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VIA PRIVATE CARRIER AND EMAIL

Mr. James R. Carroll
Program Administrator
Land Restoration Program
Land Management Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230

Subject: Proposed Indoor Air Screening Level for Trichloroethene (TCE) in Middle River Complex Building "A" Basement

Dear Mr. Carroll:

Lockheed Martin has been monitoring Middle River Complex Buildings A, B, and C for vapor intrusion (VI) since 2006 by collecting indoor air and sub-slab soil vapor samples during February and August each year. Indoor air quality on the main floors of these occupied industrial buildings has been under control from VI based on a comparison to the United States Environmental Protection Agency (US EPA) indoor air screening levels derived using default exposure assumptions for commercial/industrial workers. On the infrequent occasion when the indoor air screening level was exceeded on the main floor of Building A (five exceedances out of 251 samples or 2% of total samples), the indoor air was re-sampled and in each case the re-sample was less than the screening level. As presented in EPA's Vapor Intrusion Screening Level (VISL) calculator the following exposure assumptions are used to develop screening levels for workers: 8 hours per day, 250 days per year, and 25 years of exposure.

Lockheed Martin has also been monitoring indoor air and soil vapor in the Building A basement semi-annually since 2008 and most recently completed a two-month continuous air sampling program from February 21 to April 21, 2017. Unlike the main floors, the basement is a minimally occupied space with workers entering primarily for short-term utility maintenance or repair. Due to this difference in exposure potential, Lockheed Martin is proposing a site-specific screening level for trichloroethene (TCE), the primary constituent of concern in subsurface vapor. TCE vapors are thought to be present in the basement air due to the presence of impacted water releasing vapors that migrate through conduits such as sumps and floor drains that serve as preferential pathways for VI.

As presented in Table 1, Lockheed Martin considered two possible exposure scenarios for a basement screening level. The first scenario assumes that permanent employees enter the basement an average of two hours per day, 250 days per year over the course of 25 years of employment. Under this scenario, the exposure time is reduced from 8 hours per day to 2 hours per day compared to the default worker scenario.

A second scenario considers a subcontractor employee working in the basement for 8 hours per day, for 20 days (5 work days x 4 weeks) to perform some type of utility or construction installation or repair. The exposure duration for this activity is one month (or 1/12 of a year – 0.083 years).

The calculated cancer and noncancer values for each scenario are presented on Table 1. Each cancer value is based on a $1x10^{-5}$ risk level and the noncarcinogenic screening levels are based on a hazard quotient (HQ) of 1. For each scenario, including the default worker scenario, the noncancer hazard values are lower (more protective) than the cancer values. The lowest screening level value calculated for the two site-specific basement scenarios is 35 $\mu g/m^3$ based on a long-term employee who visits the basement for 2 hours per day, 250 days per year, over the course of 25 years of employment. Lockheed Martin is proposing to use this health risk-based value to assess indoor air basement results, particularly from the recent continuous air sampling program. In addition, Lockheed Martin is evaluating the feasibility of more permanent solutions to control potential VI in the basement.

Lockheed Martin is requesting MDE's concurrence to use this site-specific criterion to assess indoor air sampling results in the Building A basement and for risk communication purposes. Please let me know if you have any questions. My office phone is (301) 548-2209.

Sincerely,

Thomas D. Blackman
Project Lead, Environmental Remediation

Enclosure: Summary of TCE Screening Level Development

cc: (via email without enclosure)
Gary Schold, MDE
Mark Mank, MDE
Christine Kline, Lockheed Martin
Norman Varney, Lockheed Martin
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Michael Martin, Tetra Tech
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cc: (via mail with CD enclosure)
Jann Richardson, Lockheed Martin

TABLE 1
Comparison of TCE Screening Levels Under Varying Exposure Scenarios

Inhalation Pathway Exposure Parameters: Commercial / Industrial Exposure Scenario	**Units**	**Default Worker [(1)]**	**Adjusted (Long Term) [(2)]**	**Adjusted (Short Term) [(3)]**
Averaging time for carcinogens	(yrs)	70	70	70
Averaging time for non-carcinogens	(yrs)	25	25	0.083
Exposure duration	(yrs)	25	25	0.083
Exposure frequency	(days/yr)	250	250	20
Exposure time	(hr/day)	8	2	8
TCE Toxicity Values				
Inhalation Unit Risk (IUR)	$\mu g/m^3$	4.1E-06	4.1E-06	4.1E-06
Reference Concentration (RfC)	mg/m^3	2.0E-03	2.0E-03	2.0E-03

Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

Exposure Scenario	**TCE Cia, c Cancer ($\mu g/m^3$)**	**TCE Cia, nc Noncancer ($\mu g/m^3$)**	
Standard Worker Scenario (Default)	30	**8.8**	
Adjusted Worker Scenario (Long Term)	120	**35**	**
Adjusted Worker Scenario (Short Term)	112,171	**109**	

Notes:

(1): Default exposure assumptions for a commercial worker from EPA's Vapor Intrusion Screening Level (VISL) calculator.

(2): Adjusted site-specfic scenario assumes full time workers enter basement for an average of 2 hours per day, 250 days per year, over the course of 25 years of employment.

(3): Adjusted site-specific scenario assumes a subcontractor enters the basement for 8 hours per day over the course of four weeks of construction or repair work.

** Of the two plausible site-specfic exposure scenarios, the lowest value of 35 $\mu g/m^3$ is selected to be protective of worker exposure.