943578

EXHIBIT 1

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS,
WESTERN DIVISION

LAJIM, LLC, an Illinois Limited Liability Company, PRAIRIE RIDGE GOLF COURSE, LLC, an Illinois Limited Liability Company, LOWELL BEGGS, and MARTHA KAI CONWAY,	)	
Plaintiffs,	)	Case No.: 13-CV-50348
v.	)	Judge Iain D. Johnston
GENERAL ELECTRIC COMPANY, a New York Corporation,	)	
Defendant.	)	

AFFIDAVIT OF KONRAD J. BANASZAK, PH.D.

I, Konrad J. Banaszak, Ph.D., state as follows:

1. I am a hydrogeologist with over 40 years of professional experience. Throughout my career, I have directed and participated in hundreds of investigations of subsurface contamination caused by the release of chemicals, including chlorinated industrial solvents, which are the chemicals released at the former GE plant in Morrison, Illinois. I have worked on both sides of environmental matters, for those who have caused contamination as well as for those who have been affected by contamination caused by others. I have worked in several capacities: as a government scientist, as a professor of hydrogeology, and as a consultant to businesses, large and small, and to individuals.

2. I have been disclosed in this lawsuit as an expert witness and have offered opinions on the topics of hydrogeology, vapor intrusion, and the investigation of and response to environmental contamination. My resume is attached hereto as **Exhibit A**.

3. I have reviewed the reports, data, correspondence, and other documents in the Illinois EPAôs file concerning the GE chlorinated solvent contamination matter in Morrison, Illinois.

4. In this litigation, I have prepared an expert report and a rebuttal expert report, and I been deposed. These materials have been submitted to the Court as follows:

- Expert Report of Konrad J. Banaszak (Dkt. 40-1 through 40-5, PlaintiffsôDoc. 10)
- Rebuttal Expert Report of Konrad J. Banaszak (Dkt. 68-8, PlaintiffsôDoc. 61)
- Deposition of Konrad J. Banaszak (Dkt. 68-6, PlaintiffsôDoc. 59).

5. I have reviewed the expert report and deposition transcript of GEôs expert Peter Vagt. These materials have been submitted to the Court as follows:

- Expert Report of Peter Vagt (Dkt.45-1 through 45-3, PlaintiffsôDoc. 49)
- Deposition of Peter Vagt (Dkt. 68-3, PlaintiffsôDoc. 56).

6. I have reviewed the expert report and deposition transcript of GEôs expert Nadine Weinberg. These materials have been submitted to the Court as follows:

- Expert Report of Nadine Weinberg (Dtk. 46-1, PlaintiffsôDoc. 50)
- Deposition of Nadine Weinberg (Dkt. 68-9, PlaintiffsôDoc. 62).

7. I have reviewed the affidavit of Peter Vagt, dated April 7, 2016, recently submitted to the Court (Dkt. 117-1).

8. After the completion of my expert reports and deposition, there was some additional reporting and correspondence between GE and the Illinois EPA. I have reviewed GEôs Remedial Objectives Report (ROR) dated June 18, 2015. This report is attached to my affidavit as **Exhibit B**. GEôs ROR proposed no active remediation and relied on the presumed continuity of existing land use. GEôs ROR also relies on the incorrect assumption that the site investigation is complete. I have also reviewed the Illinois EPAôs response letter commenting on the ROR dated February 10, 2016, attached to my affidavit as **Exhibit C**. I have further reviewed GEôs responses to the Illinois EPAôs comments dated March 15, 2016, attached to my affidavit as **Exhibit D**.

9. In preparation of this affidavit, I also reviewed once again the following historical correspondence:

- IEPA Letter dated May 24, 2002 (Dkt. 43-4, PlaintiffsôDoc. 34)
- GE Response to Comments Letter (authored by Harrington Engineering) dated Oct. 11, 2002 (Dkt. 43-6, PlaintiffsôDoc. 36)
- IEPA Letter dated July 19, 2004 (Dkt. 43-7, PlaintiffsôDoc. 37)
- IEPA Email dated Jan. 8, 2014 (Dkt. 68-1, PlaintiffsôDoc. 54)
- IEPA Letter dated Mar. 18, 2015 (Dkt. 68-5, PlaintiffsôDoc. 58).

10. In consideration of everything described above, I conclude that GE has not proposed to the Illinois EPA that GE perform, and the Illinois EPA has not demanded of GE that GE perform, the actions necessary to appropriately investigate, respond to, and abate an imminent and substantial endangerment to human health and the environment.

11. Each of the thirteen specific requests for injunctive relief sought in an injunctive order by Plaintiffs is necessary to appropriately investigate, respond to, and abate an imminent and substantial endangerment to human health and the environment on Plaintiffsô properties. The rationale, basis, and support for each of these thirteen actions have in one form or another already been presented to the Court via my expert report, my rebuttal expert report, and my

deposition. Additional support for why I believe that GE should be ordered to perform these thirteen actions is presented below:

(1) the installation of appropriate soil borings and monitoring wells in the area of GE's degreasers (in bedrock), and determine the mass and lateral and vertical extent of Dense Non-Aqueous Phase Liquid ("DNAPL") and free phase chlorinated solvents present at the GE facility

This needs to be ordered because the concentrations of chlorinated solvents found in groundwater downgradient of the GE facility, where the degreasers were located, is strongly indicative of the presence of DNAPL, and the presence of DNAPL would provide for the continued release of chlorinated solvents to the groundwater which flows beneath the neighborhood and the Prairie Ridge Golf Course south of the plant. These conditions make it necessary to find if there is DNAPL present, especially in the upper bedrock. GE has declined to do this work under the plant building, because says GE, the Geoprobe drilling methods used by GEôs environmental consultant for the on-site investigation would not penetrate the bedrock. However, there are more robust drilling methods that could be used that penetrate the bedrock. The IEPA raised the issue of the need for GE to do a proper investigation for DNAPL all the way back in 2002, but to date a proper DNAPL investigation in the source area still has not been performed. At present, GE is not proposing such an investigation, and the IEPA is not requiring it. A proper DNAPL investigation can be done, and it needs to be done.

(2) the installation of recovery wells and ground water flow technology designed to prevent further migration of contamination from the GE facility to the City of Morrison and to Plaintiffs' properties

The installation and operation of recovery wells could contain the chlorinated solvents to the GE property and prevent the continued release of those chemicals to underneath the neighborhood and the Prairie Ridge Golf Course south of the GE plant. The IEPA had asked GE to install active remediation on the plant property back in 2002 and 2004. However, no active remediation has been performed at the degreaser sources, and the contamination continues to flow from the source areas to underneath the neighborhood and the Prairie Ridge Golf Course. At present, GE is not proposing to do anything that actually stops or restricts the continued migration of contamination from the GE plant property, and the IEPA is not demanding GE do so either. While installing a system preventing new incursion of contaminated groundwater to the areas to the south of the GE plant would go a long way to reducing the risk of GEôs contamination, for the reasons below it is still not enough. First, as I discussed in my expert reports and deposition, the actual total extent of the contamination is presently unknown. That fact means that a system to stop or restrict the continued migration of contamination cannot be fully designed on the basis of present knowledge. Second, the operation of the system would require a plan to monitor the systemôs performance and to react in case of failure, which failure would result in the further incursion of contaminated groundwater. Third, even with a system to stop or restrict the migration of contamination, contamination would nevertheless be left behind south of that system, and that contamination still has an undetermined magnitude and extent, but it is clearly persistent.

(3) determine the horizontal and vertical extent of groundwater contamination emanating from the GE facility and migrating off site

The extent of the contamination both horizontally and vertically needs to be found and defined in order to develop a competent plan to remediate the contamination and control exposure to contaminated groundwater. It clearly is fundamental to the cleanup because you cannot clean what you do not know is dirty.

GE overstates the extent to which the IEPA buys into GEôs incorrect Rock Creek groundwater divide theory. Clearly if the IEPA believed with certainty that Rock Creek was a divide, then the IEPA would not be requiring that GE keep monitoring wells on the south side of Rock Creek for future sampling. The IEPA seems to know this is an issue but it has not required GE to further investigate this issue. GE seems to want to avoid the ramifications of having to deal with the fact that Rock Creek is not the boundary to its contamination that it has always said it was. It is obvious that Rock Creek is not a divide, because TCE was found in the south supply well. Even Peter Vagt acknowledges that the TCE in the south supply well came from the GE plant.

There are also some relatively deep monitoring wells with significant contamination a long way from the plant, and there have not been deeper monitoring wells installed at those locations that were found to be clean. Particularly, the vertical extent of contamination at monitoring wells MW-7 and MW-8 has not been defined by deeper clean wells at those locations. Another example of the lack of vertical definition is well MW-1D where contamination is found at a depth of 269 feet, and no investigation has been completed deeper at this location.

GE suggests that the nested wells installed by MWH on the south side of Rock Creek (MW-11, MW-12, and MW-13) complete the investigation. That is most certainly not the case.

The IEPA recognizes as a general matter that the total extent of groundwater contamination must be defined, but yet with significant gaps in defining the vertical and horizontal extent of contamination at this site, GE is not proposing more investigation and the IEPA is not requiring it. The horizontal and vertical extent of contamination must be defined.

(4) implement an immediate, interim remedial plan to remove hot spots of contamination (to residential concentrations) identified at the GE facility and in the City of Morrison and at Plaintiffs' properties

ñHot spotò cleanup is a fundamental function to prevent the continued release of contaminants to the groundwater. Any DNAPL ñhot spotò is especially important because of the length of time that such a ñhot spotò will act as a source of continuing release from the plant to the neighborhood to the south and the Prairie Ridge Golf Course. There is no indication that the IEPA is demanding ñhot spotò removal at the GE plant or in areas south of the GE plant, but it needs to be done.

(5) investigate the third degreaser reportedly in Building 14

There could be a source, perhaps even a DNAPL source, at this completely uninvestigated degreaser. It needs to be understood if this area is a contributor to the groundwater contamination plume and if so, what is the extent and magnitude of solvent contamination emanating from this area. GEôs position that the sampling south of Building 14 is adequate to address this question is just not credible. Source areas need to be investigated, and this area is no different. There could be DNAPL at this location, or significant contamination that should be removed or remediated, to shut down a source continuing to feed the plume. At present, GE is not proposing any sampling at the former degreaser reportedly in Building 14, and the IEPA is not demanding GE do it. It needs to be done.

(6) install deeper wells near MW-7 and MW-8 in order to properly investigate the conditions at Rock Creek

As explained in item 3 above, deeper wells near MW-7 and MW-8 should be installed to define the vertical extent of contamination. These two wells are approximately 100 feet deep and TCE has been found in them at concentrations of hundreds and thousands of parts per billion. The present groundwater flow conditions at greater depths needs to be further defined to see how deep the contamination is in the area beneath Rock Creek. Deeper wells at this location are also critical to understanding the hydrogeology, particularly the vertical and horizontal gradient at depth below Rock Creek, which is critical to understanding the way in which contamination is flowing under Rock Creek and where the contamination is going. GE is not proposing to do the work necessary to fill this significant data gap, which is fundamental to a proper hydrogeologic characterization and definition of the extent of contamination. Nor is the IEPA requiring or demanding that GE do so. This work is essential and needs to be performed.

(7) determine whether Rock Creek is a groundwater divide given the presence of contamination discovered south of Rock Creek

The occurrence of TCE contamination in the south supply well which taps the bedrock below the elevation of the bottom of the valley fill at its maximum thickness is not explained. The south supply well is 800 feet south of Rock Creek, and it stands to reason that Rock Creek is not or was not a divide of the type where all of the groundwater, including deeper groundwater, flowed into the creek from both banks. The idea that the present conditions are the historical conditions is not justified as contaminated groundwater at the GE plant has a long history. The groundwater conditions of today may not be the conditions in the past. Data reported by GEôs environmental consultants in the past show that Rock Creek lost water to the groundwater. The primary contamination migration route may be in the shallow bedrock above the Maquoketa Shale. This migration route has not been adequately studied. The nested wells installed by GE south of Rock Creek are not in the correct locations to answer the question of why TCE was found in the south supply well located so far to the south of Rock Creek. Work that should be performed to answer the important question of how TCE got into the south supply well includes: (a) installing deeper wells at locations MW-7 and MW-8 as proposed above, (b) installing new shallow bedrock wells along a line from the GE Facility to the south supply well with at least one being near Rock Creek, (c) installing new monitoring wells at different depths south of Rock Creek, but closer to

Rock Creek than nested wells MW-11, MW-12, and MW-13, (d) additional sampling of the south supply well, and (e) pump testing of the south supply well to understand its hydraulic influence vertically and horizontally.

(8) perform an investigation to properly characterize the groundwater quality south of the golf course, between the south well and Rock Creek

The very likely route for chlorinated solvents from the GE Facility to the south is along a more direct path, and perhaps even in the bedrock. GE has apparently discounted that this route could be the path that the chlorinated solvents took from the source at the GE plant to the south supply well. The nature and extent of contamination is not defined by nested wells MW-11, MW-12, and MW-13, as the presence of contamination in the south supply well remains unexplained. Even the IEPA recognized recently that wells MW-11, MW-12, and MW-13 would leave an area of undefined nature and extent between Rock Creek and those wells, but then the IEPA never followed up on its expressed concern. The IEPA is not requiring a proper characterization of the hydrogeology and the nature and extent of contamination on the south side of Rock Creek, nor is the IEPA requiring the development of an explanation for the presence of contamination in the south supply well. GE is not proposing to do anything either. This work must be done.

