Letter Health Consultation

RAYTHEON PRODUCE TESTING SITE
ST. PETERSBURG, FLORIDA

Prepared by the
Florida Department of Health

MAY 8, 2009

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

RAYTHEON PRODUCE TESTING SITE

ST. PETERSBURG, FLORIDA

Prepared By:

Florida Department of Health
Bureau of Environmental Public Health Medicine
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

May 7, 2009

Gayle Guidash
Environmental Health Director
Pinellas County Health Department
4175 East Bay Drive
Clearwater, FL 33764

RE: Azalea Neighborhood Produce Testing

Dear Ms. Guidash:

In July and August 2008, consultants for Raytheon tested homegrown produce watered from shallow irrigation wells near Raytheon in St Petersburg. These wells had levels of volatile organic compounds (VOC) above drinking water standards. No VOCs were detected in the produce (Table I and II). The Florida Department of Health (DOH) evaluated the health risk associated with consumption of these homegrown fruits and vegetables. Even though the laboratory results were all non-detect, Florida DOH calculated an ingestion dose using ½ the laboratory's detection limits. We then compared these doses to the federal Agency for Toxic Substance and Disease Registry's (ATSDR) comparison values. Florida DOH evaluates the public health risks near Florida hazardous waste sites through a cooperative agreement with ATSDR.

General Site Background and Statement of Issues

The Raytheon hazardous waste site is located at 1501 72nd Street North in St. Petersburg, Florida (Attachment A). The 32 acre site was owned by: Futuronics Toy Company (1955-1958), Air Associates (1958-1976), E-Systems (1976-1995) and Raytheon (1995-present). Since 1955 this property was used to manufacture electronics and communications hardware. During construction of a walking/biking trail in 1991, Pinellas County discovered ground water contaminated with trichloroethene (TCE), and other volatile organic chemicals (VOCs). In 1992 E-Systems removed contaminated soil from the site and began a preliminary contamination assessment.

In 1995, Raytheon acquired the site and continued the assessment. As of August 2008, Raytheon was moving employees to new facilities in the area. It is anticipated that once the facility is vacated it will be sold for commercial re-use or redeveloped with appropriate mitigation measures and/or institutional controls (Environ August 2008).

Historically, the site was used for general office and electronics manufacturing. Land use in the surrounding area includes commercial, residential, and recreational areas. The site is adjacent to single-family residential areas to the south and southeast, the Brandywine Apartments and Stone's Throw Condominiums to the east, commercial buildings to the north, and recreational areas including a park and ball field to the west. A recreational walking/biking trail, built along a former CSX railroad bed, extends along the eastern boundary of the site. Additional residential areas are west of the park along with an elementary school and preschool.

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To date, Raytheon has identified 19 nearby private irrigation wells exceeding a drinking water standard. During public meetings, residents expressed concerns about the possible health risks associated with exposure to chemicals in their homegrown produce. In this health consultation, Florida DOH examines consumption of homegrown fruits and vegetables watered from shallow irrigation wells. In a separate report dated September 22, 2008, Florida DOH addressed residents concerns about the possible health risks associated with exposure to chemicals in their irrigation wells via lawn irrigation and swimming pools.

Irrigation Water background

To date, 1,4-dioxane, TCE and *cis*-1,2-dichloroethene (DCE) have been found above drinking water standards in private irrigation wells near the Raytheon site.

There are no private drinking water wells near the Raytheon site. According to the Pinellas County Department of Public Works, homes near the Raytheon site connected to municipal water following construction. However because of a chronic water shortage, many nearby residents rely on shallow irrigation wells for lawn and garden watering.

On May 5, 2008 Florida DOH, Pinellas County Health Department (CHD), and Florida Department of Environmental Protection (DEP) met with representatives of nearby home owners associations. Florida DOH gathered health concerns associated with use of contaminated irrigation wells. After the meeting Florida DOH established a toll-free hotline to answer health related questions. On May 30, 2008, Florida DOH attended a public meeting held by Raytheon. On July 9, 2008, in conjunction with a Florida DEP information session, Florida DOH held an open house to answer health related questions, gather community health concerns, and to distribute a community update.

