

| <b>ATSDR's Substance-Specific Priority Data Needs – Filled</b> |   |                             |
|--|---|-----------------------------|
| <b>Substances</b>  | <b>PDN Description</b>  | <b>Status<sup>(1)</sup></b> |
| <b>Aldrin/Dieldrin</b>   | <ul style="list-style-type: none"> <li>• Dose-response data in animals for intermediate<sup>(2)</sup>-duration oral exposure</li> <li>• Bioavailability from soil</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul> | Filled                      |
| <b>Arsenic</b>   | <ul style="list-style-type: none"> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Bioavailability from soil</li> </ul>   | Filled                      |
| <b>Asbestos</b>  | <ul style="list-style-type: none"> <li>• Potential candidate for subregistry of exposed persons</li> <li>• Improved analytical methods for screening samples and determining the chemical structure of asbestos fibers. Also, techniques are needed to normalize studies in which different analytical methods were employed</li> </ul>   | Filled                      |
| <b>Benzene</b>   | <ul style="list-style-type: none"> <li>• Epidemiologic studies on the health effects of benzene (Special emphasis end points include immunotoxicity)</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | Filled                      |
| <b>Beryllium</b>   | <ul style="list-style-type: none"> <li>• Analytical methods to determine environmental speciation</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>  | Filled                      |
| <b>Cadmium</b>   | <ul style="list-style-type: none"> <li>• Analytical methods for biological tissues and fluids and environmental media</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>                                    | Filled                      |

|   |   |        |
|---|---|--------|
| <b>Carbon tetrachloride</b>                 | <ul style="list-style-type: none"> <li>• Immunotoxicology battery of tests via oral exposure</li> <li>• Half-life in soil</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>  | Filled |
| <b>Chlordane</b>                            | <ul style="list-style-type: none"> <li>• Oral multigenerational studies to evaluate reproductive toxicity</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations potentially exposed to chlordane</li> <li>• Exposure levels in children</li> </ul>  | Filled |
| <b>Chlorinated dibenzo-p-dioxins (CDDs)</b> | <ul style="list-style-type: none"> <li>• Exposure levels in humans (adults) living near hazardous waste sites</li> <li>• Exposure levels in children</li> </ul>   | Filled |
| <b>Chloroform</b>                           | <ul style="list-style-type: none"> <li>• Dose-response data in animals for intermediate-duration oral exposure</li> <li>• Epidemiologic studies on the health effects of chloroform (Special emphasis end points include cancer, neurotoxicity, reproductive and developmental toxicity, hepatotoxicity, and renal toxicity)</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | Filled |
| <b>Chromium</b>                             | <ul style="list-style-type: none"> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Dose-response data in animals for acute-duration exposure to chromium (VI) via oral exposure</li> <li>• Dose-response data in animals for intermediate-duration exposure to chromium (VI) via oral exposure</li> <li>• Multigeneration reproductive toxicity study via oral exposure to chromium (VI)</li> <li>• Prenatal developmental toxicity study via oral exposure to chromium (VI)</li> </ul> | Filled |
| <b>Cyanide</b>                              | <ul style="list-style-type: none"> <li>• Evaluation of the environmental fate of cyanide in soil</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | Filled |
| <b>1,2-Dibromoethane</b>                    | <ul style="list-style-type: none"> <li>• Immunotoxicity battery studies via oral exposure</li> </ul>  | Filled |

|  |   |               |
|--|---|---------------|
| <p><b>1,1-Dichloroethene</b></p>         | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute<sup>(3)</sup>-duration exposure by the inhalation route</li> <li>• Dose-response data in animals for chronic<sup>(4)</sup>-duration exposure by the inhalation route</li> </ul>  | <p>Filled</p> |
| <p><b>1,2-Dichloroethane</b></p>         | <ul style="list-style-type: none"> <li>• Neurotoxicology battery of tests following inhalation exposure</li> </ul>  | <p>Filled</p> |
| <p><b>1,1-Dichloroethene</b></p>         | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute-duration exposure by the oral route</li> <li>• Dose-response data in animals for intermediate-duration exposure by the oral route</li> <li>• Prenatal developmental toxicity studies following oral exposure</li> </ul>  | <p>Filled</p> |
| <p><b>DDT</b></p>                        | <ul style="list-style-type: none"> <li>• Epidemiologic studies on the health effects of DDT, DDD, and DDE (Special emphasis end points include immunotoxicity, and reproductive and developmental toxicity)</li> <li>• Bioavailability and bioaccumulation from soil</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>   | <p>Filled</p> |
| <p><b>Di(2-ethylhexyl) phthalate</b></p> | <ul style="list-style-type: none"> <li>• Epidemiologic studies on the health effects of DEHP</li> <li>• Dose-response data in animals for acute-duration oral exposure</li> <li>• Dose-response data in animals for intermediate-duration oral exposure</li> <li>• Multigeneration reproductive toxicity study via oral exposure</li> <li>• Comparative toxicokinetic studies (Studies designed to examine how primates metabolize and distribute DEHP as compared with rodents via oral exposure)</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul> | <p>Filled</p> |
| <p><b>Di-n-butyl phthalate</b></p>       | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute- duration exposure via the oral route</li> <li>• <i>In vivo</i> genotoxicity studies</li> <li>• Environmental fate of di-n-butyl phthalate in environmental media</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>   | <p>Filled</p> |

