTFs were used in the model such as provided in Travis and Arms (1988).

b. In addition, as noted previously by BTAG, the use of BBTFs to project mouse tissue levels may under or over estimate the actual concentration of contaminant in mouse tissue. BBTFs were calculated from uptake of contaminants from vegetation into the flesh of cattle. Because a cow and a mouse, etc., physically process food and metabolically process contaminants much differently, and BBTFs do not consider whole body concentrations of contaminants, their use in the model is questionable and should be discussed in the uncertainly section.

10. p.3-5 (paragraph 3): It is stated that the daily ingestion rate for the short-tailed shrew is 15 grams. However, in the ingestion rate for the short-tailed shrew as reported in the Wildlife Exposure Factors Handbook (EPA/600/R-93/187a December 1993) is 8 grams per day. The exposure calculation should be checked to ensure that the correct ingestion rate was used.

11. p.4-4 (first paragraph): For organic COCs detected in the Hudson Branch sediments, sediment quality values were determined using the equilibrium partitioning approach (EqP). However, the EqP is not recommended for assessing ecological risk associated with sediment. The method fails to consider that the sediments may be directly consumed by the receptor,

that the receptor may be in continual or extensive physical contact with the sediments, or the potential for food chain effects.

12. p.4.5 (paragraph 1): It is stated that the presence of inorganic-tolerant taxa such as mayflies is a suitable indicator of stress.

Mayflies may not be suitable indicators species since most species are associated with riffle/run habitat and rocky substrates. Since on-site pond and Hudson Branch water bodies exhibit low flow velocity and a highly organic substrate, high mayfly species diversity is not expected. In addition, species tolerating low flow/highly organic substrates may be more tolerant of organic and inorganic pollutants due to the highly organic nature of the substrate and the tendency of such sediments to act as contaminant "sinks".

13. p.5-1 (Table): It is stated that potential plant receptor impacts are assessed by the stressed vegetation survey.

Although the stressed vegetation survey for the wetlands may provide a field indication of actual stress, phytotoxicity benchmark should be used for initial screening. Exceedances of such benchmark can then be addressed (at least in part) by the results of a stressed vegetation survey. However, for the grassed areas (anthropogenic monoculture), a native/natural plant community is not present for assessment of contaminant stress. Potential stress is best assessed via phytotoxicological benchmark in the absence of a diverse natural community.

14. p.5-2 (paragraph 1): A scaled ecological hazard quotient scheme is presented to evaluate the potential for impacts to receptors.

As previously discussed by BTAG, the use of scaled EHQs is not recommended. The uncertainties associated with ecological risk assessment preclude using such a quantitative interpretation of the HQ results. While it appears that a scaled HQ system is used in other programs (e.g., in predictive risk modeling for permitting new pesticides), this is not the method recommended for ecological risk assessments conducted for Superfund. For example, it is recommended that a HQ value of less than 1 be interpreted as little or no potential risk, while a value greater than 1 be interpreted as indicating that the potential for risk exists ("Framework for Ecological Risk Assessment," EPA/630/R-92/001, February 1992). In place of the use of a scaling system for evaluating any potential risk, as determined by a HQ >1, other factors which aid the interpretation of potential risk should be considered. These include spatial extent of affected media, significance of affected habitat, and corroborating field evidence.

15. p.5-8 (bullet 2): It is stated that a sediment quality criterion is not available for Sb.

Note that Long and Morgan (1990) provides both an ER-L (2 ppm) and ER-M (25 ppm) value. These values shall be used to recalculate EHQs, total EHQs, and risk levels to the various receptors.

16. p.5-15 (paragraph 1): It is stated that sediment toxicity testing results indicate habitat-related decreases in the growth of C. tentans.

The above statement shall be modified to include the word "apparent" between the words "indicate" and "habitat-related" since other interpretations are possible such as toxic contributions.

17. p.5-17 (paragraph 2): It is noted that the sizable population of mayflies in the on-site pond and various Hudson Branch locations may be indicative of a community unimpacted by contaminants.

Despite the large number of individuals collected, it shall be noted that species diversity appears quite low. For example, only 2 genera (not identified to species), one of which is markedly dominant, were collected in the on-site pond. This should be discussed as an uncertainty. Also see comment for p.4-5 (paragraph 1) above.

