Managing Risk at the Roy-Hart Schools
Middleport, New York

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Middleport, a village of about 2000 people in Western New York, grew up with the Erie Canal nearly 200 years ago. It lies within the towns of Royalton and Hartland, which jointly operate a school district. Middleport is essentially a one-company town. From 1928 to 1943 Niagara Sprayer made pesticides there. FMC (originally Food Machinery and Chemical) purchased the plant in 1943. For many years it was a major producer of pesticides and other chemicals, but today it only conducts formulation and packaging there.

In 1946, FMC sold nearly 20 acres to the of Royalton-Hartland (Roy-Hart) Central School District for one dollar. The District built a Middle School, High School, and maintenance facilities on the site. Needless to say, building a campus downwind from a major pesticide manufacturing plant is not a good idea. In 1975, thousands of migratory birds died from exposure to toxic chemicals in FMC's wastewater lagoon. In 1984, just weeks before the lethal chemical disaster in Bhopal, a faulty pump at FMC released methyl isocyanate—the Bhopal chemical—forcing the evacuation of 600 Roy-Hart students. According to a local activist, "Dozens of students and teachers were treated by rescue workers and local hospitals."

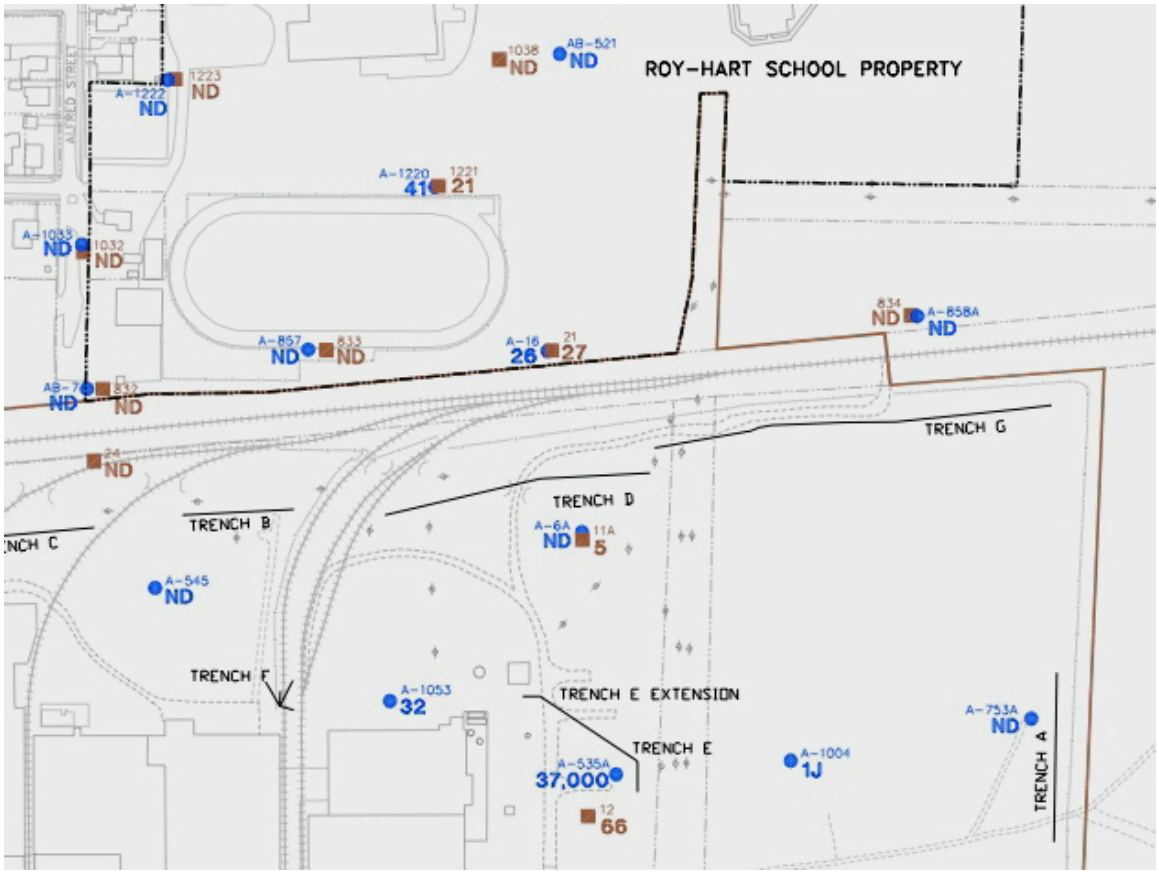
Many people in Middleport recognize that the pesticide plant has been the community's economic engine, and thus have been reluctant to acknowledge the chemical hazards it has created. Others remember the 1984 incident, and they suspect that the current risks of toxic exposure are higher than government agencies admit.

Roy-Hart Schools—from the south

In 1999-2000, FMC removed soil with elevated levels of arsenic from the school athletic fields, which lie between the plant and the school building. It stored the contaminated soil on the eastern edge of the plant property, and it applied to establish that area as a permanent disposal site—a Corrective Action Management Unit (CAMU) under the Resource Conservation and Recovery Act. Local activists say this site is too close to the school—just 100 feet from the athletic fields from which the waste was excavated. Approval is pending.

