Letter Health Consultation

Soil Vapor Intrusion Investigation

FMC CORPORATION FACILITY
VILLAGE OF MIDDLEPORT, NIAGARA COUNTY, NEW YORK

Prepared by the
New York State Department of Health

AUGUST 26, 2009

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

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LETTER HEALTH CONSULTATION

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DEPARTMENT OF HEALTH
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August 13, 2009

Mr. Gregory V. Ulirsch, Ph D.
Environmental Health Engineer
Superfund Site Assessment Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry/DHAC
1825 Century Center Atlanta, GA 30345

Re: Letter Health Consultation
Soil Vapor Intrusion Data Evaluation
2008 Soil Vapor Intrusion Investigation of the
FMC Corporation Facility
FMC Site #932014
Middleport (V.) Niagara Co.

Dear Mr. Ulirsch:

In July of 2008, the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) requested assistance from the New York State Department of Health (NYSDOH) to review and interpret analytical data from analysis of sub-slab soil vapor, indoor air and outdoor air samples collected by FMC at their Middleport, New York facility. This letter is a summary of the NYSDOH's response to the request for assistance by the NYSDEC and the USEPA.

Background and Statement of Issues

The FMC Middleport facility is a 91-acre active pesticide formulation facility located in the Village of Middleport and in the Town of Royalton, Niagara County, New York. The facility is bounded by residential properties to the west, agricultural lands to the east, commercial properties to the south, a former railroad line and the Royalton-Hartland School to the north. A site location map is attached as Figure 1.

The FMC Middleport facility has operated since the early 1900's and past facility activities included the manufacture of pesticide spraying machines, pesticide manufacturing, pesticide product formulation and packaging, and pesticide research and development. Several agricultural product lines, including agricultural insecticides and herbicides have been manufactured at FMC's Middleport facility. FMC ceased pesticide manufacturing at their Middleport plant in 1985. FMC currently employs approximately 50 people at its Middleport facility, where activities are limited to pesticide formulation (which consists of mixing, blending and/or diluting pesticide active ingredients produced elsewhere), packaging and storage. There are numerous structures on the FMC Middleport facility used for various purposes, including warehouse/storage, product packaging and formulation, maintenance, and office space.

Past operations and waste management practices have resulted in adverse impacts to soil, groundwater, surface water and sediments both on-site and off-site. FMC is currently implementing a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) to delineate the nature and extent of site-related contaminants in on-site and off-site environmental media. To date, FMC has performed numerous on-site and off-site investigations and remedial activities.

FMC began an investigation of groundwater quality at and around their facility in 1979 and continues to implement several groundwater monitoring and remediation programs. In addition to inorganic metals and pesticides, certain volatile organic compounds (VOCs), including trichloroethene, carbon tetrachloride, methylene chloride, ethylbenzene, benzene, and chlorobenzene have been used at the facility and have been detected in on-site groundwater monitoring wells.

Groundwater in the immediate vicinity of the site is not being used as a drinking water supply. Existing information (i.e. private well surveys, etc.) suggests that there are no current exposures to FMC-related groundwater contaminants. However, the inhalation of contaminated soil vapor, which could volatilize from contaminated groundwater (through a process known as soil vapor intrusion) is considered a potential exposure route for occupants of the facility buildings. This Letter Health Consultation summarizes NYSDOH's review and interpretation of the results of the 2008 soil vapor intrusion sampling conducted at the FMC Middleport facility.

Discussion

In March of 2008, FMC conducted soil vapor intrusion sampling of 15 buildings at their Middleport facility. The sampling included the concurrent collection of sub-slab soil vapor, indoor air and outdoor air samples. Sample locations were selected to be representative of specific building conditions and uses, in consideration of existing groundwater quality data. Many of the facility buildings sampled are referred to as building complexes or groups to reflect additions over time. The buildings and building groups sampled and their general occupancy and uses are identified in Table 1.

Samples were collected by FMC in 6 liter SUMMA® canisters for a duration of twelve hours. Analysis was performed by a NYSDOH Environmental Laboratory Approval Program-certified laboratory for the standard list of VOCs using USEPA Method TO-15 to provide either standard analytical reporting limits or low-level analytical reporting limits. The investigation included the collection of 15 sub-slab soil vapor samples, 15 indoor air samples and two ambient (outdoor) air samples. The indoor air, sub-slab soil vapor and outdoor air data from the March 2008 sampling event is summarized on Table 2.

NYSDOH evaluated the soil vapor intrusion investigation data using a multiple-lines-of-evidence approach, as described in the *October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York.* Using this approach, the data were evaluated in consideration of several factors, including, building-specific conditions, potential source(s) of volatile chemicals, past and current building uses, background levels of volatile chemicals in air and relevant standards and criteria and guidance values. For most structures, VOCs were either not detected in the sub-slab soil vapor or were detected at low levels. As indicated in Table 2, several VOCs were detected in the sub-slab soil vapor at elevated concentrations under buildings 23, 70A, 70B and the Main Office. In addition, many contaminants were identified as not detected in the sub-slab soil vapor of the Main Office, and buildings 70A and 70B; however, as indicated on Table 2, the detection limits were elevated for these contaminants due to matrix interference or dilution factors. In these samples, data evaluation was complicated due to the elevated detection limits.

For most structures, site-related contaminants were either not detected in the indoor air samples or were detected at low levels, below applicable indoor air background levels or NYSDOH air guideline values. Several contaminants were detected in the indoor air at levels which exceed applicable indoor air background levels in buildings 48A, 48B, 65A, 70A, 71A, 71B and building 72. For most of these compounds, including methylene chloride, 1,4-dichlorobenzene, 1,2,4-trimethlybenzene, 2-butanone, acetone, 1,3,5-trimethlybenzene and 4-ethyltoluene, the concentrations detected in the indoor air are greater than the concentrations detected in the sub-slab soil vapor. This indicates that the these compounds are likely present in the indoor air from sources other than soil vapor intrusion – including outdoor air and facility manufacturing operations.

As indicated on Table 2, indoor air of the facility buildings does not appear to be significantly affected by sub-slab soil vapor contaminants, including those structures where sub-slab soil vapor concentrations were elevated.