18. p.5-17 (paragraph 3): The consultant summarizes the on-site pond macroinvertebrate survey results by concluding that the community is non-impacted, exhibiting characteristics similar to the reference location.

a. A distinction shall be made between similarity to a reference location (based on community surveys) and non-impacted. For example, the reference area may be impacted as well (due to different stressors) and therefore harbor a similar community. Without such a distinction, risk management and risk assessment issues can be confused.

b. Note, also, that the reference pond is impacted by high nutrient levels while the on-site contains high metal concentrations. This difference may explain the significant mortality exhibited by H. azteca in on-site pond sediment toxicity tests versus reference pond tests. Also see comment for p.6-4 below.

19. p.5-35 (first paragraph): It is stated that incidental ingestion rates for the shrew and robin of 5% and 2% for the mouse will overestimate soil exposure. It should be noted that the robin and short-tailed shrew would be expected to be exposed to a high incidental intake of contaminated soil due to capture and consumption of the soil dwelling earthworms, burrowing (shrew), cleaning/preening, and nesting (robin). Therefore, it is believed that the incidental ingestion rates used for soil in the ERA may not be overestimating exposure.

20. p.6-2 (paragraph 1): It is stated that Zn exceeds the acute ambient water quality criterion (AWQC) in the Hudson Branch and in the reference locations implying little concern from a risk management perspective (i.e it is a background problem).

It shall be noted that although the acute criterion is exceeded at both Hudson Branch and reference locations, the Hudson Branch exceedances are approximately 3 times the reference concentrations indicating that site contributions are likely.

21. p.6-4 (paragraphs 1-4): It is stated that on-site pond benthic invertebrates are not being adversely impacted despite elevated inorganic levels. Cited as substantiating this statement is the presence of H. azteca in the pond despite significant mortality of this species in laboratory toxicity tests using lab raised individuals, similar community indices (e.g., species dominance), and sizable mayfly populations.

Note that amphipod numbers are reduced in the on-site pond versus the reference pond (17 and 20 versus 62) which may indicate impacts. As noted previously by BTAG, pond amphipod populations may be somewhat acclimated to the high metal levels. However, this amphipod is a surrogate for other sensitive macroinvertebrates, some of which may not be capable of acclimating. The significant toxicity indicated in 4 of 5 pond and Hudson Branch sediment tests from the locations with the highest metals levels strongly suggests metal related toxicity which may prevent establishment of a more natural species assemblage.

Although the mayfly order Ephemeroptera is generally pollution intolerant, some taxa (species, genera, families) do exhibit significant pollution tolerance. For example, of the 2 mayfly genera identified in the pond, the dominant genus (Caenis) is in the family Canidae which registers a pollution tolerance score of "7" on the Hilsenhoff Biotic Index (1-10 in order of increasing organic pollution tolerance).

Additionally, although the habitat assessment and macroinvertebrate surveys for the on-site and reference ponds indicate similar habitat and macroinvertebrate assemblages (diversity/frequency), it should not be soundly concluded that measured toxicity in on-site pond toxicity tests is an artifact. An alternate interpretation is that although macroinvertebrate survey results show similar depredation/impacts at both ponds, the impacts are caused by different stressors. The on-site pond contains severely elevated inorganics (site related) while the reference pond contains severely elevated nutrient levels (not site related). The metals would be expected to cause significant toxicity in short term (growth/survival) tests while nutrients may not. Elevated nutrient levels may preclude establishment of sensitive populations (not measured by toxicity tests performed) resulting in a similarly degraded community. The remediation of site related contaminants within the on-site pond (and Hudson Branch) would therefore prevent continuing contaminant transport to Hudson Branch and allow establishment of a more natural aquatic community and decrease potential impacts to consumers (kingfisher, etc.).

Therefore, based on the above, this section should be revised to reflect the above determination or discussed in the uncertainty section.

22. p.6-5 (paragraph 2): It is stated that sediment samples collected from background location SD-35 evidenced several inorganic compounds that were elevated above sediment quality criteria (SQC) values suggesting a lack of site specificity for these compounds.

This statement is misleading. The only SQC reference exceedances as per Table C-2 (Appendix C) are Sb, Cd, and Hg. However, neither Sb or Cd exceedances (Cd; 1.5 ppm compared to an LEL of 0.6 ppm, Sb; 18.9 ppm compared to an ER-L of 2) are depicted on bar graph Figs. 5-37 and 5-33 respectively. These Figures shall be corrected. Although Sb, Cd, and Hg do exceed chronic SQCs, Hudson Branch concentrations of Sb greatly exceed (> 1 order of magnitude, >acute) the concentrations at SD-35 and pond reference locations. Hudson Branch Cd also exceeds (> 3x) SD-35 but is comparable to reference pond samples. Hudson Branch Hg exceeds (acute) both SD-35 and reference pond levels (chronic) by more than 3 times. Therefore, only the Hudson Branch Cd exceedance may be attributable to background conditions. This statement shall be modified/clarified.

