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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Via U.S. Postal Service and Electronic Mail

July 1, 2011

Donald Thompson, President Pechiney Cast Plate
c/o Eileen Burns-Lerum
8770 West Bryn Mawr Avenue
Mail Code 7J
Chicago, IL 60631-3542

Re: Polychlorinated Biphenyls - U.S. EPA Conditional Approval Under 40 CFR 761.61(c), Toxic Substances Control Act – *"Polychlorinated Biphenyls Notification Plan Former Pechiney Cast Plate, Inc Facility Vernon, California,"* July 9, 2009

Dear Mr. Thompson:

We have completed the review of AMEC Geomatrix's (AMEC's) December 29, 2010 letter proposing modified cleanup levels for polychlorinated biphenyls (PCBs) in soils and concrete at the former Pechiney Cast Plate, Inc. (Pechiney) facility (Site) in Vernon, California. AMEC submitted its letter on behalf of Pechiney. In Section A of this letter, the U.S. Environmental Protection Agency Region 9 (USEPA) is approving PCB cleanup levels for the Pechiney Site based on AMEC's proposal.

Section B of this letter modifies USEPA's July 2, 2010 letter (Enclosure 1) approving with conditions Pechiney's *"Polychlorinated Biphenyls Notification Plan Former Pechiney Cast Plate, Inc Facility Vernon, California,"* (risk-based disposal approval application or Application dated July 9, 2009) for cleanup of PCBs at the Site.[1]

The former Pechiney facility comprises 26.9 acres. This Site has been subdivided into several individual Phase Areas for investigatory and remedial purposes. The Site has been impacted by PCBs and non-PCB contaminants (e.g., metals, solvents).

We understand the City of Vernon (City) plans on redeveloping the Pechiney Site into industrial and commercial uses. The Application states the land use for the former Pechiney site will remain industrial and commercial and that no other land use (e.g., residential) will be allowed at the site. The City plans on recording a restrictive covenant to limit the former Pechiney property to industrial and commercial land uses.

Section A – USEPA Conditional Approval of Cleanup Levels for the Pechiney Site

In its July 9, 2009 Application Pechiney proposed to remove and dispose offsite concrete and soils contaminated with PCBs at levels equal to or above 5.3 mg / kg. Pechiney proposed to dispose onsite crushed concrete with a PCB concentration below 5.3 mg/kg at 0 to 5 feet below ground surface (bgs). According to Pechiney's proposal in the Application, soils with PCBs below 5.3 mg/kg would be disposed onsite at 0 to 5 feet bgs, soils with a PCB level equal to or below 35 mg/kg would be disposed onsite within 5 to 15 feet bgs, and soils with PCBs above 35

[1] AMEC Geomatrix prepared the Application for Pechiney. USEPA's July 2, 2010 conditions of approval required additional soil and concrete characterization for PCB Aroclors and dioxin-like PCB congeners.

mg/kg would be disposed onsite below 15 feet bgs. USEPA did not approve the cleanup levels proposed in the Application.

Conditions C.3, C.3.a , C.5, and C.6[2] in USEPA's July 2, 2010 letter approving the Application required additional characterization of onsite soils and concrete for PCB Aroclors and dioxin-like PCB congeners (PCB congeners) and use of that new data in updating the cumulative multiple-contaminant risk evaluation for the Site. That risk evaluation includes PCB and non-PCB contaminants. The Department of Toxic Substances Control (DTSC) is addressing the non-PCB contaminants and has established the risk-management target for the industrial Pechiney Site at the $1x10^{-5}$ carcinogenic risk level. That risk level accounts for combined PCB and non-PCB contaminants at the Site.

Due to the age of PCB releases and type and nature of PCB Aroclors released at the Site, USEPA required Pechiney to sample and test onsite soils and concrete for PCB congeners. Specifically, USEPA required Pechiney to demonstrate that if present at the Site, PCB congener concentrations do not increase the overall DTSC-established cumulative risk level for the Site above $1x10^{-5}$.

In addition, USEPA required that if this risk level is exceeded that Pechiney propose for USEPA approval cleanup levels for PCBs in concrete and soils that do not pose a risk of injury to health or the environment. Such cleanup levels would have to be developed considering the contribution of PCB congeners to the overall risk from PCBs and non-PCB contaminants at the Site.

In accordance with USEPA's July 2, 2010 approval letter, AMEC conducted additional soil and concrete characterization at the Site, developed and evaluated correlations between PCB Aroclors and PCB congeners; and re-evaluated the PCB cleanup levels it had initially proposed in its Application. Based on the review of that preliminary information, USEPA requested an additional level of regression analysis to better understand the spatial (Phase Areas) relationship between PCB concentrations when identified as PCB Aroclors as opposed to identification based upon their dioxin-like congener content.

Accordingly, in Attachment 1 ("*Impact of Additional Soil and Concrete Characterization on Risk-Based Remediation Goals*") of its letter, AMEC proposes modified PCB cleanup levels for the Site based on correlations (via linear regression analysis) between site-specific concentrations of PCB Aroclors and PCB congeners. AMEC's proposal is attached as Enclosure 2.

USEPA's review and scrutiny of regression statistical parameters used by AMEC suggests that a strong and reproducible site-specific relationship has been identified between dioxin-like PCB congeners and PCB Aroclor concentrations at certain discrete Phase Areas of the Pechiney Site. The strength of this relationship fosters a more comprehensive Site characterization and cleanup approach - as PCB congener concentrations can be inferred from the results of existing and proposed PCB Aroclor analysis.

The regression correlation coefficients that USEPA requested of Pechiney uniformly ranged from 0.85 to 0.99. Correlation coefficients exceeding 0.70 are typically considered indicative of a strong correlation amongst the dependent variables (i.e., PCB congeners and PCB Aroclors in this instance) considered.

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[2] These conditions are described as follows: Condition C.3 (Onsite disposal of onsite PCB-contaminated concrete and soils), C.3.a (Cumulative risk evaluation to include dioxin-like PCB congeners), C.5 (Amendment 2 to Application. Additional proposed concrete and soil sampling for PCB Aroclor and PCB congener analysis), and C.6 (Amendment 3 to Application).

The 3.5 mg/kg soil cleanup level equates to an approximately 4.7 x 10^{-6} excess cancer risk level for the site-specific industrial exposure scenario. This proposed soil cleanup level is protective and was developed with methods and procedures consistent with overarching USEPA risk assessment guidance. Our review also finds the cleanup level proposed for PCB impacted concrete as a discrete media is similarly appropriate and protective.

Therefore, USEPA is approving below the PCB cleanup levels for concrete and soil at the Pechiney Site based on AMEC's proposal and with conditions. However, as required in Condition C.3.e (Interim cap) in USEPA's July 2, 2010 letter, Pechiney must install an interim cap atop of exposed soils and concrete after such soils and concrete have achieved the cleanup levels. As stated in USEPA's letter, "it is not certain when the site will be redeveloped and the specific industrial / commercial uses for the site have not been finalized." The PCB concentration in the cap must not exceed 1 mg/kg PCBs. The interim cap is to prevent dust from the site and minimize storm water runoff until the Site is redeveloped with permanent dust and storm water runoff controls in place.

1. USEPA Approved Cleanup Levels for Concrete and Soils at the Pechiney Site

USEPA is approving the cleanup levels with the conditions in Section A.2 below.

a. *Cleanup Level C-1: Concrete (0 to 5 feet below ground surface [bgs]) - Total PCB Aroclors:* The approved cleanup level for concrete is 3.5 mg/kg (or 3,500 ug/kg) total PCB Aroclors and such concrete can be disposed at the Site at 0 to 5 feet below ground surface (bgs). This cleanup level is the total PCB Aroclor concentration resulting in a maximum dioxin TEQ (toxic equivalence) concentration of 81 pico-grams/gram (pg/g) (or 0.081 ug/kg). The concrete cleanup level is based on regression analysis for dioxin-like PCB congeners versus total PCB Aroclors in combined soil and concrete. According to AMEC the gradational specification for the crushed concrete will meet the Greenbook specification for crushed miscellaneous base (Spec #200.2.4). Various grain sizes will result from crushing the concrete, with the maximum grain size not to exceed approximately 1.5-inches. The smaller grain sizes will range from less than approximately 1.5-inches to 0.003-inches.

b. *Cleanup Level S-1: Soil (0 to 15 feet bgs) - PCB Aroclor 1254:* The approved cleanup level for Aroclor 1254 is 2.0 mg/kg (or 2,500 ug/kg) for soils at 0 to 15 feet bgs which is based on a non-cancer risk-based screening level for construction worker and a target non-cancer hazard index of 1. Soils containing a concentration of PCB Aroclor 1254 above 2.0 mg/kg will be excavated and removed from the Site even if the total PCB Aroclor concentration is below 3.5 mg/kg.

c. *Cleanup Level S-2: Soil (0 to 5 feet bgs) - Total PCB Aroclors:* The approved PCB cleanup level for soils in the upper 5 feet layer of soil is 3.5 mg/kg (or 3,500 ug/kg) total PCB Aroclors. This cleanup level is the total PCB Aroclor concentration resulting in a maximum dioxin TEQ concentration of 81 pg/g (or 0.081 ug/kg). The 3.5 mg/kg soil cleanup level is based on regression analysis for dioxin-like PCB congeners versus total PCB Aroclors in combined soil and concrete; and equates to an approximately 4.7 x 10^{-6} excess cancer risk level for the industrial exposure scenario.

d. *Cleanup Level S-3: Soil (5 to 15 feet bgs) – Total PCB Aroclors:* AMEC has also proposed a cleanup level of 23 mg/kg (or 23,000 ug/kg) total PCB Aroclors for soils to be left in place at 5 to 15 feet bgs. This proposed cleanup level, which was developed for protection of a site-specific construction worker exposure scenario, is the total PCB concentration resulting in a maximum dioxin TEQ concentration of 530 pg/g (or 0.530 ug/kg).