Public Health Implications

Sampling results suggest that vapor intrusion is not a significant source of indoor air contamination in buildings at the site. However, several VOCs were detected in indoor air at levels that are above USEPA Building Assessment and Survey Evaluation (BASE) indoor air background levels for public and commercial office buildings. Only two VOCs (1,4-dichlorobenzene and 1,2,4-trimethylbenzene) were detected at levels that exceed both typical indoor air levels and public health comparison values (Table 3). Elevated concentrations of these chemicals in the indoor air are likely due to indoor/outdoor sources rather than soil vapor intrusion. Other chemicals, including methylene chloride, toluene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,3,5-trimethylbenzene, 2-butanone, acetone, chloroform and 4-ethyltoluene were detected above typical indoor air background levels for public and commercial buildings. However, these chemicals were detected below their public health assessment comparison values. Therefore, the health risks from exposure to these chemicals is minimal. The public health implications of exposures to VOCs in buildings at the FMC facility were evaluated using the NYSDOH procedures for assessing health risks (Appendix A).

Long-term occupational exposure to high levels of 1,4-dichlorobenzene in workplace air is associated with irritation of the eyes and respiratory tract and effects on the nervous system and liver. In studies of laboratory animals, high levels of exposure to 1,4-dichlorobenzene caused adverse effects on the liver, kidneys, respiratory system and nervous system, and effects on offspring following exposure of parents. 1,4-dichlorobenzene causes cancer in laboratory animals exposed to high levels over their lifetimes. Chemicals that cause cancer in laboratory animals may also increase the risks for cancer in humans. Whether or not 1,4-dichlorobenzene causes cancer in humans is unknown. Exposure over a 25-year working lifetime to the highest detected level of 1,4-dichlorobenzene in indoor air (32 mcg/m^3) is estimated to pose a low increased risk for cancer. The risk for noncancer health effects from exposure to 1,4-dichlorobenzene is minimal.

Workers exposed to solvents containing 1,2,4-trimethylbenzene for long periods of time had respiratory, central nervous system and hematological effects. Similar effects have been observed in studies of laboratory animals at high levels of exposure. There is also some evidence of effects in offspring (i.e., reduced body weight) of animals, but only at high exposure levels that also caused adverse effects on the mothers. The risk for noncancer health effects from exposure to the highest detected level of 1,2,4-trimethylbenzene in indoor air (43 mcg/m^3) is low.

Conclusions

ATSDR and the NYSDOH concluded that breathing site-related chemicals through soil vapor intrusion in structures on the FMC plant site is not expected to harm people's health. This is because, overall, the data indicate that VOCs in on-site groundwater do not appear to have significantly affected the indoor air of the facility buildings through soil vapor intrusion. However, the levels of several contaminants in the sub-slab soil vapor of buildings 23, 70A, 70B and the Main Office building present the potential for future exposures via soil vapor intrusion. For certain contaminants (methylene chloride, trichloroethene, carbon tetrachloride and tetrachloroethene) detected in the sub-slab samples, evaluation of the data was complicated by elevated reporting limits which did not allow the concentrations to be compared to matrix values and background levels. Therefore, monitoring/re-sampling was recommended in several structures to support this conclusion.

Recommendations

Based on a review of the analytical data and available information, the NYSDOH made the following recommendations for structures sampled at the FMC Middleport facility:

- *Monitoring*: was recommended for four structures (Buldings 23, 70A, 70B, Main Office) where elevated levels of VOCs were detected in the sub-slab soil vapor samples and additional sampling is needed to determine whether concentrations in indoor air or sub-slab vapor have changed (Table 2). The re-sampling should result in better quality data that can be used for comparison.

- *Take reasonable and practical actions to identify source(s) and reduce exposures:* was recommended for six structures (Buildings 48A, 48B, 65A, 71A, 71B, 72) where the concentrations of VOCs in the indoor air are likely due to indoor and/or outdoor sources rather than soil vapor intrusion given the concentration detected in the sub-slab vapor sample.

- *No Further Action*: was recommended for five structures (Buildings 21, 24, 65B, 75, 104) where VOCs were generally not detected in the indoor air or were not detected in the indoor air at levels of concern and VOCs were not detected in sub-slab samples at levels which would be expected to substantially affect indoor air quality.

The NYSDOH's recommendations were provided to FMC by the NYSDEC and the USEPA. The Agencies subsequently held a conference call with FMC to discuss these recommendations. FMC has agreed to implement the Agencies recommendations and the re-sampling of the requested structures occurred in March of 2009. The results of the sampling are currently under review by the Agencies.

Sincerely,

Nathan T. Freeman
Public Health Specialist
Bureau of Environmental Exposure Investigation

cc: G. Litwin / D. Miles / R. Fedigan/FILE
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References:

NYSDEC/DOH (New York State Department of Environmental Conservation and Department of Health). 2006. New York State Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document.

FIGURES

FIGURE 1:
SITE LOCATION MAP

TABLES

Table 1: Uses and Occupancy of Buildings and Building Groups Sampled

Building Group	***Building Use***	***Occupancy***
21	Warehouse	as needed for production support
23/24	Pesticide Formulation	24 hours/6 days per week
48A/48B	Offices/Locker Room/Lab	24 hours/6 days per week
65A/65B	Warehouse	24 hours/6 days per week
MO	Main Office	8 hours/5 days per week
70A/70B	Carbofuran Department/Warehouse/Locker Rooms	24 hours/6 days per week
71A/71B	Pesticide Formulation	24 hours/6 days per week
72	Carbofuran Warehouse	24 hours/6 days per week
75	Maintenance and Offices	8 hours/5 days per week
104	Warehouse	as needed for production support

Table 2: Indoor Air, Outdoor Air and Sub-Slab Soil Vapor Data Summary Table
FMC Plant Site Buildings

