Health Consultation

LONNIE C. MILLER, SR. PARK

JACKSONVILLE, DUVAL COUNTY, FLORIDA

CERCLIS NO. FL0001758952

SEPTEMBER 28, 1999

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR 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. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA

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HEALTH CONSULTATION

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Prepared by:

Exposure Investigation and Consultation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

Background and Statement of Issues

On September 10, 1999, the U.S. Environmental Protection Agency (EPA), Region IV requested that the Agency for Toxic Substances and Disease Registry (ATSDR) review the December 31, 1997 Site Inspection (SI) report for the Lonnie C. Miller, Sr., Park site in Jacksonville, Duval County Florida to determine if contaminants present in surface soil are of public health concern.

The Lonnie C. Miller, Sr., Park site is one of the four Jacksonville Ash sites that include: Brown's Dump, the Forest Street Incinerator, the 5th and Cleveland Street Incinerator site, and the Lonnie C. Miller, Sr., Park site. From the 1940s to the 1960s, the city of Jacksonville burned solid waste in incinerators at Forest Street and at 5th and Cleveland and disposed of the resulting ash, which contained lead, at two landfills. Currently, there is a Head Start school near the Forest Street incinerator site; the Lonnie C. Miller, Sr., Park is located on one landfill; and an elementary school (M.M. Bethune Elementary) on the other landfill (known as Brown's Dump). Parents of the children who go to the schools, as well as other nearby residents, are concerned about the possible health effects associated with these sites. ATSDR, the Florida Department of Health, and the Duval County Health Department are working closely with the community to address community concerns and to determine the extent of lead exposure. [1]

The Lonnie C. Miller, Sr., Park site is a municipal park located on Price Road near the intersection of Moncrief Road and Soutel Road in Jacksonville, Duval County, Florida (Figure 1) [2]. The park is bound to the south and northeast by private residences, to the west and northwest by light commercial development, and to the east by the Ribault River. The park contains a playground, public restroom, a small fish pond, and several picnic shelters. The nearest house is located approximately 100 feet south of the park boundary, and six houses are located within 200 feet of the park boundary.

On July 7, 1997, PRC Environmental Management, Inc. collected 14 surface soil samples from zero to three inches below the ground surface as part of EPAs site investigation activities at the Lonnie C. Miller, Sr., Park site. The locations of the surface soil samples are presented in Table 1 and shown in Figure 1.

Table 1
Surface Soil Locations
Lonnie C. Miller, Sr., Park site
July 7, 1997

Background sample

MP-SS-01	Collected from a vacant lot in the Sterling Park Subdivision.

Samples collected to determine the presence or absence of hazardous substances

MP-SS-02	Collected from a utility company right-of-way, adjacent to a private residence.
MP-SS-03	Collected from the northwest corner of the playground area.
MP-SS-04	Collected from the southeast corner of the park property (near the Ribault River).
MP-SS-05	Collected from the central portion of the park property (near the Ribault River).
MP-SS-06	Collected from the northeast corner of the park property (near the Ribault River).
MP-SS-07	Collected from the north central portion of the park property.
MP-SS-08	Collected from the central portion of the park property.
MP-SS-09	Collected from the central portion of the park property.
MP-SS-10	Collected from a private residence at 7520 Price Road
MP-SS-11	Collected from the southwest corner of park property.
MP-SS-12	Collected from the northwest corner of park property.
MP-SS-13	Collected from the central portion of the park property (near a drainage ditch).
MP-SS-14	Collected from the central portion of the park property (near a drainage ditch).

MP – Lonnie C. Miller, Sr., Park site
SS – surface soil

Surface Soil Data – July 9, 1999

An EPA contract laboratory analyzed the surface soil samples for EPA target compounds including: volatile organic compounds, extractable semivolatile compounds, pesticides, polychlorinated biphenyls, dioxins, and inorganic substances (Table 2). In the SI report, the EPA identified a contaminant as elevated if its concentration was greater than or equal to three times the concentration detected in the background or control sample [2]. In addition, if a contaminant was not detected in the background or control sample, any concentration equal to or greater than the laboratory-derived sample quantitation limit was considered to be elevated [2].