In a September 2008, letter, Florida DOH concluded lawn watering or filling swimming pools from private irrigation wells near the Raytheon site is a no apparent public health hazard. They concluded breathing low levels of TCE, 1,4-dioxane and other chemical vapors resulting from lawn irrigation with contaminated ground water is unlikely to cause cancer or other illnesses. They also concluded that skin contact with or accidentally drinking small amounts of water from private irrigation wells is not likely to cause cancer or other illnesses.

Discussion

Homegrown Produce Sampling Background

Raytheon's consultant collected homegrown produce from three residential properties on July 2, 2008 and four residential properties on August 15, 2008 (Figure 2). The homegrown produce samples included oranges, grapefruits, lemons, limes, tangerines, tangelos, banana peppers, bell peppers, jalapeno peppers, onions and tomatoes.

All samples were collected from homeowners whose irrigation water exceeded the drinking water standards for VOCs associated with Raytheon.

The size of the fruit and veggies varied. Except for the citrus fruit, all the other produce collected were ripe. Florida DOH verified the number of fruit collected on the chain of custody forms.

The exact weight for each sample collected was not recorded but was enough to run the analyses. The control produce for the July sample event was purchased from Elias Deli Produce 3200 34th Street in St.

Petersburg. For the August sampling event, all control produce was purchased from this store except pink grapefruit and navel oranges purchased from Publix is St. Petersburg. The control produce included bell peppers, jalapenos and tomatoes.

Raytheon's consultant had all produce shipped to K Prime, Inc laboratory in Santa Rosa, California for analysis of 1,4-dioxane, TCE, and *cis*-1,2-DCE.

Sampling Methodology

K Prime, Inc. laboratory analyzed the edible portions of all the produce samples for 1,4-dioxane, TCE, and *cis*-1,2-DCE using EPA method 5035 for the preparation/extraction and using EPA method 8260 for the analysis. The edible portions of each produce sample were sealed into a 40 ml volatile organic analysis (VOA) vial, purged using helium in a closed system purge and trap, directly introduced into a gas chromatograph, and analyzed using GCMS according to EPA 8260 or EPA 8260 Selective Ion Method (SIM). The samples collected in July were initially analyzed using EPA 8260. However, due to the significant levels of certain naturally occurring VOCs in the citrus samples, all samples were reanalyzed for 1,4-dioxane and TCE using 8260 operated in the SIM mode. The samples collected in August were all analyzed using 8260 SIM. 8260 is the method for all VOCs and the SIM mode is used for more sensitivity/lower detection limits for TCE and 1,4-dioxane. All control samples were non-detect (not detected at or above the stated reporting limit). All the recovery percentages were satisfactory at or above 80%.

Homegrown Produce Results and Evaluation

The DOH evaluated the health risk associated with consumption of homegrown fruits and vegetables watered from shallow irrigation wells near the Raytheon hazardous waste site. 1,4-dioxane, TCE, and *cis*-1,2-DCE were non-detect in all produce samples (Tables I and II). Even though all the laboratory results were non-detect, the Florida DOH calculated an ingestion dose using ½ the lab's detection limits. We then compared these doses to the Agency for Toxic Substance's (ATSDR) non-cancer comparison values. Since all levels of 1,4-dioxane, TCE and 1,2-DCE were significantly less than ATSDR's comparison values, no observed adverse effect levels (NOAEL) or lowest observed adverse effect level (LOAEL), eating these fruits and vegetables is not likely to cause non-cancer illness.

Even if the average consumption rate doubled or tripled, the calculated doses are still less than ATSDR's health comparison values, NOAELs or LOAELs.