(9) determine the source of contamination that is present in the south supply well at the golf course

The finding of TCE in the south supply well tells us that there must be a source for it. The most likely source is the GE plant. Even GEôs expert acknowledges this. No other source has been identified. The concentration of TCE detected in the south irrigation well was below the MCL, but it stands to reason that higher concentrations of TCE are then nearby, upgradient from the well. Logically, with TCE detected in recent years at 4,800 ppb in MW-8 at Rock Creek, and TCE being below the 5 parts per billion MCL at the south supply well, there is likely groundwater with TCE concentrations between those two numbers in the area and depths in between. GE takes the position that data from its monitoring wells MW-11, MW-12, and MW-13 adequately address this issue. It does not. If this issue was resolved to the IEPAôs satisfaction, the IEPA would not be requiring these wells to remain in place for possible future sampling. The work described in response 7 above is essential to definitively explaining the TCE found in the south supply well.

(10) investigate the shale conditions GE reports as a vertical barrier, but where contamination has been discovered beneath the shale, and effectively define the vertical extent of contamination in that area

This investigation is needed because there is not an adequate explanation of the amounts of contamination being found in the bedrock aquifer below the shale years and decades after what GE characterized as the only conduits to the deep aquifer being closed. City Well #1 continued to have TCE in it up until it was closed just recently. GEôs explanation of the historical ñholesò in the Maquoketa shale associated with now-closed deep wells is insufficiently developed. The work of the USGS ï a neutral agency that studied the geology of the Maquoketa shale not for this site in particular but in furtherance of its general mission of studying and reporting the

hydrogeology ï clearly showed that what GE calls the *barrier* shale (the Maquoketa) actually transmits water downward, from the shallow contaminated groundwater to the deeper aquifer below the shale. The production of water from the zones beneath the so-called barrier shale is a possible cause of this downward transmission. The IEPA has not demonstrated that it understands the vertical migration of chlorinated solvents into the shale. The IEPA is not requiring that GE further investigate or study this issue. To characterize the nature and extent of contamination and develop a plan for remediating and controlling that contamination, it is necessary to characterize and understand the behavior of the shale and investigate and address the contamination that may be passing through the shale and that has already passed through the shale into the aquifer below. Installing deep wells into the shale is a necessary step to answer the questions that need to be answered.

(11) implement long-term vapor intrusion monitoring and immediately implement active vapor remediation where needed (also addressed by Illinois EPA as inadequate)

Clearly, contamination continues to migrate from the plant to underneath the residential neighborhood and the golf course clubhouse. Given that situation, ongoing vapor intrusion monitoring is needed. At the clubhouse, the TCE concentrations in soil gas have actually been rising over the past few years. The conditions are not static, and ongoing monitoring with a continuing evaluation of whether contamination levels observed pose a risk is needed. With the extreme levels of contamination at and coming from the plant, GE is not proposing any more vapor intrusion testing, and the IEPA is not demanding it. Yet this work is essential under these circumstances.

(12) investigate the source of 1,2 Dichloroethane discovered in the home of Plaintiffs, Lowell and Kai, and the long term risk of exposure, and immediately implement active vapor remediation at that residence

The compound 1,2-Dichloroethane (1,2-DCA) has been discovered in the house of Lowell Beggs and Kai Conway. Several autochthonous sources have been hypothesized by GE but not found in the house. 1,2-DCA has been found in the groundwater not far from the house. This conflict between the subslab data and the source data needs to be resolved. The IEPA has not demanded that GE prove up its 1,2-DCA theory with reliable data, and GE is satisfied with ending its inquiry in what is essentially still the unproven theory stage.

(13) *promptly remove and treat all contamination in the source areas determined above – in order to abate the imminent and substantial danger associated with the contamination migrating from the GE facility and all consistent a RCRA Corrective Action Plan.*

The way to prevent the continued release of contaminants to the Prairie Ridge Golf Course is to remove sources of release. This activity also will shorten the time for completion of remediation of the contaminants associated with the sources. It is the case that there is not yet a method proposed by GE that will remediate the contamination at and emanating from its plant, and so at a minimum, the removal of source areas is a necessary operation at this point in time to at least insure that the problem will last the shortest amount of time possible and reach the lowest achievable concentrations downgradient from the sources. GE has not even fully characterized

the sources by doing such things as drilling deeper borings and looking for DNAPL at the former degreaser locations in the main building, or by doing any testing at the third degreaser in Building 14. And thus GE has certainly not removed contamination from these source areas. GE is not proposing do so, and the IEPA is not demanding it. It must be done.

12. For all of the reasons described in the paragraphs above, and as further supported by my expert report, my rebuttal expert report, and my deposition, it is my opinion that GE has not taken and is not taking, and the IEPA has not required and is not requiring, GE to take the actions necessary to appropriately investigate, respond to, and abate an imminent and substantial endangerment to human health and the environment. GE should be ordered to perform the thirteen actions described above.

I swear under penalty of perjury that the foregoing is true and correct.

4/18/16

Konrad J. Banaszak, Ph.D. DATE

SUBSCRIBED AND SWORN TO
Before me on this 18th day of April, 2016

Kathy Jo Cohen

Notary Public

KATHY JO COHEN
Notary Public, State of Indiana
Marion County
My Commission Expires
January 24, 2024

EXHIBIT A

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG
Hydrogeologist & Geochemist

Konrad J. Banaszak, PhD is a hydrogeologist and geochemist, bringing 40 years of experience to Genesis Engineering and Redevelopment as Chief Scientist. Dr. Banaszak is a leading expert in the fate and transport of chemicals in soil and groundwater, the geochemistry of water and sediments, and the migration and impacts of vapors in soil and indoor air. Dr. Banaszak provides expert witness services on complex litigations for plaintiffs and defendants and Project Management services on numerous high profile projects.

From his PhD thesis on the origins of lead and zinc ores found in limestones and dolomites to recent efforts to understand the generation and movement of trichloroethene vapors, Konrad has worked with fluids. As a geochemist and hydrogeologist, he started in academia. The development of a heightened environmental concern lead to his involvement first with the government as a regulator and researcher and then in the private sector as a consultant/expert.

Dr. Banaszak has significant experience with the management of scientists, engineers, and the professionals necessary to government and business. For example, he was Chief of a 50 person Hydrologic Investigations Section with an annual budget of roughly $2.5m in the mid '80s. Konrad opened the Indianapolis Office of Geraghty and Miller (now Arcadis-US) and successfully lead the office to high profitability. He also led the Environmental Investigations Business Practice for Arcadis-US, with responsibility for ensuring both the scientific accuracy and profit and loss of 42 offices. Konrad joined Genesis Engineering and Redevelopment in October of 2010.

EDUCATION

Bachelor of Science, Geology, Beloit College
Master of Science, Geology, Northwestern University
Doctorate, Geochemistry, Northwestern University

CERTIFICATIONS

Illinois Licensed Professional Geologist (#196-000436)
Indiana Certified Professional Geologist (#16)
Kentucky Certified Professional Geologist (#835)
Wisconsin Certified Professional Geologist (#446)
Certified Professional Geologist (AIPG-#3981)

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG

EXPERIENCE

Chief Scientist, Genesis Engineering and Redevelopment, 2010-present
Chief Scientist, EnviroForensics, 2008-2010
Senior Vice President, Keramida Inc., 2003-2008
Independent Consultant, 2003
Senior Vice President, Practice Leader, Geraghty and Miller which became Arcadis-US, 1988-2002
Groundwater Specialist and then Chief of Hydrologic Investigations, Indiana District, Water Resource Division, United States Geological Survey, 1981- 1988
Hydrogeologist/Water Quality Specialist additionally Officer for Mineral Research Institutes, US Office of Surface Mining, Region III, 1979-1981
Associate Professor of Geology, Indiana University Purdue University at Indianapolis, 1977-1979
Assistant Professor of Geological Engineering, University of Mississippi, 1971-1977

PROFESSIONAL ASSOCIATIONS

American Association for the Advancement of Science
American Geophysical Union
American Institute of Hydrology
American Institute of Professional Geologists
American Water Resources Association
Geological Society of America
Geochemical Society
Indiana Academy of Sciences, Fellow
Indiana Geologists
Indiana Water Resources Association

REPRESENTATIVE ACTIVE PROJECTS

Chlorinated VOCs contamination in a karst terrain with Public Supply Wells in Central Missouri.

Cleanup of nitrate contaminated groundwater, Central Valley, CA.

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG

Vapor intrusion of chlorinated VOCs for housing development in Central Indiana.

Remediation of landfill that received drilling mud and designation of contaminants to PRPs, San Joaquin Delta, CA.

Gasoline contamination in groundwater and as a separate phase in southern Mississippi.

Chlorinated VOCs contamination, Los Angeles, CA

Chlorinated and Petroleum VOCs contamination, Southern CA

Dry Cleaner, New York City/

2 Dry Cleaners, New Jersey

REPRESENTATIVE FORMER PROJECTS

Consulting Expert, chlorinated VOCs and Perchlorate groundwater contamination in Southern CA.
Brownfield revitalization and cleanup in Central Indiana.
Chlorinated VOCs in groundwater downgradient of industrial park in suburban Chicago.
Expert Witness for nitrate contamination of Public Supply Well, Central Valley, CA.
Nitrate contamination of groundwater and domestic well, Central Valley, CA.
Expert witness for production of sediment in surface streams from a construction site in Central Indiana.
Floating product and petroleum contamination with vapor intrusion and surface water impacts in area of New York City.
Goundwater level issues for drainage control ponds in Central Indiana.
Geochemical expert in Superfund cost allocation, arsenic in Pennsylvania.
Lead consultant on pesticide/herbicide Superfund site in Southeast.

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG

Consulting hydrologist for quarry operator for site in Central Indiana, which then lead to work all over the contiguous US.

Lead consultant on RCRA RFI/CMS for large nonferrous metals refining and recycling plant in Northwest Indiana.

Lead/advising consultant on RCRA RFI/CMS for two integrated steel mills in Northwest Indiana.

Lead and advising consultant for a self-implementing PCB cleanup under the "Mega Rule".

Geochemical consultant on chemicals that entered Puget Sound, WA.

Geochemical and isotope expert witness for landfill toxic tort in Texas.

Geochemical and loading allocation expert Superfund action for large watershed in New York.

Expert witness on the probable character of dust in an asbestos case brought to trial in San Francisco but concerning a site in Hoboken, NJ.

Source identification and allocation of PCBs in two streams in Indiana and one in Ohio.

Expert witness for cost allocation for a chemical depot that was atop an old coal tar refinery in Chicago.

Expert witness, geochemistry of constituents and isotopes of oil field brines for several sites in Texas.

Advising geochemist on mobility and treatment for a nuclear waste site in Washington State.

Lead hydrogeologist in the development of an Institutional Control Area alternative for several Superfund subsites in Nebraska.

Lead hydrogeologist and geochemist (including radionuclide and stable isotopes) for site-wide study of Argonne National Laboratories, IL.

Expert witness for degree of harm and cost recovery action in Federal Bankruptcy action.

Geochemical and groundwater expert in cost recovery for chlorinated solvents in "Silicon Valley," CA.

Senior advisor for geochemistry of inorganic and organic contamination for a large landfill in the middle of intense industrial development in Los Angeles Metro Area.

Expert witness for cost recovery from insurers for a major landfill operator for multiple sites.

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG

Advising expert on hog waste for major food manufacturer, NC.

Senior advisor on environmental chemistry for a RCRA site where pesticides are manufactured in Kansas.

Groundwater expert for Brownfield development of Jefferson North Assembly Plant, Chrysler, Detroit.

River Bank Infiltration projects for both Louisville Water and Indianapolis Water.

Expert witness for manufacturer of large paper making machinery in Northern Illinois over potential contamination of domestic wells.

Expert witness for manufacturer in Los Angeles Area, using a then new "chemical fingerprinting" technique.

Expert witness for logger in California involved in a case of two fish kills and alleged sedimentation and water quality degradation of a river and two reservoirs.

Outside expert for State of North Carolina on geochemistry and hydrogeology for siting a low-level radioactive waste facility.

Expert witness in several cases for the coal mining industry in Indiana, the most notable of which concerned the disposal of coal combustion wastes in surface mines.

Geochemical expert on cost allocation in a case concerning heavy metals in South Carolina.

Development of systems to predict behavior of chemicals spilled on or applied to soils for a major agricultural chemical company.

Expert witness for nitrate contamination from hog waste in surface stream in Indiana

Review of Four County Landfill for the Agency for Toxic Substances and Disease Registry.

Review of the EIS for the proposed CDF in Lake Michigan to hold sediments to be dredged from the Indiana Harbor Canal for EPA-V.

Review of the REM/FIT of the North Main Street Well Field, Elkhart, IN for EPA-V.

Represented USGS in Development of Field effort to capture spring flow at highest groundwater level from karst systems near Bloomington, IN for EPA-V.

Expert witness for sample collection of stream water for the Office of Surface Mining.

Conducted acid rain studies in Indianapolis and Mississippi.

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG

SELECTED PUBLICATIONS

Coals as aquifers in the Eastern United States. 1980 Symposium on Surface Mining Hydrology, Sedimentology, and Reclamation, University of Kentucky, Lexington, KY, p. 235-241.

Predicted changes in mineralogy of spoil as a function of net neutralization potential and rate of flushing. 1981 Symposium on Surface Mining Hydrology, Sedimentology, and Reclamation, University of Kentucky, Lexington, KY, p. 459-462.

Drainage problems in Little Eagle Creek, Indianapolis and Speedway, IN. in Contribution to urban engineering geology of the Indianapolis area, Field trips in Midwestern Geology, v. 2, Geological Society of America, 1983 Meeting, Indianapolis, IN.