Table 2
List of Contaminants Sampled for at the Lonnie C. Miller, Sr., Park

Inorganic	aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc, cyanide
Organic	phenatherene, anthracene, fluoranthene, pyrene, bis(2-ethylhexyl phthalate), benzo(a)anthracene, chrysene, benzo(b and/or k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(ghi)perylene, dieldrin, 4,4'-DDE, 4,4'-DDT, polychlorinated biphenyls, gamma-chlordane, heptachlor, heptachlor epoxide, alpha-chlordane, gamma-chlordane, aldrin, dioxins, and furans

The SI report concluded that elevated levels of arsenic, lead, manganese, and several other inorganic constituents were present in surface soil at the Lonnie C. Miller, Sr., Park site [2]. In addition, the SI reported elevated levels of dioxins and furans, pyrene, benzo(a)anthracene, chrysene, benzo(b and/or k) fluoranthene, dieldrin, 4, 4'-DDE, and polychlorinated biphenyls (isomer 1260). The resulting data for some contaminants were not useable in our evaluation because the data were marked with qualifiers indicating a presumptive evidence of the contaminant. In addition, three unidentified compounds were reported in the data.

Discussion

Using ATSDR comparison values, EPA Region 3 risk-based concentrations, and recommended daily allowances for essential metals like calcium and magnesium when no other comparison value was available, *ATSDR eliminated all contaminants listed in Table 2, except copper, for further evaluation.* Please refer to Appendix B for an explanation on ATSDRs comparison values and Appendix C for an explanation of how ATSDR evaluates dioxins and furans.

ATSDR does not expect that the levels of contaminants detected at the Lonnie, C. Miller, Sr., Park site will result in acute or chronic adverse health effects. Copper is discussed further below. ATSDR used a conservative approach in its analysis by assuming that the Lonnie C. Miller, Sr., park site is used for residential purposes (i.e., a child from 6 to 12 years old playing on the property for 7 days a week for 52 weeks).

Copper

Estimated levels of copper are reported for all sampling locations at the Lonnie C. Miller, Sr., Park site. Background levels of copper are estimated at 1.7 milligrams/kilogram (mg/kg). The lowest concentration of copper was estimated at 4.1 mg/kg at MP-SS-11 and the estimated highest concentration was 4200 mg/kg at MP-SS-11. The estimated average of all samples is 747 mg/kg.

The levels of copper detected at the Lonnie C. Miller, Sr., Park site are below levels known to chronic adverse health effects. Under normal situations, the ATSDR does not consider that the levels of copper will result in acute adverse health effects.

In evaluating the concentrations of the metals in surface soil at the Lonnie C. Miller, Sr., Park site, ATSDR considered the outcome if a child consumed a large amount of soil (5 grams). This is 25 times the amount of soil that children are normally expected to consume from the incidental ingestion of soil (200 mg) [3].

Based on this scenario, the levels of copper in surface soil are not of public health concern for all locations except MP-SS-11. A child who ingested 5 grams of soil at this location may experience vomiting and diarrhea [4]. However, ATSDR considers this exposure unrealistic because: 1) MP-SS-11 was collected from a location that is on the park's boundary and removed from the playground area; 2) vegetative cover would greatly reduce accessibility to the soil; and, 3) it is unlikely that children will consume 5 grams of soil. *Therefore, ATSDR does not believe that acute adverse health effects will result from exposure to copper in soil.*

Child Health Initiative

ATSDR recognizes that infants and children may be more vulnerable to exposures than adults when faced with contamination of air, water, soil, or food [5]. This vulnerability is a result of the following factors:

- Children are more likely to play outdoors and bring food into contaminated areas.
- Children are shorter and their breathing zone is closer to the ground, resulting in a greater likelihood to breathe dust, soil, and heavy vapors.
- Children are smaller and receive higher doses of chemical exposure per body weight.
- Children's developing body systems are more vulnerable to toxic exposures, especially during critical growth stages in which permanent damage may be incurred.