EPA cancer risk numbers are available for 1,4-dioxane and TCE. 1,2-DCE is not classified as a carcinogen. Since none of the VOCs were detected in produce, an increase in cancer risk from eating these vegetables is highly unlikely.

Conclusion

Homegrown produce irrigated with water from shallow wells near the Raytheon site is no apparent public health hazard.

Recommendation

Raytheon should retest homegrown produce if contaminant levels in irrigation or monitor wells increase

significantly.

Please call me if you have any questions about this assessment.

Sincerely,

Susan Skye
Florida Department of Health
Bureau of Environmental Public Health Medicine

cc: Deborah Getzoff, Southwest District Office
Brian Dougherty, FDEP Tallahassee Office

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References:

(ATSDR) Agency for Toxic Substances and Disease Registry. 2007. Toxicological Profile for 1,4 Dioxane. Draft for Public Comment.

(ATSDR) Agency for Toxic Substances and Disease Registry. 1996. Toxicological Profile for 1,2-DCE..

(ATSDR) Agency for Toxic Substances and Disease Registry. 1997. Toxicological Profile for TCE.

(ENVIRON) ENVIRON International Corporation August 2008. Human Health Risk Assessment, Raytheon Company Facility St. Petersburg, Florida. Prepared for the Florida Department of Environmental Protection on behalf of Raytheon Company, St. Petersburg, Florida

(USEPA) United States Environmental Protection Agency. 1997. Exposure Factors Handbook. EPA/600/P-95/002Fa.

CERTIFICATION

The Florida Department of Health, Division of Environmental Health prepared this Health Consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It followed approved methodology and procedures existing at the time it began and completed editorial review.

Jennifer Freed
Technical Project Officer,
CAT, CAPEB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.