Indiana – groundwater resources. in National Water Summary 1984, U.S. Geological Survey Water Supply Paper 2275, p. 205-210.

Potential effects on groundwater of a hypothetical surface mine in Indiana: 1985 Groundwater Monitoring Review, v. 5, no. 1, p. 51-57.

Water quality in a thin water-table aquifer adjacent to Lake Michigan within a highly industrialized region of Indiana. in The Great Lakes: Living with North America's Inland Waters, D.M. Hickcox, ed 1988, American Water Resources Association Bethesda, MD, p. 247-258. (K.J. Banaszak and J.M. Fenelon)

Preliminary analysis of the shallow groundwater system in the vicinity of the Grand Calumet River/Indiana Harbor Canal, northwestern Indiana. 1989 U.S. Geological Survey Open-File Report 88-492, 45p. (L.R. Watson, R.J. Shedlock, K.J. Banaszak, L.D. Arihood, and R.K. Doss).

Coal-Hydrology of the Interior Province – Eastern Region. in Summary of U.S, Geological Survey and U.S. Bureau of Land Management National Coal-Hydrology Progress. Britton, L.J. and others, eds. 1989 U.S. Geological Survey Professional Paper 1464. p.47-52.

Glacial geology and groundwater flow in Northern and Central Indiana. in Proceedings of the Indiana Academy of Science, G.E. Dolph, ed., v. 98, 273-279, 1994.

A Brownfield's success story – Chrysler's Jefferson North Assembly Plant in Detroit, MI. in Remediation and Reuse. 1995 Indiana Department of Environmental Management. v. 1, Issue 7, p. 4-5.

GENESIS ENGINEERING & REDEVELOPMENT

Konrad Banaszak, PhD and CPG

Negative Indicators in Fenton application give insight into process. in Fourth Battelle Conference of Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California 2004. (S.A. Hunnicut, A.A. Gremos, and K.J. Banaszak)

In-Situ reductive dechlorination of solvents. in Heleco 2005 Conference, Athens, Greece (K.J. Banaszak, A.A. Gremos, and S.A. Hunnicut).

Communicating science in public decision making. in Heleco 2005 Conference, Athens, Greece.

Scientific, cost-effective investigations of karsts. in Heleco 2005 Conference, Athens, Greece.

EXHIBIT B

Lewis S. Streeter
Senior Project Manager

GE
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Albany, NY 12203

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lewis.streeter@ge.com

June 18, 2015

Mr. Todd Hall
Illinois Environmental Protection Agency
Remedial Project Management Section, Bureau of Land
1021 North Grand Avenue East
PO Box 19276
Springfield, IL 62794
One paper copy, one electronic copy

Re: Remediation Objectives Report
Consent Order No. 04 CH 28
GE facility, 709 West Wall St., Morrison, IL

Dear Mr. Hall:

The General Electric Company (GE) is submitting the attached Remedial Objectives Report (ROR) as required by the referenced Consent Order. The ROR has been prepared by MWH Americas, Inc., on behalf of GE, for the former GE facility in Morrison IL. Please note that the Focused Site Investigation was conditionally approved by Illinois Environmental Protection Agency (IEPA) in a letter dated March 18, 2015 which was received by GE on March 24, 2015. In that approval letter, IEPA provided three comments on the FSI Addendum Report. Responses to those comments are contained in the attached ROR.

Please contact me with any questions or comments, or if you need any additional information.

Sincerely,

Lewis S. Streeter
Senior Project Manager

LSS/bg

Attachment

OneEHS

cc:

Division of Legal Counsel
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GE MORRISON FACILITY

REMEDIAL OBJECTIVES REPORT

CONSENT ORDER NO. 04 CH 28

GENERAL ELECTRIC COMPANY
ALBANY, NEW YORK

Prepared For:

GE Corporate Environmental Programs

Prepared By:

MWH Americas, Inc.

MWH

BUILDING A BETTER WORLD

Project No. 1011490

June 2015

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APPENDICES

Appendix A	IEPA Letter dated March 18, 2015
Appendix B	SL-SCREEN Model
Appendix C	Professional Engineer Affirmation

ACRONYMS AND ABBREVIATIONS

Arcadis	ARCADIS U.S., Inc.
AST	Above ground storage tank
bgs	Below ground surface
cis-1,2-DCE	Cis-1,2-dichloroethene
COCs	Chemicals of concern
COPCs	Chemicals of potential concern
CSM	Conceptual Site Model
FSI	Focused Site Investigation
GE	General Electric
GRO	Groundwater remediation objective
HI	Hazard index
IAC	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
ILCR	Incremental lifetime cancer risk
J&E	Johnson and Ettinger
MC	Methylene chloride
mg/L	Milligrams per liter
MWH	MWH Americas, Inc.
PCE	Tetrachloroethene
RAP	Remedial Action Plan
RfCs	Reference concentrations
ROs	Remedial Objectives
ROR	Remedial Objectives Report
RSLs	Regional Screening Levels
SCGIER	Soil component of the groundwater ingestion exposure route
SGROs	Soil gas remediation objectives
Site	GE Morrison Facility
SL SCREEN	SL-SCREEN Version 2.3 03/01
SRO	Soil Remediation Objectives
SSDS	Sub-slab depressurization system

TACO	Tiered Approach to Corrective Action Objectives
TCE	Trichloroethene
UECA	Uniform Environmental Covenants Act
URFs	Unit risk factors
USEPA	United States Environmental Protection Agency
VC	Vinyl chloride
VOCs	Volatile organic compounds
SVOCs	Semi-volatile organic compounds
1,1,1-TCA	1,1,1-trichloroethane
1,1,2-TCA	1,1,2-trichloroethane
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1-dichloroethene
µg/Kg	Micrograms per kilogram

1.0 INTRODUCTION

This Remedial Objectives Report (ROR) is prepared in accordance with Consent Order No. 04 CH 28 between the State of Illinois and the General Electric Company (GE), which was entered on December 23, 2010. The Illinois Environmental Protection Agency (IEPA) is the administrative agency for the State of Illinois. This ROR presents the proposed remedial objectives for soil, groundwater and soil gas associated with the ongoing remedial activities at the former GE Morrison facility (Site) located in Morrison, Illinois. MWH Americas, Inc. (MWH) is the consultant to GE, and has prepared this ROR on its behalf. The location of the Site is shown on ***Figure 1***.

GE submitted a Focused Site Investigation (FSI) Report (MWH, 2013a) to IEPA in April 2013. IEPA provided comments on the FSI in a letter dated July 25, 2013 requesting submittal of a Work Plan to provide additional investigation activities. GE submitted a Supplemental Work Plan (MWH, 2013b) to IEPA in August 2013. The supplemental investigation was completed in April 2014 and GE submitted a FSI Addendum Report to IEPA in May 2014 (MWH, 2014a). In a letter dated August 14, 2014, the IEPA provided comments on the Addendum Report and requested a response. A Response to IEPA Comments was submitted in October 2014 and included information to supplement the FSI documents, prepared by MWH (MWH, 2014b) as well as a Tiered Approach to Corrective Action (TACO) Tier 3 Evaluation for the Indoor Inhalation Exposure Route. The Tier 3 Evaluation was prepared by ARCADIS U.S., Inc. (Arcadis, 2014) on behalf of GE. The IEPA conditionally approved the FSI in a letter dated March 18, 2015.

A copy of the IEPA approval letter, which was received by GE on March 24, 2015, is provided as ***Appendix A***. In accordance with the requirements of the Consent Order, this ROR is being provided to the IEPA by the due date of June 22, 2015. Section 2 provides a response to the IEPA comments on the FSI. Section 3 describes the recognized environmental conditions at the Site. Section 4 provides the TACO Tier 3 indoor air inhalation evaluation for the Main Building. The remedial objectives for the Site are presented in Section 5.

2.0 RESPONSE TO COMMENTS

This section of the ROR provides a response to the IEPA comments provided in the letter dated March 18, 2015 (***Appendix A***).

The following comment was on the October 22, 2014 Response to IEPA Comments – Focused Site Investigation Addendum Report prepared by MWH.

IEPA Comment 1: As discussed on Page 14 in the document, three (3) well nests (MW11, MW12 and MW13) were installed south of Rock Creek to provide further analysis of the groundwater flow regime and to delineate the groundwater divide. These well nests must remain installed in the event additional information is required to further verify the groundwater flow regime and/or additional sampling of these wells is required.

GE Response to Comment 1: *The monitoring wells installed south of Rock Creek will be included as part of the monitoring well network. These wells will be maintained as long as data is required from them and GE continues to have permission from the current landowner(s) to do so.*

The following comments were on the October 22, 2014 Response to IEPA Comments – Focused Site Investigation Addendum Report prepared by Arcadis (Tier 3 Evaluation for the Indoor Inhalation Exposure Route).

IEPA Comment 1) a): The Illinois Uniform Environmental Covenants Act (UECA) will be relied upon to create a perpetual environmental covenant that the SSDS at 304 Oak Street remains in operation.

GE Response to Comment 1) a): *A UECA will be relied upon to create a perpetual environmental covenant so that the SSDS at 304 Oak Street remains in operation. A more detailed discussion of the UECA covenant will be included in the Remedial Action Plan (RAP) for the Site.*

IEPA Comment 1) b): In regards to the golf course property, the future use must be addressed. Specifically, no land use restriction or covenant is in effect which would prevent redevelopment of the golf course into an alternate land use (e.g. residential). The Illinois EPA questions what steps will be taken to certify that land use at the golf course property will remain consistent with the current use and/or what steps will be taken to evaluate the indoor inhalation exposure route if the land use changes in the future.

GE Response to Comment 1) b): *There are no known plans for redevelopment of the Golf Course into an alternate land use (e.g. residential). In addition, for most of the Golf Course property, change of the current use is not reasonably anticipated given that most of the course is located within the 100-year flood plain area as delineated by the Federal Emergency Management Agency. Both City of Morrison and Whiteside County ordinances impose significant requirements (i.e., raising elevation of lowest living space above the 100-year flood elevation) on any construction within the 100-year flood plain that would make any residential use cost prohibitive in the Morrison area. It should also be noted that south of the creek, shallow groundwater is not contaminated so there would be no complete exposure route for indoor inhalation in the highly unlikely event that land use did change in that area. GE has evaluated the area north of the creek and found the indoor air exposure pathway to be incomplete.*

IEPA Comment 2: Table 1 in the document shows that off-site groundwater sampling results were compared the 35 IAC 742 Appendix B. Table I groundwater remediation objectives (ROs) for the indoor inhalation pathway. Additional discussion should be provided to verify why these ROs were used in lieu of the 35 IAC 742 Appendix B. Table H ROs. Based on the nature of the off-site groundwater plume of volatile compounds downgradient of the Site, it would be possible that contamination may be possible within 5 feet vertically or horizontally of a building or man-made pathway, prompting comparison of groundwater results to the 35 IAC 742 Appendix B. Table H ROs. Additional discussion must be provided.

GE Response to Comment 2: *Section 742.505(b)(2)(D) states: Appendix B, Table I may be used only when all soil and groundwater contamination is located more than 5 feet, vertically and horizontally, from the existing or potential building or manmade pathway.*

Table I was selected based on the saturated intervals observed in the boring logs of the soil borings drilled in Morris Street, at the Clubhouse and in the residential neighborhood. In general, depth to groundwater was 12 feet or greater within the residential neighborhood. Basements in the Midwest are typically six feet or less below grade. The table below summarizes the temporary wells where VOCs were detected in grab groundwater samples above the most stringent GRO (which is the Class I drinking water standard) and the corresponding saturated interval.

Temporary Well	***Saturated Interval***
SB24	*12 feet bgs*
SB35	*17 feet bgs*
SB44	*18 feet bgs*

bgs – below ground surface

Based on the saturated intervals observed in the soil borings for these temporary wells Table I is the appropriate screening table. Comparison of the concentrations of VOCs detected in shallow groundwater to Table I screening criteria shows no exceedance of those screening values. A copy of Table 1 including both Table H and Table I screening criteria is included in ***Appendix A****.*

3.0 RECOGNIZED ENVIRONMENTAL CONDITIONS

This section of the ROR presents the chemicals of concern (COCs) detected in site media, a summary of the conceptual site model (CSM), a discussion of the recognized environmental conditions and an evaluation of the identified exposure routes.

3.1 IDENTIFICATION OF CHEMICALS OF CONCERN

The FSI field work began in December 2011 and supplemental field investigation activities were completed by April 2014. The purpose of the FSI was to collect samples where additional data was determined to be needed and to monitor concentrations of VOCs in groundwater. The Study Area includes the GE Morrison Facility, the right-of-ways of Wall Street and Morris Street and the down gradient residential and industrial/commercial properties (Golf Course) to Rock Creek. The Study Area was expanded south of Rock Creek during the supplemental investigation to include the Golf Course parcel and residential homes south of the Golf Course. The FSI investigations included:

- Collection of 70 soil samples for volatile organic compounds (VOC) analysis;
- Collection of 6 soil samples for semi-volatile organic compound (SVOC) analysis;
- Collection of 4 soil samples for geotechnical and physical characteristics analysis;
- Collection of 5 soil samples for fraction organic carbon analysis;
- Collection of 29 grab groundwater samples from temporary wells for VOC analysis;
- Collection of 24 soil gas samples for VOC analysis;
- Collection of 80 groundwater samples from permanent monitoring wells for VOC analysis;
- Collection of 5 surface water samples for VOC analysis;
- Collection of 7 private water well samples for VOC analysis; and,
- Collection of 4 investigative derived waste samples for disposal characterization.