Based on the data reviewed, the concentrations of contaminants in surface soil detected at the residential Lonnie C. Miller, Sr., Park site are not at levels of health concern for children, people use the park, or for other residents of the area.

Conclusions

Based on the results in the December 31, 1997, Site Investigation Report, ATSDR concludes that the levels of contaminants detected in surface soil at the Lonnie C. Miller, Sr., Park site represent a ***no apparent public health hazard***. This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects. This determination represents a professional judgment based on critical data which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.

Some of the sampling results in the December 31, 1997, Site Investigation report contained data qualifiers making them unuseable for a public health evaluation.

Recommendations

ATSDR recommends additional surface soil (0 to 3 inches) sampling at the Lonnie C. Miller, Sr., Park site to better characterize the contamination present at the park and to reflect current site conditions. ATSDR requests that the additional sampling be reflective of areas where children are most likely to play.

References

1. Agency for Toxic Substances and Disease Registry. Public health fact sheet for the Jacksonville Ash sites, Jacksonville, Florida. Atlanta: US Department of Health and Human Services, Public Health Service, September 1999.

2. U.S. Environmental Protection Agency. Site inspection report for the Lonnie C. Miller, Sr., Park Site, Jacksonville, Duval County, Florida, December 31, 1997.

3. Agency for Toxic Substances and Disease Registry. Public health assessment manual. Atlanta: US Department of Health and Human Services, Public Health Service, September 1992.

4. Agency for Toxic Substances and Disease Registry. Toxicological profile for copper. Atlanta: US Department of Health and Human Services, Public Health Service, 1990.

5. Agency for Toxic Substances and Disease Registry. Interim guidance on including child health issues in Division of Health Assessment and Consultation Documents. Atlanta: US Department of Health and Human Services, Public Health Service, July 1998.

5. Agency for Toxic Substances and Disease Registry. Toxicological profile for aluminum. Atlanta: US Department of Health and Human Services, Public Health Service, 1999.

6. Agency for Toxic Substances and Disease Registry. Toxicological profile for arsenic. Atlanta: US Department of Health and Human Services, Public Health Service, 1998.

7. Agency for Toxic Substances and Disease Registry. Toxicological profile for barium. Atlanta: US Department of Health and Human Services, Public Health Service, 1992.

8. Agency for Toxic Substances and Disease Registry. Toxicological profile for cadmium. Atlanta: US Department of Health and Human Services, Public Health Service, 1999.

9. Agency for Toxic Substances and Disease Registry. Toxicological profile for chlorinated dibenzo-p-dioxins. Atlanta: US Department of Health and Human Services, Public Health Service, 1990.

10. Agency for Toxic Substances and Disease Registry. Toxicological profile for chromium. Atlanta: US Department of Health and Human Services, Public Health Service, 1998.

11. Agency for Toxic Substances and Disease Registry. Toxicological profile for cobalt. Atlanta: US Department of Health and Human Services, Public Health Service, 1992.

12. Agency for Toxic Substances and Disease Registry. Toxicological profile for copper. Atlanta: US Department of Health and Human Services, Public Health Service, 1990.

13. Agency for Toxic Substances and Disease Registry. Toxicological profile for cyanide. Atlanta: US Department of Health and Human Services, Public Health Service, 1997.

14. Agency for Toxic Substances and Disease Registry. Toxicological profile for di(2-ethylhexyl)phthalate. Atlanta: US Department of Health and Human Services, Public Health Service, 1993.

15. Agency for Toxic Substances and Disease Registry. Toxicological profile for lead. Atlanta: US Department of Health and Human Services, Public Health Service, 1999.

16. Agency for Toxic Substances and Disease Registry. Toxicological profile for manganese. Atlanta: US Department of Health and Human Services, Public Health Service, 1990.

17. Agency for Toxic Substances and Disease Registry. Toxicological profile for mercury. Atlanta: US Department of Health and Human Services, Public Health Service, 1999.

18. Agency for Toxic Substances and Disease Registry. Toxicological profile for polychlorinated biphenyls. Atlanta: US Department of Health and Human Services, Public Health Service, 1998.