23. p.6-6 (paragraphs 2, 3): It is stated that the sediment toxicity exhibited at Hudson Branch locations SD-14 and -19 is likely an artifact since SD-17 did not show significant toxicity despite comparable high metals levels.

Although SD-17 did not exhibit significant mortality in sediment toxicity test (despite high metals levels), it is significant that of the 5 pond/ stream locations with the highest metals concentrations, SD-17 is the **only** location which did not exhibit significant toxicity. Therefore, the results at SD-17 may represent a data point outlier. In addition, although SD-17 did contain the highest Cr and Sb of Hudson Branch locations, Al, Ba, Be, Cd, Cu, Hg, Se, and V were higher at SD-14 and -19 than at SD-17. This may explain the apparent discrepancy in toxicity results.

24. p.6-8 (last paragraph): It is stated that the background concentrations of Al, Co, Se, and Zn were estimated to have similar ecological impacts as Hudson Branch sampling locations. Therefore, it is unlikely that these COCs present a greater risk to the belted kingfisher than do naturally occurring background levels.

This statement shall be clarified since Zn (and to a lesser extent Al) are greatly elevated above background levels in the Hudson Branch.

25. p.6-10 (bullet 2): It is stated that if a site mean EHQ is less than 3 times the background mean EHQ, it is not considered relevant to the ERA.

Making the judgement that a site contaminant mean at or less than 3 times a mean background EHQ is not relevant is statistically unacceptable. Comparison of a site mean to the 95 % upper confidence limit on the reference mean should be made to determine the significance of any difference from the reference mean. The consultant shall modify their methodology for assessing site versus background risk and their conclusions where appropriate.

26. p.6-10 (bullet 2): Based on a conversation with TRC Ecologist Scott Heim (8 May, 1996), it is assumed the sediment reference mean is calculated using sediment samples SD6A, -6B, -6C, SD-29, -30, -31 and -35.

Sediment samples SD-29, -30, -31 and -35 are true sediment samples (pond and stream locations); however, SD-6A, -B, and -C are actually wetland soil samples collected just off the site's southeast corner. These latter samples were collected as a soil reference (assumed unimpacted by site) and for pond sediment "clean zone" delineation since there was no upgradient flow clearly unimpacted by pond flooding. However, SD-6A, -B, and -C contain relatively high levels of site specific metals such as Al, Fe, Cr, and V, etc., which may indicate site influence, possibly due to wind blown dusts from the unvegetated waste storage area on the eastern half of the site. Including these samples to calculate sediment reference means may therefore be inappropriate as it would bias the reference mean high and decrease site versus background/reference risk. Finally, including wetland soil samples with sediment samples to calculate a sediment mean may also be inappropriate. Although recalculations of site versus background risk are not required, the potential bias should be noted in the uncertainty section along with the uncertainties introduced by calculating a sediment mean using both soil and sediment.

27. Table 3-10: This table includes BAF values associated with contaminants for fish and crayfish. However, it is unclear why for some of the contaminants a value was reported in the crayfish column while a non-detect was indicated in the fish column. As explanation for this situation shall be provided.

28. Table 4-2: Incorrect information is presented as follows, so the table shall be revised accordingly.

a. The severe effects levels (SEL) for organics obtained from the "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario" (D. Persaud, et. al. August 1993. "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario." Ontario Ministry of Environment and Energy) amy not be appropriate for this site because of the elevated total organic content (TOC) detected int eh sediment samples. The Ontario SEL values for organic constituents are to be converted to bulk sediment values by multiplying by the actual TOC concentration of the sediments at a maximum of 10%. However, several of the samples collected contained TOC levels of more that 10%

b. The table does not include sediment quality values for antimony. These values (ER-L of 2 ppm and ER-M of 25 ppm) can be found in Long and Morgan 1990 (Long, E.R. and Morgan L.G., 1990. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. National Oceanic and Atmospheric Administration Technical Memorandum NOS OMA 52).

29. Table 4-3: Table 4-3 includes some benchmark doses which are inappropriately higher than the reference dose. The reference dose presented for aluminum as a chronic no observed effect level (NOEL) for the ring dove is 1.10 mg/kg/day and the benchmark dose as a chronic NOEL is listed as 110 mg/kg/day. The reference dose for the rat from cadmium is 1.0 mg/kg/day and the benchmark dose is listed as 2.5 mg/kg/day. These discrepancies may only be typographical errors, but the table shall be revised accordingly.