

Development of the “EPA chromium fix overlaps and speciated” dataset.

Orig 1/27/2011, updated 4/7/2011 to remove issues on CMV since these data were not included in the 2008 NEI version 1 release.

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Methodology

A dataset called “EPA chromium fix overlaps and speciated” was developed to augment chromium emissions from the 2008 National Emissions Inventory for point and nonpoint data categories. The data set was created to ensure that every process had zero total Chromium emissions and appropriate hexavalent Chromium and trivalent Chromium emissions based on state/local/tribal (S/L/T) reported emissions. This augmentation addresses two issues.

- 1. Removing Ambiguity from Overlapping Pollutants:** S/L/T have reported chromium emissions, pollutant code = (7440473) with hexavalent chromium (18540299) and/or trivalent chromium (16065831) for the same process. As explained in our HAP reporting webinar “How to Report HAP Emissions for the 2008 NEI” (<http://www.epa.gov/ttn/chief/eidocs/training.html#eis>) we understand/interpret chromium, pollutant code = 7440473, to be the aggregated “sum” of hexavalent chromium (18540299) and trivalent chromium (16065831). Thus, we assume that when chromium emissions exist with hexavalent and trivalent, then there is double counting¹. EIS does not flag such double counting as an error, and as a result we have received data from S/L/T that we need to augment so that it will be clear to users of the data how to treat these overlapping chromium compounds. Note that it is not double counting to have any form of chromium along with chromic acid mist (7738945) and chromium trioxide (7738945) which are specific chromium compounds that we treat as additive to whatever other chromium is already reported for the process. Users of this data are most interested in hexavalent chromium, chromic acid mist and chromium trioxide. There may be other chromium ions (such as chromium II); however, they do not have any risk information associated them and thus we treat them along with trivalent chromium.
- 2. Providing a consistently speciated chromium inventory:** We would like to only store the speciated forms of chromium to provide a consistent form of these pollutants throughout the inventory. While chromium, pollutant code = 7440473 is a valid pollutant, most users of the data require it to be speciated particularly in order to estimate risks. As a result, we use speciation profiles based on the type of source (as described by

¹ We recognize that there may be other chromium ions (such as chromium II); however, they do not have any risk information associated them and thus we treat them along with trivalent chromium

the regulatory code and the source classification code) to speciate chromium into hexavalent and trivalent forms. The attached access file provides the speciation factors we used (Cr Speciation factors.mdb)

Table 1 shows the calculations made for developing the EPA chromium fix and speciated data set and the meta data used for documentation. A file providing the resulting augmented records by Case is provided at: Cr EIS Flat Files 121310 Point Update.accdb

Table 1: Calculations for Generating the EPA Dataset: chromium_corrected_speciated_EPA Based on SLT-reported Combinations of Process-Level Chromium

Case	Cr*	Hex*	Tri*	Manipulation	Meta data for EmissionsCalculationMethodCode (ECMC) and EmissionsComments (EC)
1	X			Speciate using speciation factors from the ACCESS dataset: "Cr Speciation factors.mdb"	*** ECMC = 5 (USEPA Speciation Profile) EC=Speciation of ____-reported chromium using Cr Speciation 01122009.mdb (Note: ____ is the program system code for the SLT data)
1.5	X			This is the exact same case as above with the same META data, however, case 1.5 allowed us to denote records which were Case 1 but used the default (34% hex/66% tri) speciation for situations for which there was no match of either regulatory code or SCC to a profile in the Cr Speciation 01122009.mdb.	
2	X	X		Remove Cr and add Tri to be computed as follows: Tri = Cr – Hex. Note: if Tri is <0 it is set to 0.	ECMC=2 (Engineering Judgment) EC=Replacement dataset corrects ____-reported Cr overlap. Remove Cr and add Tri computed as Tri=Cr-Hex (Note: ____ is the program system code for the SLT data)
3	X	X	X	If Cr > Hex + Tri Subtract: Cr –(Hex + Tri) and add the difference to the existing Tri Rationale: When total is greater than hex+tri, we assume total and hex as valid and re-calculate a new "tri". This is because we assume that cr+2 may be the difference that explains why total cr is greater than the two pieces. If Cr < Hex + Tri then remove Cr and keep Hex and Tri as is Rationale: where total Cr is less than sum of hex+tri, we assume that the hex and tri are correct, and thus remove the total.	If Cr > Hex + Tri ECMC=2 (Engineering Judgment) EC= Replacement dataset corrects Cr overlap. Added the difference between ____-reported Aggregated Chromium and ____-reported Hexalent Chromium to ____-reported Trivalent Chromium. The difference is assumed to represent divalent chromium, which we include with trivalent chromium. If Cr < Hex + Tri ECMC=2 (Engineering Judgment) EC= Replacement dataset corrects Cr overlap. Remove ____-reported aggregated chromium because it is assumed to overlap with ____-reported hexavalent and trivalent chromium. (Note: ____ is the program system code for the SLT data)
4	X		X	Remove Cr and add and add Hex to be computed as follows: Hex = Cr – Tri Note: if Hex is <0 it is set to 0.	ECMC=2 (Engineering Judgment) EC= Replacement dataset corrects ____-reported Cr overlap. Remove Cr and add Hex computed as Hex=Cr-Tri (Note: ____ is the program system code for the SLT data)
5		X	X	None – this is valid	
6		X		None – this is valid	
7			X	None – this is valid	

*Cr=chromium (7440473); Hex=hexavalent chromium (18540299); Tri = trivalent chromium (16065831)