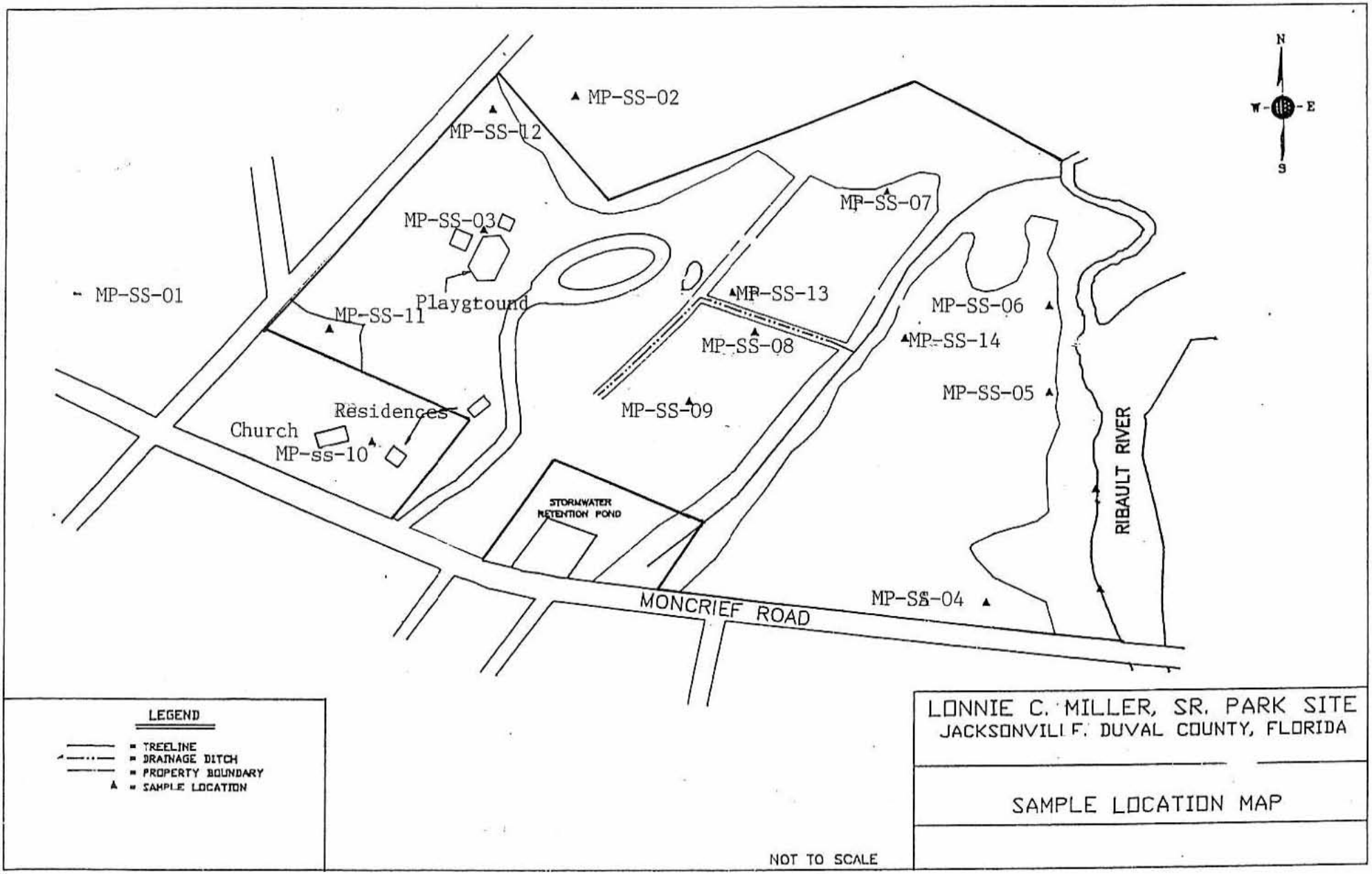
19. Agency for Toxic Substances and Disease Registry. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta: US Department of Health and Human Services, Public Health Service, 1990.

