# Site Clean-up Goals (Media Protection Standards [MPS])

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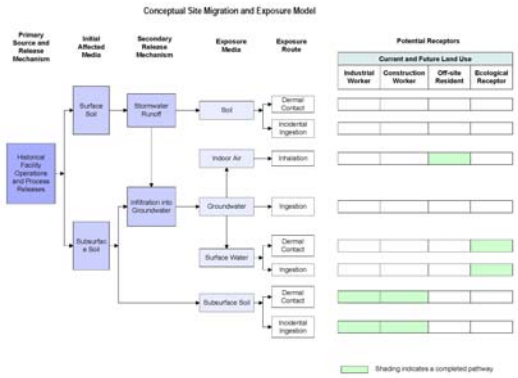
The purpose of this document is to provide details regarding the Site Clean-up Goals, or Media Protection Standards (MPS) that are applicable to the affected media identified at the site. According to *Results-Based Approaches and Tailored Oversight Guidance* (*EPA 530-R-03-012*), Media Clean-up Objectives for final remedies include the specific concepts of media clean-up levels, points of compliance, and clean-up time frames. These specific concepts are discussed below.

Since the overall objective and mandate for corrective action is to protect human health and the environment, the focus of Media Clean-up Objectives would logically be to reduce the potential exposure of human and ecological receptors to constituents of concern (COCs) from the site. The term "media" refers to these specific components of the environment including: air, surface water, groundwater, and soil. The term "constituents of concern" refers to specific chemicals that have been correlated with site activities and are present at concentrations high enough to warrant attention and exhibit the potential to adversely affect human health or the environment.

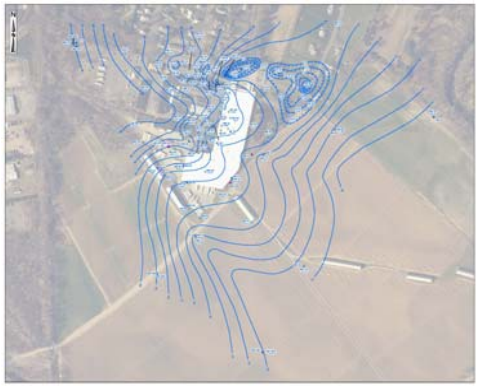
The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) previously documented affected media and COCs at the site. The RFI is addressed in greater detail in the section entitled *Environmental Investigations and Studies*. Interim Corrective Measures (ICMs), conducted since the RFI, have addressed identified constituents and media of concern to reduce potential migration and exposure. ICMs are discussed in *Soil Site Restoration Activities* and *Groundwater Site Restoration Activities*. MPS for final corrective measures are based on observed site conditions following ICMs and on current or reasonably anticipated future exposures to affected media.

A *site conceptual exposure model* for potential exposure to COCs in affected media at the site has been developed. Historic releases from operations at the facility were the primary sources of release to the site media. The initial media affected by the primary source releases were the surface and subsurface soil. Secondary sources, or release mechanisms, to site media included migration of affected surface soil in storm water runoff and migration of constituents in affected subsurface soil to underlying groundwater. During the time that affected surface soil was present at the site, storm water from the site flowed into the on-site storm water retention basin (Reflecting Pond – SWMU 16). Most of the storm water runoff from the Reflecting Pond was discharged through a National Pollutant Discharge Elimination System (NPDES) permitted outfall to surface water. However, some of the storm water may also have soaked into the ground below the reflecting pond, thus potentially providing a pathway for surface soil COCs to migrate to groundwater. Subsurface soil directly affected by the various solid waste management units (SWMUs) and areas of concern (AOCs) at the site also provided a potential migration pathway to groundwater. Additionally, direct contact with affected soil on the site by site workers or temporary construction workers represents a potentially completed exposure pathway.




**Site Conceptual Exposure Model**

The water table at the site occurs at depths ranging from approximately 10 feet below ground surface (bgs) in the northwest corner of the site to 20 feet bgs in the southeast corner of the site. A groundwater divide extending east-west through the center of the site separates groundwater that migrates toward the north-northeast (North End Groundwater) from groundwater that migrates toward the southeast (South End Groundwater). No public groundwater extraction or use is known to occur in the vicinity of the site. Residences and businesses in the vicinity of the site receive municipal water service from the City of Westfield Water Department.



**Water Table Configuration (May 2009)**

North End Groundwater migrates north-northeast toward the residential neighborhood across Cycle Street from the site and then toward Little River. A portion of South End Groundwater migrates toward the southeast beneath occupied industrial buildings on the site. South End Groundwater migrates southeast toward Little River. Groundwater flow is shown on the *Water Table Configuration (May 2009)* map. Although there is no potential exposure to affected groundwater by direct contact or consumption, volatile organic COCs in groundwater can potentially migrate as vapor into structures located above the affected groundwater plume. Additionally, groundwater at the site eventually migrates over time to surface water. The nearest surface water for North End Groundwater is Little River, located approximately one-third of mile to the north. The nearest surface water for South End Groundwater is Little River, located slightly less than one-half a mile to the south.

## Media Clean-up Levels (or MPS)

MPS are target concentrations that intentionally conservative and protective of human health and the environment from specific COCs, assuming specific exposure pathways. The Massachusetts Department of Environmental Protection (MA DEP) has developed MPS for use at affected sites within the state as a part of the Massachusetts Contingency Plan (MCP; 310 CMR 40). The regulations provide both default concentrations under various exposure scenarios and methods to calculate site-specific target concentrations for cases where default assumptions are not applicable or where COCs are present that are not included in the default tables. MPSs are provided for both groundwater (see *Table 1, Groundwater Target Concentrations for Historical Detection of Constituent in Site Groundwater*) and soil at the site (see *Table 2, Soil Target Concentrations*).

