UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

CONTAINS ENFORCEMENT-SENSITIVE INFORMATION

MEMORANDUM

DATE: August 26, 2010

SUBJ: Request for a Removal Action at the Parker Street Waste Site, New Bedford, Bristol County, Massachusetts - **Action Memorandum and Exemption from the Statutory $2,000,000 and 12-Month Limits on Removal Actions**

FROM: Wing Chau, On-Scene Coordinator W.C.
Emergency Response and Removal Section II

THRU: Steven R. Novick, Chief
Emergency Response and Removal Section II

Arthur V. Johnson III, Chief
Emergency Planning & Response Branch

TO: James T. Owens III, Director
Office of Site Remediation and Restoration

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed removal action at the Parker Street Waste Site (the Site), which is located in a previously estimated 104-acre area, intersected by Parker Street, in New Bedford, Bristol County, Massachusetts. Hazardous substances present in soils and sediments at the Site, if not addressed by implementing the response actions selected in this Action Memorandum, will continue to pose a threat to human health and the environment. This Action Memorandum also requests and documents the approval of an "emergency" exemption from the $2 million and 12-month statutory limits for removal actions under the National Contingency Plan. There are no nationally significant or precedent-setting issues associated with this Site, and there has been no use of the OSC's $200,000 warrant authority.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID# : MAN000105955
SITE ID# : 01GB
CATEGORY : Time-Critical

A. Site Description

1. Removal site evaluation

The Parker Street Waste Site is a previously estimated 104-acre area located in an urban area of New Bedford, Bristol County, Massachusetts. The estimated extent of the Parker Street Waste Site, based upon data generated to date, is believed to be bounded to the north by Durfee Street, to the east by Liberty Street and the Oak Grove Cemetery, to the south by Hillman Street, and to the west by Summit Street. Centered around a former city-owned landfill, the Parker Street Waste Site includes the New Bedford High School campus, the recently constructed Keith Middle School (KMS), the Hetland Memorial Skating Rink property, Walsh Field, the new Andre McCoy Field, residential properties, New Bedford Housing Authority properties, Carabiner's Indoor Climbing Facility, and two private apartment complexes.

In 2000, during an environmental due diligence investigation of the former McCoy Field as a possible location for the new KMS, PCB levels above regulatory limits were detected. Beginning in 2005, BETA Group Inc., working on behalf of the City of New Bedford, remediated the site by removing PCB-contaminated soil and sediment and installing a 3-foot cap over the contaminated areas. The KMS was then constructed over the resulting 3-foot cap. Throughout the course of the remediation, BETA Group, Inc. conducted several subsurface environmental investigations between 2004 and 2006 at other locations on the Site. In addition, a PCB cleanup of the wetlands behind KMS was conducted in 2005/2006.

Following the remediation of the former McCoy Field/current KMS location, TRC Environmental Corp. (TRC) was contracted by the City of New Bedford to conduct site investigations at the Parker Street Waste Site. TRC conducted investigations at the New Bedford High School campus, Walsh Field area, new Andre McCoy Field area, 16 residential properties, one church, five city-owned right-of-way areas, one privately-owned commercial property, and one city-owned lot on Durfee St. Most of the investigatory work was completed throughout 2007 and 2008, with portions of the final reports completed by the end of year 2008.

For the past several years, the City of New Bedford has been addressing contamination at the Parker Street Waste Site pursuant to the Massachusetts Contingency Plan (MCP), the State's privatized cleanup program, and under a PCB cleanup approval issued by EPA Region 1 under the Toxic Substance Control Act (TSCA). On April 15, 2009, the EPA Administrator, Lisa Jackson, visited the City of New Bedford to announce funding from the American Recovery and Reinvestment Act of 2009 being made available for the cleanup of New Bedford Harbor. During this visit, various stakeholders raised concerns regarding the Parker Street Waste Site. In response to these concerns, EPA and the Massachusetts Department of Environmental Protection (MassDEP) conducted a public meeting on September 30, 2009, during which concerns regarding the scope and pace of the environmental assessment and clean up of the Site were voiced by residents and community leaders. One of their concerns included the unknown extent

of contamination which could possibly extend into the largely residential neighborhoods surrounding the school campuses. At the meeting, EPA and the MassDEP committed to work with the City of New Bedford and community members to expedite further investigation of the boundaries of the Parker Street Waste Site, and to determine whether there is any immediate threat to human health and/or the environment related to contamination from the Site.