20. Agency for Toxic Substances and Disease Registry. Toxicological profile for selenium. Atlanta: US Department of Health and Human Services, Public Health Service, 1994.

21. Agency for Toxic Substances and Disease Registry. Toxicological profile for thallium. Atlanta: US Department of Health and Human Services, Public Health Service, 1992.

Appendix A

FIGURE 1


N
W
E
S
MP-SS-01
MP-SS-02
MP-SS-12
MP-SS-03
MP-SS-07
MP-SS-13
MP-SS-11
Playground
MP-SS-06
MP-SS-14
MP-SS-08
MP-SS-05
MP-SS-09
Residences
Church
MP-SS-10
STORMWATER RETENTION POND
RIBAULT RIVER
MP-SS-04
MONCRIEF ROAD
LEGEND
= TREELINE
= DRAINAGE DITCH
= PROPERTY BOUNDARY
= SAMPLE LOCATION
NOT TO SCALE
LONNIE C. MILLER, SR. PARK SITE
JACKSONVILLE, DUVAL COUNTY, FLORIDA
SAMPLE LOCATION MAP

Appendix B

ATSDRs comparison values are media-specific concentrations that are considered to be "safe" under default conditions of exposure. They are used as screening values in the preliminary identification of "contaminants of concern" at a site.

Generally, a chemical is selected as a contaminant of concern because its maximum concentration in air, water, or soil at the site exceeds one of ATSDR's comparison values. However, it cannot be emphasized strongly enough that comparison values are *not* thresholds of toxicity. While concentrations at or below the relevant comparison value may reasonably be considered safe, it does not automatically follow that any environmental concentration that exceeds a comparison value would be expected to produce adverse health effects. Indeed, the whole purpose behind highly conservative, health-based standards and guidelines is to enable health professionals to recognize and resolve potential public health problems *before* they become actual health hazards. The probability that adverse health outcomes will actually occur as a result of exposure to environmental contaminants depends on site-specific conditions, individual lifestyle, and genetic factors that affect the route, magnitude, and duration of actual exposure, *not* on environmental concentrations alone.

Screening values based on non-cancer effects are obtained by dividing the lowest concentrations associated with health effects found in animal or (less often) human studies by cumulative safety margins (variously called safety factors, uncertainty factors, and modifying factors) that typically range from 10 to 1,000 or more. By contrast, cancer-based screening values are usually derived by linear extrapolation from animal data obtained at high doses, because human cancer incidence data for very low levels of exposure simply do not exist, and probably never will. In neither case can the resulting screening values (i.e., EMEGs or CREGs) be used to make realistic predictions of health risk associated with low-level exposures in humans.

Cancer Risk Evaluation Guides (CREGs) are estimated concentrations of contaminants that are expected to cause no more than one excess cancer case for every million (1×10^{-6}) persons who are continuously exposed to the concentration for an entire lifetime. These concentrations are calculated from EPA's cancer slope factors, which indicate the relative potency of carcinogenic chemicals. Only chemicals that are known or suspected of being carcinogenic have CREG comparison values. It should be noted that exposures equivalent to CREGs are not actually expected to cause one excess cancer in a million persons exposed over a lifetime. Nor does it mean that every person in an exposed population of 1 million has a 1-in-a-million chance of developing cancer from the specified exposure. Although commonly interpreted in precisely these ways, the CREGs reflect only a rough estimate of population risks, which should not be applied directly to any individual.

Environmental Media Evaluation Guides (EMEGs) are estimates of chemical concentrations that are not likely to cause an appreciable risk of deleterious, noncancerous health effects for fixed durations of exposure. These concentrations factor in estimates of receptor body weights and rates of ingestion. EMEGs may reflect several different types of exposure: acute (1 to 14

days), intermediate (15 to 365 days), and chronic (more than 365 days). These concentrations are ultimately based on data published in ATSDR Toxicological Profiles for specific chemicals.

EPA Region III Risk-Based Concentrations (RBCs) are similar to ATSDR's CREGs and EMEGs in that they are risk-based concentrations derived for carcinogens and noncarcinogens from RfDs and cancer slope factors, respectively, assuming default values for body weight, exposure duration and frequency, and so on. Unlike EMEGs, however, they are available for fish as well as for water, soil, and air.