	Building 23		**Building 70A**		**Building 70B**		**Main Office**	
	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor
Sample ID:	IA-023	SS-023	IA-070A	SS-070A	IA-070B	SS-070B	IA-M01	SS-M01
Date Collected:	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08
Volatile Organics								
1,1,1-Trichloroethane	1.1 U	76.0 U	1.1 U	52.0 U	1.1 U	87.0 U	1.1 U	55.0 U
1,1,2,2-Tetrachloroethane	1.4 U	96.0 U	1.4 U	65.0 U	1.4 U	110 U	1.4 U	69.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	2.9	110 U	1.5 U	73.0 U	47.0	120 U	1.5 U	77.0 U
1,1,2-Trichloroethane	1.1 U	76.0 U	1.1 U	52.0 U	1.1 U	87.0 U	1.1 U	55.0 U
1,1-Dichloroethane	0.81 U	57.0 U	0.81 U	38.0 U	0.81 U	65.0 U	0.81 U	40.0 U
1,1-Dichloroethene	0.79 U	56.0 U	0.79 U	38.0 U	0.79 U	63.0 U	0.79 U	40.0 U
1,2,4-Trichlorobenzene	3.7 UJ	260 U	3.7 U	1,600	3.7 U	1,300	3.7 U	190 U
1,2,4-Trimethylbenzene	3.8	69.0 U	0.98 U	1,400	0.98 U	79.0 U	0.98 U	49.0 U
1,2-Dibromoethane	1.5 U	110 U	1.5 U	73.0 U	1.5 U	120 U	1.5 U	77.0 U
1,2-Dichlorobenzene	1.2 U	84.0 U	1.2 U	1,100	1.2 U	590	1.2 U	60.0 U
1,2-Dichloroethane	0.81 U	57.0 U	0.81 U	38.0 U	0.81 U	65.0 U	0.81 U	40.0 U
1,2-Dichloroethene (total)	0.79 U	56.0 U	0.79 U	38.0 U	0.79 U	120	0.79 U	40.0 U
1,2-Dichloropropane	0.92 U	65.0 U	0.92 U	44.0 U	0.92 U	74.0 U	0.92 U	46.0 U
1,2-Dichlorotetrafluoroethane	1.4 U	98.0 U	1.4 U	66.0 U	1.4 U	110 U	1.4 U	70.0 U
1,3,5-Trimethylbenzene	1.0	69.0 U	0.98 U	1,400	0.98 U	79.0 U	0.98 U	49.0 U
1,3-Butadiene	1.1 U	77.0 U	1.1 U	53.0 U	1.1 U	88.0 U	1.1 U	55.0 U
1,3-Dichlorobenzene	1.2 U	84.0 U	1.2 U	57.0 U	1.2 U	96.0 U	1.2 U	60.0 U
1,4-Dichlorobenzene	1.2 U	84.0 U	1.2 U	1,900	1.9	1,500	1.2 U	60.0 U
1,4-Dioxane	18.0 U	1,300 U	18.0 U	860 U	18.0 U	1,400 U	18.0 U	900 U
2,2,4-Trimethylpentane	0.93 U	65.0 U	0.93 U	44.0 U	0.93 U	75.0 U	0.93 U	47.0 U
2-Butanone	5.6	100 U	**19.0**	71.0 U	12.0	120 U	1.5 U	74.0 U
2-Chlorotoluene	1.0 U	72.0 U	1.0 U	49.0 U	1.0 U	83.0 U	1.0 U	52.0 U
2-Hexanone	2.0 U	140 U	2.0 U	98.0 U	2.0 U	160 U	2.0 U	100 U
3-Chloropropene	1.6 U	110 U	1.6 U	75.0 U	1.6 U	130 U	1.6 U	78.0 U
4-Ethyltoluene	4.9	79.0	0.98 U	1,300	1.6	79.0 U	0.98 U	49.0 U
4-Methyl-2-pentanone	2.0 U	140 U	2.0 U	98.0 U	2.0 U	160 U	2.0 U	100 U
Acetone	16.0	830 U	20.0	4,000	26.0	950 U	14.0	590 U
Benzene	0.64 U	45.0 U	0.64 U	160	0.73	130	0.64 U	32.0 U
Bromodichloromethane	1.3 U	94.0 U	1.3 U	64.0 U	1.3 U	110 U	1.3 U	67.0 U
Bromoethene	0.87 U	61.0 U	0.87 U	42.0 U	0.87 U	70.0 U	0.87 U	44.0 U
Bromoform	2.1 U	140 U	2.1 U	98.0 U	2.1 U	170 U	2.1 U	100 U
Bromomethane (Methyl Bromide)	0.78 U	54.0 U	0.78 U	37.0 U	0.78 U	62.0 U	0.78 U	39.0 U
Carbon disulfide	1.6 U	110 U	1.6 U	78.0	1.6 U	140	1.6 U	78.0 U
Carbon tetrachloride	1.3 U	88.0 U	1.3 U	60.0 U	1.3 U	100 U	1.3 U	63.0 U
Chlorobenzene	0.92 U	64.0 U	0.92 U	1,200	0.92 U	2,400	0.92 U	46.0 U
Chloroethane	1.3 U	92.0 U	1.3 U	63.0 U	1.3 U	110 U	1.3 U	66.0 U
Chloroform	0.98 U	68.0 U	0.98 U	46.0 U	0.98 U	78.0 U	0.98 U	49.0 U
Chloromethane	1.5	72.0 U	1.0 U	50.0 U	1.0 U	83.0 U	1.1	52.0 U
cis-1,2-Dichloroethene	0.79 U	56.0 U	0.79 U	38.0 U	0.79 U	120	0.79 U	40.0 U
cis-1,3-Dichloropropene	0.91 U	64.0 U	0.91 U	43.0 U	0.91 U	73.0 U	0.91 U	45.0 U
Cyclohexane	0.69 U	48.0 U	0.69 U	33.0 U	1.2	55.0 U	0.69 U	34.0 U
Dibromochloromethane	1.7 U	120 U	1.7 U	81.0 U	1.7 U	140 U	1.7 U	85.0 U
Dichlorodifluoromethane	3.3	170 U	2.5 U	120 U	2.5 U	200 U	11.0	7,900
Ethylbenzene	0.87 U	4,000	0.87 U	200	1.3	520	0.87 U	43.0 U
Hexachlorobutadiene	2.1 UJ	150 U	2.1 U	100 U	2.1 U	170 U	2.1 U	110 U
Isopropyl Alcohol	12.0 U	860 U	12.0 U	590 U	12.0 U	980 U	21.0	610 U
Methyl Methacrylate	2.0 U	140 U	2.0 U	98.0 U	2.0 U	160 U	2.0 U	100 U
Methyl Tert Butyl Ether	1.8 U	130 U	1.8 U	87.0 U	1.8 U	140 U	1.8 U	90.0 U
Methylene chloride	1.7 U	120 U	1.7 U	83.0 U	2.0	140 U	1.7 U	87.0 U
Naphthalene	2.6 U	180 U	2.6 U	130 U	2.6 U	210 U	2.6 U	130 U
n-Heptane	0.82 U	57.0 U	3.6	39.0 U	4.5	66.0 U	2.6	41.0 U
n-Hexane	1.8 U	120 U	1.8 U	85.0 U	1.8 U	140 U	1.8 U	88.0 U
o-Xylene	0.87 U	5,200	0.87 U	610	1.4	330	0.87 U	43.0 U
Styrene	0.85 U	60.0 U	0.85 U	40.0 U	0.85 U	81.0	0.85 U	43.0 U
tert-Butyl Alcohol	15.0 U	1,100 U	15.0 U	730 U	15.0 U	1,200 U	15.0 U	760 U
Tetrachloroethene	1.4 U	95.0 U	1.4 U	64.0 U	1.4 U	110 U	1.4 U	68.0 U
Tetrahydrofuran	15.0 U	1,000 U	15.0 U	710 U	15.0 U	1,200 U	15.0 U	740 U
Toluene	1.6	360	14.0	83.0	17.0	5,300	0.94	38.0 U
trans-1,2-Dichloroethene	0.79 U	56.0 U	0.79 U	38.0 U	0.79 U	63.0 U	0.79 U	40.0 U
trans-1,3-Dichloropropene	0.91 U	64.0 U	0.91 U	43.0 U	0.91 U	73.0 U	0.91 U	45.0 U
Trichloroethene	1.1 U	75.0 U	1.1 U	51.0 U	1.1 U	86.0 U	1.1 U	54.0 U
Trichlorofluoromethane	1.3	79.0 U	1.1	53.0 U	1.1	90.0 U	4.3	56.0 U
Vinyl chloride	0.51 U	36.0 U	0.51 U	24.0 U	0.51 U	41.0 U	0.51 U	26.0 U
Xylene (m,p)	2.2 U	24,000	2.2 U	610	4.0	1,800	2.2 U	110 U
Xylene (total)	0.87 U	29,000	0.87 U	1,200	5.6	2,100	0.87 U	43.0 U
Volatile Organics (Low)[1]								
Carbon tetrachloride	0.40	NA	0.40	NA	0.45	NA	0.45	NA
Trichloroethene	0.21 U	NA	0.21 U	NA	0.28	NA	0.21 U	NA