EPA and MassDEP mobilized to the Site on April 19, 2010 to establish the command post and work areas. Field sampling activities for the preliminary assessment/site investigation (PA/SI) began on April 26, 2010 and concluded in early June 2010. The site investigation identified several residential and commercial properties with elevated levels of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and/ or heavy metals in soils at or near the surface, which pose an imminent and substantial endangerment to public health. Currently 25 of the 47 properties tested to date have undergone risk evaluations by MassDEP; and 20 properties have been determined to contain elevated levels of contamination that trigger an Imminent Hazard condition and/or Significant Risk condition as defined under the Massachusetts Contingency Plan (MCP). Under the MCP, the contamination within the top 1-foot of soil is evaluated to determine if an Imminent Hazard exists. For the top 3-feet of soil, the contamination is evaluated to determine if a Significant Risk is present based upon the current land-use of the property. Evaluations of the other remaining properties are on-going. The PA/SI was concluded and a time-critical removal action was recommended in the Site Investigation Closure Memorandum dated August 19, 2010. Although this phase of the PA/SI has concluded, an estimated 23 additional residential and commercial properties are also scheduled to be sampled to determine whether there is an immediate threat present to human health and/or the environment, and to also further define the extent of the Site boundaries.

2. Physical location

The Parker Street Waste Site is a previously approximated 104-acre area located in New Bedford, Bristol County, Massachusetts. Geographic coordinates of the Site are approximately 41° 38' 33" north latitude and 70° 56' 44" west longitude, as measured from the approximate center of the Site. The estimated extent of the Site is believed to be bounded to the north by Durfee Street, to the east by Liberty Street and the Oak Grove Cemetery, to the south by Hillman Street, and to the west by Summit Street. Located within the bounds of the former waste site is the New Bedford High School campus, the Keith Middle School, the Hetland Memorial Skating Rink property, Walsh Field, the new Andre McCoy Field, residential properties, New Bedford Housing Authority properties, Carabiner's Indoor Climbing Facility, and two privately-owned apartment complexes. The estimated size of the Site has increased with the addition of the impacted properties identified during the initial PA/SI. Additional properties identified to be sampled may also be included into the Site if determined to be impacted by Site related contamination.

3. Site characteristics

According to historical topographical maps, the Site was a wetland area linked to the Apponagansett Swamp prior to 1936. Subsequent maps and aerial imagery revealed that the southern end of the Site (Walsh Field area) was the first to be developed and was displayed as dry land in historical maps. The majority of activity suspected to be associated with the waste material identified on the Site occurred in the 1950s and early 1960s and was located in the current New Bedford High School campus area. This waste material is suspected to have been disturbed during construction of the New Bedford High School's foundation between 1968 and 1972. Further disturbance of fill-related waste material is also suspected to have occurred during the construction of the former Andre McCoy Field (prior to construction of KMS).

All nearby residents receive city-supplied water; therefore, there are no impacted drinking water supply wells. The current location of KMS is a historical wetland, and there are small wetlands located west and north of KMS. According to the 2000 Census, the approximate area population is respectively 30,119, 7,074, and 894 people within a 1 mile, 0.5 mile, and 0.25 radius of the Site. The surrounding area is predominantly used for residential and recreational purposes. According to the EPA Region 1 Environmental Justice Mapping Tool, the Site is in an environmental justice area.

a. Removal Action Areas

Area 1

Residential properties located south and west of Walsh Field (Maxfield Street, Hunter Street, Florence Street, Hillman Street). (Please refer to the Parker Street Waste Site Map in Attachment 1)

Area 2

Residential and Commercial Properties located on Parker Street and Hunter Street. (Please refer to the Parker Street Waste Site Map in Attachment 1)

Area 4

Residential and commercial properties located on Hathaway Boulevard, Greenwood Street, and Ruggles Street. (Please refer to the Parker Street Waste Site Map in Attachment 1)

Area 7

Residential properties located on Durfee Street. (Please refer to the Parker Street Waste Site Map in Attachment 1)

Area 8

Wetland area located between Durfee Street and Potter Street. (Please refer to the Parker Street Waste Site Map in Attachment 1)

Area 11

Westlawn Public Housing Complex located on Liberty Street, Maxfield Street, Lindsey Street, and Smith Street. (Please refer to the Parker Street Waste Site Map in Attachment 1)

An additional extent of contamination investigation will be conducted on properties south of Area 1 and on properties south and east of Area 11 to further delineate the Site boundaries. This investigation will commence in September 2010. If the investigation identifies site conditions that warrant a removal action, additional properties may be added to this Site and will increase the scope of this proposed response action.

The following areas, as shown on Parker Street Waste Site Map in Attachment 1, are not being addressed in this proposed removal:

Area 3 – Site conditions do not warrant a removal action.

Areas 5, 6, and 10 – City owned properties are currently being addressed by the City of New Bedford under the oversight of MassDEP.

Area 9 – The Hetland Memorial Ice Skating Rink is a state-owned property. MassDEP will be the lead regulatory agency for overseeing any cleanup work that may be warranted in this area.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

PCBs are hazardous substances as defined by Section 101(14) of CERCLA, 42 U.S.C. §9601(14). On the residential and commercial properties sampled during this PA/SI, PCBs were detected in levels as high as 8.6 parts per million ("ppm"). Therefore, a release into the environment of hazardous substances has already occurred. The concentrations of PCBs present at the Site exceed or have the potential to exceed default standards and cleanup levels considered protective of public health including: EPA's PCB Cleanup and Disposal Regulations, 40 CFR Section 761.61, (1 ppm for unrestricted use, and 10 to 100 ppm with a compliant cap); the preliminary remediation goals (1 ppm for residential areas, 10 to 25 ppm for industrial use) specified in EPA OSWER Directive 9355.4-01; and the Massachusetts Contingency Plan Method 1 default standard of 2 ppm for both residential and industrial soils.