2. Conditions of Approval for PCB Cleanup Levels

The cleanup levels described in Section A.1 above are approved with the conditions described below.

a. *Soil Cleanup Levels S-1, S-2, and S-3:* Post-excavation cleanup verification sampling must demonstrate that soil cleanup levels S-1, S-2, and S-3 have been achieved at the maximum depth (e.g., 5 feet bgs) of each of the soil zones (e.g., 0 to 5 feet bgs) where they apply. Within 15 days before excavating PCB contaminated soils that are not located below structures such as concrete slabs or asphalt, submit a revised cleanup verification sampling approach that will facilitate the required demonstration. These soil cleanup levels are being approved without the benefit of detailed redevelopment plans for the Site. At the time of this approval, USEPA is not aware of any redevelopment plans to be implemented at the Site.

b. *Revised Grading Plan:* As to cleanup level S-3, the Site still has to be graded to its interim and final configuration. Soils with 23 mg/kg PCB Aroclors that may be present within 5 to 15 feet bgs may be disturbed during the interim (immediately after Site remediation) and future final grading of the property for redevelopment and during construction of future land use projects. Therefore, within 15 days after the date of this approval, submit for USEPA review a revised grading plan that incorporates all the information in Condition C.3.b of the July 2, 2010 approval letter and effectively responds to the issues USEPA has described in this Condition.

c. *Additional Conditions:* Conditions C.3.c (Soils management plan after remediation) and C.7.e (Soil management during below-grade demolition) are relevant and directly applicable to the approval of the soil cleanup levels.

d. *Concrete Cleanup Level C-1:* Concrete with PCBs above 1 mg/kg and below 3.5 mg/kg will not be used at the Site as surface cover.

Section B – Modifications to USEPA July 2, 2010 Conditional Approval Letter

This section modifies certain conditions of approval in USEPA's July 2, 2010 letter approving the Pechiney Application. Except for the modifications described below, all conditions of approval in USEPA's letter remain in effect.

a. *General Modification:* The soil and concrete risk-based cleanup levels approved in Section A of this letter are incorporated by reference into the conditions of approval in USEPA's July 2, 2010 letter approving the Pechiney Application. The cleanup levels must be implemented in context to the requirements of the specific conditions where cleanup levels are referenced.

b. *Condition C.5.d (Proposed statistical correlations between dioxin-like PCB congeners TEQ and individual Aroclor mixture concentrations):* USEPA is approving Attachment 1 ("*Impact of Additional Soil and Concrete Characterization on Risk-Based Remediation Goals*") of AMEC's December 29, 2010 letter containing the description and process used to make correlations between site-specific concentrations of PCB Aroclors and dioxin-like PCB congeners.

We look forward to being of assistance to Pechiney and its consultant during implementation of the Application as modified by this approval of risk-based cleanup levels specific to the Pechiney Site and the July 2,

2011conditional approval of the Application. Please contact Carmen Santos of my staff at 415.972.3360 if you have any questions concerning this conditional approval.

Sincerely,

for Jeff Scott
Director
Waste Management Division

Enclosures (2)

Cc: Linda Conlan, AMEC Geomatrix
Lewis Pozzebon, City of Vernon
Michel Iskarious, DTSC
Brian Endlick, DTSC
Arlene Kabei, USEPA R9
Steve Armann, USEPA R9
Carmen Santos, USEPA R9
Patrick Wilson, USEPA R9

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July 2, 2010

Donald Thompson, President Pechiney Cast Plate
c/o Eileen Burns-Lerum
8770 West Bryn Mawr Avenue
Mail Code 7J
Chicago, IL 60631-3542

Re: Polychlorinated Biphenyls - U.S. EPA Conditional Approval Under 40 CFR 761.61(c), Toxic Substances Control Act – *"Polychlorinated Biphenyls Notification Plan Former Pechiney Cast Plate, Inc Facility Vernon, California,"* July 9, 2009

Dear Mr. Thompson:

The U.S. Environmental Protection Agency Region 9 (USEPA) is approving with conditions certain elements of the *"Polychlorinated Biphenyls Notification Plan Former Pechiney Cast Plate, Inc Facility Vernon, California,"* dated July 9, 2009 and prepared by AMEC Geomatrix (Application) for Pechiney. Pechiney submitted this risk-based disposal approval application for polychlorinated biphenyls (PCBs) under the Toxic Substances Control Act (TSCA) regulations in 40 CFR 761.61(c). On behalf of Pechiney, AMEC Geomatrix (AMEC) revised the Application on March 16 and April 12, 2010.

The Application and its subsequent amendments propose additional characterization for PCBs in soils and concrete and onsite and offsite disposal of onsite soils and concrete depending on PCB levels. Enclosure 1 contains the conditions of approval. Pechiney and Geomatrix must implement the elements of the Application approved in Enclosure 1 as modified by the conditions of approval.

USEPA is approving with conditions the additional site characterization and sampling proposed in the Application and subsequent Application amendments. USEPA believes these proposed activities do not pose an unreasonable risk of injury to health or the environment.

Enclosure 1 does not cover approval of the cleanup levels and onsite disposal of onsite PCB-` contaminated soils and concrete proposed in the Application. USEPA is deferring approval of these elements of the Application until after USEPA reviews the information requested in Enclosure 1.

Attached to Enclosure 1 are comments on the Application prepared by RTI International for Dr. Zubair Saleem (USEPA Headquarters). Among other issues, these comments focus on the remediation goals proposed in the Application, soil and concrete sampling, and analysis of PCB congeners.

Potential sources of PCB contamination in soils and concrete include hydraulic oils used in cast plate equipment (e.g., forge presses), dielectric fluids used in transformers and capacitors, and waxes used in metal casting. Aroclor 1232, 1248, 1254, and 1260 were detected at the Pechiney site.

In general, Pechiney proposes to remove and dispose offsite concrete and soils contaminated with PCBs at levels equal to or above 5.3 mg / kg (ppm). Specifically, Pechiney proposes to dispose onsite crushed concrete with a PCB concentration below 5.3 ppm at 0 to 5 feet below ground surface (bgs). According to Pechiney's proposal, soils with PCBs below 5.3 ppm will be disposed onsite at 0 to 5 feet bgs, Soils with a PCB level equal to or below 35 ppm will be disposed onsite within 5 to 15 feet bgs; and soils with PCBs above 35 ppm will be disposed onsite below 15 feet bgs.

After USEPA reviews the information required in Enclosure 1, USEPA will approve or modify with conditions Pechiney's proposed PCB cleanup levels for onsite disposal of onsite PCB-contaminated soils and crushed concrete. USEPA will make this decision together with a determination as to whether the PCB cleanup levels, PCB cleanup activities, and onsite disposal of onsite PCB-contaminated onsite soils and crushed concrete do not present an unreasonable risk of injury to health or the environment.

The Pechiney site will undergo cleanup for PCBs (cleanup regulated under USEPA TSCA regulations) and other contaminants such as volatile organic compounds (cleanup regulated by the California Department of Toxic Substances Control)[1] in preparing the site for redevelopment.

We understand the City of Vernon (City) plans on redeveloping the former 26.9-acre Pechiney site into industrial and commercial uses. The Application states the City plans to record a restrictive covenant to limit the Pechiney property to industrial and commercial land uses and that no other land use (e.g., residential) will be allowed at the site. The conditions of approval in Enclosure 1 require that at a minimum Pechiney record a deed notice in accordance with California law and that such notice meet the requirements in Enclosure 1.

Finally, USEPA recommends that routes to be used for transportation of PCB-containing wastes (e.g., PCB remediation wastes) for offsite disposal and cleanup

[1]Cleanup of non-PCB contaminants will be under a California Department of Toxic Substances Control imminent and substantial endangerment determination and consent order.

activities be designed to minimize impact to nearby communities already bearing a burden or impact from other environmental issues that affect them. One such community is the community of Maywood.

We look forward to be of assistance to Pechiney and its consultant during implementation of the enclosed conditional approval of Pechiney's Application. Please contact Carmen Santos of my staff at 415.972.3360 if you have any questions concerning this conditional approval.

Sincerely,

Jeff Scott
Director
Waste Management Division

Enclosures (2)

Cc: Linda Conlan (AMEC Geomatrix)
Michel Iskarious (DTSC)
Brian Endlick (DTSC)
Arlene Kabei, USEPA R9
Steve Armann, USEPA R9
Patrick Wilson, USEPA R9
Margaret Alkon, USEPA R9
Carmen Santos, USEPA R9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

July 2, 2010

USEPA Conditional Approval for Former Pechiney Cast Plate, Inc. Facility
PCB Risk-Based Cleanup Under 40 CFR 761.61(c)

"Polychlorinated Biphenyls Notification Plan Former Pechiney Cast Plate, Inc Facility Vernon, California"
Prepared by AMEC Geomatrix, July 9, 2009 (Application) for Pechiney Cast Plate

A. Background and Introduction

The U.S. Environmental Protection Agency Region 9 (USEPA) is approving with conditions certain elements of the *"Polychlorinated Biphenyls Notification Plan Former Pechiney Cast Plate, Inc Facility Vernon, California,"* dated July 9, 2009 and prepared for Pechiney by AMEC Geomatrix (Application). Pechiney submitted the Application in accordance with the Toxic Substances Control Act (TSCA) regulations in 40 CFR 761.61(c) (risk-based disposal approval application). This approval is for the 26.9-acre former Pechiney Cast Plate Inc. facility (Pechiney or Site) at 3200 Fruitland Avenue, Vernon, California.

