

Middleport Community Input Group FAQ's

Is arsenic dangerous to health?

Arsenic is a known carcinogen when consumed over a long period of time. It can also have other biological effects and can be fatal when consumed in very high quantities.

How can arsenic enter the body?

There are three pathways for arsenic to enter the human body: ingestion, absorption and breathing (or inhalation). Arsenic can be ingested by eating traces of contaminated soil. It can be absorbed through the skin when contaminated soil remains on the skin. Breathing in contaminated dust is also a pathway. The Agencies have dismissed the latter two as small risks when compared to ingestion. Therefore only ingestion is being considered as the primary pathway for Middleport risk.

How valid are the studies cited by the Agencies to risk from arsenic in Middleport soil?

The Agencies use studies performed in China and other third world countries where high levels of arsenic were present in drinking water. It is widely accepted that arsenic in drinking water is a serious concern since arsenic is in a dissolved state and more easily absorbed by the body when it is in water. However arsenic in soil has chemically combined over time with other minerals such as iron and copper to form compounds which are not as readily absorbed by the body because they tend to be bound to the soil. In addition humans tend to drink a lot more water than they eat soil. The applicability of the Agencies studies to the situation in the Middleport Air Deposition are is questionable since they do not typically cite studies of risk from arsenic in soil but rely on studies in other countries where the concern is exposure from drinking water. Therefore, the actual risk from exposure to arsenic in contaminated soil would be less than that from ingestion of the same quantity of arsenic dissolved in water.

What is the acceptable risk for a contaminant?

The acceptable risk range for any contaminant for both federal and state agencies lies between one in one million and one in ten thousand extra deaths from cancer than would be expected within similar populations not exposed to the contaminant.

What are the NYS Agencies' acceptable risk for arsenic in soil?

The New York State Department of Health has told the MCIG that a one in a million cancer incident corresponds to a 0.11 PPM contamination level of arsenic in residential soil. The risk for other values are one in a hundred thousand to 1.1 PPM and one in ten thousand to 11 PPM. The risk assumes over 200 days per year exposure for 70 years.

How valid are the State's numbers?

The State's numbers are calculated based on several assumptions meant to be very protective. That means that where there is uncertainty or ranges of numbers, the risk calculations use lower concentrations to assure that the final numbers are as conservative or protective as possible. In New York State that actual meaning or reality of the State's numbers are rendered somewhat irrelevant since the average background in the state for arsenic is 16 PPM which lies outside the acceptable risk range. In effect this means it is unhealthy to live in New York State.

What are the EPA's acceptable risk for arsenic in soil?

The EPA currently relates exposure risk for one in a million excess cancer deaths to 0.4 PPM, one in one hundred thousand to 4 PPM and one in ten thousand to 40 PPM. While the cancer risk occurs "over

a 70 year lifespan" the actual exposure duration for residential soils is 30 years and the exposure frequency is assumed to be every day (350 days/yr) minus 2 weeks vacation.

How valid are the EPA numbers?

More valid than the State's and which at one time were recognized by the state agencies. The state average for arsenic in soil (16 PPM) would lie within the acceptable range for risk. However an everyday exposure would not be valid in western New York when taking into account the winter season.

What does a one in a million risk mean?

A one in a million means that one extra cancer incident might be reported in a group of one million people.

How does that relate to Middleport?

Since there are under 1800 residents in Middleport and the area of Middleport under consideration for remediation is one third of the village it could be assumed that the number of people whose properties would be affected by the project is 600. The one in a million would reduce to .0006 persons benefited.

How much soil needs to be ingested to reach risk levels?

Using data from the Agency for Toxic Substances and Disease Registry, part of the U.S. Department of Health and Human Services, Dr. Daniel Watts estimates a 150 lb. person could ingest the equivalent of 85 peas worth of dirt at 20 ppm of arsenic contamination each day and would still be safe under the acute exposure rule. For chronic exposure it would be the equivalent of 5.1 peas a day.

Can vegetables grown in local gardens uptake arsenic?

Although the Agencies claim vegetables uptake arsenic, it would depend on the level of contamination these plants are grown in. Studies performed in Middleport soil show negligible to no uptake of arsenic from soil except for one plant, brake fern, native to warmer climates with longer growing seasons. Brake ferns are not an edible plant. As described below, a study of vegetables grown in Middleport resulted in no evidence of harmful arsenic levels.

What are some of the studies done directly related to Middleport?

The studies performed in Middleport concerning arsenic in soil and exposure include:

1. The Exponent Study collected urine and toenail samples from 439 people including 77 children under 7 years old, half the 7 year old children living in the study area. There was no separation of those who lived in Air Deposition area and those who did not. The result showed no relationship between the arsenic levels in the blood and toenail samples taken from residents and the arsenic levels in their residential yards. All blood and toenail results were well under acceptable limits. These results suggest that for the individuals involved in the study, there is no evidence that exposure to elevated arsenic levels in their environment is responsible for arsenic levels in their body.
2. Vegetable study by Exponent took vegetable samples from 42 gardens. The result showed no increase in arsenic levels in samples taken from Middleport in an unwashed state to those purchased at a local supermarket. These results suggest that for the 42 gardens surveyed and the particular crops sampled, there is no evidence that elevated arsenic levels in the garden crops exists as compared with supermarket samples.
3. The phytoremediation study used plants known to or believed to uptake arsenic in other studies conducted outside Middleport. There were three areas in Middleport used for the study, 2 residential sites and one farm field location. Of the several types of plants used, only one, the

brake fern, showed any evidence of arsenic uptake. However the amount was not high enough to encourage use of plants as a method for removal of arsenic from soil in a reasonable period of time. Soils from Middleport were taken to a lab for a more controlled study with similar results. These results suggest that for the plants investigated, the soil binding and growing conditions in Middleport do not facilitate uptake of more than very small levels of arsenic (if any).