Other hazardous substances as defined by Section 101(14) of CERCLA that have been released at residential and commercial properties on the Site are shown in the table below with the highest concentrations detected during the PA/SI compared to the remediation standards identified in the Massachusetts Contingency Plan.

Hazardous Substance	**Highest Concentrations Detected**	**MCP Soil Remediation Standards** S-1 (high frequency/intensity use area)
Arsenic	62.5 ppm	20 ppm
Barium	3690 ppm	1000 ppm
Cadmium	27.4 ppm	2 ppm
Chromium	954 ppm	30 ppm
Lead	34,200 ppm	300 ppm
PCBs	8.6 ppm	2 ppm
Benzo(a)anthracene	830 ppm	7 ppm
Benzo(a)pyrene	700 ppm	2 ppm
Benzo(b)fluoranthene	1000 ppm	7 ppm
Benzo(k)fluoranthene	360 ppm	70 ppm
chrysene	930 ppm	70 ppm
Dibenzo(a,h)anthracene	110 ppm	0.7 ppm
indeno(1,2,3-cd)pyrene	390 ppm	7 ppm
phenanthrene	1800 ppm	500 ppm
Pyrene	1800 ppm	1000 ppm

5. NPL status

The site is not currently on the National Priorities List, and has not received a Hazardous Ranking System rating.

B. Other Actions to Date

1. Previous actions

EPA's TSCA program has provided regulatory oversight of PCB assessment and cleanup activities related to the construction of the Keith Middle School, remediation of the interior of the New Bedford High School, remediation of New Bedford High School Campus, remediation of the wetland located behind Keith Middle School, and demolition of 3 former residential properties.

EPA Region 1 issued a Consent Agreement and Final Order (CAFO) on May 21, 2004, resolving alleged TSCA PCB violations by the City of New Bedford at McCoy Field,

which is part of the Parker Street Waste Site. The CAFO assessed an administrative penalty of $27,500 under Section 16 of TSCA for improper disposal of PCBs. The CAFO alleged that the City had removed materials containing PCBs from the "burn dump" (historically part of the Parker Street Waste Site) and had stockpiled them at McCoy Field in violation of PCB disposal regulations. In the CAFO the City agreed to assess and clean up the McCoy Field property, site of the future Keith Middle School, in accordance with an EPA-approved work plan and consistent with the PCB regulations under TSCA.

An Amended CAFO was issued on October 25, 2004, expanding the geographic areas on the McCoy Field property to be addressed in accordance with the PCB regulations under TSCA. The Amended CAFO also included assessment and cleanup of properties in proximity to McCoy Field where PCBs might have migrated or been disposed of as a result of the stockpiling of materials from the "burn dump." The Amended CAFO also provided an extension of time for completion of the PCB cleanup work.

C. State and Local Authorities' Roles

1. State and local actions to date

Currently, the City of New Bedford is assessing and remediating city owned properties under the regulatory oversight of MassDEP and EPA's TSCA program. MassDEP conducted the soil boring activities at the Hetland Memorial Ice Skating Rink as part of the overall assessment of the extent of the Site boundaries. In addition, MassDEP has provided technical assistance to EPA during the PA/SI, which included field presence and sampling oversight.

During the development of the Sampling and Analysis Plan (SAP) for this Site, a technical work group was created to develop a comprehensive plan to achieve assessment objectives of delineating site boundaries and filling in data gaps. The technical workgroup consisted of members/stakeholders from community advocacy groups, community technical consultants, the City of New Bedford, MassDEP, and EPA.

2. Potential for continued State/local response

The MassDEP will continue to work with the City of New Bedford to address issues related to city owned properties. On residential properties where an imminent hazard condition exists, MassDEP will implement interim response measures to address the contact threat to allow EPA time to implement the removal strategy provided herein. MassDEP will also continue to provide technical assistance to EPA during the removal action.

Once EPA has completed this proposed removal action, MassDEP will continue to be the lead agency for any long-term regulatory oversight of this Site, including the residential and commercial properties sampled by EPA.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

As described below, the conditions at various properties located within the Parker Street Waste Site meet the general criteria for a removal action, as set forth in 40 C.F.R. §300.415(b)(1), in that "there is a threat to public health or welfare of the United States or the environment", and in consideration of the factors set forth in 40 C.F.R. §300.415(b)(2) as described below.

Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants; [§300.415(b)(2)(i)];

According to the 2000 Census, the approximate area population is respectively 30,119; 7,074; and 894 people within a 1 mile, 0.5 mile, and 0.25 radius of the Site. The Site is predominately used for residential, academic, and recreational purposes, which include public housing, public schools, private multi-housing units, single family homes, and recreational ball fields. The hazardous substances, including PCBs, PAHs, and metals in the soils pose an immediate direct contact threat and/or potential exposure.