### North End Groundwater and South End Groundwater

MA DEP provides groundwater target concentrations for three circumstances:

- Category GW-1: For groundwater that is currently or potentially a drinking water source and is protective of exposure to humans through direct contact with the groundwater.

- Category GW-2: For groundwater within 30 feet of an existing or planned building where the groundwater is within 15 feet of the ground surface and is protective of exposure to humans through inhalation of vapors in indoor air.
- Category GW-3: For groundwater that may discharge to surface water and is protective of exposure to the ecological receptors (like fish). In addition to the standard tables provided in the regulations, site-specific target concentrations can be calculated using the methods provided in 310 CMR 40.

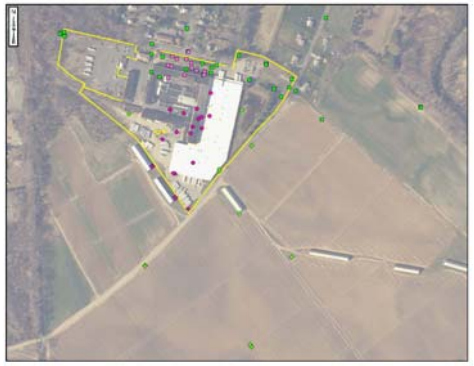
North End Groundwater is characterized as Category GW-2, while South End Groundwater is characterized, for the most part, as Category GW-3. However, South End Groundwater underlying the current facility buildings or within 30 feet of them must meet GW-2 groundwater targets for volatile organic compounds (VOCs) to be protective of site workers that may be exposed to VOC vapors in indoor air. Site-specific GW-2 residential and industrial groundwater target concentrations were calculated for volatile constituents detected in both the North End Groundwater and South End Groundwater. The details of the calculated residential and industrial MPS are provided in *Development of Site-specific MPS for VOCs and Site Metals in Groundwater*. The site-specific residential target concentrations are applicable to the North End Groundwater and are protective of potential residential exposure to vapors in indoor air. The site-specific industrial target concentrations are applicable to the South End Groundwater and are protective of potential exposure to a facility worker or construction worker to VOC vapors in indoor air. With the exception of cadmium, the target concentrations for the site specific metals (cadmium, chromium, copper, nickel, and zinc) are the default GW-3 targets that are protective of potential exposure to ecological receptors in the surface water of the Little River. Cadmium has consistently been detected in groundwater samples from background well MW-25S at concentrations above the default GW-2 and GW-3 targets. Therefore, the MPS for cadmium is set at the 95 percent upper confidence limit of the mean concentration in MW-25S. *Table 1 (Groundwater Target Concentrations for Historical Detections of Constituents in Site Groundwater)* provides a list of groundwater target concentrations for constituents that have been detected in site groundwater historically.

**Site-wide Soil**

MA DEP provides soil target concentrations for three categories of soil based on frequency of exposure, intensity of exposure, and accessibility. Category S-1 is for soil with high exposure potential, such as surface soil in a residential neighborhood. Category S-2 is for soil with a moderate exposure potential such as near surface soil in an industrial setting. Category S-3 is for soil with a low exposure potential such as soil with limited accessibility in an industrial setting. These soil exposure settings are combined with the groundwater exposure settings (discussed above) to develop specific soil target concentrations. *Table 2 (Soil Target Concentrations)* provides a list of soil target concentrations for constituents that have been detected in site soil. Because both North End Groundwater and South End Groundwater affected by VOCs have the potential to affect indoor air quality, soil targets combine S-2 soil with GW-2 groundwater (protective of human exposure to VOC vapors in indoor air).

## Application of MPS for North End Groundwater and South End Groundwater

Comparing the target concentrations, or MPS, for groundwater in *Table 1 (Groundwater Target Concentrations for Historical Detections of Constituents in Site Groundwater)* to the most recent groundwater monitoring data from May 2009 provides the list of COCs requiring further consideration for final corrective measures. The results of the most recent groundwater monitoring are provided and discussed in *Groundwater Site Restoration Activities.* *Table 3 (Groundwater Detected Constituents May and December 2009)* provides lists of COCs identified for North End Groundwater and South End Groundwater for final corrective measures. The locations where groundwater is detected at concentrations above the MPS are shown on the *Locations Where Constituents in Groundwater Above MPS* map.



**Locations Where Constituents in Groundwater Above MPS**

Constituents specifically identified as primary constituents of concern for groundwater at the site are as follows. Primary COCs are selected as constituents that had groundwater concentrations greater than the applicable MPS during baseline sampling.

- Cadmium
- Chromium
- *cis*-1,2-Dichloroethene (DCE)
- Copper
- Nickel
- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- Total petroleum hydrocarbon (TPH)
- Vinyl chloride
- Zinc

## Application of MPS for Site-wide Soil

Post-ICM soil data at the site is limited. Therefore, there is some level of uncertainty about where constituents may be present in the soil (as identified in *Table 2 [Soil Target Concentrations]*) at concentrations above the MPS. Some specific areas are known to be above MPS, but leachability data collected during the 2008-2009 ICM supports that the soil no longer contributes constituents to groundwater at levels that would potentially cause groundwater concentrations to be detected above the MPS. The *Soil ICMs Locations and Current Conditions* map shows the areas where site soil is known or suspected to be above industrial MPS. Outside of the areas where soil ICMs have been conducted, the subsurface soil in the remainder of the industrial area of the site also has potential to have TPH present at concentrations above the MPS, especially at the capillary fringe of the groundwater table. Post-ICM soil concentrations are discussed in *Soil Site Restoration Activities*.

**Soil ICMs Locations and Current Conditions**

Corrective measures for remaining COCs in soil and groundwater are discussed in *Long-term Actions and Contingencies*.