This approval covers conditions of approval for additional characterization, sampling, and analysis proposed in the Application and conditions for other work that USEPA believes to be necessary in relation to PCBs at the site. This approval also covers offsite disposal of PCBs from the Pechiney site. This approval is effective on the date of USEPA's transmittal letter. The conditions of approval are described in Section C.

However, this approval does not cover approval of the cleanup levels and onsite disposal of onsite PCB-contaminated soils and concrete proposed in the Application. USEPA is deferring approval of these elements of the Application until after USEPA reviews the information requested in this approval.

This conditional approval does not relieve the owner of the Pechiney property from complying with all other applicable federal, state, and local regulations and permits. Departure from the approval conditions without prior written permission from USEPA may result in the commencement of proceedings to revoke this approval, and / or an enforcement action. Nothing in this approval bars USEPA from imposing penalties for violations of this approval or for violations of other applicable TSCA PCB requirements or for activities not covered in this approval.

B. Pechiney Risk-Based Application

This conditional approval is based on USEPA's review of the Application, AMEC Geomatrix's Amendments[1] 1 through 3 to the Application, and USEPA Headquarters (USEPA HQ) review of the Application. Amendments 1 through 3 modify the Pechiney Application (Amended Application). The Application Amendments respond to several issues raised in the USEPA HQs comments.

[1]Amendments 1 through 3 to the Application are dated March 16, 2010 (Response to USEPA preliminary comments on the Application), April 2, 2010 (Proposed concrete and soil sampling plan for coplanar PCBs), and April 2, 2010 (Proposed additional concrete sampling plan for PCBs).

ALCOA owned and operated a 56-acre manufacturing facility from 1937 until 1997. Among others, activities at the facility included manufacturing of high-precision cast aluminum plates. Century Aluminum purchased the western 26.9-acre portion of the ALCOA facility in 1998. Pechiney purchased the 26.9-acre Century Aluminum facility in 1999. High precision cast aluminum plates were also manufactured at the former Pechiney facility. The site is currently zoned as industrial / commercial. A restrictive covenant will be recorded by the City of Vernon to maintain this zoning for the site. The site is paved with asphalt and a 600,000 square feet concrete slab is present at the site.

Potential sources of PCB contamination at the site include PCB-containing hydraulic fluids and dielectric fluids. Based on the Application, PCBs are present in soils at concentrations up to 2,000 mg / kg (ppm) at depths up to 20 to 22 feet below ground surface (bgs) and at 35 ppm or greater at depths between 5 and 15 feet bgs. PCBs are present in concrete at concentrations below and above 50 ppm PCBs. PCB Aroclors 1248, 1254, and 1260 are the predominant Aroclors detected at the site. Ground water depth at the site is about 160 feet below ground surface (bgs). In addition to PCBs, other contaminants (e.g., total petroleum hydrocarbons and chlorinated hydrocarbons) are present in soils at the site.

Pechiney's Proposal for PCB Cleanup

In general, the Application as modified by Amendments 1, 2, and 3 consists of removing via excavation and disposing of PCB contaminated soils, concrete, and asphalt pavement. Depending on certain factors, PCB contaminated soils will be either disposed onsite or offsite.

- Proposed PCB cleanup level of 5.3 mg / kg (ppm) for concrete and surface /shallow (0 to 5 feet below ground surface [bgs]) soils[2].
- Removal of manmade structures such as building slabs, pavement, footings, foundations, pits, and sumps as part of the below grade demolition. Segregation of concrete for disposal based on PCB concentration in the concrete.
- Crushing and onsite disposal of onsite concrete and asphalt slabs with PCBs below 5.3 ppm. This waste is proposed to be disposed as excavation and site-wide backfill[2] and
- Offsite disposal of concrete and asphalt pavement with PCBs equal to and above 5.3 ppm PCBs.
- Remove onsite surface soils in the 0 to 5 bgs interval that are contaminated with PCBs at and above 5.3 ppm and dispose of these soils offsite.
- Additional soil characterization for PCBs beneath manmade structures and other areas. Certain soil samples will be collected for analysis of 12 dioxin-like PCB congeners (coplanar PCBs).
- Additional concrete characterization for PCBs including analysis for coplanar PCBs.
- Collection of soil cleanup confirmation samples.
- Onsite disposal of onsite soils in the 5 to 15 feet depth interval containing PCBs at 35 ppm[2].
- Onsite disposal of onsite soils at a depth below 15 feet bgs containing PCBs above 35 ppm[2].
- Restrictive covenant restricting the use of the property to industrial / commercial use.

[2] This approval does not cover approval of the cleanup levels and onsite disposal of onsite PCB-contaminated soils and concrete proposed in the Application. USEPA is deferring approval of these elements of the Application until after USEPA reviews the information requested in this approval.

C. USEPA Conditions of Approval

USEPA is hereby approving with certain conditions Pechiney's Amended Application including Section 6 of the Application, "PCB Remedial Action Plan" (PCB RAP). USEPA is approving the PCB RAP and Amended Application as modified by the conditions established in this approval. Pechiney must implement the Amended Application and RAP as modified by the conditions of approval established herein.

1. Certification. Within 15 days after the date of this approval and before beginning implementation of the Amended Application, please submit a revised certification that reflects and maintains the integrity of the Certification language in 40 CFR 761.3 and 761.61(a)(3)(i)(E).

The PCB regulations are very specific about the language to be used to qualify as "Certification." Modifying that language by inserting qualifiers undercuts the requirement that the certifying officials take responsibility to do a diligent inquiry. Limiting the certification to only certain type of characterizations (e.g., like those specifically addressed in AMEC Geomatrix's certification) is problematic. USEPA's TSCA regulations call for all characterizations to be made available to USEPA. Further, we understand that Pechiney has used all available site characterization data in developing the risk evaluation for the Pechiney site.

In addition, 40 CFR 761.61(a)(3)(i)(E) requires certification by the owner of the property where the cleanup site is located and the party conducting the cleanup. The certification that AMEC Geomatrix has submitted is designed to be signed by both of these parties. However, the certification wording says that the certification is being made "as the Consultant," which is inaccurate wording when applied to the owner. The owner and the consultant shall sign a certification matching the language required in the TSCA PCB regulations.

2. Updated site-specific sampling and analysis plan. Within 15 days after the date of this approval, Pechiney shall submit for USEPA approval an updated sampling and analysis plan for soils, concrete, and asphalt. The plan shall consolidate the sampling proposed in the Application and in Amendments 1, 2, and 3 and shall include the rationale for number and type of samples to be collected for both additional PCB site-characterization and PCB-cleanup verification. The sampling plan shall utilize the "EPA Region 1 Standard Operating Procedure for Sampling Porous Surfaces for PCBs" (EPA SOP) to collect concrete samples. USEPA Analytical Method 1668-B shall be consulted to verify the sample collection method in the EPA SOP is appropriate to collect samples for dioxin-like PCB congeners.

USEPA reserves the right to obtain split or duplicate samples upon request.

3. Onsite disposal of onsite PCB-contaminated concrete and soils. Pechiney shall complete the additional soil and concrete characterization proposed in the Amended Application within 45 days after the date of this approval.

This approval does not cover approval of the cleanup levels and onsite disposal of onsite PCB-contaminated soils and concrete proposed in the Application. Before disposing of onsite soils and crushed onsite concrete containing PCBs at the Pechiney site at levels below a PCB cleanup level to be approved by USEPA, Pechiney shall submit the information required below. Upon review of that information, USEPA will determine if Pechiney's proposed PCB cleanup levels for onsite disposal of onsite soils and crushed concrete

can be implemented as proposed or if those cleanup levels need to be revised. Pechiney shall obtain USEPA's approval of the PCB cleanup levels for soils and concrete at the site.

a. **Cumulative health risk evaluation to include dioxin-like PCB congeners.** Within 30 days after completion of the additional site characterization (including PCB RAP and Amendments 1, 2, and 3 to the Application) for PCBs (Aroclors and PCB congeners) required under this approval, Pechiney shall demonstrate the cumulative health risk from the site addressing all contaminants of concern does not increase above 1×10^{-5}. Due to the age of the releases at the site, dioxin-like PCB congeners (i.e., PCB congeners) may be present in onsite concrete and soils and are, therefore, added to the contaminants of concern. If PCB congeners are detected in onsite concrete and / or soils, Pechiney must demonstrate the PCB congener levels do not increase the overall cumulative risk for the site above 1×10^{-5}. If this risk level is exceeded, Pechiney must propose for USEPA approval cleanup levels for PCBs in concrete and soils that do not pose a risk of injury to health or the environment.

b. **Grading plan for the Pechiney site before remediation.** Within 45 days after the date when Pechiney completes the additional site characterization required in this approval, Pechiney shall submit for USEPA review and concurrence, the grading plan for the site. In general, the site-specific grading plan shall:

1. Identify the location, depth, and PCB concentration (Aroclors and PCB congeners) of all onsite soils proposed for onsite disposal relative to the location and depth of soils that may get disturbed during grading of the site and relative to onsite soils containing total PCB concentrations below the approved PCB cleanup level.

2. Be informed by the results of additional soil and concrete characterization required at the site and described in the Amended Application. See Condition 3a above.

3. Identify the locations for onsite disposal of crushed concrete with PCB concentrations below the approved cleanup level relative to the location of soils contaminated with PCBs above the cleanup level and soils contaminated with solvents (e.g., volatile organic compounds, total petroleum hydrocarbons, Stoddard solvent).

4. Demonstrate that during grading operations PCB contaminated soils located below 5 feet bgs (or at a depth modified by USEPA) and containing PCBs equal to or above the approved cleanup level will not be disturbed and mixed with onsite soils and crushed concrete containing less than the approved cleanup level and less than 1 ppm PCBs.