FMC has been pumping and treating trichloroethylene (TCE) from the plant site since 1988. Starting 1994, it created blast-fractured trenches in the bedrock "to enhance the removal of contaminated groundwater and to control its migration" to the north and east. In 2002 FMC concluded that the pumping had "halted the migration to the east, and slowed its migration to the north." In late 2008 New York state regulators expressed confidence, in a phone interview, that the plume was stable.

Groundwater data collected in 2006 showed a single TCE hot-spot, of 37,000 ppb, in the middle of the plant property. Most other monitoring wells came up non-detect, but low levels of TCE were found on the school property. The limited data I have reviewed suggest an indirect pathway with a plume pointed in the direction of the high school.



Numbers indicate TCE groundwater concentrations in parts per billion
Blue is for water in the shallow bedrock; red is for the overburden

In fact, the May 2006 TCE concentration in the shallow bedrock at a new monitoring well north of the athletic fields is nearly 60% greater than the level at the property boundary. More important, there is no monitoring well directly between these wells and the high school building. The distal boundary of the plume has not been identified, so I find the conclusion that migration has slowed, let alone stopped, to be unpersuasive.

Vapor Intrusion Investigation

The regulators were concerned enough about the presence of TCE near the school buildings to order FMC to conduct a vapor intrusion investigation on the campus in 2005-2006. The report, prepared by Geomatrix Consultants, was published in December 2006. A east-west transect of soil-gas sampling points at 100 feet intervals south of the school buildings found very low levels, all under 5 micrograms per cubic meter ($\mu g/m^3$). (Soil gas concentrations attenuate as vapors enter buildings, so soil-gas levels must be significantly above threshold levels for indoor air to be considered a health risk.)

Low levels of TCE vapors (under 1.0 $\mu g/m^3$) were found inside the middle school, but not in the underlying crawlspaces. TCE was found in other crawlspaces at slightly higher levels, but it was not found in the rooms above. From this and other sampling results, FMC concluded, "the low level presence of TCE measured in the indoor air of occupied spaces is not attributable to vapor intrusion from the subsurface."

At the high school, TCE was found at a very low level (.28 $\mu g/m^3$) in a boiler room and nowhere else in the building. The subslab soil gas sample at the boiler room registered 97 $\mu g/m^3$, and soil gas under a classroom measured 30 $\mu g/m^3$. FMC concluded that vapor intrusion was not occurring, and it suggested that historic use of TCE at the school—for boiler cleaning or other purposes—was the likely source of the contamination.

Finally, TCE was not detected in the single subslab sample at the schools' Maintenance Office Building, but it was found in the basement (1.8 $\mu g/m^3$) and first floor (.97 $\mu g/m^3$), as well as outdoors (1.2 $\mu g/m^3$). Due to the subslab non-detect, FMC concluded vapor intrusion was not taking place, and it theorized that historic use of TCE and PCE for bus maintenance might have been responsible for the detections.

With the benefit of 2007 data that I do not have, the regulators agreed with FMC. In June 2007 the state Department of Environmental Conservation and Department of Health issued a fact sheet, stating:

> Vapor samples from beneath the school buildings, indoor air within the school buildings and outdoor air samples near the school buildings collected in 2006 and 2007 indicate that **TCE contamination from vapor intrusion was not detected in the school classrooms.**

Looking through the athletic fields at FMC with monitoring wells in the foreground

They explained further that the schools' positive-pressure HVAC (heating, ventilation, and air conditioning systems) were "minimizing the potential for vapor intrusion into classroom areas."

My View

The available data supports the conclusions reached by FMC and the regulatory agencies. Vapor intrusion is probably not a current source of exposure at this site. It is not clear, however, where the TCE vapor is coming from. If indeed it's from the current or recent use of TCE for boiler-cleaning or other maintenance activities, that practice should be halted. On the other hand, it is possible that turning off the positive pressure system would allow low levels of TCE to rise from beneath the building. This may be true, whether the source is on-site or from FMC's groundwater plume. Finally, with unknown subsurface pathways, the data that I've had a chance to review does not rule out the presence of contamination groundwater near or even under the buildings.

Regulators are faced with a difficult task. On the one hand, they are charged with taking action to protect the schools' occupants. On the other hand, they do no want to scare parents, teachers, and students if there is no cause for alarm. They know that more sampling points would provide a more complete picture of contamination pathways, but it is unreasonable to expect responsible parties to "study a site to death." Furthermore, for twenty years they have ordered the proper long-term solution: cleanup of the source areas on FMC property.

Yet some members of the Middleport community are unconvinced by official assurances. *The data are not strong enough, consistent enough, or dense enough to provide certainty that school occupants are not and will not be exposed to unsafe levels of TCE*. For example, other New York DEC studies of subslab soil gas have shown significantly different levels of TCE vapors under a single home, as well as over larger areas. It is conceivable that a TCE plume, with associated vapors, has passed through the soil-gas sampling transect without detection.

Students and teachers today are safe from vapor intrusion. There is no data that shows an imminent threat. But I do not think FMC and the regulators can walk away from the site, comfortable that vapors will not ever be a problem. As at schools elsewhere, I believe the solution lies in the development of a long-term site management plan (SMP). Such an SMP would include groundwater sampling sufficient to determine whether water moving under the buildings contains TCE. It would include periodic indoor air sampling to determine whether TCE levels in classrooms pose even a low risk of exposure. And it would ensure that positive air pressure is maintained consistently to prevent vapors from entering occupied spaces.

In general, at any school site where the presence of volatile organic compounds is not fully explained or delineated, long-term management should be a standard response.