The COCs for the Site are VOCs; specifically trichloroethylene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and to a lesser extent tetrachloroethylene (PCE), (along with several VOCs due to the breakdown of the virgin products) which were used during manufacturing operations at the Site and have been detected in samples collected during the FSI. The concentrations of COCs are compared to IEPA TACO Tier 1 screening criteria in Title 35 Illinois Administrative Code (IAC) Part 742.

Table 1 lists the COCs detected above TACO Tier 1 screening criteria for each media type (soil, groundwater, soil gas and surface water). In addition to VOCs, naphthalene was detected in one soil sample above the Tier 1 soil remediation objective (SRO) for the construction worker inhalation exposure route, therefore this compound is included on the list of COCs for this Site.

3.2 SUMMARY OF CONCEPTUAL SITE MODEL

The results of the FSI and supplemental investigations confirm the CSM developed for the Study Area. The CSM predicts the majority of VOCs released at the Site have migrated along the bedrock interface zone towards Rock Creek, where they are now detected in the sand and gravel 100 feet below the creek. The highest concentrations of VOCs are detected in groundwater samples collected from monitoring wells located adjacent to the Rock Creek and screened at a depth of approximately 100 feet below ground surface (MW7-LS, MW8-LS and MW4-LS).

Figure 2 is a graphic of the CSM, drawn to provide a qualitative representation of the surface and groundwater flow and interaction in the Study Area. The following observations are made.

- The source of groundwater is precipitation that falls within the Rock Creek basin.
- Primary groundwater recharge occurs in the upland areas.
- Rock Creek, which is incised below the water table, is the primary groundwater discharge area.
- Groundwater flows from the uplands on both sides of Rock Creek towards the discharge area at the creek through multiple pathways.
- Approximately 70 percent of the groundwater flows through the deep pathway along the bedrock interface zone from the recharge area to the discharge area at Rock Creek.
- Groundwater converges towards Rock Creek from both the north and south. Colliding groundwater pathways zero out the horizontal gradient in the bedrock interface zone 60-100 feet below the creek.
- Since water discharges to Rock Creek, water pressure is reduced at the top of the aquifer, and the primary gradient is upward near Rock Creek. The horizontal groundwater flow paths curve upward as they near the creek.

- The potentiometric pressures are equal and opposite from the north and south side of the creek in the bedrock interface zone, and so the blue cylinder on Figure 2 represents a zone of essential zero gradient in the north/south direction.
- Where there is essentially no gradient, there is no significant driving force to move the groundwater. Therefore groundwater in this cylindrical zone remains largely stagnant.
- The only significant gradient in the cylindrical zone is upward, towards discharge into Rock Creek.
- However, the only pathway to discharge into the creek is through 40 feet of low permeability clayey silt so groundwater seepage into Rock Creek is minimal compared to the total surface water flowing along Rock Creek.
- The discharge volume to the creek from the hydrostratigraphic units is sufficient to make Rock Creek predominantly a gaining stream.
- Water level measurements at MW7-LS and MW8-LS also document the existence of a small horizontal gradient oriented west to east at the bedrock interface zone, along the axis of the creek, shown by the white arrow on top of the blue cylinder in ***Figure 2***.
- This gradient creates the potential for slow migration of a small portion of groundwater in the bedrock interface zone along the axis of Rock Creek to the east.
- Some of the highest VOC concentrations in groundwater are detected in monitoring wells MW7-LS and MW8-LS, which are screened within the bedrock interface zone near Rock Creek. These represent contaminants that migrated toward Rock Creek in the past along the 1,000-foot wide groundwater flow path between the Main Building and Rock Creek.
- The VOCs are concentrated in the stagnant zone in the bedrock interface zone beneath Rock Creek. While the small gradient eastward along the axis of the creek causes the migration eastward of VOCs in the bedrock interface zone downstream sampling results show that the VOCs do not extend outside the Study Area.
- Surface water sampling in Rock Creek shows no detectable concentrations of VOCs.
- Concentrations of VOCs have decreased systematically under each of the three sampling methodologies employed in the Study Area since 1987. All indicators confirm that natural attenuation is active in the source and groundwater plume.

3.3 DEFINITION OF STUDY AREA

The FSI included the collection of samples from three primary areas; the Main Building, the residential area and the Golf Course south of the GE Facility. In addition, samples were collected in the right-of-ways of Wall Street and Morris Street located north and south of the Main Building, respectively. Samples were also collected from private wells at seven residential properties south of the Golf Course. These areas are described below.

Main Building

Soil borings were installed where VOCs were most likely to be detected at locations requested by the IEPA. Soil samples were collected beneath the Main Building and immediately adjacent to the Main Building and in the right-of-ways of Wall Street and Morris Streets. Soil borings were completed on GE property on the east side of the Main Building and two soil borings were completed beneath the former 1,1,1-TCA above ground storage tank (AST). Soil samples were not collected in the residential areas or on the Golf Course because the transport mechanism for VOC migration to these areas is groundwater. Soil sample results are summarized on ***Table 2***.

Grab groundwater samples were collected on the east side of the Main Building and in the right-of-ways of Wall Street and Morris Street. Grab groundwater results are summarized on ***Table 3***.

Soil gas samples were collected on the north and east sides of the Main Building and in the right-of-ways of Wall Street and Morris Streets. Soil gas results are summarized on ***Table 4***.

Residential Area

The residential area includes the homes south of the Main Building extending to Rock Creek. Shallow grab groundwater samples were collected at locations throughout the residential area to provide groundwater data for the vapor intrusion investigation, which at the time of the sampling was being conducted under United States Environmental Protection Agency (USEPA) direction. Grab groundwater sample results are summarized on ***Table 3***.

The soil vapor intrusion exposure route for down gradient residential properties was evaluated. Grab groundwater samples were collected in Morris Street and throughout the residential neighborhood to determine which homes required further evaluation.

Sub-slab and indoor air samples were collected from nine residential homes in the Study Area. The results of the soil vapor intrusion investigation are summarized in the Tier 3 Evaluation for the Indoor Inhalation Exposure Route (Arcadis 2014).

In addition, two permanent monitoring wells MW8-LS and MW-9 were installed adjacent to Rock Creek on the residential property located at 601 Hickory Hill Drive. Monitoring well MW8-LS was required as part of the original Work Plan (MWH, 2011) as a down gradient monitoring point. Monitoring well MW-9 was installed adjacent to MW8-LS to monitor shallow groundwater at this location.

During the supplemental investigation, the private well survey was expanded to include seven residential homes south of Rock Creek. The seven homes are using private wells and; therefore, those wells were sampled for VOCs. No COCs were detected in samples collected from the private wells south of Rock Creek.

Golf Course

During the private well survey, two irrigation wells were identified on the Golf Course. These wells are not used for irrigation directly but rather are used to fill ponds from which water is pumped into the irrigation system. Groundwater samples were collected from the irrigation wells and surface water samples were collected from the ponds associated with these two wells. Groundwater sample results from the irrigation well sampling are summarized on ***Table 5***. Surface water sample results are summarized on ***Table 6***.

Grab groundwater samples were collected from soil boring SB-35 to evaluate shallow groundwater conditions near the clubhouse and assist with the vapor intrusion evaluation. In addition, grab groundwater samples were collected from five intervals during the installation of monitoring well MW-10, installed on the Golf Course, in order to provide a vertical profile of the upper aquifer at this location. Grab groundwater sample results are summarized on ***Table 3***.

The soil vapor intrusion exposure route for the Golf Course Club House was evaluated. The evaluation included the collection of sub-slab soil gas samples and indoor air samples. The results of that evaluation are summarized in the previously referenced Tier 3 report.

The FSI included the installation of one, new monitoring well MW7-LS on the Golf Course adjacent to Rock Creek. The purpose of this well was to evaluate groundwater data downgradient of the GE Facility. In addition, monitoring well MW-10 was installed

at the potential location of a replacement irrigation well on the Golf Course. During the supplemental investigation, the groundwater monitoring network was expanded to include the installation and sampling of six new monitoring wells on the south side of Rock Creek, which were installed on Golf Course property.

3.4 RECOGNIZED ENVIRONMENTAL CONDITIONS

The following environmental conditions are recognized within the Study Area:

1. VOCs were detected in soils beneath the Main Building at concentrations above the soil component of the groundwater ingestion exposure route (SCGIER).

2. VOCs were detected in soils beneath the Main Building at concentrations above the outdoor inhalation SRO for the industrial/commercial worker and the construction worker.

3. One SVOC, naphthalene, was detected beneath the floor of the Main Building at a concentration that is above the construction worker inhalation SRO for this compound.

4. Tetrachlorethene was detected in one soil gas sample collected immediately adjacent to the Main Building at a concentration above the industrial/commercial indoor inhalation exposure route.

5. VOCs were detected in soils beneath Wall Street at concentrations above the SCGIER.

6. VOCs were detected in shallow groundwater immediately adjacent to the Main Building at concentrations above Tier 1 groundwater remediation objectives (GROs) for Class I groundwater.

7. VOCs were detected in groundwater downgradient from the Main Building, including the northern irrigation well on the Golf Course, at concentrations above GROs for Class I groundwater.

8. VOCs were detected in a surface water sample collected from the north Golf Course pond, while the irrigation well was being pumped, at concentrations above IEPA surface water criteria (the source of the VOCs was water being pumped from the irrigation well into the pond). Results from two sampling events conducted after the pump was shut down indicated the surface water criteria were not exceeded.

3.5 EXPOSURE ROUTE EVALUATION

Title 35 IAC Part 742 requires the evaluation of the following exposure routes:

- Outdoor soil inhalation exposure route;
- Soil Ingestion exposure route;
- Soil component of groundwater ingestion exposure route;
- Groundwater component of the groundwater ingestion exposure route;
- Indoor air inhalation exposure route; and,
- Surface water.

Individual exposure routes are discussed by media type.

3.5.1 Outdoor Soil Inhalation Exposure Route

The outdoor soil inhalation exposure route was evaluated by comparing the concentrations of VOCs in soil to the SROs for the industrial/commercial, construction worker and residential inhalation exposure routes (35 IAC Part 742, Appendix B, Tables A and B).

Residential Inhalation Exposure Route

The outdoor soil inhalation exposure route for residential use is applicable for soil in the right-of-way of Wall Street and Morris Street. Concentrations of VOCs detected in soil samples collected in Wall Street and Morris Street are below inhalation SROs and; therefore, the outdoor inhalation exposure route is not complete for soils outside the Main Building (***Table 2***).

Concentrations of 1,2-dichloroethane (1,2-DCA), in soil samples collected beneath the Main Building, are detected above residential inhalation SROs. The Main Building is industrial/commercial and; therefore, the residential SRO does not apply.

Industrial Worker Inhalation Exposure Route

Concentrations of 1,2-DCA were detected in soil beneath the Main Building above the industrial/commercial worker inhalation SRO for this compound. Concentrations of 1,2-DCA were detected above the SRO in two soil samples (SB-07 and SB-08), collected beneath the former central degreaser location (***Table 2***). Based on the results of soil samples collected beneath the Main Building, the soil inhalation exposure pathway for the industrial worker is complete.

Construction Worker Inhalation Exposure Route

Concentrations of VOCs in soil beneath the Main Building were detected above construction worker inhalation SROs. Concentrations of 1,1-dichloroethene (1,1-DCE) were detected above the construction worker SRO in three soil samples (SB06, SB07 and SB08) and 1,-2-DCA was detected above the SRO in soil sample SB-08 (***Table 2***). These concentrations were detected in soil samples collected beneath the former central degreaser operation. Naphthalene was detected in soil boring SB-31 at a concentration above the construction worker inhalation SRO for this compound. Soil boring SB-31 was located approximately 100 feet east of the central degreaser, beneath the former cold control area in the Main Building.

Based on the results of soil samples collected beneath the Main Building, the soil inhalation exposure pathway for the construction worker is complete.

3.5.2 Soil Ingestion Exposure Route

The soil ingestion exposure pathway was evaluated by comparing the concentrations of VOCs in soil to SROs for the industrial/commercial and construction worker ingestion exposure routes (35 IAC Part 742, Appendix B, Table B). In addition, soil samples collected in the right-of-way of Wall Street and Morris Street were screened against the residential SROs for the ingestion exposure route (35 IAC Part 742, Appendix B, Table A).

Concentrations of VOCs detected in soil are below ingestion SROs and therefore this exposure route is not complete. No further evaluation is proposed for this exposure route.

3.5.3 Soil Component of the Groundwater Exposure Route

The SCGIER is evaluated by comparing the concentrations of VOCs in soil to SROs for Class I groundwater (35 IAC Part 742, Appendix B, Table A). Nine VOCs were detected in soil samples above the SCGIER.

The following table summarizes the frequency and locations of VOCs detected above the SCGIER.

Compound	SCGIER (µg/kg)	No. of Samples Above the SCGIER/ No. Samples	Soil Boring Location(s)
1,1-DCE	60	6 / 70	SB-06, SB-07, SB-08, SB-09, SB-14 and SB-20
1,2-DCA	20	4 / 70	SB-06, SB-07, SB-08 and SB-14
1,1,1-TCA	2,000	3 / 70	SB-06, SB-08 and SB-14
TCE	60	3 / 70	SB-02, SB-14 and SB-16
MC	20	2 / 70	SB-06 and SB-08
PCE	60	2 / 70	SB-06 and SB-14
cis-1,2-DCE	400	1 / 70	SB-17
VC	10	1 / 70	SB-17
1,1,2-TCA	20	1 / 70	SB-07 (duplicate)

Notes:
cis-1,2-DCE – cis-1,2-dichloroethene
MC – methylene chloride
VC – vinyl chloride
1,1,2-TCA - 1,1,2-trichlorethane
µg/kg – micrograms per kilogram

Beneath the former central degreaser, soil samples collected from borings SB-06, SB 07, SB-08, SB-09, SB-14, SB-16, SB-17 and SB-20 contained one or more VOC compounds above the SCGIER. Soil samples collected from one boring SB-02, beneath the former western degreaser, contained TCE at a concentration above the SCGIER (***Table 2***).