|   |  |        |
|---|--|--------|
| <b>Disulfoton</b>   | <ul style="list-style-type: none"> <li>• Immunotoxicology testing battery following oral exposure</li> </ul>   | Filled |
| <b>Endrin/endrin aldehyde</b>   | <ul style="list-style-type: none"> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>   |        |
| <b>Ethylbenzene</b>   | <ul style="list-style-type: none"> <li>• Dose-response data for acute-duration exposure by the inhalation route</li> <li>• Dose-response data for chronic-duration exposure by the inhalation route</li> <li>• Dose-response data for intermediate-duration exposure by the oral route</li> <li>• Multigeneration toxicity study examining reproductive end points and indicators of endocrine disruption following inhalation exposure</li> <li>• Studies for comparative toxicokinetics</li> <li>• Exposure levels in humans living near hazardous waste sites</li> <li>• Exposure levels in children</li> </ul> | Filled |
| <b>Heptachlor/<br/>heptachlor epoxide</b>   | <ul style="list-style-type: none"> <li>• Multigeneration reproductive toxicity studies via the oral route of exposure</li> <li>• Prenatal developmental toxicity studies via the oral route of exposure</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> <li>• Dose-response animal data for acute- and intermediate-duration oral exposures, including immunopathology</li> </ul>   | Filled |
| <b>Hexachloro-<br/>cyclohexane (<math>\alpha</math>, <math>\beta</math>, and <math>\gamma</math>)</b> | <ul style="list-style-type: none"> <li>• Dose-response data for chronic-duration oral exposure</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>  | Filled |
| <b>Lead</b>   | <ul style="list-style-type: none"> <li>• Mechanistic studies on the neurotoxic effects of lead</li> <li>• Analytical methods for tissue levels</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>  | Filled |

|                           |  |                       |
|---------------------------|--|-----------------------|
| <b>Manganese</b>          | <ul style="list-style-type: none"> <li>• Dose-response data for acute- and intermediate-duration oral exposures (the intermediate-duration study should include reproductive histopathology and an evaluation of immunologic parameters including manganese effects on plaque-forming cells (SRBC), surface markers (D4:D8 ratio), and delayed hypersensitivity reactions)</li> <li>• Toxicokinetic studies on animals to investigate uptake and absorption, relative uptake of differing manganese compounds, metabolism of manganese, and interaction of manganese with other substances following oral exposure</li> <li>• Epidemiological studies on the health effects of manganese (Special emphasis end points include neurologic, reproductive, developmental, immunologic, and cancer)</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul> | Filled                |
| <b>Mercury</b>            | <ul style="list-style-type: none"> <li>• Multigeneration reproductive toxicity study via oral exposure</li> <li>• Dose-response data in animals for chronic-duration oral exposure</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul>  | Filled                |
| <b>Methoxychlor</b>       | <ul style="list-style-type: none"> <li>• Evaluate neurologic effects after long-term, low-level oral exposure</li> </ul>   | Filled                |
| <b>Methylene chloride</b> | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute- and intermediate-duration oral exposure. The intermediate-duration study should include extended reproductive organ histopathology, neuropathology, and immunopathology</li> <li>• Prenatal developmental toxicity study via the oral route</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | Filled <sup>(5)</sup> |
| <b>Nickel</b>             | <ul style="list-style-type: none"> <li>• Epidemiologic studies on the health effects of nickel (Special emphasis end points include reproductive toxicity)</li> <li>• Prenatal developmental toxicity study via the oral route</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>  | Filled                |