5. Include the measures that Pechiney will take to prevent spread of PCBs at and above the approved cleanup level throughout or at specific locations at the site if the soil mixing mentioned in Item 4 above occurs.

6. Identify the location of any proposed underground physical barriers that Pechiney may install before grading the site and that are intended to alert others that onsite soils containing high PCB concentrations (e.g., 2,000 ppm) have been disposed onsite.

c. **Soils management plan after remediation.** Within 30 days after Pechiney completes remediation of the site, Pechiney shall submit for review and USEPA approval a post-remediation soil management plan. The plan must describe all the actions that will be taken to ensure proper management and disposal of PCB-contaminated soils, PCB-contaminated concrete, PCB-contaminated asphalt if such materials are encountered during grading, construction, and installation of underground utilities; and after redevelopment, if such materials are encountered during maintenance or repair of underground structures (e.g., utilities) at the site above the PCB cleanup levels approved by USEPA. Such soils, concrete, and / or asphalt must be removed from the site if encountered at the surface and / or at depths that USEPA determines may result in an unreasonable risk of injury to health or the environment.

d. **Revised Appendix C before remediation.** Within 45 days after Pechiney completes the additional site characterization required in this approval, Pechiney must submit a revised Appendix C (Site-Specific Modeling for the Protection of Groundwater).

   Rainfall totals that were used were based on an average rainfall year of 14.8 inches (1914-2007) of which a 25% infiltration rate of approximately 4 inches was used. Since the model was run over a period of 500 years and in order to simulate a more conservative worst case, a suggested 250-500 year recurrence interval for rainfall would be more realistic. In addition, short duration, high intensity rainfall events shall be considered. Can the model simulate 24-hour rainfall events such as 100, 250, 500 year 24-hour recurrence intervals that would produce wetting fronts capable of transporting PCBs?

   In addition, solvents are indicated as being present in the soils around the facility. Have solvents been considered in the mobility and transport of PCBs in soils under both saturated and unsaturated conditions? Can the models factor in the effects of solvents on the mobility of PCBs?

   The revised Appendix C shall be responsive to the questions. The revised Appendix C shall evaluate the potential for PCBs to migrate from crushed concrete when such material is disposed in onsite areas where soils are contaminated with solvents (e.g., chlorinated hydrocarbons, Stoddard solvent, total petroleum hydrocarbons). Appendix C shall explain the fate and transport mechanism involved in the migration of PCBs at depths well below 15 feet bgs. PCBs have been detected at 71 feet bgs (e.g., 0.490 mg / kg). In addition, the revised Appendix C shall indicate the particle size used in the model for the crushed PCB-contaminated concrete proposed for onsite disposal.

e. **Interim cap.** Within 60 to 90 days after the date of this approval or within 15 days after completing cleanup verification sampling, whichever occurs first, Pechiney shall provide a figure to scale depicting the interim cap to be installed at the Pechiney site atop crushed onsite concrete containing PCBs below the approved cleanup level for surface and shallow soils. The figure shall identify the type and thickness of material that will function as an interim cap. The PCB concentration in the cap material shall be below 1 ppm PCBs. The interim cap shall not allow infiltration of water. Although the site is fenced, it is not certain when the site will be redeveloped and the specific industrial / commercial uses for the site have not been finalized.

Pechiney's Proposed Cap

Pechiney has proposed to add a color dye to the waste concrete with PCBs below 5.3 ppm to be disposed onsite within 0 to 5 feet bgs and to place atop that waste crushed onsite-concrete containing PCBs below 1 ppm. If USEPA approves the PCB cleanup levels that Pechiney proposed for concrete and soils, USEPA may consider the proposed cap if (1) a material (e.g., a layer of asphalt) that could prevent water infiltration is placed atop the crushed concrete containing PCBs below 1 ppm, (2) information is provided to USEPA demonstrating no adverse impacts to the environment are expected from the dyes Pechiney proposes to use, and (3) the interim cap is placed after site grading is completed. In addition, Pechiney needs to provide the figure to scale depicting the interim cap requested in this Condition of approval.

4. **Amendment 1 to Application.** Refer to Condition 5 below. In addition, within 15 days after the date of this approval, submit a response to the attached comments (USEPA HQs comments). If Pechiney has responded to any of the attached comments, please include the reference for that response. Amendment 1 to the Application contains responses to some of these comments that USEPA Region 9 included as questions in various e-mail messages containing specific questions about the Pechiney site.

5. **Amendment 2 to Application. Additional proposed concrete and soil sampling for PCB Aroclor and PCB congener analysis.** Pechiney shall conduct the additional soil and concrete sampling and laboratory analysis proposed in Amendment 2 ("Proposed Concrete and Soil Sampling Plan for Coplanar Polychlorinated Biphenyls Former Pechiney Cast Plate Facility", April 2, 2010) as modified by the conditions of approval established below.

a. **PCB congener analysis.** Laboratory analysis of PCB congeners (i.e., dioxin-like coplanar PCBs) shall be conducted using USEPA Method 1668B or the most current revision of this method.

b. **Concrete sampling.** The attached "Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs), Revised April 10, 2008 and prepared by USEPA Region 1 shall be used for collection of additional concrete core samples proposed in Amendment 2 and in other conditions of this approval. Subpart O sampling frequency or spacing may be used in conjunction with the sample collection method in the EPA SOP.

c. **Additional site characterization.** Within 15 days after Pechiney receives the laboratory analysis results for the additional soil and concrete samples proposed in Amendment 2 and any other additional concrete and soil sampling required in this approval, Pechiney shall report this information to USEPA accompanied by a justification demonstrating that PCB Aroclor and PCB congener analysis results for the additional samples do not increase the cumulative risk for the site above 1×10^{-5}. However, if after including these analysis results in revised risk calculations the cumulative risk for the site increases above 1×10^{-5}, Pechiney must propose and justify PCB cleanup levels for concrete and soils for onsite disposal that are protective of human health and the environment. See Condition 3.

d. **Proposed statistical correlations between dioxin-like PCB congeners TEQ and individual Aroclor mixture concentrations.** USEPA is not approving the use of these correlations because it believes that such correlations may not be accurate due to weathering of the original Aroclor mixtures.

6. **Amendment 3 to Application.** Additional proposed concrete sampling for PCB Aroclor analysis. Pechiney shall conduct the additional concrete sampling and laboratory analysis proposed in Amendment 3 ("Proposed Additional Concrete Sampling Plan for Polychlorinated Biphenyls Former Pechiney Cast Plate Facility," April 2, 2010) as modified by Approval Conditions 5.b. and 5.c. above.

7. **Section 6 of the Application, "PCB Remedial Action Plan" (PCB RAP).** USEPA is approving the PCB RAP as modified by the conditions established in this approval.

a. **Determining PCB concentration for offsite disposal.** Soils and concrete at the Pechiney site contaminated with total PCBs above 1 ppm are bulk PCB remediation waste. The as-found (in-situ) PCB concentration in concrete and soils must be used to determine the offsite disposal method and disposal facility. Pechiney shall follow the requirements in 40 CFR 761.61(a)(5) for offsite disposal of PCB remediation waste. The Department of Toxic Substances Control regulates PCBs as a hazardous waste. Pechiney must comply with all state, local, and federal regulations applicable to disposal of PCBs. Section 6.1.1.1 states that concrete containing PCBs above 5.3 ppm and below 50 ppm are a non-hazardous waste. This statement may not be accurate. In addition, concrete at the Pechiney site with PCBs below 50 ppm is still regulated for disposal under TSCA as a bulk PCB remediation waste.

b. **Disposal of PCB remediation waste.** The following describes how PCB remediation wastes shall be disposed offsite and takes into consideration that PCBs at certain concentrations may remain onsite based on PCB cleanup levels to be approved by USEPA at a later date.

   Non-porous surfaces contaminated with PCBs: This remediation waste (e.g., metal piping contaminated with PCBs), if present at the Pechiney site, shall be disposed offsite in accordance with 40 CFR 761.61(a)(5)(i)(B)(2)(ii) and 761.61(a)(5)(i)(B)(2)(iii) depending on the their PCB concentrations.

   Porous surfaces contaminated with PCBs: This category also includes wastes such as piping made of or coated with porous materials; concrete; and asphalt surfaces contaminated with PCBs. These wastes shall be disposed in accordance with 40 CFR 761.61(a)(5)(i).