Along Wall Street, VOCs were detected at concentrations above the SCGIER in shallow soil samples (four feet or less) collected at three locations (SB-14, SB-16 and SB-17). Soil samples collected from Morris Street did not contain VOCs at concentrations above the SCGIER.

Soil samples collected beneath the Main Building and Wall Street contained VOCs above the SCGIER for several compounds; therefore, this exposure route may be considered complete.

3.5.4 Groundwater Ingestion Exposure Route

The groundwater component of the groundwater ingestion exposure route is evaluated by comparing concentrations of VOCs detected in groundwater to the GROs for Class I groundwater (35 IAC Part 742, Appendix B, Table E).

Concentrations of VOCs were detected in groundwater samples above GROs at seven grab groundwater sample locations. Three of these locations were located in Wall Street (SB-15, SB-17 and SB-21), north of the Main Building. Three locations were south of the

Main Building in Morris Street (SB-24), Oak Street (SB-44), and the parking lot of the Golf Course (SB-35). Additionally, one grab groundwater sample detected VOCs above GROs from the vertical profiling conducted during the installation of MW-10 from an interval of 9-14 feet bgs. Grab groundwater results are summarized in ***Table 3***.

During the FSI, VOCs were detected above GROs in samples collected from five monitoring wells (G105D, MW3-UD, MW4-LS, MW7-LS and MW8-LS). In addition, VOCs were detected above GROs in groundwater samples collected from the northern irrigation well (***Table 5***). This is consistent with the CSM which predicts VOCs released at the Main Building are traveling vertically downward and then horizontally along the bedrock interface towards Rock Creek. Groundwater results for samples collected from wells within the groundwater monitoring network are summarized in the tables previously provided in the FSI Report and FSI Addendum Report.

Concentrations of VOCs were detected in groundwater within the Study Area above Tier 1 GROs. However, there is an IEPA-approved Groundwater Ordinance restricting the use of groundwater within the City of Morrison, and all sources of potential groundwater exposure have been identified, sampled or mitigated:

- There are no private wells being utilized as potable water sources between the GE Facility and Rock Creek.
- The residential homes using private groundwater wells south of Rock Creek are located beyond the groundwater divide and COCs were not detected in samples collected from those wells.
- The Golf Course irrigation wells are not a potable water source and signs have been placed on the wells stating the groundwater is not to be consumed.
- City Well No. 3 was closed in 2013.

Based on the findings of the FSI and already completed remedial actions, human ingestion of groundwater is not anticipated and; therefore, this exposure route is not complete.

3.5.5 Indoor Air Inhalation Exposure Route

The indoor air inhalation exposure route for down gradient properties was excluded based on the results of the Tier 3 Evaluation. However, that Tier 3 Evaluation did not address the indoor air inhalation exposure route for the Main Building. This evaluation addresses the indoor air inhalation exposure route for the Main Building.

The TACO guidance uses soil gas and groundwater data to evaluate the potential for the indoor air inhalation exposure route (35 IAC Part 742, Appendix B, Table H). Soil samples were collected beneath the floor of the Main Building and soil, soil gas and shallow groundwater samples were collected adjacent to the Main Building and within the right-of-ways of Wall Street and Morris Street. Shallow groundwater and soil gas sample results are summarized in ***Tables 3 and 4***; respectively.

Shallow Groundwater

Concentrations of VOCs in shallow groundwater collected in the right-of-ways of Wall Street and Morris Street and within the residential neighborhoods were below the inhalation GRO's for the indoor air inhalation exposure route (***Table 3***). This is further evidence the shallow groundwater near the Main Building is not creating a vapor intrusion exposure scenario for downgradient residential and industrial/commercial properties.

Soil Gas

Tetrachloroethylene was detected above the industrial/commercial soil gas remediation objective (SGRO) in soil gas sample SG-1, collected on the north side of the Main Building, near the former chlorinated solvents storage tanks area (***Table 4***).

Concentrations of TCE were detected above the residential indoor inhalation exposure route in soil gas samples SG-1, SG-3 and SG-5. SG-3 was collected in Wall Street and SG-5 was collected in Morris Street. These sample locations are in close proximity to the Main Building and adjacent to industrial/commercial properties.

Soils

35 IAC Part 742.312 states the indoor air inhalation exposure route can be excluded if "No building or man-made pathway exists or will be placed above contaminated soil gas or groundwater exceeding Tier 1 remediation objectives for residential property (Appendix B, Table H), provided, however, that there is also no soil or groundwater contamination exceeding Tier 1 remediation objectives for residential property (Appendix B, Table A) or Class I groundwater (Appendix B, Table E) located 5 feet or less, horizontally, from any existing or potential building or man-made pathway".

Based on the detected concentration of PCE at the SG-5 location and the known concentrations of VOCs in soil below the Main Building the indoor inhalation exposure route for the Main Building is complete.

3.5.6 Surface Water Exposure Route

The surface water exposure route was evaluated by comparing the concentrations of VOCs detected in surface water to IEPA derived surface water criteria (***Table 6***).

During the 1987 Phase I Remedial Investigation, three surface water samples were collected from Rock Creek and analyzed for VOCs. One sample was found to contain 1,1,1-TCA at an estimated concentration of 0.003 parts per million. This concentration is below the most stringent IEPA surface water criteria.

Three rounds of surface water samples were collected from the north pond and one sample was collected from the south pond. The sample results showed that the highest VOC concentrations were detected during the September 2012 surface water sampling event while water was being pumped into the pond from the irrigation well. Concentrations dropped significantly and quickly thereafter when pumping ceased. The September 2012 results were used in this evaluation. Results from the other sampling events were below IEPA derived surface water criteria.

Four VOCs (TCE, 1,1,1-TCA, 1,1-DCE and cis-1,2-DCE) were detected in the surface water sample collected from the north pond in September 2012. Only TCE was detected above the surface water criteria for human non-threshold criteria. This sample was collected while water was being pumped into the pond from the irrigation well. Concentrations of VOCs detected in surface water samples were below criteria for aquatic life. Concentrations of VOCs in surface water samples collected from the pond when the irrigation well was not pumping were below surface water criteria.

Based on the results of this investigation, the surface water exposure route may be considered to be complete for the north pond when water is being pumped into the pond from the irrigation well.

4.0 TIER 3 INDOOR AIR EVALUATION

This section of the ROR presents the Tier 3 indoor air evaluation for soil vapor intrusion into the Main Building.

4.1 TIER 3 INDOOR AIR INHALATION EVALUATION

The vapor intrusion risk evaluation follows the basic Tier 3 Soil to Indoor Air Modeling procedures presented in 35 IAC 742 (TACO) and procedures in the USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) (USEPA, 2002). Other guidance documents used in the vapor intrusion risk evaluation include:

- Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual (USEPA, 1989); and,
- Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual. Supplemental Guidance (USEPA, 1991).

Contaminant Sources and Soil COPCs

Results of recent soil investigations revealed the presence of VOCs in soils surrounding and beneath the Main Building. Detected VOCs in soil samples collected beneath the Main Building include the following chlorinated VOCs: 1,1,1-TCA, 1,1,2-TCA, 1,1-DCE, 1,2-DCA, cis-1,2-DCE, MC, PCE, TCE and VC. Concentrations of the following seven VOCs in soil beneath the Main Building were detected above TACO Tier 1 SROs: 1,1,1-TCA, 1,1,2-TCA, 1,1-DCE, 1,2-DCA, MC, PCE and TCE. As a result, these seven VOCs were identified as chemicals of potential concern (COPCs) for soil beneath the Main Building.

A small basement with a sump is present under a portion of the Main Building; however, soil samples were not collected from beneath the basement. Therefore, the basement was not included in the risk evaluation.

Potentially Exposed Populations and Potentially Complete Exposure Pathways

The Site is an inactive industrial facility with only a caretaker visiting the Main Building for approximately one hour per day, four days per month. The current land use designation for the Site is industrial. Although no current or future industrial activities

are planned for the Site, it is possible for hypothetical future industrial workers to be exposed to Site contaminants.

As stated previously, current soil characterization results indicate that VOCs are present in the vadose zone beneath the Main Building. Consequently, there is a potential for VOCs to migrate vertically in soil vapor, pass through cracks in the foundation of the building, and intrude into indoor air. Therefore, the human receptors that are potentially exposed to COPCs in soil through vapor intrusion to indoor air of the Main Building are the hypothetical future industrial worker and the current and future caretaker.

Estimation of Indoor Air Concentrations

The USEPA has developed a spreadsheet-based model that incorporates equations included in the vapor intrusion model originally published by Johnson and Ettinger (J&E, 1991) to aid in evaluating the vertical migration of VOCs in the subsurface and vapor intrusion into buildings. The SL-SCREEN Version 2.3 03/01 (SL SCREEN) version of USEPA's J&E vapor intrusion model (USEPA, 2001) allows estimation of the transport of contaminant soil vapors emanating from subsurface soils into indoor spaces located directly above the source of contamination.

The maximum detected concentrations of VOCs identified as soil COPCs were entered into the SL SCREEN model, to estimate potential human health risks associated with vapor intrusion to indoor air. The SL-SCREEN model was modified to utilize a combination of Site-specific soil physical parameters, Site-specific building dimensions, and default exposure assumptions presented in IEPA TACO regulations and USEPA vapor intrusion guidance (2002). The exposure parameters used in the vapor intrusion risk evaluation are presented in ***Appendix B, Table 1***.

In order to characterize theoretical carcinogenic risks and noncarcinogenic hazards associated with the vapor intrusion to indoor air pathway, toxicity information for each of the soil COPCs were updated within the SL SCREEN model to include current unit risk factors (URFs) and reference concentrations (RfCs) as presented in USEPA's Regional Screening Levels (RSLs) table (USEPA, 2015). The toxicity values used in the vapor intrusion risk evaluation are presented in ***Appendix B, Table 2***.

Vapor Intrusion Risk Estimates

The vapor intrusion risk estimates for the hypothetical future industrial worker and the current and future caretaker, the maximum detected concentration of each soil COPC, and the depth at which each soil COPC maximum concentration was detected are presented in ***Appendix B, Table 3***.

The USEPA considers an incremental lifetime cancer risk (ILCR) between 1×10^{-6} and 1×10^{-4} and a noncancer hazard index (HI) of 1 as the points of departure for making risk management decisions concerning a site (USEPA, 1991). Further evaluation, or consideration of remedial alternatives, are typically suggested for any site with associated cumulative cancer risk and noncancer HI estimates that exceed these criteria. For sites with a cumulative cancer risk estimate below the 1×10^{-6} to 1×10^{-4} range, and a noncancer HI of less than 1, it may be appropriate for conditional closure.

Cumulative ILCR and noncancer HI estimates for the hypothetical future industrial worker exposed to soil COPCs through vapor intrusion to indoor air were 1×10^{-7} and 0.06, respectively. These ILCR and HI estimates are below USEPA's acceptable risk and hazard criteria.

Cumulative ILCR and noncancer HI estimates for the current and future caretaker exposed to soil COPCs through vapor intrusion to indoor air were 3×10^{-9} and 0.001, respectively. These ILCR and HI estimates are below USEPA's acceptable risk and hazard criteria.

5.0 REMEDIAL OBJECTIVES

This section of the ROR presents the proposed remedial objectives for potential exposure routes identified in the FSI.

5.1 SOIL REMEDIATION OBJECTIVES

Ten COCs were identified in Site soils. COCs in soil are limited to the footprint of the Main Building and in the right-of-way of Wall Street. The soil remediation objectives for specific soil exposure routes are discussed below.

5.1.1 Outdoor Inhalation Exposure Route

The remediation objective for the outdoor inhalation exposure route is to prevent human exposure to soils above the inhalation SROs. Concentrations of COCs were detected in soil beneath the Main Building above the residential, industrial/commercial worker and construction worker inhalation SROs. There is no current threat to users because the building is unoccupied and the existing slab prevents exposure to site soils. However, potential exposures by reasonably anticipated future users will be addressed in the RAP.

5.1.2 Soil Component of the Groundwater Ingestion Exposure Route

Concentrations of COCs were detected beneath the Main Building and within the right-of-way of Wall Street above the Tier 1 SCGIER. The remediation objective for the SCGIER is to prevent ingestion of groundwater containing VOCs above Tier 1 GROs. The RAP will address the potential for concentrations of VOCs in soil to migrate to groundwater and evaluate the potential for use, if any, of that groundwater.

5.2 GROUNDWATER REMEDIATION OBJECTIVES

The remediation objective for groundwater is to prevent ingestion of groundwater containing VOCs above Tier 1 GROs. Based on the investigation conducted for the FSI and the existing Groundwater Ordinance no humans are ingesting groundwater containing VOCs above Tier 1 GROs. The existing Groundwater Ordinance will prevent ingestion of contaminated groundwater in the area covered by the ordinance. The RAP will evaluate the potential for ingestion of groundwater in the future in areas outside the area of the Groundwater Ordinance and measures, if any, necessary to prevent ingestion.

5.3 INDOOR AIR INHALATION EXPOSURE ROUTE

For the down gradient residential properties, the remediation objective for the indoor air inhalation exposure route is to prevent exposure to indoor air containing concentrations of VOCs above Tier 1 ROs. The indoor air inhalation exposure route for down gradient properties was conditionally excluded by the IEPA based on the Tier 3 Evaluation (Arcadis, 2014). Currently, no residences are being exposed to indoor air above Tier 1 ROs. Provisions for establishment of a UECA covenant at 304 Oak Street will be provided in the RAP.