J= Estimated concentration

NA=Not analyzed

[1]= Compounds analyzed by EPA TO-15 with selective ion monitoring to achieve minimum reporting limits lower than those achieved with TO-15 alone

UJ= The compound was not detected above the reported sample quantitation limit. However the reported limit is approximate and may/may not represent the actual quantitation limit

28 Compound detected at a concentration that exceeds the 90% from the USEPA 2001 Building Assessment and Evaluation (BASE)

28 Compound detected at a concentration that exceeds both the 90% from the USEPA 2001 BASE and public health comparison values.

Buildings where additional monitoring was requested are shaded, as well as elevated compounds in sub-slab soil vapor

Table 2: Indoor Air, Outdoor Air and Sub-Slab Soil Vapor Data Summary Table
FMC Plant Site Buildings

	Building 48A		**Building 48B**		**Building 65A**		**Building 71A**	
	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor
Sample ID:	IA-048A	SS-048A	IA-048B	SS-048B	IA-065A	SS-065A	IA-071A	SS-071A
Date Collected:	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08
Volatile Organics								
1,1,1-Trichloroethane	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.5 U	1.1 U
1,1,2,2-Tetrachloroethane	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.9 U	1.4 U
1,1,2-Trichloro-1,2,2-trifluoroethane	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	41.0	46.0
1,1,2-Trichloroethane	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.5 U	1.1 U
1,1-Dichloroethane	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	1.1 U	0.81 U
1,1-Dichloroethene	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	1.1 U	0.79 U
1,2,4-Trichlorobenzene	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 UJ	5.2 U	3.7 UJ
1,2,4-Trimethylbenzene	0.98 U	12.0	0.98 U	3.5	0.98 U	4.9	**43.0**	19.0
1,2-Dibromoethane	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	2.2 U	1.5 U
1,2-Dichlorobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.7 U	1.2 U
1,2-Dichloroethane	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	1.1 U	0.81 U
1,2-Dichloroethene (total)	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	1.1 U	0.79 U
1,2-Dichloropropane	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	1.3 U	0.92 U
1,2-Dichlorotetrafluoroethane	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	2.0 U	1.4 U
1,3,5-Trimethylbenzene	0.98 U	4.6	0.98 U	1.1	0.98 U	1.8	**14.0**	7.9
1,3-Butadiene	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.5 U	1.1 U
1,3-Dichlorobenzene	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.7 U	1.2 U
1,4-Dichlorobenzene	**28.0**	8.4	**32.0**	4.0	1.2 U	1.2 U	1.7 U	1.2 U
1,4-Dioxane	18.0 U	18.0 U	18.0 U	18.0 U	18.0 U	18.0 U	25.0 U	18.0 U
2,2,4-Trimethylpentane	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	1.3 U	0.93 U
2-Butanone	1.5 U	2.4	1.5 U	2.1	1.9	1.5	**23.0**	4.4
2-Chlorotoluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.4 U	1.0 U
2-Hexanone	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.9 U	2.0 U
3-Chloropropene	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	2.2 U	1.6 U
4-Ethyltoluene	0.98 U	6.9	0.98 U	2.2	1.3	3.8	**54.0**	29.0
4-Methyl-2-pentanone	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.9 U	2.0 U
Acetone	19.0	24.0	17.0	48.0	19.0	23.0	88.0	67.0
Benzene	0.64 U	5.1	0.64 U	0.64 U	0.64 U	1.8	0.89 U	3.5
Bromodichloromethane	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.9 U	1.3 U
Bromoethene	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	1.2 U	0.87 U
Bromoform	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.9 U	2.1 U
Bromomethane (Methyl Bromide)	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U	1.1 U	0.78 U
Carbon disulfide	1.6 U	16.0	1.6 U	1.6 U	1.6 U	2.3	2.2 U	17.0
Carbon tetrachloride	1.3 U	1.3 U	1.3 U	1.3 U	1.3	1.3 U	1.8 U	1.3 U
Chlorobenzene	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	1.3 U	4.4
Chloroethane	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.8 U	1.3 U
Chloroform	0.98 U	0.98 U	0.98 U	0.98 U	**10.0**	13.0	**3.2**	9.8
Chloromethane	1.0 U	1.0 U	1.0 U	1.0 U	1.3	1.0 U	1.4 U	1.0 U
cis-1,2-Dichloroethene	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	1.1 U	0.79 U
cis-1,3-Dichloropropene	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	1.3 U	0.91 U
Cyclohexane	0.69 U	11.0	0.69 U	0.69 U	0.69 U	1.4	0.96 U	1.7
Dibromochloromethane	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	2.4 U	1.7 U
Dichlorodifluoromethane	2.8	3.4	2.8	3.1	2.7	2.5 U	3.5 U	2.9
Ethylbenzene	0.87 U	4.8	0.87 U	1.1	0.87	5.6	3.3	52.0
Hexachlorobutadiene	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 UJ	3.0 U	2.1 UJ
Isopropyl Alcohol	12.0 U	12.0 U	12.0 U	12.0 U	12.0 U	12.0 U	17.0 U	12.0 U
Methyl Methacrylate	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.9 U	2.0 U
Methyl Tert Butyl Ether	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2.5 U	1.8 U
Methylene chloride	1.7 U	1.7 U	1.7 U	1.7 U	**13.0**	6.3	6.6	8.7
Naphthalene	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	3.7 U	2.6 U
n-Heptane	0.82 U	20.0	0.82 U	0.82 U	0.82 U	4.9	2.2	8.6
n-Hexane	1.8 U	19.0	1.8 U	1.8 U	1.8 U	4.9	2.5 U	7.4
o-Xylene	0.87 U	8.3	0.87 U	1.6	1.7	8.7	3.8	19.0
Styrene	0.85 U	0.89	0.85 U	0.85 U	0.85 U	0.85 U	1.2 U	0.85 U
tert-Butyl Alcohol	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	21.0 U	15.0 U
Tetrachloroethene	1.4 U	3.6	1.4 U	3.3	1.4 U	1.4 U	1.9 U	1.4 U
Tetrahydrofuran	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U	21.0 U	15.0 U
Toluene	2.7	21.0	1.1	2.9	3.7	11.0	41.0	24.0
trans-1,2-Dichloroethene	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U	1.1 U	0.79 U
trans-1,3-Dichloropropene	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U	1.3 U	0.91 U
Trichloroethene	1.1 U	1.1	1.1 U	1.1 U	1.1 U	1.1 U	1.5 U	1.1 U
Trichlorofluoromethane	1.5	1.9	1.6	2.8	1.4	1.3	1.6 U	1.2
Vinyl chloride	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.72 U	0.51 U
Xylene (m,p)	2.2 U	20.0	2.2 U	4.8	3.2	33.0	8.7	140
Xylene (total)	0.87 U	28.0	0.87 U	6.1	4.8	42.0	13.0	160
Volatile Organics (Low)[1]								
Carbon tetrachloride	0.43	NA	0.48	NA	0.49	NA	0.40	NA
Trichloroethene	0.24	NA	0.21 U	NA	0.21 U	NA	0.21 U	NA