   Cleanup wastes: Includes among others, non-liquid cleaning materials and personal protective equipment. This waste shall not be disposed as PCB debris as indicated in the Application but as PCB remediation waste in accordance with 40 CFR 761.61(a)5)(v).

c. **Number and location of soil cleanup verification samples:** Within 2 days after removing below ground structures, USEPA shall be notified via phone call and e-mail message of the estimated number of soil samples that will be collected at the site beneath concrete slabs, asphalt, and other below-ground structures (e.g., piping) still to be removed from the site. Written notification shall include a table indicating the number of samples to be collected and a figure identifying their location. If PCBs are detected in these samples, USEPA shall be notified of the analysis results and the estimated number of soil cleanup verification samples that will be collected from remedial excavations beneath below-ground structures (e.g., concrete slabs, asphalt, piping) at the site.

d. **Decontamination of sampling equipment and tools used during cleanup and / or decontamination activities and disposal of decontamination waste and residues.** Movable equipment, tools, and sampling equipment contaminated with PCBs shall be decontaminated by swabbing surfaces that have contacted PCBs with a solvent; a double wash / rinse as defined in 40 CFR Part 761 Subpart S, or applicable decontamination procedures in 40 CFR 761.79. Decontamination waste and residues should be disposed offsite at their existing PCB concentrations in accordance with 40 CFR761.60.

e. **Soil management during below-grade demolition.** An AMEC geologist must be present at the site while below-grade demolition is being performed at the site. In-situ soil samples shall be collected during below-grade demolition activities and submitted for laboratory analysis to determine the concentration at which PCBs may be present.

f. **Dust control and air perimeter monitoring.** Within 30 days before conducting remediation activities (e.g., crushing concrete, excavating soils) at the site, Pechiney shall submit to USEPA an updated Perimeter Air Sampling Plan (Plan). The Plan shall identify the measures that will be taken to mitigate dust. Among other information, the revised plan shall include a season-specific wind rose for the site for the time frame that Pechiney anticipates performing the concrete crushing and other remediation activities (e.g., excavation activity) at the site. Air monitoring instruments shall be located based on this site-specific wind rose. In addition to the wind rose, Pechiney shall submit a figure showing wind flow patterns in the vicinity of the Pechiney site in relation to neighboring communities (e.g., City of Maywood).

g. **Backfilling and grading.** The PCB RAP refers to "reuse" and "recycling" of PCB contaminated concrete. However, the TSCA PCB regulations do not include "reuse" and / or "recycling" of PCB-contaminated concrete. Therefore, placement of PCB-contaminated concrete onsite at the former Pechiney facility is disposal and not reuse or recycling of concrete. USEPA is deferring approval of cleanup levels and onsite disposal of onsite PCB-contaminated soils and concrete until after USEPA reviews the information requested in this approval. This approval does not cover approval of the cleanup levels and onsite disposal of onsite PCB-contaminated soils and concrete proposed in the Application.

h. **Figure 9, PCB Soil Remediation Areas, Former Pechiney Cast Plate, Inc. Facility, dated 07/01/2009.** Phase VI in the figure depicts former Building 114 Press Building (used to turn out aluminum and magnesium forgings, extrusions, and castings. Structures 1A, 1B, 1C and 1D are identified in the legend as "previously decommissioned buried structures (to remain)." USEPA's March 6, 1990 Consent Agreement and Final Order (Docket No. TSCA-09-89-0015) was issued to ALCOA while the facility was in operation. ALCOA ceased operation of the facility in 1997.

   The Final Order states that "[a]t such time that the facility is no longer in operation, or if the facility is sold or transferred, or if any long term shutdown of the facility occurs, full cleanup of PCB contamination in the #10 Press Building shall occur, with PCB Clean Up Policy Standards 40 C.F.R. 761.120 standards being met." Building 114 is referred to in the Final Order also as "the #10 Press Building." It is not certain if structures 1A through 1D were sampled for PCBs. If these structures contain PCBs, onsite disposal of these structures has not been authorized by USEPA. Therefore, this approval requires that structures 1A through 1D be sampled to determine the PCB concentration. Pechiney shall propose the number of samples to be collected from these structures.

8. Routes for transportation of wastes for disposal. Within 30 days before PCB-containing wastes are transported to an appropriate offsite disposal facility, Pechiney shall submit a map depicting the transportation route that will be followed for this purpose. Routes to be used for transportation of PCB-containing wastes (e.g., PCB remediation wastes) for offsite disposal and cleanup activities should be designed to minimize impact to nearby communities already bearing a burden or impact from other environmental issues that affect them. One such community is the community of Maywood.

9. Restrictive covenant: Within 75 days of completion of the PCB cleanup under this approval, Pechiney or the new owner of the property must record in accordance with state law a restrictive covenant for the property that will in perpetuity notify any potential purchaser of the property:

- Of the PCB concentrations left in place at Pechiney in soils and concrete disposed onsite and a survey map clearly depicting the locations or areas including depths at which such materials are found.
- Of the PCB cleanup levels achieved at Pechiney and locations (including depths) at Pechiney where such levels were achieved.
- Of the Pechiney Application dated July 9, 2009 and all Application Amendments.
- Of the USEPA July 2, 2010 letter and enclosure to the letter conditionally approving Pechiney's Application and Amendments to the Application referenced in USEPA's approval letter.
- Of the USEPA letter conditionally approving PCB cleanup levels for soils and concrete that may be disposed onsite at the Pechiney site.
- Of the USEPA-approved Pechiney cleanup report for the former Pechiney Cast Plate Inc. site in Vernon, California.
- Of the Soil Management Plan after Remediation that USEPA has required in its July 2, 2010 conditionally approving Pechiney's Application. See Approval Condition 3.c. in USEPA's July 2, conditional approval letter.

Within 15 days after recording the restrictive covenant, Pechiney must submit to USEPA a certification signed by the owner of the property that he or she has recorded the required instrument.

RTI INTERNATIONAL | Memorandum

Date: November 16, 2009

From: David Brenner, PhD., James Markwiese, PhD, Neptune and Company; Steve Beaulieu, RTI

Subject: Pechiney Cast Plate Inc., Facility

To: Zubair Saleem, PhD., EPA

Introduction and General Comments

We found the application for the risk-based cleanup of soil and concrete containing polychlorinated biphenyls (PCBs) at the Pechiney Cast Plate Inc., Facility to be relatively consistent with the Code of Federal Regulations (CFR), Title 40, Subchapter R, Toxic Substances Control Act (TSCA), Part 761 (40 CFR 761) and to follow Environmental Protection Agency guidance on PCB risk assessment. However, several areas should be investigated further before the risk characterization and remedial application can be approved. The focus of our review was on the scientific defensibility of the proposed approach in the following technical areas:

1. **Proposed Remediation Goals** – The Code of Federal Regulations (CFR) cleanup levels for PCB-contaminated soil and concrete are based on relative use, where use is categorized as low or high occupancy. This assessment generated site-specific cleanup levels based on high occupancy assumptions. The site-specific cleanup levels are, however, contrasted to the less restrictive, low occupancy levels listed in the CFR. Justification is needed for why site-specific levels are higher than applicable standards listed in the CFR.
2. **Site Sampling** – The primary concern involves the adequacy of addressing false negatives in the sampling scheme used to accept or reject material for onsite fill.
3. **Form of PCBs Measured** – PCBs were characterized using EPA Methods 8080, 8081 and 8082, which yields data on Aroclors and total PCBs. Weathering at the site decreases the utility of these data and information on congeners would be better suited for risk characterization.
4. **Protection of the Environment.** Although unnecessary given site conditions, the characterization and proposed remedy should be protective of non-human receptors. The report does not acknowledge that the need for an ecological risk assessment was ever considered.

Each of these issues, presented in order of decreasing importance, is discussed in detail below and, as appropriate, we have provided recommendations (including guidance, web links, and citations) for improving the characterization and remedial action plan.

1. Proposed Remediation Goals

This assessment is concerned with PCB-contaminated soil and concrete. A proposal for remediation is to leave some of this material exposed at the surface. The Code of Federal Regulations (CFR) cleanup levels for PCB-contaminated wastes like this are based on relative use, categorized as low or high occupancy.

According to the CFR, low occupancy is defined as any area where PCB remediation waste has been disposed of on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is less than 335 hours (an average of 6.7 hours per week). Under the same conditions, high occupancy is defined as 335 hours or more (an average of 6.7 hours or more per week) for bulk PCB remediation waste. According to Section 4.2.3.3, (page 23), the risk based screening levels (RBSLs) derived for the site were calculated as follows,

> "The exposure parameters used to derive the RBSLs are based on reasonable maximum exposure (RME), which is defined by U.S. EPA as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site (U.S. EPA, 1989). The exposure parameters associated with a RME scenario are therefore highly conservative. For example, it was assumed that an outdoor commercial/industrial worker is present on-site for 250 days/year for 25 years."

Use of RME assumptions therefore qualifies as high occupancy use under the CFR. In other words, the assessment used site-specific cleanup levels based on assumptions that would qualify as high occupancy. For PCB-contaminated soil left exposed at the surface, the high-occupancy cleanup goals listed in the CFR are ≤ 1 ppm PCB without further restrictions [40 CFR 761.61 (a)(4)(i)(A)]. Anything greater than 1 ppm needs to be covered with a cap.

The site-specific cleanup levels for contaminated soil and concrete that can be placed anywhere onsite without restrictions is 5.3 ppm (Section 5.2, page 28, first and second bullets). Furthermore, wastes with this level of contamination are incongruously contrasted to the less restrictive, low occupancy levels listed in the CFR. Section 5.2 (page 28, top of page) states, "[i.e., less than 50 mg/kg as defined in 40 CFR 761.61 (a)(4)(i)(A)].

The comparison between CFR standards and site specific remediation goals should be made relative to CFR high-occupancy levels. More importantly, justification needs to be presented for why site-specific levels are less protective than applicable standards listed in the CFR.

2. Site Sampling

As stated in Section 2.4.3 (page 13),

> "The Geomatrix soil sample locations were selected based on the highest likelihood of impact from former equipment and/or operations and as indicated by previous Alcoa sampling results..."

Although the authors state, (Section 2.3.1, page 9),

> "These data provided sufficient information for characterization and delineation of the PCB-impacted concrete."

there are still large expanses of concrete where samples were not collected. For concrete having PCB concentrations below the calculated risk based screening limits, the proposed remedy is to break it up and use for on-site fill. Areas of concrete that have PCB concentrations above the RBSL will be disposed off-site. At issue is the apparent assumption that areas of concrete not associated with former PCB related activities are assumed to have PCB concentrations less than the calculated RBSLs and therefore can be broken up and re-used as on-site fill. Considering the samples collected, statistics are not presented for the false negative rate. Consequently, it is not possible to determine if the re-use of areas of concrete not sampled will result in PCB concentrations in crushed concrete fill above the calculated RBSLs.