For the Main Building, the remediation objective for the indoor air inhalation exposure route is to eliminate exposure to concentrations of VOCs that would present an unacceptable risk or hazard to the user. The Tier 3 Evaluation for the hypothetical future industrial work and the current user and future user (caretaker) shows there is not an unacceptable risk for inhalation of indoor air within the Main Building and there are no plans in the foreseeable future for the use to change. The RAP will evaluate measures to prevent unacceptable exposures to future users, should the future user scenario change.

5.4 SURFACE WATER EXPOSURE ROUTE

The remediation objective for the surface water exposure route is to prevent human exposure to surface water containing VOCs above IEPA derived surface water criteria. Based on the results of the FSI, the surface water exposure route may be complete when water is being pumped into the pond from the irrigation well. The RAP will evaluate measures to prevent incidental exposure or consumption of aquatic life in surface water containing VOCs.

6.0 CONCLUSIONS

The remediation objectives for soils beneath the Main Building where soil concentrations are above inhalation of SROs is to prevent exposure of future users to those soils. Measures to prevent exposure to soils in these areas will be identified in the RAP.

The remediation objective for the SCGIER is to prevent ingestion of groundwater containing VOCs above Tier 1 GROs. The RAP will address the potential for concentrations of VOCs in soil to migrate to groundwater and evaluate the potential for use, if any, of that groundwater.

Arcadis performed a Tier 3 evaluation of the indoor exposure route for the down gradient residential properties and the Golf Course. The IEPA conditionally approved the Tier 3 report in a letter dated March 18, 2015. Provisions for establishment of a UECA covenant at 304 Oak Street will be provided in the RAP.

MWH performed a Tier 3 Evaluation for the indoor exposure route for the Main Building for the hypothetical future industrial worker and current and future user (caretaker). The Tier 3 Evaluation shows there is not an unacceptable risk for inhalation of indoor air within the Main Building. The RAP will evaluate measures to prevent unacceptable exposures to future users, should the future user scenario change.

The remediation objective for groundwater is to prevent ingestion of groundwater containing VOCs above Tier 1 GROs. Based on the findings of the FSI there are no humans ingesting groundwater containing VOCs above Tier 1 GROs. The existing Groundwater Ordinance will prevent ingestion of contaminated groundwater in the area covered by the ordinance. The RAP will evaluate the potential for ingestion of groundwater in the future in areas outside the area of the Groundwater Ordinance and measures, if any, necessary to prevent ingestion.

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7.0 REFERENCES

ARCADIS U.S., Inc., 2014. *Tier 3 Evaluation for the Indoor Inhalation Exposure Route*, GE Morrison Facility. October.

Johnson, P.C. and R.A. Ettinger (J&E), 1991. *Heuristic Model for the Intrusion Rate of Contaminant Vapors into Buildings*. Environ. Sci. Technol. 25(8). 1445-1452.

MWH, Americas Inc. (MWH), 2011. *Work Plan*, GE Morrison Facility. October.

MWH, 2013a. *Focused Site Investigation Report*, GE Morrison Facility. April.

MWH, 2013b. *Supplemental Work Plan*, GE Morrison Facility. August.

MWH, 2014a. *Focused Site Investigation Addendum Report*, GE Morrison Facility. May.

MWH, 2014b. *Response to IEPA Comments Report*, GE Morrison Facility. October.

United States Environmental Protection Agency (USEPA), 1989. *Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response*, Washington, D.C. EPA/540/1-89/002. December.

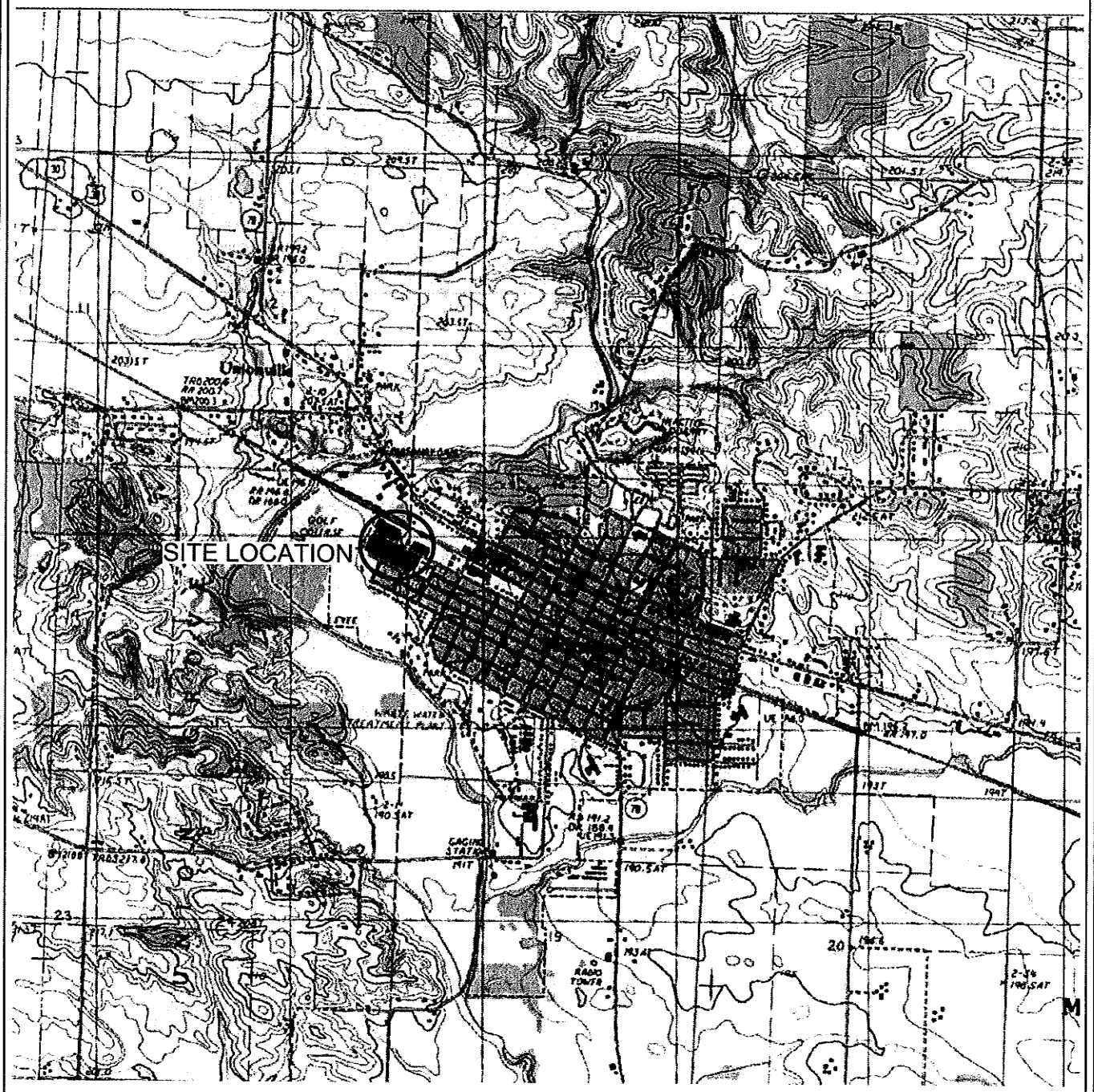
USEPA, 1991. *Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual. Supplemental Guidance 'Standard Default Exposure Factors'*. Office of Emergency and Remedial Response, Washington, D.C. OSWER Directive 9285.3-03. March.

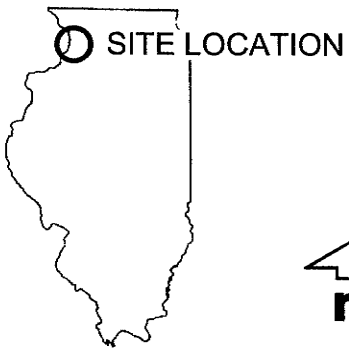
USEPA, 2001. Johnson and Ettinger Model: SL-SCREEN Version 2.3. (3/01).

USEPA, 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*. EPA530-F-02-052.

USEPA, 2015. *Regional Screening Levels*. http://www.epa.gov/region9/superfund/prg/. January.

FIGURES



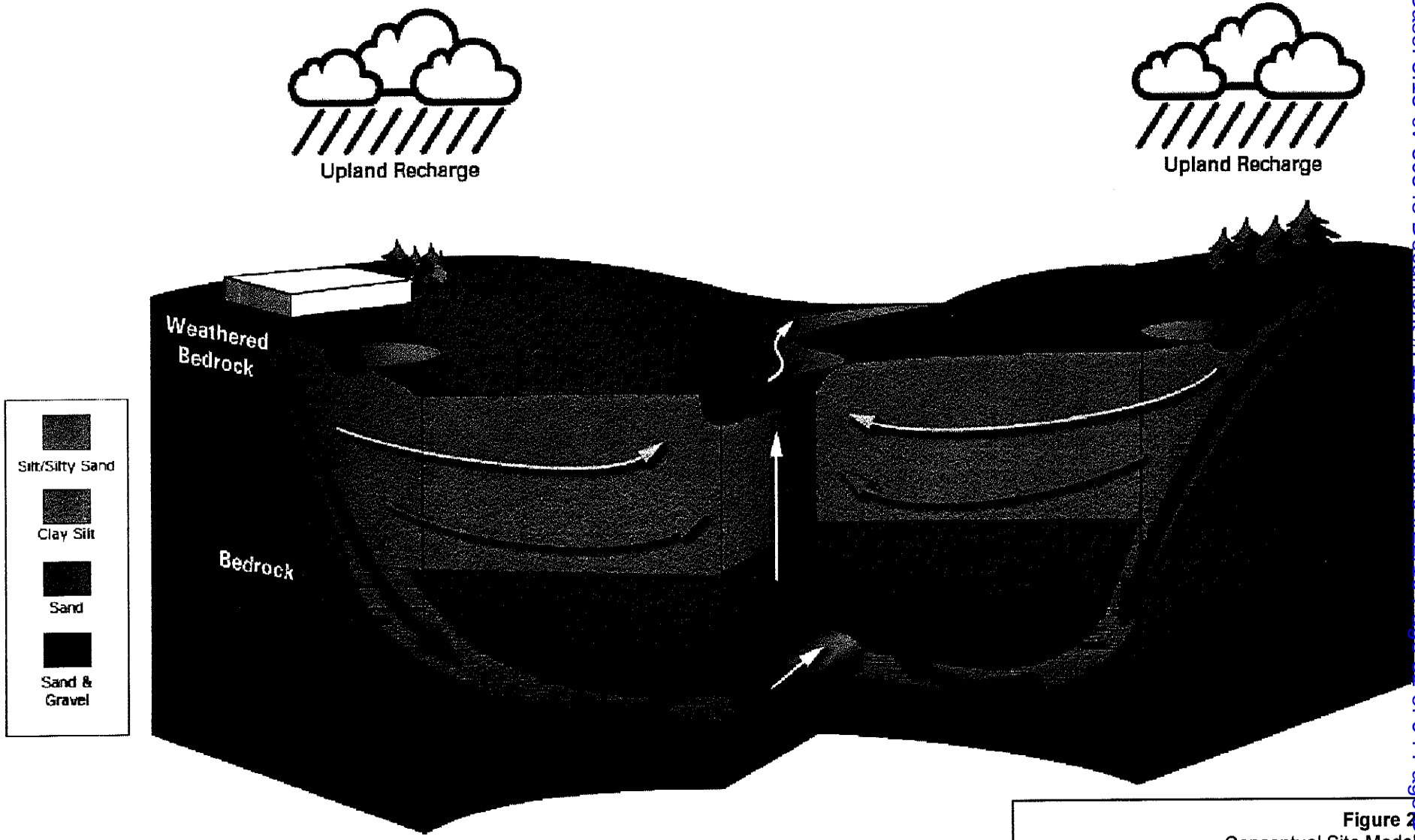


north

GE MORRISON FACILITY
709 WEST WALL STREET
MORRISON, ILLINOIS

FIGURE 1 - SITE LOCATION MAP

MWH



NOT TO SCALE

Figure 2
Conceptual Site Model
GE Morrison Facility
709 West Wall Street
Morrison, Illinois

MWH

TABLES

Table 1
Chemicals of Concern
Soil, Groundwater and Soil Gas
GE Morrison Facility
Morrison, Illinois

Chemicals of Concern (COCs)[1]	Tier 1 Soil Remediation Objectives (ug/kg)						
	Industrial/Commercial[2]		Construction Worker[2]		Residential[3]		Soil Component of the Groundwater Ingestion Exposure Route[3]
	Ingestion	Outdoor Inhalation	Ingestion	Outdoor Inhalation	Ingestion	Outdoor Inhalation	
1,1,1-Trichloroethane	--	1,200,000	--	1,200,000	--	89,000	2,000
1,1,2-Trichloroethane	8,200,000	1,800,000	8,200,000	1,800,000	310,000	1,800,000	30
1,1-Dichloroethene	100,000,000	470,000	10,000,000	3,000	3,900,000	290,000	60
1,2-Dichloroethane	63,000	700	1,400,000	220	7,000	500	50
cis-1,2-Dichloroethene	20,000,000	1,200,000	20,000,000	1,200,000	780,000	1,200,000	400
Methylene chloride	760,000	24,000	12,000,000	34,000	85,000	13,000	30
Tetrachloroethene	110,000	20,000	2,400,000	28,000	12,000	11,000	60
Trichloroethene	520,000	8,900	1,200,000	12,000	58,000	5,000	60
Vinyl chloride	7,900	1,100	170,000	1,100	460	280	10
Naphthalene	41,000,000	270,000	4,100,000	1,800	1,600,000	170,000	12,000