Alan Yarbrough
Team Lead
CAT, CAPEB, DHAC, ATSDR

Figure 1. Site Location Map

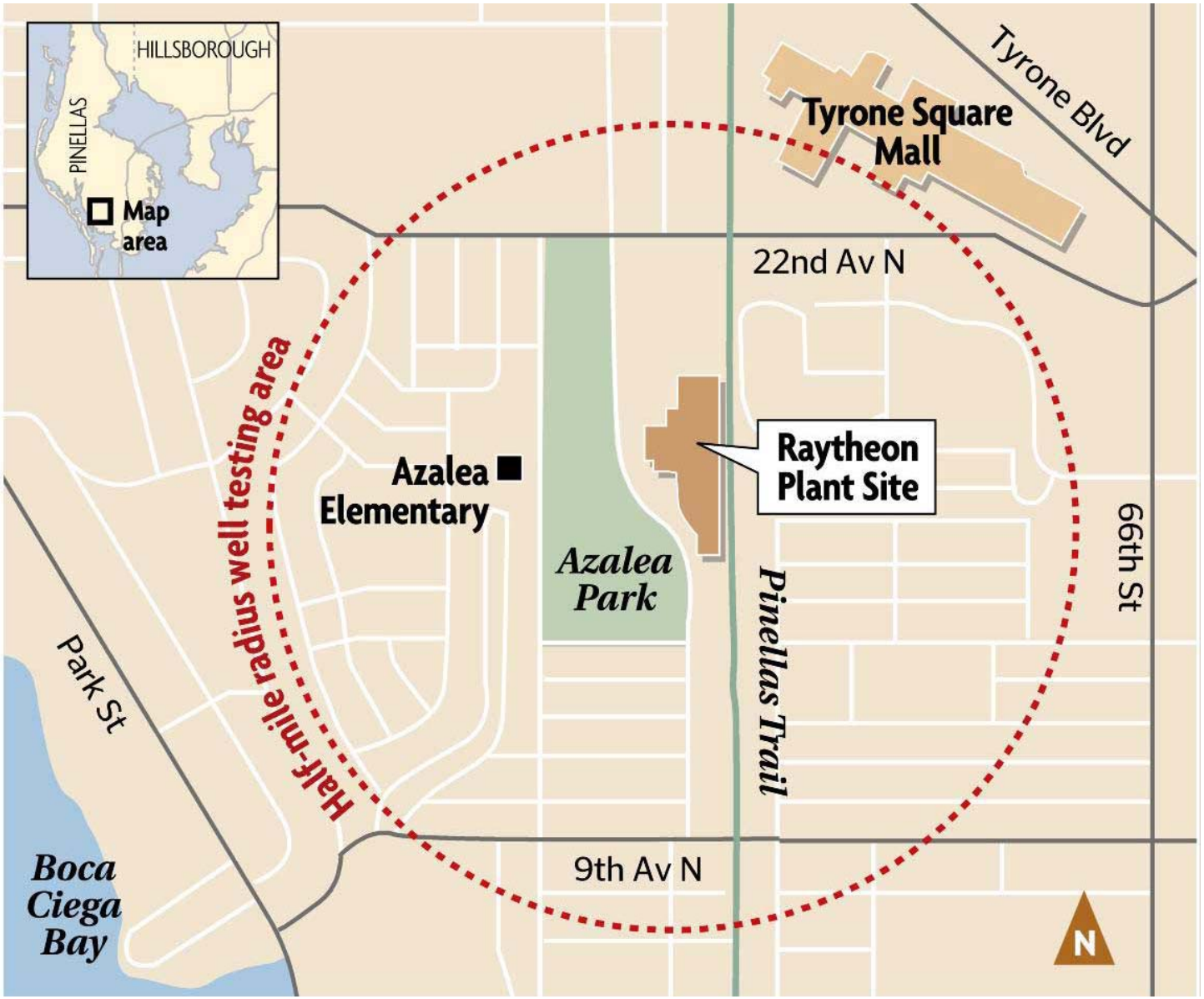

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Figure 2
Aerial Map of Produce Testing Locations