High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate [§300.415(b)(2)(iv)];

Elevated levels of hazardous substances, including PCBs, PAHs, and heavy metals, in soils largely at or near the surface have been detected

Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released [§300.415(b)(2)(v)]; and

Under adverse weather conditions, exposed contaminated soil could potentially migrate off-site via erosion and surface water runoff.

The availability of other appropriate Federal or State response mechanisms to respond to the release [§300.415(b)(2)(vii)].

In a letter dated August 19, 2010, MassDEP has requested EPA's assistance on addressing properties at this Site that are determined to have elevated levels of contamination that trigger either an Imminent Hazard or Significant Risk Condition.

POLYCHLORINATED BIPHENYLS (PCBs)- Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Polychlorinated Biphenyls, February 2001* in Attachment II.

ARSENIC – Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Arsenic, August 2007* in Attachment II.

BARIUM – Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Barium, August 2007* in Attachment II.

CADMIUM – Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Cadmium, September 2008* in Attachment II.

CHROMIUM – Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Chromium, September 2008* in Attachment II.

LEAD – Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Lead, August 2007* in Attachment II.

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) – Please see the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheet for Polycyclic Aromatic Hydrocarbons (PAHs), September 1996* in Attachment II.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.[1]

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[1] In accordance with OSWER Directive 9360.0-34, an endangerment determination is made based on "appropriate Superfund policy or guidance, or on collaboration with a trained risk assessor, which is outlined and discussed in Section III above. Appropriate sources include, but are not limited to, EPA relevant action level or clean-up standards, Agency for Toxic Substances and Disease Registry documents or personnel, or staff toxicologists." EPA relied on the Massachusetts Contingency Plan's (MCP) cumulative risk approach which compares site-

V. EXEMPTION FROM STATUTORY LIMITS

CERCLA § 104(c) states that removal actions can exceed the 12-month and $2 million statutory limits if conditions meet either the "emergency exemption" criteria or the "consistency exemption criteria. The consistency exemption requires that the proposed removal action be appropriate and consistent with the remedial action to be taken. As described below, conditions at the Site meet the criteria for the emergency exemption.

A. Emergency Exemption

Under CERCLA § 104(c)(1)(A), removal actions may exceed the 12-month and $2 million statutory limits if:

1. There is an immediate risk to public health or welfare or the environment;
2. Continued response actions are immediately required to prevent, limit, or mitigate an emergency; and
3. Such assistance will not otherwise be provided on a timely basis.

1. There is an immediate risk to public health or welfare or the environment:

Unrestricted access to elevated level of PCBs, heavy metals, and PAHs exists largely in soils at or near the surface. Furthermore, an estimated 23 additional residential properties are also scheduled to be sampled to determine whether there is an imminent and substantial endangerment present through a contact threat with contaminated surface soils. Site residents include families with young children who play in the yard.

MassDEP and its Site Assessment Remediation Support Services (SARSS) contractor, MACTEC, performed an evaluation of the analytical data for the properties sampled during this PA/SI to determine whether response action is required under the Commonwealth of Massachusetts Waste Site Cleanup requirements contained in 310 Code of Massachusetts Regulations (CMR) 40.0000, known as the MCP. Currently, 25 of the 47 properties tested to date have been evaluated and 20 properties have been determined to contain either an Imminent Hazard and/or Significant Risk condition, as defined in the MCP. Evaluations of the other remaining properties are on-going.

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specific information to a Cumulative Cancer Risk Limit (*See* 310 Code of Massachusetts Regulations (CMR) 40.0000). In addition, MassDEP has, and is continuing to, evaluate the data collected during this PA/SI to determine whether Imminent Hazard and/or Significant Risk conditions, as defined in the MCP, are present at this Site.

Failure to approve the 12-month and $2 million exemption request for this removal action will result in the continued exposure of the public and the environment to these hazardous materials.

2. Continued response actions are immediately required to prevent, limit, or mitigate an emergency:

With the contamination affecting such a large area and several properties impacted, continued response actions, including fully characterizing the extent of Site related contamination, soil removal, and property restoration, are required to prevent, limit, or mitigate this substantial contact threat posed to the public. In order to complete these actions, an exemption from the 12-month and $2 million ceiling is required.

3. Assistance will not otherwise be provided on a timely basis:

The State of Massachusetts currently does not have the resources to abate the threat at this Site due to the large area of contamination. In a letter dated August 19, 2010, MassDEP has requested EPA's assistance on addressing properties at this Site that are determined to have elevated levels of contamination that trigger either an Imminent Hazard or Significant Risk Condition to surface soils under State criteria. In addition, referral of this Site to the remedial program is not practicable, despite the projected expense of the removal, due to the time required for the remedial process.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

The actions required to mitigate the threats outlined herein, are given below. At this time, EPA has initiated a search for any potentially responsible parties (PRPs). The proposed actions will protect public health, welfare, and the environment by removing the hazardous substances from accessible areas of the Site.