J= Estimated concentration

NA=Not analyzed

[1]= Compounds analyzed by EPA TO-15 with selective ion monitoring to achieve minimum reporting limits lower than those achieved with TO-15 alone

UJ= The compound was not detected above the reported sample quantitation limit. However the reported limit is approximate and may/may not represent the actual quantitation limit

28 Compound detected at a concentration that exceeds the 90% from the USEPA 2001 Building Assessment and Evaluation (BASE)

28 Compound detected at a concentration that exceeds both the 90% from the USEPA 2001 BASE and public health comparison values.

Table 2: Indoor Air, Outdoor Air and Sub-Slab Soil Vapor Data Summary Table
FMC Plant Site Buildings

	Building 71B		**Building 72**		**Building 21**		**Building 24**	
	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor
Sample ID:	IA-071B	SS-071B	IA-072	SS-072	IA-021	SS-021	IA-024	SS-024
Date Collected:	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08
Volatile Organics								
1,1,1-Trichloroethane	2.2 U	1.1 U	2.5 U	1.1 U	1.1 U	1.3	1.1 U	1.1 U
1,1,2,2-Tetrachloroethane	2.7 U	1.4 U	3.2 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
1,1,2-Trichloro-1,2,2-trifluoroethane	84.0	130	3.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
1,1,2-Trichloroethane	2.2 U	1.1 U	2.5 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
1,1-Dichloroethane	1.6 U	0.81 U	1.9 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U
1,1-Dichloroethene	1.6 U	0.79 U	1.8 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
1,2,4-Trichlorobenzene	7.4 U	82.0 J	8.9 U	3.7 U	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ
1,2,4-Trimethylbenzene	**32.0**	15.0	3.1	8.8	0.98 U	2.2	0.98 U	28.0
1,2-Dibromoethane	3.1 U	1.5 U	3.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
1,2-Dichlorobenzene	2.4 U	6.6	2.8 U	1.2	1.2 U	1.2 U	1.2 U	1.2 U
1,2-Dichloroethane	1.6 U	0.81 U	1.9 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U
1,2-Dichloroethene (total)	1.6 U	0.79 U	1.8 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
1,2-Dichloropropane	1.8 U	0.92 U	2.1 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
1,2-Dichlorotetrafluoroethane	2.8 U	1.4 U	3.2 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
1,3,5-Trimethylbenzene	**11.0**	6.9	2.3	4.5	0.98 U	1.2	0.98 U	10.0
1,3-Butadiene	2.2 U	1.1 U	2.7 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
1,3-Dichlorobenzene	2.4 U	10.0	2.8 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
1,4-Dichlorobenzene	2.4 U	25.0	2.8 U	1.4	1.2 U	1.2 U	1.2 U	1.7
1,4-Dioxane	36.0 U	18.0 U	43.0 U	18.0 U	18.0 U	18.0 U	18.0 U	18.0 U
2,2,4-Trimethylpentane	1.9 U	0.93 U	2.1 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U
2-Butanone	**47.0**	8.6	3.5 U	1.5 U	1.5 U	1.5 U	1.5 U	8.0
2-Chlorotoluene	2.1 U	1.0 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Hexanone	4.1 U	2.0 U	28.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
3-Chloropropene	3.1 U	1.6 U	3.8 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
4-Ethyltoluene	**39.0**	26.0	**8.4**	6.4	0.98 U	1.6	0.98 U	13.0
4-Methyl-2-pentanone	4.1 U	2.0 U	4.9 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acetone	110	48.0	**150**	20.0	12.0	36.0	22.0	67.0
Benzene	1.3 U	2.3	1.5 U	2.8	0.64 U	8.9	0.64 U	9.6
Bromodichloromethane	2.7 U	1.3 U	3.1 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Bromoethene	1.7 U	0.87 U	2.0 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U
Bromoform	4.1 U	2.1 U	4.8 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Bromomethane (Methyl Bromide)	1.6 U	0.78 U	1.8 U	0.78 U	0.78 U	0.78 U	0.78 U	0.78 U
Carbon disulfide	3.1 U	7.2	3.7 U	1.6 U	1.6 U	17.0	1.6 U	24.0
Carbon tetrachloride	2.5 U	1.3 U	2.9 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Chlorobenzene	1.8 U	1.3	2.1 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
Chloroethane	2.6 U	1.3 U	3.2 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Chloroform	**3.3**	4.9	**2.7**	1.6	0.98 U	0.98 U	0.98 U	0.98 U
Chloromethane	2.1 U	1.4	2.5 U	1.0 U	1.6	1.0 U	1.4	1.4
cis-1,2-Dichloroethene	1.6 U	0.79 U	1.8 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
cis-1,3-Dichloropropene	1.8 U	0.91 U	2.1 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
Cyclohexane	1.4 U	1.1	1.6 U	13.0	0.69 U	45.0	0.69 U	7.6
Dibromochloromethane	3.4 U	1.7 U	3.9 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Dichlorodifluoromethane	4.9 U	3.2	5.9 U	3.8	3.3	2.9	3.0	3.6
Ethylbenzene	4.0	7.4	4.3	4.3	0.87 U	3.1	0.87 U	8.7
Hexachlorobutadiene	4.3 U	2.1 UJ	4.9 U	2.1 U	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ
Isopropyl Alcohol	25.0 U	12.0 U	29.0 U	12.0 U	12.0 U	12.0 U	12.0 U	12.0 U
Methyl Methacrylate	4.1 U	2.0 U	4.9 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl Tert Butyl Ether	3.6 U	1.8 U	4.3 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Methylene chloride	6.6	5.6	4.2	1.7 U	1.7 U	27.0	1.7 U	1.7 U
Naphthalene	5.2 U	2.6 U	6.3 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
n-Heptane	3.4	7.0	1.9 U	21.0	0.82 U	120	0.82 U	31.0
n-Hexane	3.5 U	2.7	4.2 U	11.0	1.8 U	81.0	1.8 U	29.0
o-Xylene	3.6	6.5	6.1	6.9	0.87 U	3.8	0.87 U	15.0
Styrene	1.7 U	0.85 U	2.0 U	0.85 U	0.85 U	0.85 U	0.85 U	1.7
tert-Butyl Alcohol	30.0 U	15.0 U	36.0 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U
Tetrachloroethene	2.7 U	1.4 U	3.1 U	2.2	1.4 U	1.4 U	1.4 U	2.9
Tetrahydrofuran	29.0 U	15.0 U	35.0 U	15.0 U	15.0 U	15.0 U	15.0 U	15.0 U
Toluene	**53.0**	68.0	36.0	19.0	0.83	32.0	2.0	45.0
trans-1,2-Dichloroethene	1.6 U	0.79 U	1.8 U	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
trans-1,3-Dichloropropene	1.8 U	0.91 U	2.1 U	0.91 U	0.91 U	0.91 U	0.91 U	0.91 U
Trichloroethene	2.1 U	1.1 U	2.5 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Trichlorofluoromethane	2.2 U	1.3	2.6 U	2.3	1.4	1.2	1.4	1.5
Vinyl chloride	1.0 U	0.51 U	1.2 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U
Xylene (m,p)	9.6	23.0	15.0	19.0	2.2 U	16.0	2.2 U	56.0
Xylene (total)	13.0	30.0	21.0	26.0	0.87 U	20.0	0.87 U	74.0
Volatile Organics (Low)[1]								
Carbon tetrachloride	0.55	NA	0.53	NA	0.43	NA	0.38	NA
Trichloroethene	0.21 U	NA	0.21 U	NA	0.21 U	NA	0.21 U	NA

J= Estimated concentration NA=Not analyzed

[1]= Compounds analyzed by EPA TO-15 with selective ion monitoring to achieve minimum reporting limits lower than those achieved with TO-15 alone

UJ= The compound was not detected above the reported sample quantitation limit. However the reported limit is approximate and may/may not represent the actual quantitation limit

28 Compound detected at a concentration that exceeds the 90% from the USEPA 2001 Building Assessment and Evaluation (BASE)

28 Compound detected at a concentration that exceeds both the 90% from the USEPA 2001 BASE and public health comparison values.

Table 2: Indoor Air, Outdoor Air and Sub-Slab Soil Vapor Data Summary Table
FMC Plant Site Buildings