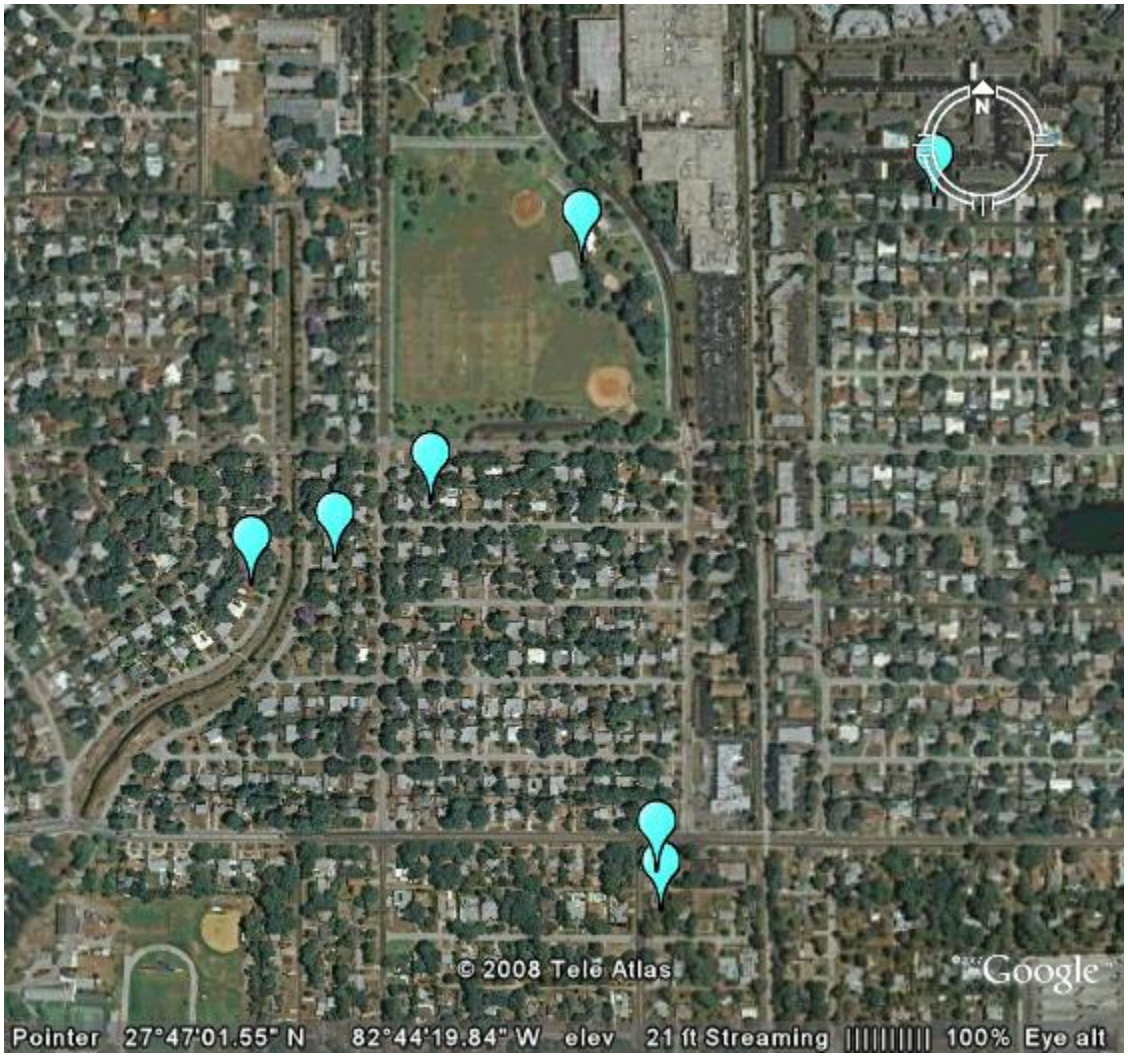

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Table I
July 2, 2008 Produce Contaminant Concentrations (ug/kg)

Address	Produce	# samples collected	1,4-dioxane	Reporting Limit	TCE	Reporting Limit	*Cis*-1,2 DCE	Reporting Limit
House #1	grapefruit	6	ND	37.5	ND	0.75	ND	200
House #2	grapefruit	6	ND	37.5	ND	0.75	ND	200
	lemons	4	ND	37.5	ND	0.75	ND	200
	limes	17	ND	37.5	ND	0.75	ND	500
House #1	onions	3	ND	37.5	ND	0.75	ND	400
	oranges, temple	6	ND	37.5	ND	0.75	ND	200
	peppers, banana	3	ND	37.5	ND	0.75	ND	1.5
	peppers, bell	2	ND	37.5	ND	0.75	ND	1.5
Control: Elias Deli Produce 3200 34th Street	peppers, bell	2	ND	37.5	ND	0.75	ND	1.5
House #1	peppers, jalapeno	4	ND	37.5	ND	0.75	ND	1.5
Control: Elias Deli Produce 3200 34th St	peppers, jalapeno	6	ND	37.5	ND	0.75	ND	1.5
House #1	tangelos	9	ND	37.5	ND	0.75	ND	200
	tangerines	8	ND	37.5	ND	0.75	ND	200
	tomatoes, roma	4	ND	37.5	ND	0.75	ND	1.5
House #3	tomatoes	4	ND	37.5	ND	0.75	ND	1.5
Control: Elias Deli Produce 3200 34th St	tomatoes	6	ND	37.5	ND	0.75	ND	1.5

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Data Source: Environ August 2008
Results in micrograms per kilogram (ug/kg)
ND = Not detected at or above the stated reporting limit
Limit of Detection (analyzed initially using EPA Method 5035/8260 Survey Mode, then using EPA Method 5035/8260 SIM mode)

Note: The lab analyzed the produce (grapefruit, lemons, limes, onions, oranges peppers, tangerines, tangelos and tomatoes) first using EPA method 5035/8260 in survey mode. When they realized their reporting limits were higher than the health based standard, they reanalyzed in SIMs mode for lower reporting limits. The reporting limits in this table are the lower of the two.

