

To: Robert Koster and Charles Gruenenfelder
From: Matt Kadlec
Subject: Pasco Landfill RTO Design Modification and Assessment of Health Risks at Basin Disposal Incorporated, Pasco, Washington
Date: February 11, 2015

Regarding Mark Brunner’s design modification in the Pasco Sanitary Landfill RTO stack gas exit velocity,^[1] Ranil Dhammapala agrees with his assertion the effect of the increase would be to non-linearly lower modeled Toxic Air Pollutant (TAP) concentrations slightly relative to those we reviewed before in the *December 30, 2014 Second Tier Review Recommendation Document for the Pasco Landfill Regenerative Thermal Oxidizer Project, Pasco, Washington*. Lower concentrations result in lower exposure and consequently less potential for harm to human health.

Despite the RTO proponent’s assertions that Basin Disposal Incorporated (BDI) is “*Development Related to Landfill (owned by L. Dietrich)*,” you recently confirmed it is not, and that the RTO emission health risks must therefore be evaluated at BDI in order to comply with Ch. 173-460 WAC. The following is our evaluation.

The *January 27, 2015 Supplement to the Pasco Landfill RTO Health Impact Assessment (HIA)* and modeling files compact disk (CD) provided the 8-hour averaged hydrogen chloride (HCl) and hydrogen fluoride (HF) concentrations in the BDI area. These data and their corresponding hazard quotients are shown in Table A:

Table A.

	Maximum 8-hour averaged concentration ($\mu\text{g}/\text{m}^3$)	OSHA Permissible Exposure Limit ($\mu\text{g}/\text{m}^3$, 8-hr TWA)	Hazard Quotient
HCl	123	7000	0.018
HF	3.1	2500	0.001

The maximum concentrations are far less than the Occupational Health and Safety Administration (OSHA) Permissible Exposure Limits (PELs) thus no adverse effects are likely from chronic exposure to either TAP. These TAPs are acid gases so together they might have additive effects if in sufficient concentrations. However, the sum of their hazard quotients, *i.e.*, the hazard index (HI), is only 0.019. Because this HI is less than one, it indicates there is low or no potential adverse health effects from chronic exposure to acid gases from the RTO to BDI workers even if they will be employed fulltime and long-term.

¹ Email from: Mark Brunner to Robert Koster and Charles Gruenenfelder. Cc: Matthew Kadlec, Jeremy Schmidt, Gregory S. Flibbert, Thom Morin; Adam Morine; Michael Riley; Jeremy Davis; Jim Wilder. Subject: Pasco Landfill RTO - Minor Design Modification. Sent: February 03, 2015

As noted in the Table B of the *December 30, 2014 Second Tier Review Recommendation Document for the Pasco Landfill Regenerative Thermal Oxidizer Project, Pasco, Washington*, the USEPA estimated the long-term average HCl concentration in Franklin County census tract (020100) in the 2005 National Air Toxics Assessment. The tract is where BDI is located. EPA's modeled concentration estimate was 0.070- $\mu\text{g}/\text{m}^3$ (We know of no HF background concentration information for the area). HQs given this level of exposure are 0.01 and 0.004. Adding either one to the RTO-attributable chronic HI (0.019) yields an overall HI of either 0.029 or 0.023. Because these HIs are less than one it is safe to conclude there is low or no potential health concern from chronic exposure to acid gases among people engaged in work at BDI.

You also confirmed that the general public has short-term access to BDI. This requires that occasional acute exposures to ordinary people – even those who may be unusually sensitive to such exposures – also be evaluated in order to comply with Ch. 173-460 WAC. We did this by comparing maximum 1-hour averaged HCl and HF concentrations in the BDI area to the California Office of Environmental Health Hazard Assessment (OEHHA) acute inhalation Reference Exposure Levels (RELs) for HCl and HF.

The *January 27, 2015 Supplement...* and modeling files CD do not report the 1-hour averaged outputs of HCl and HF concentrations on BDI property. Nonetheless, Ranil Dhammapala noted they may be reliably estimated beginning with the 1-hr and 8-hr averaged maximum concentrations at a receptor near BDI (at coordinates 341524, 5123808 UTM). These data are in the original HIA and modeling files CD. Maximum reported HCl concentrations at the receptor are 194- $\mu\text{g}/\text{m}^3$ (1-hr averaged) and 108- $\mu\text{g}/\text{m}^3$ (8-hr averaged). Their ratio (1:8 -hr ratio) is 1.8. Coincidentally, the modeled 1-hour maximum occurred during the maximum 8-hour concentration interval.

We calculated the 1-hr HCl concentration maximum on BDI property by multiplying the reported maximum modeled 8-hr average concentration at BDI by the 1:8 -hr ratio.

$$123\text{-}\mu\text{g}/\text{m}^3 \times 1.8 = 221\text{-}\mu\text{g}/\text{m}^3$$

To estimate the maximum 1-hr averaged HF concentration, we first calculated the HCl:HF concentration ratio based on the reported maximum 8-hour averaged concentrations on BDI property:

$$123\text{-}\mu\text{g HCl}/\text{m}^3 \div 3.1\text{-}\mu\text{g HF}/\text{m}^3 = 40$$

We then divided the calculated the 1-hr HCl maximum concentration by the HCl:HF ratio to obtain the maximum 1-hr averaged HF concentration on BDI property:

$$221\text{-}\mu\text{g HCl}/\text{m}^3 \div 40 = 6\text{-}\mu\text{g HF}/\text{m}^3$$

Lastly we compared calculated 1-hr averaged HCl and HF BDI property concentration maxima to the California OEHHA acute RELs as shown in Table B:

Table B.

	Maximum 1-hour averaged concentration ($\mu\text{g}/\text{m}^3$)	OEHHA REL ($\mu\text{g}/\text{m}^3$, 1-hr TWA)	Hazard Quotient
HCl	211	2,100	0.1
HF	6	240	0.03

These maxima are less than the OEHHA acute RELs thus no one is likely to experience adverse effects as a result of even the highest exposures to these acid gases. Exposure to both together might cause additive effects if they were present at higher concentrations; However, the HI is only 0.13. This indicates there is low or no potential health concern from acute exposure to acid gases from the RTO among people working at or briefly visiting the BDI facility.

We have no information on fluctuations in short-term average HCl or HF concentrations attributable to existing background sources near BDI. Therefore we cannot realistically estimate the acute HI for overall acid gas exposure there. Nonetheless, we have no reason to suspect that swings in these concentrations occur in sufficient magnitude to result in health risks among people there when in combination with the RTO emissions.

In summary the risks of the RTO's acid gas emissions to workers and other people in the BDI area are apparently *de minimis* and therefore permissible under Ch. 173-460 WAC.