	Building 65B		Building 75		Building 104		Ambient (Outdoor) Air	
	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor	Indoor Air	Sub-Slab Soil Vapor		
Sample ID:	IA-065B	SS-065B	IA-075	SS-075	IA-104	SS-104	AA-1	AA-2
Date Collected:	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08	03/25/08
Volatile Organics								
1,1,1-Trichloroethane	1.1 U	1.1 U	1.1 U	1.6 U	1.1 U	3.2	1.8 U	1.1 U
1,1,2,2-Tetrachloroethane	1.4 U	1.4 U	1.4 U	2.1 U	1.4 U	1.4 UJ	2.3 U	1.4 U
1,1,2-Trichloro-1,2,2-trifluoroethane	1.5 U	1.5 U	1.5 U	2.3 U	1.5 U	1.5 U	2.5 U	1.5 U
1,1,2-Trichloroethane	1.1 U	1.1 U	1.1 U	1.6 U	1.1 U	1.1 UJ	1.8 U	1.1 U
1,1-Dichloroethane	0.81 U	0.81 U	0.81 U	1.2 U	0.81 U	0.81 U	1.3 U	0.81 U
1,1-Dichloroethene	0.79 U	0.79 U	0.79 U	1.2 U	0.79 U	0.79 U	1.3 U	0.79 U
1,2,4-Trichlorobenzene	3.7 U	3.7 UJ	3.7 U	5.6 U	3.7 UJ	3.7 UJ	6.2 U	3.7 U
1,2,4-Trimethylbenzene	0.98 U	5.9	0.98 U	31.0	0.98 U	5.9 J	1.6 U	0.98 U
1,2-Dibromoethane	1.5 U	1.5 U	1.5 U	2.3 U	1.5 U	1.5 UJ	2.5 U	1.5 U
1,2-Dichlorobenzene	1.2 U	1.2 U	1.2 U	1.8 U	1.2 U	1.2 UJ	2.0 U	1.2 U
1,2-Dichloroethane	0.81 U	0.81 U	0.81 U	1.2 U	0.81 U	0.81 U	1.3 U	0.81 U
1,2-Dichloroethene (total)	0.79 U	0.79 U	0.79 U	1.2 U	0.79 U	0.79 U	1.3 U	0.79 U
1,2-Dichloropropane	0.92 U	0.92 U	0.92 U	1.4 U	0.92 U	0.92 U	1.5 U	0.92 U
1,2-Dichlorotetrafluoroethane	1.4 U	1.4 U	1.4 U	2.1 U	1.4 U	1.4 U	2.3 U	1.4 U
1,3,5-Trimethylbenzene	0.98 U	1.9	0.98 U	14.0	0.98 U	3.2 J	1.6 U	0.98 U
1,3-Butadiene	1.1 U	1.1 U	1.1 U	1.7 U	1.1 U	1.1 U	1.8 U	1.1 U
1,3-Dichlorobenzene	1.2 U	1.2 U	1.2 U	1.8 U	1.2 U	1.2 UJ	2.0 U	1.2 U
1,4-Dichlorobenzene	1.2 U	1.2 U	1.2 U	4.0	1.2 U	1.2 UJ	2.0 U	1.2 U
1,4-Dioxane	18.0 U	18.0 U	18.0 U	27.0 U	18.0 U	18.0 U	30.0 U	18.0 U
2,2,4-Trimethylpentane	0.93 U	0.93 U	0.93 U	1.4 U	0.93 U	0.93 U	1.5 U	0.93 U
2-Butanone	1.5 U	1.9	1.5 U	11.0	1.5 U	2.0	2.4 U	1.5 U
2-Chlorotoluene	1.0 U	1.0 U	1.0 U	1.6 U	1.0 U	1.0 UJ	1.7 U	1.0 U
2-Hexanone	2.0 U	2.0 U	2.0 U	3.1 U	2.0 U	2.0 UJ	3.4 U	2.0 U
3-Chloropropene	1.6 U	1.6 U	1.6 U	2.3 U	1.6 U	1.6 U	2.6 U	1.6 U
4-Ethyltoluene	0.98 U	4.9	0.98 U	29.0	0.98 U	3.2 J	1.6 U	0.98 U
4-Methyl-2-pentanone	2.0 U	2.0 U	2.0 U	3.1 U	2.0 U	2.0 U	3.4 U	2.0 U
Acetone	12.0 U	26.0	12.0 U	88.0	12.0 U	19.0	20.0 U	12.0 U
Benzene	0.64 U	4.2	0.64 U	6.4	0.64 U	7.0	1.1 U	0.64 U
Bromodichloromethane	1.3 U	1.3 U	1.3 U	2.0 U	1.3 U	1.3 U	2.2 U	1.3 U
Bromoethene	0.87 U	0.87 U	0.87 U	1.3 U	0.87 U	0.87 U	1.4 U	0.87 U