1) Conduct face-to-face meetings with property owners and tenants to discuss the scope of this proposed removal action.

2) Conduct site walk with the Emergency Rapid Response Services (ERRS) contractor.

3) Establish a command post and staging area, and connect necessary utilities.

4) Document existing property conditions for subsequent restoration.

5) Document with each property owner the extent of removal and restoration activities to be accomplished.

6) Remove, to the extent practicable, interference for excavation such as shrubbery, trees, outbuildings, playground equipment, or other items as required.

7) Implement erosion control measures as determined necessary by the EPA OSC.

8) Conduct air monitoring and implement dust control measures as appropriate.

9) Excavate PCBs, PAHs, and/or metals-contaminated surface soils. Remove and dispose of contaminated surface soil determined necessary by EPA. Performance standards for this removal action are based upon cleanup standards established pursuant to the MCP. The extent of the removal action will achieve cleanup standards that will eliminate Imminent Hazard conditions and Significant Risk conditions mainly within the 0-3 ft depth, as defined in the MCP.

10) Conduct extent of contamination sampling to determine the extent of landfill material to be removed; and conduct confirmation sampling as determined necessary by the EPA OSC.

11) Cleanup-generated waste streams will be packaged, documented and shipped off-site for disposal at EPA/MassDEP-approved facilities. Wastes will be staged in a secure area on-site while awaiting shipment to CERCLA compliant off-site disposal facilities to the extent practicable. Live-loading contaminated soils from the properties into dump trucks for disposal may be necessary given the lack of staging areas. Depending on anticipated storage duration prior to shipment for ultimate disposal, the OSC will determine whether waste will be staged on-site or shipped to a properly permitted temporary storage facility. Waste staging options will be evaluated based on cost and safety considerations.

12) Installation of a visual marker to delineate contaminated soils (if any) which may remain at depth (beyond 3 feet below surface grade) or which cannot otherwise be excavated.

13) Repair response related damages, including backfilling with clean fill material, grading, and re-establishing vegetation in areas affected by response related activities.

14) Demobilize all personnel and equipment from the Site.

15) Referring the Site to MassDEP for any long-term remedial measures (including institutional controls and long-term operation and maintenance of any cap that is constructed) that may be required to address remaining Site risks.

2. Community relations

Upon approval of the Action Memorandum, the OSC will coordinate with the EPA's Office of Public Affairs Community Involvement staff to disseminate information regarding the project to the City and the impacted residents.

3. Contribution to remedial performance

The cleanup proposed in this Action Memorandum is designed to mitigate the threats to human health and the environment posed by the Site. The cleanup objectives have been established using state action levels and risk evaluations. MassDEP believes that the actions taken at the Site would be consistent with and will not impede any future responses. Also, MassDEP will be responsible for any long-term regulatory oversight for this Site.

4. Description of alternative technologies

The use of alternative technologies with regard to disposal options will be further examined as the site work progresses. On-site field screening and analytical techniques may be utilized during the removal action.

5. Applicable or relevant and appropriate requirements (ARARs)

Pursuant to 40 C.F.R. 300.415(j), removal actions shall, to the extent practicable considering the exigencies of the situation, attain ARARs. Current ARARs identified, but not limited to, are listed below.

Federal ARARs:

40 C.F.R. Section 122.26(c)(ii)(C) and 122.44(k) Clean Water Act NPDES Regulations (Stormwater Control and Management)

40 C.F.R. Parts 260-262 and 264 Resource Conservation and Recovery Act, Subtitle C- Hazardous Waste Identification and Listing Regulations; Generator and Handler Requirements, Closure and Post-Closure - Massachusetts has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations. State regulations that have adopted these federal standards are listed below.

40 CFR Section 761.61 : TSCA requirements for cleanup and disposal of PCBs

40 C.F.R. Section 761.79 TSCA Decontamination of Equipment Used

40 C.F.R. Part 61 Clean Air Act – Standards for controlling dust

State ARARs:

310 CMR 40.0900 Procedures and Standards for the Characterization of the Risk of Harm to Health, Safety, Public Welfare and the Environment

310 CMR 30.100 Hazardous Waste Rules for Identification and Listing of Hazardous Wastes

310 CMR 30.300 Hazardous Waste Management Rules - Requirements for Generators

310 CMR 30.500 Hazardous Waste Management Rules - General standards for hazardous waste facilities

310 CMR 30.680 Hazardous Waste Rules - Containers

310 CMR 30.690 Hazardous Waste Rules - Management, Storage, and Treatment in Tanks

The OSC will coordinate with State officials to identify additional State ARARs, if any. In accordance with the National Contingency Plan and EPA Guidance Documents, the OSC will determine the applicability and practicability of complying with each ARAR which is identified in a timely manner.

6. Project schedule

Pending funding availability, the removal action is expected to commence in October 2010.