4. Dermal Arsenic Absorption of Middleport soils used rhesus monkeys which were dosed with arsenic applied to the abdominal skin. Arsenic absorption was measured based on urinary excretion of arsenic. The Exponent study results indicated that dermal absorption of arsenic from Middleport soil is negligible. In studies such as these, rhesus monkeys are frequently used because their biological responses are very similar to those expected with humans. Therefore, this evidence suggests that dermal absorption of arsenic from exposure to Middleport soil would also be negligible.
5. Oral Absorption of arsenic in soil, a study conducted at the University of Florida using soil from various localities including Middleport, used cynomolgus monkeys that were fed a slurry of soil in water and then their urine and feces were tested for arsenic excretions. This type of monkey is also frequently used in studies to predict human health because of similar biological characteristics. Soil concentrations used were 339, 549, and 1,000 mg/kg or PPM, much higher than those found in typical residential yards in Middleport. The slurry had arsenic levels of 0.30, 0.49, and 0.99 mg/kg or PPM. The results indicated that 28% or less of the arsenic consumed from Middleport soils remained in the monkeys. When considering all soils used from various locations, 31% was the highest amount retained. This means that in this study, just 28% of the arsenic in the Middleport soil was adsorbed by the monkeys used in the test after ingestion.
6. NYSDOH cancer incidence study was performed by the New State Department of Health. It compared the number of cancer incidences reported by and for Middleport residents to those in similar communities. The result was no statistical difference.
7. NYSDOH Roy-Hart student Study was also performed by the NYSDOH. The study took hair and blood samples from Roy-Hart high school athletes and elementary school children attending the schools in Middleport. The results were compared to similar students in a similar school outside Albany, NY. The study showed little difference in the samples taken between the two schools. In fact the arsenic levels in the elementary school children from the Albany area were slightly higher than those from the Middleport school. These results suggest that under the conditions of this study and for the students sampled any elevated levels of arsenic in Middleport soil had no effect on arsenic levels found in the local students.
8. URS Consultants of Buffalo was hired by the Roy-Hart School Board to evaluate the levels of arsenic and lead found in school yard soils at both buildings. This evaluation was performed before the massive cleanup of the athletic fields. It was concluded that there was no long term health threat to people using the school property.

Do the government agencies recognize or agree with any of these studies?

The Agencies do not accept any of the above studies, even their own, as applicable to establishing an acceptable risk level for exposure to Middleport soil. It appears that studies that do not support the Agencies' goals are dismissed.

What is the Agencies choice for remedial action in Middleport?

The Agencies want to clean up any areas where arsenic levels in soils exceed 20 PPM. They have indicated that they will allow some flexibility if a property owner would like to save a landmark such as a tree. However that level of flexibility is not defined. The history of past practice in Middleport

indicates that such flexibility will be very limited. Removal and replacement of 228,000 cubic yards of soil from 181 properties would be involved with 49,400 trucks full of dirt passing through village streets over a 5 to 10 year time frame.

What does FMC recommend as a cleanup action?

FMC is ready to implement a cleanup that would result in an average of 20 PPM per residential property with a maximum of 40 PPM. This means that the average concentration of arsenic on any particular property would be 20 PPM with the maximum level on the property being 40 PPM such as near trees. This would also mean that some areas of the property would end up with arsenic levels of less than 20 PPM in order to achieve the 20 PPM average arsenic level. This type of action would require about 69,000 cubic yards of soil to be transported involving 10,050 trucks and 152 properties. The 40 PPM maximum would fall within the EPA's current acceptable range for risk. The time needed to complete the cleanup would be about half that required by the Agencies proposal.

What is the Middleport Community Input Group?

The group was organized in 2006 by then Mayor Julie Maedl to represent the residents and property owners in the community who are affected by the FMC arsenic clean up project in discussions between FMC and the Government Agencies.

Who are the members of the Middleport Community Input Group?

The members consist of local residents who are teachers, business owners, manufacturers, law enforcement officers and engineers, some of whom work for or with environmental agencies and companies.

What are the qualifications of some of the groups members?

1. Bill Arnold, the chairman, has a Bachelor's Degree in Electrical Science from RIT, a Masters Degree in Electrical Engineering from Syracuse University and spent nearly 30 years working at IBM as an engineer and manager retiring at the level of Advisory Engineer.
2. Dr. Daniel Watts, the group's technical adviser, retired from New Jersey Institute of Technology and was the Executive Director of the Otto H. York Center for Environmental Engineering and Science at the Institute. He remains active in numerous environmental issues in addition to Middleport.
3. Ann Howard, the Group's facilitator, is a Senior Associate Dean of the College of Liberal Arts at Rochester Institute of Technology. She has been working in the field of community sustainability for more than 20 years and among other activities established and oversees the University/Community Partnerships program in cooperation with resident leaders of neighborhoods in northeast Rochester. She recently received the American College Personnel Association's Champion of Sustainability Award.

What remedial action does the MCIG support?

After reviewing all the proposed alternatives described in the Corrective Measures Study, the MCIG believes the FMC proposal best fits the needs of the community. It would remove the higher levels of contaminated soil but not as severely impact the community as the Agencies selection would. Other alternatives would also be acceptable to the MCIG but it was felt they would never be acceptable to the Agencies and would lie outside the EPA's acceptable range for risk.