There are two likely resolutions to this problem. First, a uniform grid of fixed dimensions can be laid out over all the concrete foundations and pads. Samples can then be collected from grids for which there is no sample data currently available. As an alternative, the current samples can be considered adequate and a confirmation sampling plan be developed to collect samples from areas where the crushed concrete is used on-site for fill. As long as the concrete fill confirmation samples are below the RBSLs no further actions need to be taken. However, if confirmation samples on the crushed concrete fill show PCB concentrations above the calculated RBSLs then the fill should be removed for off-site disposal.

3. Form of PCBs Measured

The most likely sources of the PCBs at the Site are PCB-containing fluids associated with former hydraulic and extrusion machinery and aluminum cast plate manufacturing activities. Because operations at the site date back to the late 1930's, weathering of PCBs must have occurred over the last eight decades. As discussed in DeGrandchamp and Barron (2005), the toxicity of a particular PCB mixture, whether it is the original commercial Aroclor or weathered environmental mixture, is dependent on the type and quantity of individual PCB congeners present. It is the three-dimensional position of chlorines and the conformation of the biphenyl rings that ultimately govern the toxicity of each of the 209 PCB congeners.

Because the weathering process results in degradation of less-chlorinated congeners, weathering yields a higher proportion of the more highly chlorinated congeners. This recalcitrant fraction that remains is more toxic and more readily taken up by human and non-human receptors. Thus, it is not possible to assign toxicity values to Aroclors that have undergone weathering. Consequently, risks based strictly on Aroclors will underestimate the bioaccumulative potential and the toxicity of a weathered mixture. In order to evaluate the toxicity and health risks

associated with environmental PCB mixtures, the composition and concentration of individual PCB congeners should be considered.

4. Protection of the Environment

The CFR requires protection against risk of injury to the environment from mitigation of PCB contamination. This requirement necessitates consideration of whether ecological receptors could be adversely affected by contamination onsite. As stated in Section 1.1 (page 2), however, site conditions are such that an ecological risk assessment is unnecessary; specifically,

> The present day Site lies within an area zoned as industrial and commercial and covers an area of approximately 26.9 acres. The concrete floor slabs on the Site occupy approximately 600,000 square feet. The remainder of the Site is paved with asphalt (Figure 3).

With that said, the report makes no mention that the need for an ecological risk assessment was ever considered. Some acknowledgement of the lack of habitat for ecological receptors precluding further assessment should be made.

Literature Cited

DeGrandchamp RL, Barrron M. 2005. PCB Analyses and Risk Assessment at Navy Installations. Includes Part A - Overview of PCBs, Part B – Calculating Human Health Risk for PCB Sites and Part C – Ecological Risk Assessment for PCB Sites. Prepared for the Navy Environmental Health Center.

ATTACHMENT 1

IMPACT OF ADDITIONAL SOIL AND CONCRETE CHARACTERIZATION ON RISK-BASED REMEDIATION GOALS

As part of the U. S. Environmental Protection Agency's (U.S. EPA's) conditional approval (U.S. EPA, 2010a) of the Polychlorinated Biphenyl (PCB) Notification Plan (AMEC, 2009a), U.S. EPA deferred approval of proposed remediation goals for PCBs in soil and concrete at the former Pechiney Cast Plate facility (the Site) until Pechiney could demonstrate that dioxin-like PCB congeners, if present in onsite concrete and/or soil, do not increase the cumulative cancer risk for the Site above 1×10^{-5}. If this risk level were exceeded, it was required that Pechiney propose, for U.S. EPA's approval, cleanup levels for PCBs in concrete and soil that are adequately protective and do not pose a risk of injury to health or the environment. Based on this requirement, the additional sampling outlined in Section 2.2 of the Sampling and Analysis Plan (SAP) (AMEC, 2010) was conducted in September and October, 2010, and the sampling results were evaluated for potential human health concerns. The findings of this additional investigation are presented below.

1.0 SUMMARY OF POTENTIAL HUMAN HEALTH RISKS AND PCB REMEDIATION GOALS PRESENTED IN THE PCB NOTIFICATION PLAN

Potential human health risks associated with hypothetical exposures to PCBs in soil and concrete at the Site were originally estimated in the PCB Notification Plan (AMEC, 2009a), and subsequently in the Feasibility Study (FS) within the context of cumulative exposures to all chemicals of potential concern (COPCs) at the Site (AMEC, 2009b). Potential human health risks were evaluated separately for soil and concrete for each "Phase area" of the Site, assuming concrete building slabs may be demolished on site, crushed, and reused as fill in soil and foundation removal areas. Based on the maximum detected concentrations of PCBs (as Aroclors) in soil (between 0 to 15 feet below ground surface [bgs]) and concrete, and risk-based screening levels (RBSLs) protective of potential direct contact exposures, predicted cancer risks and noncancer hazard indexes (HIs) for potential exposures to PCBs were above target levels (10^{-5} cancer risk and a noncancer HI of 1) for hypothetical future worker outdoor commercial/ industrial workers and construction workers in the Phase I, II, and IIIa areas (AMEC, 2009a) as summarized on the next page.

Area	Potential Exposures to PCBs in Soil			Potential Exposures to PCBs in Concrete	
	Predicted Cancer Risks > $1x10^{-5}$		Predicted Noncancer HIs > 1	Predicted Cancer Risks > $1x10^{-5}$	
	Outdoor Commercial/ Industrial Worker	Construction Worker	Construction Worker	Outdoor Commercial/ Industrial Worker	Construction Worker
Phase I	$8x10^{-5}$	-[1]	-	$3x10^{-4}$	$4x10^{-5}$
Phase II	$2x10^{-3}$	$3x10^{-4}$	-	$6x10^{-3}$	$1x10^{-3}$
Phase IIIa	$2x10^{-5}$	-	3	-	-

Note:
1. = the predicted cancer risk did not exceed 10^{-5} or the noncancer HI did not exceed 1.

Carcinogenic PCBs were detected in soil and concrete in other Phase areas of the Site (in soil in the Phase IV and Phase VI areas and in concrete in the Phase IV area), but predicted cancer risks from PCB exposures were well below 10^{-5}. Predicted cancer risks for cumulative exposures to COPCs in soil in the Phase IV and VI areas were above 10^{-5} for certain receptors, but potential exposures to PCBs contributed minimally to these cumulative risks. Specifically,

- a cumulative cancer risk of $1x10^{-4}$ was estimated for outdoor commercial/industrial workers in the Phase IV area, of which potential exposures to PCBs in soil contributed $4x10^{-6}$;
- a cumulative cancer risk of $2x10^{-5}$ was estimated for construction workers in the Phase IV area, of which potential exposures to PCBs in soil contributed $6x10^{-7}$; and
- a cumulative cancer risk of $6x10^{-5}$ was estimated for outdoor commercial/industrial workers in the Phase VI area, of which potential exposures to PCBs in soil contributed $1x10^{-6}$ (AMEC, 2009b).

Potential exposure to arsenic contributed the majority of the cancer risk in these two areas.

Based on the risk assessment results for the Phase I, Phase II, and Phase IIIa areas of the Site summarized above, site-specific remediation goals were proposed for PCBs to mitigate potential direct contact exposures to future workers (AMEC, 2009a, 2009b).

1. Proposed Remediation Goals for PCBs in Concrete
   a. **Total Aroclors – 5.3 milligram per kilogram (mg/kg)**. Based on the carcinogenic RBSL for outdoor commercial/industrial workers (0.53 mg/kg), adjusted to a target cancer risk of 10^{-5}.[1]
2. Proposed Remediation Goals for PCBs in Shallow Soil (0 to 15 feet bgs)
   a. **Aroclor-1254 – 2.0 mg/kg**. Based on the noncancer RBSL for Aroclor-1254 for construction workers and a target noncancer HI of 1.[2]
   b. **Total Aroclors – 5.3 mg/kg**. For soil that may be left exposed at the surface (upper 5 feet). Based on the carcinogenic RBSL for outdoor commercial/ industrial workers (0.53 mg/kg), adjusted to a target cancer risk of 10^{-5}.
   c. **Total Aroclors – 35 mg/kg**. For soil to be left below pavement or other ground cover that only construction workers may come into contact with during construction (or 5 feet below crushed concrete containing less than 5.3 mg/kg). Based on the carcinogenic RBSL for construction workers (3.5 mg/kg), adjusted to a target cancer risk of 10^{-5}.

Additional remediation goals were proposed for arsenic and total petroleum hydrocarbons (TPH) in soil (AMEC, 2009b). However, given the nature of these additional remediation goals, which were not based on potential direct contact exposures (for arsenic, a remediation goal corresponding to site-specific background was proposed; for TPH, remediation goals were proposed for the protection of groundwater, which were lower than concentrations protective of construction worker exposures), the proposed remediation goals for PCBs were considered adequately protective within the context of cumulative exposures at the Site.

2.0 ADDITIONAL INVESTIGATION

Following U.S. EPA's review of the PCB Notification Plan, the U.S. EPA deferred approval of the proposed remediation goals until after additional information was provided, including additional soil and concrete characterization for PCBs (U.S. EPA, 2010a). An additional 82 concrete samples and 65 soil samples were collected in September and October, 2010, and analyzed for PCBs as Aroclor mixtures using U.S. EPA Method 8082. Of these, nine of the concrete samples and 17 of the soil samples were "split" for additional analysis by U.S. EPA

[1] Total Aroclors are the sum of Aroclor mixtures. As all Aroclor mixtures were considered potential carcinogens with the same degree of cancer potency, the remediation goals were proposed to address cumulative potential cancer risks.

[2] Of the Aroclor mixtures detected at the Site, only Aroclor-1254 has been identified as a potential noncarcinogen. A potential carcinogen as well, Aroclor-1254 is also included in estimations of Total Aroclors.