Bromoform	2.1 U	2.1 U	2.1 U	3.1 U	2.1 U	2.1 UJ	3.4 U	2.1 U
Bromomethane (Methyl Bromide)	0.78 U	0.78 U	0.78 U	1.2 U	0.78 U	0.78 U	1.3 U	0.78 U
Carbon disulfide	1.6 U	2.9	1.6 U	7.8	1.6 U	5.0	2.6 U	1.6 U
Carbon tetrachloride	1.3 U	1.4	1.3 U	1.9 U	1.3 U	1.3 U	2.1 U	1.3 U
Chlorobenzene	0.92 U	1.1	0.92 U	1.4 U	0.92 U	0.92 UJ	1.5 U	0.92 U
Chloroethane	1.3 U	1.3 U	1.3 U	2.0 U	1.3 U	1.3 U	2.2 U	1.3 U
Chloroform	0.98 U	7.3	0.98 U	1.5 U	0.98 U	2.0	1.6 U	0.98 U
Chloromethane	1.2	1.5	1.0 U	1.5 U	1.5	1.0 U	1.7 U	1.2
cis-1,2-Dichloroethene	0.79 U	0.79 U	0.79 U	1.2 U	0.79 U	0.79 U	1.3 U	0.79 U
cis-1,3-Dichloropropene	0.91 U	0.91 U	0.91 U	1.4 U	0.91 U	0.91 U	1.5 U	0.91 U
Cyclohexane	0.69 U	2.2	0.69 U	18.0	0.69 U	9.3	1.1 U	0.69 U
Dibromochloromethane	1.7 U	1.7 U	1.7 U	2.6 U	1.7 U	1.7 UJ	2.8 U	1.7 U
Dichlorodifluoromethane	2.7	3.1	2.8	69.0	3.1	2.9	4.1 U	3.5
Ethylbenzene	0.87 U	2.5	0.87 U	16.0	0.87 U	3.7 J	1.4 U	0.87 U
Hexachlorobutadiene	2.1 U	2.1 UJ	2.1 U	3.2 U	2.1 UJ	2.1 UJ	3.5 U	2.1 U
Isopropyl Alcohol	12.0 U	12.0 U	12.0 U	18.0 U	12.0 U	12.0 U	20.0 U	12.0 U
Methyl Methacrylate	2.0 U	2.0 U	2.0 U	3.1 U	2.0 U	2.0 U	3.4 U	2.0 U
Methyl Tert Butyl Ether	1.8 U	1.8 U	1.8 U	2.7 U	1.8 U	1.8 U	3.0 U	1.8 U
Methylene chloride	1.7 U	5.9	1.7 U	2.6 U	1.7 U	1.7 U	2.9 U	1.7 U
Naphthalene	2.6 U	2.6 U	2.6 U	3.9 U	2.6 U	2.6 UJ	4.4 U	2.6 U
n-Heptane	0.82 U	7.0	0.82 U	40.0	0.82 U	25.0	1.4 U	0.82 U
n-Hexane	1.8 U	7.4	1.8 U	42.0	1.8 U	19.0	2.9 U	1.8 U
o-Xylene	0.87 U	4.3	0.87 U	19.0	0.87 U	6.9 J	1.4 U	0.87 U
Styrene	0.85 U	0.85 U	0.85 U	1.4	0.85 U	0.85 UJ	1.4 U	0.85 U
tert-Butyl Alcohol	15.0 U	15.0 U	15.0 U	23.0 U	15.0 U	15.0 U	25.0 U	15.0 U
Tetrachloroethene	1.4 U	1.4 U	1.4 U	18.0	1.4 U	1.4 UJ	2.2 U	1.4 U
Tetrahydrofuran	15.0 U	15.0 U	15.0 U	22.0 U	15.0 U	15.0 U	24.0 U	15.0 U
Toluene	1.1	18.0	1.7	26.0	0.94	25.0	1.2 U	0.75 U
trans-1,2-Dichloroethene	0.79 U	0.79 U	0.79 U	1.2 U	0.79 U	0.79 U	1.3 U	0.79 U
trans-1,3-Dichloropropene	0.91 U	0.91 U	0.91 U	1.4 U	0.91 U	0.91 U	1.5 U	0.91 U
Trichloroethene	1.1 U	1.1 U	1.1 U	1.6 U	1.1 U	1.1 U	1.8 U	1.1 U
Trichlorofluoromethane	1.7	1.2	1.5	1.7 U	1.3	1.3	1.9 U	1.9
Vinyl chloride	0.51 U	0.51 U	0.51 U	0.77 U	0.51 U	0.51 U	0.84 U	0.51 U
Xylene (m,p)	2.2 U	13.0	2.2 U	61.0	2.2 U	20.0 J	3.6 U	2.2 U
Xylene (total)	0.87 U	18.0	0.87 U	78.0	0.87 U	27.0 J	1.4 U	0.87 U
Volatile Organics (Low)[1]								
Carbon tetrachloride	0.37	NA	0.49	NA	0.40	NA	0.41	0.43
Trichloroethene	0.21 U	NA	0.38	NA	0.21 U	NA	0.21 U	0.21 U