B. Estimated Costs

COST CATEGORY		CEILING
REGIONAL REMOVAL ALLOWANCE COSTS:		
ERRS Contractor		$4,000,000.00
Interagency Agreement		$ 0.00
OTHER EXTRAMURAL COSTS NOT FUNDED FROM THE REGIONAL ALLOWANCE:		
START Contractor		$750,000.00
Extramural Subtotal		$4,750,000.00
Extramural Contingency	20%	$950,000.00
TOTAL, REMOVAL ACTION CEILING		**$5,700,000.00**

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

A delayed removal action or the absence of a removal action described herein will cause conditions at the Site to remain unaddressed, and threats associated with the presence of hazardous substances will continue to pose a threat to human health and the environment.

VIII. OUTSTANDING POLICY ISSUES

There are no precedent-setting policy issues associated with this Site.

IX. ENFORCEMENT ... For Internal Distribution Only

See attached Enforcement Strategy.

The total EPA costs for this removal action based on full-time accounting practices that will be eligible for cost recovery are estimated to be $5,700,000 (extramural costs) + $750,000 (EPA intramural costs) = $6,450,000 X 1.4541 (regional indirect rate) = **$9,378,945** [2].

X. RECOMMENDATION

This decision document represents the selected removal action for the Parker Street Waste Site in New Bedford, Massachusetts, developed in accordance with CERCLA, as amended, and is not inconsistent with the National Contingency Plan. The basis for this decision will be documented in the administrative record to be established for the Site.

Conditions at the Site meet the NCP Section 300.415 (b)(2) criteria for a removal action due to the following:

Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants [§300.415(b)(2)(i)];

High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate [§300.415(b)(2)(iv)];

Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released [§300.415(b)(2)(v)]; and

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[2]Direct Costs include direct extramural costs $5,700,000 and direct intramural costs $750,000. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site specific costs 45.41% x $6,450,000, consistent with the full accounting methodology effective October 2, 2000. These estimates do not include pre-judgement interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.

The availability of other appropriate Federal or State response mechanisms to respond to the release [§300.415(b)(2)(vii)].

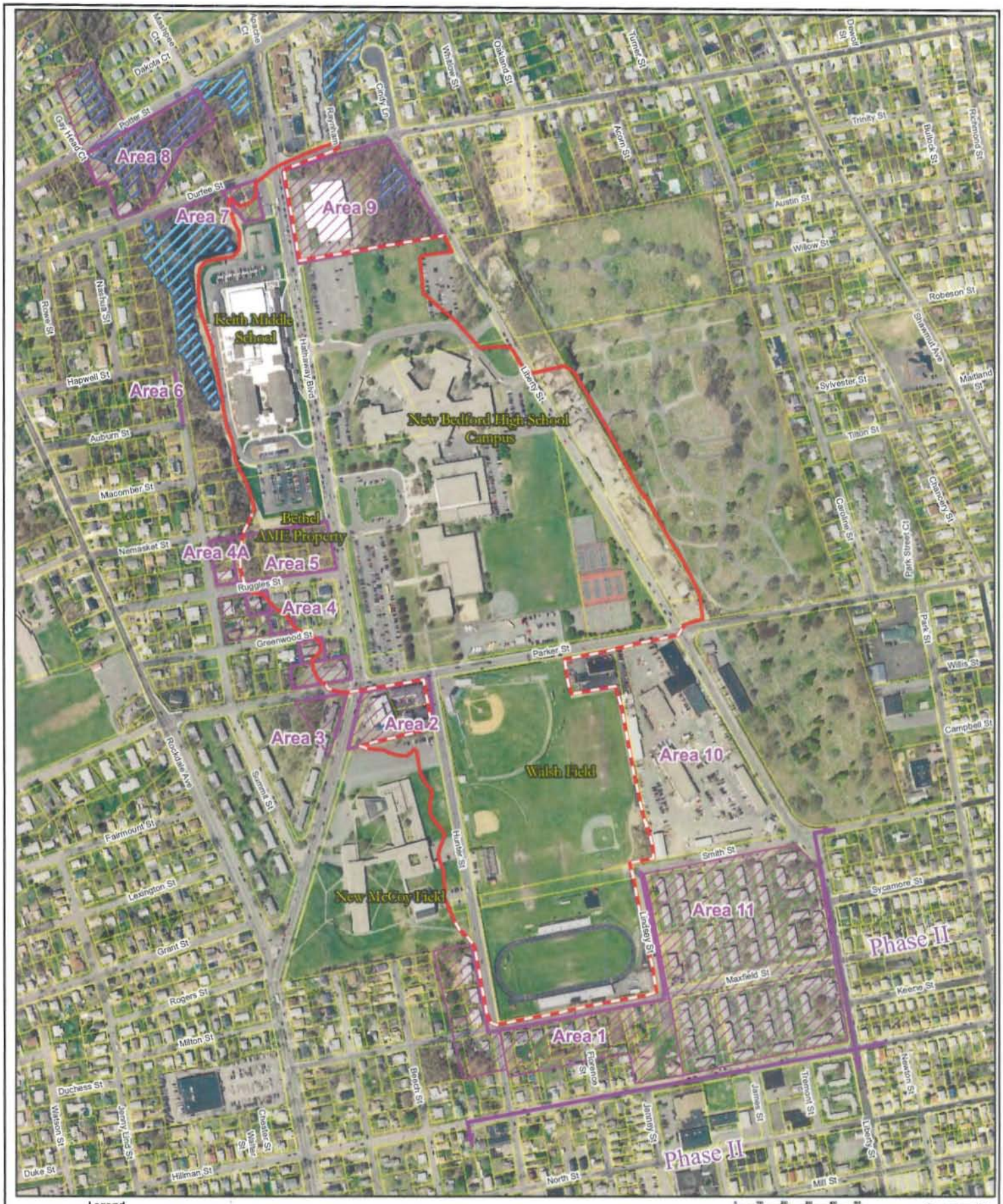
Furthermore, site conditions meet the criteria for the CERCLA Section 104(c) emergency exemption from the 12-month and $2 million limitations on removal actions. The removal action proposed in this Action Memorandum will abate, prevent, minimize, stabilize, mitigate and/or eliminate the release or threat of release of hazardous substances at the Parker Street Waste Site. I recommend your approval of the proposed removal action and the exemption from the 12-month and $2,000,000 limitations. The total removal action project ceiling if approved will be $5,700,000.