COCs[1]	Tier 1 Groundwater Remediation Objectives (ug/l)		
	Indoor Inhalation[4]		Class I Groundwater[5]
	Industrial/ Commercial	Residential	
1,1,1-Trichloroethane	1,300,000	1,000,000	200
1,1-Dichloroethene	74,000	24,000	7
Chlorobenzene	82,000	26,000	110
Chloroform	150	70	0.2
cis-1,2-Dichloroethene	3,500,000	3,500,000	70
Methylene chloride	8,200	2,100	5
Tetrachloroethene	340	91	5
Trichloroethene	1,300	340	5
Vinyl chloride	210	28	2

COCs[1]	Tier 1 Soil Gas Remediation Objectives (ug/m^3)				
	Outdoor Inhalation[6]			Indoor Inhalation[7]	
	Industrial/ Commercial	Construction Worker	Residential	Industrial/ Commercial	Residential
Tetrachloroethene	690,000,000	970,000,000	360,000,000	4,100	550
Trichloroethene	3,300,000	1,500,000	1,700,000	12,000	1,500

COCs[1]	IEPA Derived Water Quality Criteria (ug/l[8])			
	Aquatic Life Criteria[9]		Human Health Criteria[10]	
	Acute	Chronic	HTC	HNC
Trichloroethene	12,000	940	--	36

Notes
1) The COCs are volatile organic compounds and naphthalene. Listed compounds were detected above a Tier 1 Remediation Objective.
2) Tier 1 Soil Remediation Objectives from 35 IAC Part 742, Appendix B, Table B
3) Tier 1 Soil Remediation Objectives from 35 IAC Part 742, Appendix B, Table A
4) Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route from 35 IAC Part 742, Appendix B, Table H.
5) Tier 1 Groundwater Remediation Objectives for Class I Groundwater from 35 IAC Part 742, Appendix B, Table E.
6) Tier 1 Soil Gas Remediation Objectes for the Outdoor Inhalation Exposure Route from 35 IAC Part 742, Appendix B, Table G.
7) Tier 1 Soil Gas Remediation Objectives for the Indoor Inhalation Exposure Route from 35 IAC Part 742, Appendix B, Table H.
8) Illinois Environmental Protection Agency (IEPA) Derived Water Quality Criteria (http://www.epa.illinois.gov/topics/water-quality/standards/derived-criteria/index).
9) Aquatic life means native populations of fish and other aquatic life (35 IAC Part 301.220).
10) HTC = human threshold criterion (35 IAC Part 302.642); HNC = human nonthreshold criterion (35 IAC 302.651).
IAC = Illinois Administrative Code
ug/kg = micrograms per kilogram
ug/l = micrograms per liter
ug/m^3 = micrograms per cubic meter
= Highlighted cell indicates compound was detected above the Tier 1 Remediation Objective in one or more samples.

Table 2
Soil Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, Illinois

Compound	Units	Exposure Route-Specific Values for Soils: Industrial/Commercial[1] Ingestion	Industrial/Commercial[1] Inhalation	Construction Worker[1] Ingestion	Construction Worker[1] Inhalation	Residential[2] Ingestion	Residential[2] Inhalation	SCGIER Class I Groundwater[2]	Main Building (Interior Sample Locations): SB01-5	SB01-12.5	SB02-6	SB02-8.5	SB03-4	SB03-4 Duplicate	SB03-12	SB04-8	SB04-18	SB05-5	SB05-16	SB06-15	SB07-20	SB07-20 Duplicate	SB08-28	SB09-20	SB10-14	SB10-20
									12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/5/2011	12/6/2011	12/6/2011	12/6/2011	12/6/2011
VOC (SW846 8260)																										
1,1,1-Trichloroethane	µg/kg	--	1,200,000	--	1,200,000	--	89,000	[redacted]	**2.8 J**	**6.2**	**2.5 J**	**56**	**20**	**12**	**7.2**	**2.3 J**	**3.9 J**	**3.5 J**	**3.8 J**	[redacted]	*2,700 U*	**660 J**	[redacted]	**16**	4.6 U	4.5 U
1,1,2-Trichloroethane	µg/kg	8,200,000	1,800,000	8,200,000	1,800,000	310,000	1,800,000	[redacted]	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	*290 U*	*2,700 U*	[redacted]	*1,400 U*	4.0 U	4.6 U	4.5 U
1,1-Dichloroethane	µg/kg	200,000,000	1,700,000	200,000,000	130,000	7,800,000	1,300,000	23,000	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	**150 J**	2,700 U	**2,900 U**	**15,000**	**37**	4.6 U	**1.0 J**
1,1-Dichloroethene	µg/kg	100,000,000	470,000	10,000,000	[redacted]	3,900,000	290,000	[redacted]	4.7 U	4.2 U	4.4 U	**2.5 J**	**1.2 J**	**0.91 J**	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**2.0 J**	**8.2**
1,2,4-Trichlorobenzene	µg/kg	20,000,000	3,200,000	2,000,000	920,000	78,000	3,200,000	5,000	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	**0.91 J**	4.2 U	290 U	**2,700 U**	2,900 U	1,400 U	4.0 U	4.6 U	4.5 U
1,2-Dichloroethane	µg/kg	63,000	[redacted]	1,400,000	[redacted]	7,000	[redacted]	[redacted]	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	[redacted]	[redacted]	[redacted]	[redacted]	4.0 U	4.6 U	4.5 U
2-Butanone (MEK)	µg/kg	--	--	--	--	--	--	--	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	**3,700**	**4,700**	1,400 U	4.0 U	4.6 U	4.5 U
2-Hexanone	µg/kg	--	--	--	--	--	--	--	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	2,700 U	2,900 U	1,400 U	4.0 U	4.6 U	4.5 U
4-Methyl-2-Pentanone (MIBK)	µg/kg	--	--	--	--	--	--	--	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	2,700 U	**510 J**	1,400 U	4.0 U	4.6 U	4.5 U
Acetone	µg/kg	--	100,000,000	--	100,000,000	70,000,000	100,000,000	25,000	19 U	**5.3 J**	18 U	**7.2 J**	18 U	18 U	19 U	16 U	18 U	18 U	17 U	1,100 U	11,000 U	12,000 U	**5,500 U**	16 U	19 U	18 U
Chloroethane	µg/kg	--	--	--	--	--	--	--	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U*	4.2 U	290 U	2,700 U	2,900 U	1,400 U	4.0 U	4.6 U/UJ*	4.5 U/UJ*
Chloroform	µg/kg	940,000	540	2,000,000	760	100,000	300	600	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	*2,700 U*	*2,900 U*	*1,400 U*	4.0 U	4.6 U	4.5 U
cis-1,2-Dichloroethene	µg/kg	20,000,000	1,200,000	20,000,000	1,200,000	780,000	1,200,000	[redacted]	4.7 U	4.2 U	4.4 U	**1.1 J**	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	*2,700 U*	*2,900 U*	*1,400 U*	4.0 U	4.6 U	4.5 U
Dibromochloromethane	µg/kg	41,000,000	1,300,000	41,000,000	1,300,000	1,600,000	1,300,000	400	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	*2,700 U*	*2,900 U*	*1,400 U*	4.0 U	4.6 U	4.5 U
Methylcyclohexane	µg/kg	--	--	--	--	--	--	--	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	2,700 U	2,900 U	1,400 U	4.0 U	4.6 U	4.5 U
Methylene chloride	µg/kg	760,000	24,000	12,000,000	34,000	85,000	13,000	[redacted]	**1.5 JB**	**0.88 JB**	**1.2 JB**	**1.1 JB**	**2.0 JB**	**1.0 JB**	**1.3 JB**	**0.78 JB**	**0.73 JB**	**1.8 JB**	**0.97 JB**	[redacted]	*2,700 U*	*2,900 U*	[redacted]	**1.6 JB**	**1.7 JB**	**2.0 JB**
Tetrachloroethene	µg/kg	110,000	20,000	2,400,000	28,000	12,000	11,000	[redacted]	4.7 U	4.2 U	4.4 U	**1.8 J**	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	[redacted]	*2,700 U*	*2,900 U*	*1,400 U*	4.0 U	4.6 U	4.5 U
trans-1,2-Dichloroethene	µg/kg	41,000,000	3,100,000	41,000,000	3,100,000	1,600,000	3,100,000	700	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	290 U	*2,700 U*	*2,900 U*	*1,400 U*	4.0 U	4.6 U	4.5 U
Trichloroethene	µg/kg	520,000	8,900	1,200,000	12,000	58,000	5,000	[redacted]	4.7 U	**1.6 J**	**2.3 J**	[redacted]	**18**	**15**	**4.0 J**	**1.4 J**	**1.8 J**	**7.1**	**6.5**	**46 J**	*2,700 U*	*2,900 U*	*1,400 U*	**0.905 J**	4.6 U	4.5 U
Vinyl chloride	µg/kg	7,900	1,100	170,000	1,100	460	280	[redacted]	4.7 U	4.2 U	4.4 U	4.4 U	4.5 U	4.4 U	4.9 U	4.1 U	4.5 U	4.4 U	4.2 U	*290 U*	*2,700 U*	*2,900 U*	*1,400 U*	**1.8 J**	4.6 U	4.5 U

Notes:
Only detected compounds listed.
All values in micrograms per kilogram (µg/kg).
1) Tier 1 Soil Remediation Objectives from 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table B
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J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
SCGIER - soil component of the groundwater ingestion exposure route
VOCs - Volatile organic compounds

Table 2
Soil Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, Illinois

Compound	Units	Exposure Route-Specific Values for Soils						SCGIER Class I Groundwater[2]	Main Building (Interior Sample Locations)					Main Building (Exterior Sample Locations)				Wall Street					
		Industrial/Commercial[1]		Construction Worker[1]		Residential[1]																	
		Ingestion	Inhalation	Ingestion	Inhalation	Ingestion	Inhalation		SB11-12	SB11-13	SB11-13 Duplicate	SB12-2	SB12-10	SB13A-13	SB13A-13 Duplicate	SB14-4	SB14-13	SB15-5	SB15-8	SB16-1	SB16-15	SB17-4	SB17-19
									12/6/2011	12/6/2011	12/6/2011	12/6/2011	12/6/2011	12/7/2011	12/7/2011	12/6/2011	12/6/2011	12/7/2011	12/7/2011	12/7/2011	12/7/2011	12/7/2011	12/7/2011
VOC (SW846 8260)																							
1,1,1-Trichloroethane	µg/kg	--	1,200,000	--	1,200,000	--	89,000	[redacted]	4.9 U	4.6 U	4.6 U	4.3 U	**1.9 J**	**25**	**7.1**	[redacted]	**2.4 J**	4.6 U	4.5 U	**1.5 J**	4.4 U	4.3 U	4.6 U
1,1,2-Trichloroethane	µg/kg	8,200,000	1,800,000	8,200,000	1,800,000	310,000	1,800,000	[redacted]	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	*230 U*	4.7 U	4.6 U	4.5 U	**4.5 J**	4.4 U	**3.4 J**	4.6 U
1,1-Dichloroethane	µg/kg	200,000,000	1,700,000	200,000,000	130,000	7,800,000	1,300,000	23,000	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	**1.2 J**	4.6 U	4.4 U	4.3 U	4.6 U
1,1-Dichloroethene	µg/kg	100,000,000	470,000	10,000,000	[redacted]	3,900,000	290,000	[redacted]	4.9 U	**1.1 J**	4.6 U	**0.88 J**	**5.1**	4.9 U	5.1 U	[redacted]	4.7 U	4.6 U	**9.1**	4.6 U	4.4 U	**8.5**	**16**
1,2,4-Trichlorobenzene	µg/kg	20,000,000	3,200,000	2,000,000	920,000	78,000	3,200,000	5,000	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	4.6 U	**0.98 J**	4.3 U	4.6 U
1,2-Dichloroethane	µg/kg	63,000	[redacted]	1,400,000	[redacted]	7,000	[redacted]	[redacted]	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	**2.3 J**	5.1 U	[redacted]	4.7 U	4.6 U	4.5 U	**1.9 J**	4.4 U	**1.7 J**	4.6 U
2-Butanone (MEK)	µg/kg	--	--	--	--	--	--	--	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	4.6 U	4.4 U	**3.2 J**	4.6 U
2-Hexanone	µg/kg	--	--	--	--	--	--	--	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	4.6 U	4.4 U	**8.6**	4.6 U
4-Methyl-2-Pentanone (MIBK)	µg/kg	--	--	--	--	--	--	--	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	**0.94 J**	4.4 U	**0.94 J**	4.6 U
Acetone	µg/kg	--	100,000,000	--	100,000,000	70,000,000	100,000,000	25,000	20 U	18 U	18 U	17 U	18 U	20 U	20 U	910 U	19 U	18 U	18 U	**4.9 J**	18 U	**14 J**	18 U
Chloroethane	µg/kg	--	--	--	--	--	--	--	4.9 UJ/UJ*	4.6 UJ/UJ*	4.6 UJ/UJ*	4.3 UJ/UJ*	4.4 UJ/UJ*	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	4.6 U	4.4 U	4.3 U	4.6 U
Chloroform	µg/kg	940,000	540	2,000,000	760	100,000	300	600	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	**1.2 J**	4.4 U	**1.3 J**	4.6 U
cis-1,2-Dichloroethene	µg/kg	20,000,000	1,200,000	20,000,000	1,200,000	780,000	1,200,000	[redacted]	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	**82**	4.4 U	[redacted]	**39**
Dibromochloromethane	µg/kg	41,000,000	1,300,000	41,000,000	1,300,000	1,600,000	1,300,000	400	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	**2.8 J**	4.4 U	4.3 U	4.6 U
Methylcyclohexane	µg/kg	--	--	--	--	--	--	--	4.9 U	4.6 U	**0.85 J**	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	4.6 U	4.4 U	4.3 U	4.6 U
Methylene chloride	µg/kg	760,000	24,000	12,000,000	34,000	85,000	13,000	[redacted]	**2.3 JB**	**2.2 JB**	**2.4 JB**	**3.9 JB**	**2.2 JB**	**1.7 JB**	**1.5 JB**	*230 U*	**1.5 JB**	**1.5 JB**	**2.1 JB**	**0.65 JB**	**1.7 JB**	**1.3 JB**	**2.7 JB**
Tetrachloroethene	µg/kg	110,000	20,000	2,400,000	28,000	12,000	11,000	[redacted]	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	**6.6**	**1.1 J**	[redacted]	4.7 U	4.6 U	4.5 U	**2.1 J**	4.4 U	4.3 U	4.6 U
trans-1,2-Dichloroethene	µg/kg	41,000,000	3,100,000	41,000,000	3,100,000	1,600,000	3,100,000	700	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	230 U	4.7 U	4.6 U	4.5 U	**3.3 J**	4.4 U	**350 E**	**1.1 J**
Trichloroethene	µg/kg	520,000	8,900	1,200,000	12,000	58,000	5,000	[redacted]	4.9 U	4.6 U	4.6 U	**1.3 J**	**1.1 J**	**3.9 J**	**0.82 J**	[redacted]	4.7 U	4.6 U	4.5 U	[redacted]	**18**	**4.4**	**48**
Vinyl chloride	µg/kg	7,900	1,100	170,000	1,100	460	280	[redacted]	4.9 U	4.6 U	4.6 U	4.3 U	4.4 U	4.9 U	5.1 U	*230 U*	4.7 U	4.6 U	4.5 U	4.6 U	4.4 U	[redacted]	4.6 U