Method 1668B for individual "dioxin-like" PCB congeners.[3] The additional congener-specific analyses were performed to address a concern from the U.S. EPA that, based on the age of the facility and the historical manufacturing operations, dioxin-like PCB congeners may be present at the Site at more significant concentrations, in terms of potential human health risk, than PCBs as Aroclor mixtures, and that the remediation goals proposed for total Aroclors in the PCB Notification Plan may, therefore, not be adequately protective. The samples selected for both analyses were not collected at random, rather from areas where total Aroclors were reported from previous rounds of sampling at high, medium, and low concentrations with respect to the proposed 5.3 mg/kg risk-based remediation goal, with the majority of the samples intentionally collected from locations where total Aroclors were just below the remediation goal (within one order of magnitude). Specific information regarding the targeted sample locations and sampling procedures is provided in Amendment 2 to the PCB Notification Plan and Section 2.2 of the SAP. The intent of the targeted sampling was to provide coverage across a range of concentrations so that potential correlations between PCBs as Aroclors and the dioxin-like PCB congeners could be evaluated. An established correlation between PCBs as Aroclors and the dioxin-like PCB congeners could be used to 1) potentially estimate dioxin toxic equivalent (TEQ) concentrations associated with previous sampling results, 2) support (or refine) the site-specific PCB remediation goals, and 3) support remediation confirmation sampling.

2.1 Analytical Results of Additional Concrete and Soil Samples

The results of the additional concrete and soil sampling are provided in Tables 1 through 4, and are depicted on Figures 1 and 2a/2b. The 2010 characterization results for Aroclor mixtures (U.S. EPA Method 8082) in the concrete samples are presented in Table 1. Similarly, the 2010 characterization results for Aroclor mixtures in the soil samples are presented in Table 2. The concrete and soil results are presented by location on Figures 1 and 2, respectively. Consistent with earlier characterization sampling events, the primary mixture of PCBs detected in the 2010 concrete and soil samples was Aroclor-1248, and to a lesser extent, Aroclor-1254 and Aroclor-1260. Aroclor-1232 was detected in one soil sample and Aroclor-1016, previously not detected in concrete or soil, was detected in four concrete samples and two shallow soil samples (0 to 15 feet bgs).

The 2010 results for dioxin-like PCB congeners in the concrete and soil samples targeted for this additional analysis are presented in Tables 3 and 4, respectively. As presented in these tables, all 12 dioxin-like PCB congeners were detected at least once in both concrete and soil. In both sample sets, PCB 118 was consistently detected at the highest concentrations, followed

[3] Concrete samples were split by first milling each sample to a powder/fine granular mixture, then homogenizing the sample, then dividing the sample into two aliquots. Soil samples were split by manually (mechanically) blending each sample and then dividing into two aliquots.

by PCB 105. However, to put the detected concentrations of dioxin-like PCB congeners into toxicological perspective, dioxin TEQ concentrations were calculated for each sample. Dioxin TEQ concentrations were calculated using the toxic equivalency factors (TEFs) developed by the World Health Organization (WHO) in 2005 (Van den Berg, M. et al., 2006). Where the concentration of an individual dioxin-like PCB congener was reported as not detected, one half of the detection limit was used as a surrogate to calculate the contribution to dioxin TEQ concentrations from that congener. Of the two commonly used approaches to calculating a dioxin TEQ,[4] using one half of the detection limit for non-detect results was considered appropriate for the 2010 concrete and soil data given that all 12 dioxin-like PCB congeners were detected at least once in both data sets, thus providing evidence that all 12 congeners were present at the Site. Dioxin TEQ concentrations for PCB congeners ranged from 2.81 to 14,250 picograms per gram (pg/g) in concrete (Table 3) and 0.14 to 573 pg/g in soil (Table 4). The estimated dioxin TEQ concentrations for the concrete and soil samples are presented by location on Figures 1 and 2a/2b, respectively.

3.0 RISK-BASED SCREENING LEVELS FOR DIOXIN-LIKE PCB CONGENERS AND AROCLOR-1016

RBSLs were developed for dioxin-like PCB congeners following the methodology described in the PCB Notification Plan (AMEC, 2009a). RBSLs were also developed for Aroclor-1016 since this Aroclor mixture had not been previously detected in earlier sampling. The exposure parameters used in deriving the RBSLs are provided in Tables 5 and 6 for outdoor commercial/industrial workers and construction workers, respectively. Toxicity criteria selected for use in developing the RBSLs for Aroclor-1016 and dioxin-like PCB congeners were obtained from the California Environmental Protection Agency (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA) (2010) and the U.S. EPA (2010b, 2010c). The resulting RBSLs for Aroclor-1016 and dioxin-like PCB congeners are presented in Table 7 and are summarized on the next page along with the RBSLs originally estimated in the PCB Notification Plan for Aroclor-1232, Aroclor-1248, Aroclor-1254, and Aroclor-1260 (AMEC, 2009a).

[4] The alternative approach to calculating dioxin TEQ is to assume that non-detect congeners are not present and thus contribute zero to dioxin TEQ concentrations.

Chemical	RISK-BASED SCREENING LEVELS (RBSLs)			
	Outdoor Commercial/Industrial Worker		Construction Worker	
	Cancer	Noncancer	Cancer	Noncancer
Aroclors				
Aroclor-1016 (mg/kg)	0.53	26	3.5	6.9
Aroclor-1232 (mg/kg)	0.53	--	3.5	--
Aroclor-1248 (mg/kg)	0.53	--	3.5	--
Aroclor-1254 (mg/kg)	0.53	7.5	3.5	2.0
Aroclor-1260 (mg/kg)	0.53	--	3.5	--
Dioxin-like PCB Congeners				
PCB 77 (pg/g)	81,000	3,800,000	500,000	1,000,000
PCB 81 (pg/g)	27,000	1,300,000	180,000	340,000
PCB 105 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
PCB 114 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
PCB 118 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
PCB 123 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
PCB 126 (pg/g)	81	3,800	530	1,000
PCB 156, 157 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
PCB 167 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
PCB 169 (pg/g)	270	13,000	1,800	3,400
PCB 189 (pg/g)	270,000	13,000,000	1,800,000	3,400,000
Dioxin-like PCB congeners (pg/g TEQ)	8.1	380	53	100

The detected concentrations of Aroclor-1016 in the 2010 concrete samples (maximum detected concentration of 0.32 mg/kg; Table 1) and soil samples (maximum detected concentration of 0.25 mg/kg; Table 2) are below the estimated RBSLs for outdoor commercial/industrial workers and construction workers. As a result, Aroclor-1016 in concrete or soil does not pose a potential health risk to future workers at the Site. Within the context of cumulative exposures and proposed risk-based remediation for total Aroclors, the maximum total Aroclor concentrations in the samples with detected concentrations of Aroclor-1016 are 0.53 mg/kg in concrete (Sample ID DC-235-A; Table 1), and 0.25 mg/kg in shallow soil (Sample ID 203-SS-01; Table 2), both of which are well within the proposed 5.3 mg/kg remediation goal for total Aroclors in concrete or shallow soil.

4.0 POTENTIAL HUMAN HEALTH RISKS FROM DIOXIN-LIKE PCB CONGENERS VERSUS PCBs AS AROCLOR MIXTURES

For dioxin-like PCB congeners, the potential human health concern pertains to whether or not these congeners present a more significant human health risk than PCBs as Aroclor mixtures. To evaluate this potential concern, regression analyses and human health risk calculations were performed with the pairs of dioxin-like PCB congener and Aroclor mixture data from the 2010 concrete and soil samples.

4.1 REGRESSION ANALYSES OF DIOXIN TEQ VERSUS TOTAL AROCLORS

Regression analyses were performed with the pairs of dioxin-like PCB congener and Aroclor mixture data to evaluate the potential significance of the relationship between these measurements and determine whether the proposed risk-based remediation goals are adequately protective of potential PCB exposures. Dioxin TEQ and total Aroclor concentrations for the 2010 concrete and soil samples were plotted against each other as representative variables for the dioxin-like PCB congeners and Aroclor mixtures, respectively. The results of this analysis are provided below.

Separate regression analyses were performed for the concrete samples, soil samples, and concrete and soil samples combined. Each regression was made as dioxin TEQ (y-axis) versus total Aroclors (x-axis). For consistency with the treatment of non-detect congeners in the estimation of dioxin TEQ, one half of the reporting limit for non-detect Aroclor mixtures was used in the calculation of total Aroclors, with results for Aroclors 1016, 1232, 1248, 1254, and 1260 factoring into the total Aroclor concentration calculations.

The data from each sample point were originally plotted by characteristic (i.e., by Phase area and soil sample depth), but no segregation by characteristic was observed. This indicated that

there was no basis to perform statistical regressions on separate subsets of concrete or soil samples. Next, linear regressions were performed for the concrete data, soil data, and concrete and soil data combined using the Regression function in Microsoft EXCEL. In these regressions, the line was forced to pass through the origin (the 0,0 point), resulting in a linear equation in the form, $y = mx$, where m is a constant. The 95 percent upper confidence limit (95% UCL) and the 95 percent lower confidence limit (95% LCL) for each regression line were also provided by the Regression function in Microsoft EXCEL, providing upper- and lower-bound estimates, respectively, of the slope (m) of each regression line (i.e., there is less than a 5 percent chance that the true slope of the regression is steeper than the UCL and there is less than a 5 percent chance that the true slope of the regression is less steep than the LCL). Combined, the slope of each regression line represents the best estimate of the relationship between dioxin TEQ and total Aroclor concentrations (i.e., the ratio of dioxin TEQ to total Aroclor concentration) for each data set, with the 95% UCL and 95% LCL representing upper- and lower-bound estimates, respectively, of the relationship (ratio) for the data set. These procedures were performed using each data set in an untransformed state (i.e., no logarithmic or other form of transformation was performed on the data prior to the procedures).