Reference Media Evaluation Guides (RMEGs) are derived from EPA's oral reference doses. The RMEG represents the concentration in water or soil at which daily human exposure is unlikely to result in adverse noncarcinogenic effects.

Appendix C

Dioxins and furans are two families of chlorinated compounds that include more than 200 individual chemicals. Each of these chemicals has a similar structure and can be visualized as a chain with ten outward facing spokes. Eight of these spokes have the capability of holding a chlorine atom. The difference in these individual chemicals stems from the number and location of the chlorine atoms. The group with only one chlorine atom is referred to as mono-chlorinated. The groups with two through eight chlorine atoms are referred to as di-, tri-, tetra-, penta-, hexa-, and octa-chlorinated, respectively. Chemicals with the same number of chlorine atoms are referred to as isomers.

The relative toxicity or potency of dioxins and furans varies depending on the chlorine number and locations. 2,3,7,8-tetrachlorodibenzo-ρ-dioxin (2,3,7,8-TCDD), a compound with four chlorine atoms located in the 2, 3, 7, and 8 positions, has been shown to be the most toxic of the dioxins/furans. The toxicity of other dioxins and furans with chlorination in the 2, 3, 7, and 8 positions ranges from slightly less toxic to 1,000 times less toxic. The U.S. Environmental Protection Agency (EPA) has developed a system for evaluating the toxicity associated with a mixture of different dioxin and furan groups. The toxicity of each group is expressed in relation to 2,3,7,8-TCDD, using what are known as toxicity equivalent factors (TEFs). The TEFs applied to each dioxin/furan group are listed below:

Dioxin Group	TEF	Furan Group	TEF
Tetrachlorodibenzo-ρ-dioxin (TCDD)		Tetrachlorodibenzofuran (TCDF)	
2,3,7,8-TCDD	1	2,3,7,8-TCDF	0.1
other TCDDs	0	other TCDFs	0
Pentachlorodibenzo-ρ-dioxin(PeCDD)		Pentachlorodibenzofuran (PeCDF)	
2,3,7,8-PeCDD[a]	0.5	1,2,3,7,8-PeCDF	0.05
other PeCDDs	0	2,3,4,7,8-PeCDF	0.5
		other PeCDFs	0
Hexachlorodibenzo-ρ-dioxin (HxCDD)		Hexachlorodibenzofuran (HxCDF)	
2,3,7,8-HxCDD[a]	0.1	2,3,7,8-HxCDF[a]	0.1
other HxCDDs	0	other HxCDFs	0
Heptachlorodibenzo-ρ-dioxin (HpCDD)		Heptachlorodibenzofuran (HpCDF)	
2,3,7,8-HpCDD[a]	0.01	2,3,7,8-HpCDF[a]	0.01
other HpCDDs	0	other HpCDFs	0
Octachlorodibenzo-ρ-dioxin (OCDD)	0.001	Octachlorodibenzofuran (OCDF)	0.001

[a] any isomer that contains chlorine in the 2,3,7,8-position.

In this health consultation, TEFs were used to generate a TCDD-equivalent (TEQ). The TEQ expresses the total dioxin and furan concentration in relation to the toxicity of 2,3,7,8-TCDD. The TEQ is calculated by first multiplying the concentration of a dioxin/furan by its TEF to

generate a toxicity-weighted concentration. For example, 10 parts per billion (ppb) of 2,3,7,8-PeCDD is multiplied by its TEF of 0.5 for a result of 5 ppb, the toxicity-weighted concentration. The toxicity-weighted concentrations for each dioxin/furan group are summed to calculated the TEQ.

The TEQ concentration is used to assess the potential health hazards associated with a dioxin/furan mixture. The TEQ is compared to the ATSDR (or other comparable) comparison value. If the TEQ exceeds the comparison value, ATSDR further analyzes exposure to evaluate whether a public health hazard exists. ATSDR considers dioxin levels of 1 ppb or less in soil as safe.