APPROVAL: _____ DATE: August 26, 2010

DISAPPROVAL: _____ DATE: _____

Attachment 1

Parker Street Waste Site Map



Parker Street Waste Site

New Bedford, MA

This map was created by the EPA Region 1 GIS Center on July 2, 2010. Map Tracker ID=7026.
Data Sources: Parcels and Wetlands from MassGIS.
Extent of Fill from TRC, Roads from GDT, Aerial Photos from DigitalGlobe dated 4/1/2007.

Attachment II

Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, Public Health Service, *ToxFAQ Fact Sheets*

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ARSENIC
CAS # 7440-38-2

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- Arsenic cannot be destroyed in the environment. It can only change its form.
- Rain and snow remove arsenic dust particles from the air.
- Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.
- Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Almost nothing is known regarding health effects of organic arsenic compounds in humans. Studies in animals show that some simple organic arsenic compounds are less toxic than inorganic forms. Ingestion of methyl and dimethyl compounds can cause diarrhea and damage to the kidneys

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic is carcinogenic to humans.

How can arsenic affect children?

There is some evidence that long-term exposure to arsenic in children may result in lower IQ scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females, can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce the risks of exposure to arsenic?

❑ If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.

❑ If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.

❑ If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home.

Is there a medical test to determine whether I've been exposed to arsenic?

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict whether the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Arsenic (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BARIUM AND COMPOUNDS

CAS # 7440-39-3

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

- Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
- Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.
- Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).
- Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

- Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
- Living in areas with unusually high natural levels of barium in the drinking water.
- Working in a job that involves barium production or use.
- Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

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Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 µg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m^3) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m^3 of total dust and 5 mg/m^3 for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m^3 for soluble barium compounds. The NIOSH has set RELs of 10 mg/m^3 (total dust) for barium sulfate and 5 mg/m^3 (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CADMIUM
CAS # 7440-43-9

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2008

This fact sheet answers the most frequently asked health questions (FAQs) about cadmium. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to cadmium happens mostly in the workplace where cadmium products are made. The general population is exposed from breathing cigarette smoke or eating cadmium contaminated foods. Cadmium damages the kidneys, lungs, and bones. Cadmium has been found in at least 1,014 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is cadmium?

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- Cadmium enters soil, water, and air from mining, industry, and burning coal and household wastes.
- Cadmium does not break down in the environment, but can change forms.
- Cadmium particles in air can travel long distances before falling to the ground or water.
- Some forms of cadmium dissolve in water.
- Cadmium binds strongly to soil particles.
- Fish, plants, and animals take up cadmium from the environment.

How might I be exposed to cadmium?

- Eating foods containing cadmium; low levels are found in all foods (highest levels are found in shellfish, liver, and kidney meats).
- Smoking cigarettes or breathing cigarette smoke.
- Breathing contaminated workplace air.
- Drinking contaminated water.
- Living near industrial facilities which release cadmium into the air.

How can cadmium affect my health?

Breathing high levels of cadmium can severely damage the lungs. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea.

Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease. Other long-term effects are lung damage and fragile bones.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds are known human carcinogens.

How can cadmium affect children?

The health effects in children are expected to be similar to the effects seen in adults (kidney, lung, and bone damage depending on the route of exposure).

A few studies in animals indicate that younger animals absorb more cadmium than adults. Animal studies also indicate that the young are more susceptible than adults to a loss of bone and decreased bone strength from exposure to cadmium.

We don't know if cadmium causes birth defects in people. The babies of animals exposed to high levels of cadmium during pregnancy had changes in behavior and learning ability. There is also some information from animal studies that high enough exposures to cadmium before birth can reduce body weights and affect the skeleton in the developing young.