The results of the regressions for the untransformed data sets are depicted on Figures 3, 4, and 5 for the concrete data, soil data, and concrete and soil data combined, respectively. As shown in each figure, the results of the regressions were plotted against the proposed risk-based remediation goal for PCBs in concrete and soil that may be left exposed at the surface (upper 5 feet) of 5.3 mg/kg total Aroclors (represented by the black vertical line in each figure), and the equivalent risk-based remediation goal for dioxin-like PCB congeners, 81 pg/g TEQ[5] (represented by the black horizontal line in each figure).

The three regression analyses were repeated using log-transformed data. In this case, the data were transformed using the natural logarithm (symbolized as *ln*). The linear regression was performed on the transformed data using the Regression function in Microsoft EXCEL. In these regressions the line was not forced to pass through the origin. The resulting linear equations had the form of $ln(y) = m\,ln(x)+b$. The 95% UCL and 95% LCL for these linear regressions were calculated using the method described in Schefler (1979). The results of these regressions are depicted on Figures 6, 7, and 8 for the concrete data, soil data, and concrete and soil data combined, respectively. The regressions using log-transformed data estimated two variables, the slope and intercept. Thus, the 95% UCLs and 95% LCLs for these regressions are curved lines. Furthermore, none of the regression lines in the log-transformed domain had a slope that was exactly unity (1.000), which results in curved lines in the non-transformed domain. In this

[5] Based on the carcinogenic RBSL for dioxin-like PCB congeners for outdoor commercial/industrial workers (8.1 pg/g TEQ), adjusted to a target cancer risk of 10^{-5}.

case, neither the regression lines derived from the transformed data nor the corresponding UCLs or LCLs can be used to estimate the ratio of dioxin TEQ to total Aroclor concentration; however, they can be used to calculate a total Aroclor concentration corresponding to a specified dioxin TEQ.[6]

To compare the relative strength of each regression, the F-statistic for each regression was provided by the Regression function in Microsoft EXCEL. The F-statistic is the ratio of a measure of the goodness of the fit of the regression to the data to a measure of the poorness of the fit. A larger F-statistic corresponds to a better fit of the regression to the data. The resulting F-statistics are provided, along with additional characteristics of each regression, in Table 8. The F-statistic for each of the six regressions exceeded its respective critical value of F corresponding to a significance of 5% (comparable to 95% confidence). These critical values are the minimum value of the F-statistic needed to achieve a statistical significance of 5%. That all F-statistics exceeded their respective critical values indicates high strength for all of the regressions. The statistical significance of the F-statistics for the six regressions ranged from 2.49×10^{-4} to 3.33×10^{-30} (lower values represent greater strength).

The regression with the strongest F-statistic was the regression using the untransformed combined soil and concrete data. Furthermore, this regression using untransformed data has "physical significance," in that the slopes of the regression line, the UCL, and the LCL are estimators of the ratio between dioxin TEQ and total Aroclor concentration. As shown on Figure 5, this regression identifies a concentration of total Aroclors at the risk-based remediation goal equivalent for dioxin TEQ (81 pg/g) that is less than the originally proposed risk-based remediation goal of 5.3 mg/kg for concrete and shallow soil (upper 5 feet). Specifically, the total Aroclor concentrations corresponding to 81 pg/g dioxin TEQ on the regression line, the UCL, and the LCL are 3,540, 3,450, and 3,640 μg/kg (3.54, 3.45, and 3.64 mg/kg), respectively. As a result, it would appear that a revised risk-based remediation goal for PCBs (as total Aroclors) of 3.5 mg/kg for concrete and soil that may be left exposed at the surface (at a depth interval of 0 to 5 feet bgs) would be adequately protective of PCBs as dioxin-like congeners. To determine if the originally proposed risk-based remediation goal for PCBs (as total Aroclors) in deeper soil of 35 mg/kg would be adequately protective, the results of the regression for the combined soil and concrete data (untransformed) were also plotted against this remediation goal along with the

[6] The ratio of dioxin TEQ to total Aroclor concentration is the relationship between dioxin TEQ and total Aroclor concentration - should be independent of the magnitude of the total Aroclor concentration (i.e., the ratio should be constant with respect to total Aroclor concentration). That the regressions using log-transformed data yield curved lines in the non-transformed domain means that the regressions using log-transformed data suggest that the ratio varies with total Aroclor concentration, which should not be the case.

equivalent risk-based remediation goal for dioxin-like PCB congeners, 530 pg/g TEQ.[7] As shown in Figure 5, the regression using the combined soil and concrete data (untransformed) identifies a concentration of total Aroclors at the risk-based remediation goal equivalent for dioxin TEQ (530 pg/g) that is less than 35 mg/kg. As a result, it would appear that a revised risk-based remediation goal for PCBs (as total Aroclors) of 23 mg/kg for soil to be left below pavement or other ground cover that only construction workers may come into contact with during construction (or 5 feet below crushed concrete containing less than 3.5 mg/kg) would be adequately protective of PCBs as dioxin-like congeners.

4.2 HUMAN HEALTH RISK CALCULATIONS FOR DIOXIN-LIKE PCB CONGENERS AND AROCLOR MIXTURES

Potential human health risks associated with the dioxin-like PCB congener and Aroclor mixture data from the 2010 concrete and soil samples were also comparatively estimated to further assess the need to revise the proposed risk-based remediation goals based on Aroclor mixtures presented in Section 4.1.

Hypothetical, representative exposure point concentrations (EPCs) were calculated for the 12 dioxin-like PCB congeners and five Aroclor mixtures detected in the 2010 concrete and soil characterization samples. For the dioxin-like PCB congeners, EPCs were calculated for the individual congeners as well as for dioxin TEQ. For this evaluation, EPCs were calculated for the concrete and soil data combined, assuming that exposure of future workers is potentially complete for both media (i.e., assuming concrete building slabs may be demolished on site, crushed, and intermixed with soil for reuse in removal areas). U.S. EPA's ProUCL product (U.S. EPA, 2010d) was used to determine UCL of the mean EPCs for dioxin TEQ, each dioxin-like PCB congener, and each Aroclor mixture. The resulting ProUCL output is provided in Supplement A.

Potential human health risks from exposure to PCBs were then estimated by quantitatively comparing the resulting EPCs to the RBSLs presented above in Section 3.0. To streamline the evaluation, EPCs were only compared to the lowest of available RBSLs, the cancer-based RBSLs for outdoor commercial/industrial workers. Comparing the EPCs to these RBSLs would provide a conservative estimate of potential human health risks from exposure to PCBs as dioxin-like congeners versus PCBs as Aroclors. Predicted lifetime excess cancer risks were calculated for outdoor commercial/industrial workers by dividing each EPC by the appropriate cancer-based RBSL, and then multiplying these risk ratios by the target risk level used in the development of the RBSLs (i.e., one-in-one million or $1x10^{-6}$). Risks from exposure

[7] Based on the carcinogenic RBSL for dioxin-like PCB congeners for construction workers (53 pg/g TEQ), adjusted to a target cancer risk of 10^{-5}.

to dioxin-like PCB congeners were then comparatively evaluated to risks from exposure to the Aroclor mixtures.

The results of the analysis are presented in Table 9. As presented, the predicted lifetime excess cancer risk for outdoor commercial/industrial worker exposure to dioxin-like PCB congeners is 2×10^{-4} based on EPCs for each of the individual congeners, but 8×10^{-4} based on dioxin TEQ. The difference in these risk estimates can be attributed to the influence of elevated detection limits in the sample-specific calculations of dioxin TEQ. By comparison, the predicted lifetime excess cancer risk for outdoor commercial/industrial worker exposure to Aroclor mixtures is 5×10^{-4}. As a result, it would appear that, on average, the dioxin-like PCB congeners do not pose a more significant human health risk than PCBs evaluated as Aroclor mixtures, but on a sample-by-sample basis (as dioxin TEQ), the congeners present a slightly more significant human health risk than PCBs evaluated as Aroclor mixtures. These results are consistent with the results of the regression analysis. Given that the potential human health risks from dioxin-like PCB congeners as dioxin TEQ are slightly more significant than the potential human health risks from total Aroclors, a slight reduction of the risk-based remediation goals for PCBs as total Aroclors (as illustrated by the regression analyses) would be necessary to be adequately protective of PCBs as dioxin-like congeners.

5.0 SUMMARY OF REVISED PCB REMEDIATION GOALS

Based on the above evaluations, the revised PCB remediation goals proposed for the Site are summarized below.

1. Proposed Remediation Goals for PCBs in Concrete
    a. **Total Aroclors – 3.5 mg/kg**. Based on the regression analysis for dioxin-like PCB congeners versus total Aroclors in combined soil and concrete, the total Aroclor concentration that would result in a maximum dioxin TEQ concentration of 81 pg/g.
2. Proposed Remediation Goals for PCBs in Shallow Soil (0 to 15 feet bgs)
    a. **Aroclor-1254 – 2.0 mg/kg**. Based on the noncancer RBSL for construction workers and a target noncancer HI of 1.
    b. **Total Aroclors – 3.5 mg/kg**. For soil that may be left exposed at the surface (upper 5 feet). Based on the regression analysis for dioxin-like PCB congeners versus total Aroclors in combined soil and concrete, the total Aroclor concentration that would result in a maximum dioxin TEQ concentration of 81 pg/g.

c. **Total Aroclors – 23 mg/kg**. For soil to be left below pavement or other ground cover that only construction workers may come into contact with during construction (or 5 feet below crushed concrete containing less than 3.5 mg/kg). Based on the regression analysis for dioxin-like PCB congeners versus total Aroclors in combined soil and concrete, the total Aroclor concentration that would result in a maximum dioxin TEQ concentration of 530 pg/g.

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