



USEPA, NYSDEC & NYSDOH

FMC - Middleport

Arsenic Soil Contamination

FAQs

1. How was the 20 parts per million (ppm) local soil arsenic background level determined for Middleport soils?

The 20 ppm arsenic background level was determined from the 2003 Gasport Background Study where around 100 soil samples were collected and analyzed for arsenic from wooded areas, agricultural fields, commercial/industrial properties, residential properties and orchards, in the Gasport area which was not affected by FMC Plant releases. The sample results were weighted to approximate the historic land uses in Middleport (i.e., since 33% of Middleport was historically residential, residential arsenic data was weighted at 33%). The value of 20 ppm represents the weighted 95th percentile of entire background data set, which basically means that 95% of the weighted data falls at or below 20 ppm. It also happens to be the 95th percentile (un-weighted) of the residential portion of the background data set (i.e., 95% of the residential data falls at or below 20 ppm). The 20 ppm arsenic level was selected in 2003 as an appropriate upper limit of the estimated range of soil arsenic background in Middleport as appropriately weighted to reflect historic land uses.

2. How and why are the Agencies using the local soil arsenic background level in their remedial decisions?

New York State Legislation (Section 27-1415.6(b)) enacted in 2003, states that soil clean-up objectives shall not exceed an excess cancer risk of one-in-one million (10^{-6}). However, if the background soil concentration in rural soils is greater than the soil concentration associated with the 10^{-6} cancer risk level, then background levels may be used as clean-up objectives. For arsenic, the State has determined that the soil concentration associated with a 10^{-6} cancer health risk is less than 1 ppm. This risk-based concentration is lower than arsenic soil background in New York State (generally considered to range from 2 to 20 ppm). Therefore, the Agencies consideration of the local Middleport soil background level of 20 ppm is consistent with the New York State legislation and is also consistent with the New York State background-based soil clean-up objective of 16 ppm for arsenic (13 ppm where ecological resources are involved).

The Middleport arsenic background of 20 ppm is being used by the Agencies as a tool to define the extent of the FMC related arsenic soil contamination, and to guide remedial decisions. It is important to note that this background level is not being used in isolation. Other factors such as data patterns, other potential arsenic sources and migration pathways from the FMC Plant (e.g., wastewater and surface water run-off pathways, air release sources and wind patterns, etc.), as well as data variability, are all considered in determining whether soil has been impacted by past FMC Plant releases. The 20 ppm arsenic level has not been, and is not currently used as a sole criterion to trigger soil remediation. Past and current soil remedial projects have been triggered by Agency requests based on higher arsenic levels (generally above 100 ppm) and health risks (as in the case of the Roy-Hart School athletic fields) or by FMC proposals to remediate off-site properties in advance of completing final investigations and studies (as in the case of the Middleport residential properties).

3. How are the Agencies considering human health risk associated with arsenic concentrations in soil?

Arsenic is a known human carcinogen. There is strong evidence of arsenic carcinogenicity and of non-carcinogenic health effects based on large scale epidemiological studies. The State has determined that the soil concentration associated with the 10^{-6} cancer risk level (the maximum cancer risk level allowed by New York State legislation) for arsenic is less than 1.0 ppm. There are uncertainties in estimating the potential human health risk for individual exposures to arsenic in soil.

The Agencies have an obligation to minimize, to the extent practical, both current and potential future human exposure to elevated levels of arsenic in soil. We believe that, for a number of the residential properties sampled within and beyond the Village of Middleport, the levels of soil arsenic associated with historic FMC releases warrant actions to minimize the potential for human exposure to these soils. Furthermore, we believe that remediating arsenic in Middleport soils to levels consistent with local background levels is a practical means to achieve this important public health goal.

While remedial decisions are not being made solely on the basis of human health risk, the Agencies use of the 20 ppm local soil arsenic background level for the Middleport area is consistent with New York State legislation regarding the establishment of soil clean-up objectives. This does not preclude consideration of site-specific risk analyses or studies (e.g. arsenic bio-availability study) as factor(s) in future Middleport remedial decisions. A degree of conservatism must be employed when determining site-specific risk-based cleanup objectives so arsenic exposures and risks are not underestimated.

4. Why were arsenic concentrations in soil above 20 ppm left on the Roy-Hart School property after the 1999 remediation and how is this different than the residential properties?

In 1998, the USEPA performed a risk assessment using arsenic soil data from the entire school property. This risk assessment estimated that the arsenic levels in school yard soils posed an unacceptable level of cancer and non-cancer health risks to student athletes ages 5 to 18 years, primarily due to the soil arsenic levels in the athletic fields (football and soccer fields). As a result, FMC remediated these fields in 1999 at the Agencies' request. Upon completion of the remediation, the Agencies re-calculated the health risk to these students after removal of the athletic fields' soil, using the arsenic levels in the remaining school yard soils (some locations exceed 20 ppm). Based on this evaluation it was determined that the schoolyard is suitable for use by students (athletes and non-athletes) ages 5 to 18 years, in terms of their exposure to known levels of arsenic in soil. This determination was based on the current use of this property as a school yard and did not consider other possible exposure scenarios which could arise in the future from changes in property use (i.e., property uses other than as a Middle / High School). The issue of other possible future uses of this property will be evaluated during the Corrective Measures Study to determine if additional remediation of the school property is necessary to accommodate other future uses of the schoolyard.