|   |   |               |
|---|---|---------------|
| <p><b>Pentachlorophenol</b></p>   | <ul style="list-style-type: none"> <li>• Exposure levels in humans (adults) living near hazardous waste sites</li> <li>• Exposure levels in children through play activities near contaminated environmental media</li> </ul>   | <p>Filled</p> |
| <p><b>Polychlorinated biphenyls (PCBs)</b></p>  | <ul style="list-style-type: none"> <li>• Epidemiologic studies on the health effects of PCBs (Special emphasis end points include immunotoxicity, gastrointestinal toxicity, liver toxicity, kidney toxicity, thyroid toxicity, and reproductive/developmental toxicity)</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> <li>• Chronic toxicity and oncogenicity via oral exposure<sup>(6)</sup></li> <li>• Aerobic PCB biodegradation in sediment<sup>(6)</sup></li> <li>• PCB congener analysis<sup>(6)</sup></li> </ul>   | <p>Filled</p> |
| <p><b>Polycyclic aromatic hydrocarbons (PAHs)</b><br/><b>(Includes 15 substances)</b></p> | <ul style="list-style-type: none"> <li>• Dose-response data in animals for intermediate-duration oral exposures. The intermediate-duration study should include extended reproductive organ histopathology and immunopathology</li> <li>• Prenatal developmental toxicity study via inhalation or oral exposure</li> <li>• Mechanistic studies on PAHs, on how mixtures of PAHs can influence the ultimate activation of PAHs, and on how PAHs affect rapidly proliferating tissues</li> <li>• Dose-response data in animals for acute- and intermediate-duration inhalation exposures. The intermediate-duration study should include extended reproductive organ histopathology and immunopathology</li> <li>• Epidemiologic studies on the health effects of PAHs (Special emphasis end points include cancer, dermal, hemolymphatic, and hepatic toxicity)</li> <li>• Exposure levels in humans (adults) living near hazardous waste sites and other populations, such as exposed workers</li> <li>• Exposure levels in children</li> </ul> | <p>Filled</p> |
| <p><b>Selenium</b></p>  | <ul style="list-style-type: none"> <li>• Epidemiologic studies on the health effects of selenium (Special emphasis end points include cancer, reproductive and developmental toxicity, hepatotoxicity, and adverse skin effects)</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | <p>Filled</p> |

|                            |  |        |
|----------------------------|--|--------|
| <b>Tetrachloroethylene</b> | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute-duration oral exposure, including neuropathology and demeanor, and immunopathology</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | Filled |
| <b>Toluene</b>             | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute- and intermediate-duration oral exposures. The intermediate-duration study should include an extended histopathologic evaluation of the immune system</li> <li>• Comparative toxicokinetic studies (Characterization of absorption, distribution, and excretion via oral exposure)</li> <li>• Mechanism of toluene-induced neurotoxicity</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul> | Filled |
| <b>Trichloroethylene</b>   | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute-duration oral exposure</li> <li>• Epidemiologic studies on the health effects of trichloroethylene (Special emphasis end points include cancer, hepatotoxicity, renal toxicity, developmental toxicity, and neurotoxicity)</li> <li>• Exposure levels in humans living near hazardous waste sites and other populations, such as exposed workers</li> </ul>   | Filled |
| <b>Vinyl chloride</b>      | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute-duration inhalation exposure</li> <li>• Multigeneration reproductive toxicity study via inhalation</li> <li>• Prenatal developmental toxicity study via inhalation</li> </ul>   | Filled |
| <b>Xylenes</b>             | <ul style="list-style-type: none"> <li>• Dose-response data for chronic-duration exposure by the oral route. This study should be done in conjunction with the neurotoxicology battery of tests</li> <li>• Prenatal developmental toxicity study that includes neurodevelopmental end points following oral exposure</li> <li>• Exposure levels in children</li> </ul>   | Filled |

|             |   |        |
|-------------|---|--------|
| <b>Zinc</b> | <ul style="list-style-type: none"> <li>• Dose-response data in animals for acute- and intermediate-duration oral exposures. The intermediate-duration study should include an extended histopathologic evaluation of the immunologic and neurologic systems</li> <li>• Multigeneration reproductive toxicity study via oral exposure</li> </ul> | Filled |
|-------------|---|--------|

<sup>(1)</sup> Filled: A priority data need is filled:

- If it has been referred to one of the implementation mechanisms and research has been initiated, or
- If an updated ATSDR toxicological profile contains relevant new studies, or if other relevant, peer-reviewed, and publicly available new studies (not included in the toxicological profile) have been identified since the finalization of the priority data needs document; and it is generally agreed that a priority data need no longer exists.

Furthermore, in the event a priority data need is considered *filled*, it does not necessarily mean that the study has been completed and that ATSDR has accepted the data. It does, however, indicate that the agency no longer considers it a priority to initiate additional studies at this time.

<sup>(2)</sup> Intermediate-duration exposure = 15 – 364 days.

<sup>(3)</sup> Acute-duration exposure = 14 days or less.

<sup>(4)</sup> Chronic-duration exposure = 365 days or more.

<sup>(5)</sup> Neurotoxicity testing remains a priority data need in the EPA/ATSDR test rule.

<sup>(6)</sup> Data need, not priority data need.