J= Estimated concentration

NA=Not analyzed

[1]= Compounds analyzed by EPA TO-15 with selective ion monitoring to achieve minimum reporting limits lower than those achieved with TO-15 alone

UJ= The compound was not detected above the reported sample quantitation limit. However the reported limit is approximate and may/may not represent the actual quantitation limit

Table 3: Public Health Assessment Comparison Values and Typical Indoor Air Concentrations for Compounds Detected in Indoor Air at Levels Above Comparison Values at the FMC Facility
(*all values in micrograms per cubic meter (mcg/m^3)*)

Analyte	**Typical Indoor Air Levels**[1]		**Comparison Values**[2]			
	25th - 75th Percentile	**90th Percentile**	**Cancer**	**Cancer Basis**[3]	**Noncancer**	**Noncancer Basis**[3]
1,4-Dichlorobenzene	< 0.8 – 1.4	5.5	2.2	NYS CPF	1947	USEPA IRIS RfC
1,2,4-Trimethylbenzene	1.7 – 5.1	9.5	---	---	14.6	USEPA OSRTI RfC

[1] 90th Percentile Levels from the USEPA 2001 Building Assessment and evaluation (BASE) Database, SUMMA canister method. In accordance with guidance, the 90th percentile values from the 2001 USEPA BASE database were used as initial benchmarks when evaluating the indoor air data. (available at *http://www.health.state.ny.us/environmental/investigations/soil_gas/svi_guidance/docs/svi_appendc.pdf*).

[2] Comparison values are based on site-specific information and assume an office worker inhales 10 cubic meters of air per day at work, 6 days per week. The cancer comparison value is the air concentration that provides an intake corresponding to an increased lifetime cancer risk of one-in-one million and assumes an office worker inhales 10 cubic meters of air per day at work, 300 days per year for 25 years.

[3] NYS CPF: New York State Department of Environmental Conservation and Department of Health Cancer Potency Factor (NYS DEC/DOH, 2006)
USEPA IRIS RfC: United States Environmental Protection Agency Integrated Risk Information System Reference Concentration
USEPA OSRTI RfC: United States Environmental Protection Agency Office of Superfund Remediation and Technology Innovation Reference Concentration

Appendix A

NYS DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN

To evaluate the potential health risks from contaminants of concern associated with the FMC Corporation Properties the New York State Department of Health assessed the risks for cancer and noncancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low", then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

Excess Lifetime Cancer Risk

Risk Ratio	Qualitative Descriptor
equal to or less than one per million	very low
greater than one per million to less than one per ten thousand	low
one per ten thousand to less than one per thousand	moderate
one per thousand to less than one per ten	high
equal to or greater than one per ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant.

There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is general consensus among the scientific and regulatory communities on what level of estimated excess cancer risk is acceptable. An increased lifetime cancer risk of one in one million or less is generally not considered a significant public health concern.

For noncarcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for Noncarcinogenic Health Risks

Ratio of Estimated Contaminant Intake to Risk Reference Dose	Qualitative Descriptor
equal to or less than the risk reference dose	minimal
greater than one to five times the risk reference dose	low
greater than five to ten times the risk reference dose	moderate
greater than ten times the risk reference dose	high

Noncarcinogenic effects unlike carcinogenic effects are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number that reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the general human population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive subpopulations (for example, children or the elderly), extrapolation from animals to humans, and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for noncancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. A ratio equal to or less than one is generally not considered a significant public health concern. If exposure to the contaminant exceeds the risk reference dose, there may be concern for potential noncancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. This level of concern depends upon an evaluation of a number of factors such as the actual potential for exposure, background exposure, and the strength of the toxicologic data.

CERTIFICATION

The letter health consultation for the FMC Corporation (Middleport) was prepared by the Connecticut Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the letter health consultation was initiated. Editorial review was completed by the cooperative agreement partner.

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Technical Project Officer, CAT, CAPEB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation, and concurs with its findings.

Team Leader, CAT, CAPEB, DHAC, ATSDR