With regard to the previously remediated school athletic fields, it is important to note that the soils which now make up the surface soils on these fields were analyzed and found to have arsenic levels well below 20 ppm. It is also important to note, that although the depth of soil removal during the 1999 remediation was based on the limited local arsenic background data available at that time, the remaining arsenic concentrations in sub-surface soils beneath the fields have been determined to be consistent with the 20 ppm criteria developed from the 2003 Gasport Background study. Therefore, no further remediation of these fields is anticipated.

Unlike the school property, residential properties are very different in terms of who may be exposed to elevated levels of arsenic in soil, how people may be exposed, the durations of such exposure and how those exposures can be minimized. Residential properties are often used for a variety of activities (i.e. gardening, pre-school play areas, etc.), where a variety of people of different ages may frequently come into contact with elevated levels of arsenic in soil. Unlike the school property, a residential property can often be occupied by children under the age of 5 years. The high frequency of play in contact with residential soils containing elevated arsenic, in combination with the tendency of these younger children to ingest soils purposely or through frequent hand-to-mouth behavior, increases their exposure to arsenic in soils. Additionally, their small size can result in higher arsenic levels in their bodies than would occur in a larger child or adult. Also, residential property uses may change and these changes may present very different exposure scenarios (i.e., a daycare on a residential property with a bare-soil play area). These factors require that a greater degree of conservatism be used when evaluating remediation on residential properties.

5. How do the arsenic concentrations being used in the cleanup of other sites in the US, compare with those being used by New York State and in Middleport, and why are there differences?

Natural background arsenic concentrations in the U.S. soil are based on research conducted by the U.S. Geological Survey (USGS). The concentration of arsenic in U.S. natural background samples ranged up to 97.0 ppm, with an average of 7.2 ppm. Over the past 20 years, there have been various attempts to unify soil remediation cleanup standards across the U.S. The USEPA has not established standard action levels for soil which trigger cleanup actions. This is due to the fact that specific soil action levels developed for one site may not be appropriate for another site because of the nature of the site, regional differences in background levels, and the potential exposures to current and future site population.

In reviewing arsenic cleanup goals and Records of Decision (RODs) in the Superfund program for sites across the US, there has been substantial variability in cleanup goals, and the nature of each site is important in explaining the difference. For example, in EPA Region 2 (NY & NJ), most of the decisions were either based on background or residential risk analyses (a majority of these were around 20.0 ppm). In EPA Regions 8, 9 and 10 combined (CO, MT, UT, AZ, CA, and AK), there were substantially more industrial decisions resulting in higher cleanup values (200 ppm and higher) at these sites.

In addition, some States have established cleanup levels for arsenic in soil for a residential setting. Out of 17 States responding to a 1998 survey conducted by the Association for the Environmental Health of Soils, 16 have established arsenic cleanup levels ranging from 0.4 ppm to 20.0 ppm, with most based on background. Established levels in New York (16.0 ppm) and New Jersey (20.0 ppm) are based on background. Colorado is the only State responding to the survey which allows 40-250 ppm based on site-specific considerations.

In summary, there are a lot of factors to consider when determining a cleanup number for any constituent, including arsenic. Therefore, remedial decisions or arsenic cleanup levels for any particular site should not be interpreted as necessarily applicable to the Middleport since factors which are unique to each site are often involved in remedy selection.

6. Will a variety of arsenic cleanup objectives and remedial alternatives be evaluated, and how will community concerns (e.g., property values, trees, etc.) be considered during the remedy selection process?

The Corrective Measures Study (CMS) for areas with elevated arsenic levels attributable to past FMC Plant releases, will be developed by FMC in coordination with the Agencies and in consultation with the Community. The CMS will likely evaluate a number of cleanup objectives for arsenic contaminated soil, including, but not necessarily limited to cleanup to arsenic background levels. If arsenic levels above background are evaluated in the CMS, this evaluation will be required to include a site-specific health risk assessment. The CMS will also likely evaluate a number of soil cleanup alternatives, in addition to the soil removal alternative. These

other alternatives may include phyto-remediation using plants to take up the arsenic from the soil and then properly disposing of these plants. The Community will be asked to participate in the CMS process through various public involvement activities. Topics of community concern such as property values and tree preservation will be part of the CMS process. Remedial methods which remove arsenic contamination while preserving trees will be explored. It is also anticipated that this CMS process can be conducted in specific areas where there is sufficient arsenic data to define the extent of the arsenic soil contamination prior to areas outside of the Village of Middleport where additional arsenic data is needed to define the limits of soil arsenic contamination.

It is important to note that the Middleport soil remediations performed to date, either required by the Agencies as in the case of the Roy-Hart School property or proposed by FMC as in the case of past and current residential remediations, were performed as early actions. Because these early actions are conducted before the completion of the CMS, a degree of conservatism must be employed to ensure they will be consistent with the final remedy determined from the CMS and that areas or properties remediated through early actions will not require further remediation to achieve the final remedy.