How can families reduce the risks of exposure to cadmium?

- ❑ In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young children.
- ❑ Cadmium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
- ❑ If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.
- ❑ A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

Is there a medical test to determine whether I've been exposed to cadmium?

Cadmium can be measured in blood, urine, hair, or nails. Urinary cadmium has been shown to accurately reflect the amount of cadmium in the body.

The amount of cadmium in your blood shows your recent exposure to cadmium. The amount of cadmium in your urine shows both your recent and your past exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to cadmium in drinking water at concentrations of 0.04 ppm for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.005 ppm cadmium is not expected to cause any adverse effects.

The FDA has determined that the cadmium concentration in bottled drinking water should not exceed 0.005 ppm.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 5 $\mu g/m^3$ for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Cadmium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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CHROMIUM

CAS # 7440-47-3

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2008

This fact sheet answers the most frequently asked health questions (FAQs) about chromium. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chromium occurs from ingesting contaminated food or drinking water or breathing contaminated workplace air. Chromium(VI) at high levels can damage the nose and cause cancer. Ingesting high levels of chromium(VI) may result in anemia or damage to the stomach or intestines. Chromium(III) is an essential nutrient. Chromium has been found in at least 1,127 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is chromium?

Chromium is a naturally occurring element found in rocks, animals, plants, and soil. It can exist in several different forms. Depending on the form it takes, it can be a liquid, solid, or gas. The most common forms are chromium(0), chromium(III), and chromium(VI). No taste or odor is associated with chromium compounds.

The metal chromium, which is the chromium(0) form, is used for making steel. Chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

What happens to chromium when it enters the environment?

- Chromium can be found in air, soil, and water after release from the manufacture, use, and disposal of chromium-based products, and during the manufacturing process.
- Chromium does not usually remain in the atmosphere, but is deposited into the soil and water .
- Chromium can easily change from one form to another in water and soil, depending on the conditions present.
- Fish do not accumulate much chromium in their bodies from water.

How might I be exposed to chromium?

- Eating food containing chromium(III).
- Breathing contaminated workplace air or skin contact during use in the workplace.
- Drinking contaminated well water .
- Living near uncontrolled hazardous waste sites containing chromium or industries that use chromium.

How can chromium affect my health?

Chromium(III) is an essential nutrient that helps the body use sugar, protein, and fat.

Breathing high levels of chromium(VI) can cause irritation to the lining of the nose, nose ulcers, runny nose, and breathing problems, such as asthma, cough, shortness of breath, or wheezing. The concentrations of chromium in air that can cause these effects may be different for different types of chromium compounds, with effects occurring at much lower concentrations for chromium(VI) compared to chromium(III).

The main health problems seen in animals following ingestion of chromium(VI) compounds are irritation and ulcers in the stomach and small intestine and anemia. Chromium(III) compounds are much less toxic and do not appear to cause these problems.

Sperm damage and damage to the male reproductive system have also been seen in laboratory animals exposed to chromium(VI).

Skin contact with certain chromium(VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium(VI) or chromium(III). Allergic reactions consisting of severe redness and swelling of the skin have been noted.

How likely is chromium to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Reseach on Cancer (IARC), and the EPA have determined that chromium(VI) compounds are known human carcinogens. In workers, inhalation of chromium(VI) has been shown to cause lung cancer. Chromium(VI) also causes lung cancer in animals. An increase in stomach tumors was observed in humans and animals exposed to chromium(VI) in drinking water.

How can chromium affect children?

It is likely that health effects seen in children exposed to high amounts of chromium will be similar to the effects seen in adults.

We do not know if exposure to chromium will result in birth defects or other developmental effects in people. Some developmental effects have been observed in animals exposed to chromium(VI).

How can families reduce the risks of exposure to chromium?

❑ Children should avoid playing in soils near uncontrolled hazardous waste sites where chromium may have been discarded.

❑ Chromium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.

❑ Although chromium(III) is an essential nutrient, you should avoid excessive use of dietary supplements containing chromium.

Is there a medical test to determine whether I've been exposed to chromium?

Since chromium(III) is an essential element and naturally occurs in food, there will always be some level of chromium in your body. Chromium can be measured in hair, urine, and blood.

Higher than normal levels of chromium in blood or urine may indicate that a person has been exposed to chromium. However, increases in blood and urine chromium levels cannot be used to predict the kind of health effects that might develop from that exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to chromium in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The FDA has determined that the chromium concentration in bottled drinking water should not exceed 1 mg/L.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 0.005 mg/m^3 chromium(VI), 0.5 mg/m^3 chromium(III), and 1.0 mg/m^3 chromium(0) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Chromium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

- ❑ Avoid exposure to sources of lead.
- ❑ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- ❑ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- ❑ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children
- ❑ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (µg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 µg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 µg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❑ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❑ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❑ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❑ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ĭ-sī'klĭk ăr'ə-măt'ĭk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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