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Table II
August 15, 2008 Produce Contaminant Concentrations (ug/kg)

Address	Produce	# samples collected	1,4-dioxane	Reporting Limit	TCE	Reporting Limit	Cis-1,2 DCE	Reporting Limit
House #4	grapefruit (pink)	3	ND	37.5	ND	0.75	ND	200
House #5	grapefruit (pink)	10	ND	37.5	ND	0.75	ND	200
House #4	grapefruit (white)	7	ND	37.5	ND	0.75	ND	200
Control: Publix, St. Pete	grapefruit (pink) - control	4	ND	37.5	ND	0.75	ND	200
House #6	grapefruit (white)	8	ND	37.5	ND	0.75	ND	200
House #4	lemons	7	ND	37.5	ND	0.75	ND	200
	oranges, navel	6	ND	37.5	ND	0.75	ND	200
House #7	oranges	6	ND	37.5	ND	0.75	ND	200
Control: Publix, St. Pete	oranges, navel	4	ND	37.5	ND	0.75	ND	200
House #5	tangerines	26	ND	37.5	ND	0.75	ND	200

Data Source: Environ August 2008
ND = Not detected
Limit of Detection (analyzed using EPA 5035/8260 in the SIM mode)

Table III
Highest Estimated Dose of 1,4-Dioxane, Trichloroethylene, and *cis*-1,2-Dichloroethylene in Oranges Grown Near the Raytheon Site

	estimated 1,4-dioxane dose	ATSDR comparison value for ingestion	Highest estimated TCE dose	ATSDR comparison value for ingestion	Highest estimated 1,2-DCE dose	ATSDR/EPA comparison value for ingestion
Highest oranges, navel	4.5×10^{-5}	4.0 (acute) 0.6 (intermediate) 0.1 (chronic)	5.0×10^{-7}	0.20 (acute)	1.3×10^{-4}	1.0 (acute)ATSDR 0.2 (intermediate) ATSDR 0.02 (RfD Chronic)(EPA)
oranges, temple	4.5×10^{-5}	4.0 (acute) 0.6 (intermediate) 0.1 (chronic)	5.0×10^{-7}	0.20 (acute)	1.3×10^{-4}	1.0 (acute) 0.2 (intermediate) 0.02 (RfD Chronic)(EPA)

All dose calculations in milligrams per kilogram per day (mg/kg/day) assuming a concentration of ½ the reporting limit
acute = <14 days exposure
intermediate = 14-364 days exposure
chronic = >364 days exposure
RfD = reference dose

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Attachment 1

PRODUCE CALCULATIONS

ug/kg divided by 1000 = ug/g
µg/g = mg/kg

(X µg/g VOC in produce) (Y g/kg body weight-day)= Z ug/kg/day

Multiply the concentration of the amt of VOC found in the produce times that average consumption rate for that produce. Then convert to mg/kg/day and compare final dose with ATSDR MRL to see if above or below the guidelines.

Example:

0.10 µg/g of 1,2-DCE is ½ the detection limit for oranges collected near Raytheon
The Average Consumption Rate for oranges is 1.25 grams of oranges per kg body weight (bw) per day
Avg kg bw for an adult is 70 kg; for a child is 15 kg

(0.10 µg/g 1,2-DCE in oranges)(1.25 g /kg bw/day) = 0.000125 µg/kg/day = 1.3×10^{-4} mg/kg/day

Note: since this was the highest ingestion dose calculated for 1,2-DCE for all produce, this dose was used to represent the highest ingestion dose for 1,2-DCE for all produce collected near Raytheon

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