Notes:
Only detected compounds listed.
All values in micrograms per kilogram (µg/kg).
1) Tier 1 Soil Remediation Objectives from 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table B
2) Tier 1 Soil Remediation Objectives from 35 IAC Part 742, Appendix B, Table A
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SCGIER - soil component of the groundwater ingestion exposure route
VOCs - Volatile organic compounds

Table 2
Soil Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, Illinois

Compound	Units	Exposure Route-Specific Values for Soils						SCGIER Class I Groundwater[2]	Main Building (Interior)	Wall Street		Morris Street								Main Building (Exterior Sample Locations)			
		Industrial/Commercial[1]		Construction Worker[1]		Residential[1]																	
		Ingestion	Inhalation	Ingestion	Inhalation	Ingestion	Inhalation		SB20-20	SB21-12	SB21-15	SB22-4	SB22-7	SB23-4	SB23-8	SB24-5	SB24-12	SB24-12 Duplicate	SB25-8	SB25-11	SB26-6	SB26-11
VOC (SW846 8260)									12/8/2011	12/21/2011	12/21/2011	12/20/2011	12/20/2011	12/20/2011	12/20/2011	12/20/2011	12/20/2011	12/20/2011	12/21/2011	12/21/2011	12/21/2011	12/21/2011
1,1,1-Trichloroethane	µg/kg	--	1,200,000	--	1,200,000	--	89,000		290 U	**5.1**	**1.5 J**	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
1,1,2-Trichloroethane	µg/kg	8,200,000	1,800,000	8,200,000	1,800,000	310,000	1,800,000		*290 U*	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
1,1-Dichloroethane	µg/kg	200,000,000	1,700,000	200,000,000	130,000	7,800,000	1,300,000	23,000	290 U	**0.53 J**	**0.94 J**	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	**0.83 J**	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
1,1-Dichloroethene	µg/kg	100,000,000	470,000	10,000,000	[illegible]	3,900,000	290,000	[illegible]	[illegible]	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
1,2,4-Trichlorobenzene	µg/kg	20,000,000	3,200,000	2,000,000	920,000	78,000	3,200,000	5,000	290 U*	**1.0 J**	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
1,2-Dichloroethane	µg/kg	63,000	[illegible]	1,400,000	[illegible]	7,000	[illegible]	[illegible]	*290 U*	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
2-Butanone (MEK)	µg/kg	--	--	--	--	--	--	--	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
2-Hexanone	µg/kg	--	--	--	--	--	--	--	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
4-Methyl-2-Pentanone (MIBK)	µg/kg	--	--	--	--	--	--	--	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Acetone	µg/kg	--	100,000,000	--	100,000,000	70,000,000	100,000,000	25,000	1200 U	17 U	19 U	19 U	17 U	19 U	17 U	19 U	17 U	18 U	19 U	17 U	19 U	17 U
Chloroethane	µg/kg	--	--	--	--	--	--	--	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Chloroform	µg/kg	940,000	540	2,000,000	760	100,000	300	600	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
cis-1,2-Dichloroethene	µg/kg	20,000,000	1,200,000	20,000,000	1,200,000	780,000	1,200,000	[illegible]	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Dibromochloromethane	µg/kg	41,000,000	1,300,000	41,000,000	1,300,000	1,600,000	1,300,000	400	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Methylcyclohexane	µg/kg	--	--	--	--	--	--	--	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Methylene chloride	µg/kg	760,000	24,000	12,000,000	34,000	85,000	13,000	[illegible]	*290 U*	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Tetrachloroethene	µg/kg	110,000	20,000	2,400,000	28,000	12,000	11,000	[illegible]	*290 U*	**0.57 J**	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
trans-1,2-Dichloroethene	µg/kg	41,000,000	3,100,000	41,000,000	3,100,000	1,600,000	3,100,000	700	290 U	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Trichloroethene	µg/kg	520,000	8,900	1,200,000	12,000	58,000	5,000	[illegible]	*290 U*	**3.4 J**	**0.68 J**	4.7 U	4.4 U	**6.3**	**0.59 J**	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U
Vinyl chloride	µg/kg	7,900	1,100	170,000	1,100	460	280	[illegible]	*290 U*	4.2 U	4.8 U	4.7 U	4.4 U	4.8 U	4.2 U	4.7 U	4.2 U	4.6 U	4.8 U	4.3 U	4.8 U	4.3 U

Notes:
Only detected compounds listed.
All values in micrograms per kilogram (µg/kg).
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GE Morrison Facility
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		Industrial/Commercial[1]		Construction Worker[1]		Residential[1]															
		Ingestion	Inhalation	Ingestion	Inhalation	Ingestion	Inhalation		SB28-28	SB29-42	SB31-10	SB32-32	SB33-5	SB33-5 Duplicate	SB33-9	SB34-20	BG01-5	BG01-8	BG01-8 Duplicate	BG02-4.5	BG02-8
									12/29/2011	12/29/2011	12/29/2011	12/29/2011	12/29/2011	12/29/2011	12/29/2011	12/30/2011	12/28/2011	12/28/2011	12/28/2011	12/28/2011	12/28/2011
VOC (SW846 8260)																					
1,1,1-Trichloroethane	µg/kg	--	1,200,000	--	1,200,000	--	89,000	[redacted]	**13**	**0.94 J**	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
1,1,2-Trichloroethane	µg/kg	8,200,000	1,800,000	8,200,000	1,800,000	310,000	1,800,000	[redacted]	5.8 U	6.4 U	5.7 U	5.1 U	**1.5 J**	**1.6 J**	5.3 U	**60**	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
1,1-Dichloroethane	µg/kg	200,000,000	1,700,000	200,000,000	130,000	7,800,000	1,300,000	23,000	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	**4.8 J**	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
1,1-Dichloroethene	µg/kg	100,000,000	470,000	10,000,000	[redacted]	3,900,000	290,000	[redacted]	5.8 U	6.4 U	5.7 U	**1.9 J**	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
1,2,4-Trichlorobenzene	µg/kg	20,000,000	3,200,000	2,000,000	920,000	78,000	3,200,000	5,000	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
1,2-Dichloroethane	µg/kg	63,000	[redacted]	1,400,000	[redacted]	7,000	[redacted]	[redacted]	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
2-Butanone (MEK)	µg/kg	--	--	--	--	--	--	--	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
2-Hexanone	µg/kg	--	--	--	--	--	--	--	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
4-Methyl-2-Pentanone (MIBK)	µg/kg	--	--	--	--	--	--	--	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Acetone	µg/kg	--	100,000,000	--	100,000,000	70,000,000	100,000,000	25,000	23 U	25 U	23 U	20 U	22 U	23 U	21 U	22 U	24 U	23 U	24 U	23 U	23 U
Chloroethane	µg/kg	--	--	--	--	--	--	--	5.8 U	6.4 U	**2.6 J**	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Chloroform	µg/kg	940,000	540	2,000,000	760	100,000	300	600	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
cis-1,2-Dichloroethene	µg/kg	20,000,000	1,200,000	20,000,000	1,200,000	780,000	1,200,000	[redacted]	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Dibromochloromethane	µg/kg	41,000,000	1,300,000	41,000,000	1,300,000	1,600,000	1,300,000	400	5.8 UJ/UJ*	6.4 UJ/UJ*	5.7 UJ/UJ*	5.1 UJ/UJ*	5.4 UJ/UJ*	5.8 UJ/UJ*	5.3 UJ/UJ*	5.4 UJ/UJ*	6.1 UJ/UJ*	5.8 UJ/UJ*	6.0 UJ/UJ*	5.8 UJ/UJ*	5.9 UJ/UJ*
Methylcyclohexane	µg/kg	--	--	--	--	--	--	--	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Methylene chloride	µg/kg	760,000	24,000	12,000,000	34,000	85,000	13,000	[redacted]	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Tetrachloroethene	µg/kg	110,000	20,000	2,400,000	28,000	12,000	11,000	[redacted]	**1.2 J**	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
trans-1,2-Dichloroethene	µg/kg	41,000,000	3,100,000	41,000,000	3,100,000	1,600,000	3,100,000	700	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Trichloroethene	µg/kg	520,000	8,900	1,200,000	12,000	58,000	5,000	[redacted]	5.8 U	6.4 U	5.7 U	**1.1 J**	**4.0 J**	**3.1 J**	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U
Vinyl chloride	µg/kg	7,900	1,100	170,000	1,100	460	280	[redacted]	5.8 U	6.4 U	5.7 U	5.1 U	5.4 U	5.8 U	5.3 U	5.4 U	6.1 U	5.8 U	6.0 U	5.8 U	5.9 U

Notes:
Only detected compounds listed.
All values in micrograms per kilogram (µg/kg).
1) Tier 1 Soil Remediation Objectives from 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table B
2) Tier 1 Soil Remediation Objectives from 35 IAC Part 742, Appendix B, Table A
-- - Indicates there is no established screening criteria for this compound.
* - Laboratory control sample or laboratory control sample duplicate exceeds the control limits.
B - Analyte was detected in the associated method blank.
Bold - Indicates a detection of the noted compound.
E - Result exceeded calibration range.
[redacted] Highlighted result is above one or more TACO screening standard.
Italicized - Indicates that the reporting limit is above one or more TACO screening standard.
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
SCGIER - soil component of the groundwater ingestion exposure route
VOCs - Volatile organic compounds

Table 3
Grab Groundwater Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, Illinois

Compound	Units	Indoor Inhalation Exposure Route[1]		IEPA Class I Groundwater Standard[2]	Wall Street				Morris Street			Main Building (Exterior)	Golf Course Clubhouse	Morris Street	Residential Area	
		Residential	Industrial/ Commercial		SB15-12	SB17-24	SB21-20	SB21-20 Duplicate	SB22-9	SB23-11	SB24-15	SB26-14	SB-35-20	SB39-12	SB40-12	SB40-12 Duplicate
VOCs (SW846 8260B)					12/7/2011	12/7/2011	12/19/2011	12/19/2011	12/9/2011	12/20/2011	12/20/2011	12/28/2011	2/14/2012	2/14/2012	2/14/2012	2/14/2012
1,1,1-Trichloroethane	µg/l	1,000,000	1,300,000	[redacted]	**31**	**2.8 J**	**190**	**170**	5.0 U	5.0 U	5.0 U	5.0 U	[redacted]	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	--	--	--	**71**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**50** U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/l	180,000	580,000	700	**360**	**2.3 J**	**75**	**68**	5.0 U	5.0 U	**50**	5.0 U	**67**	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/l	24,000	74,000	[redacted]	[redacted]	**2.4 J**	[redacted]	[redacted]	5.0 U	5.0 U	**1.3 J**	5.0 U	[redacted]	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/l	1,800	5,900	70	10 U	5.0 U	**0.50 J**	**2.0 J**	5.0 U	5.0 U	5.0 U	5.0 U	**50** U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/l	54	220	5	**2.2 J**	5.0 U	**1.6 J**	**1.7 J**	5.0 U	5.0 U	5.0 U	5.0 U	[redacted]	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/l	26,000	82,000	[redacted]	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**50** U	5.0 U	5.0 U	5.0 U
Chloroethane	µg/l	--	--	--	**68**	5.0 U	**3.6 J**	**3.5 J**	5.0 U	5.0 U	5.0 U	5.0 U	**50** U	5.0 U/UJ*	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/l	3,500,000	3,500,000	[redacted]	10 U	[redacted]	**26**	**24**	5.0 U	5.0 U	**19**	5.0 U	**14 J**	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	µg/l	3,000	9,200	--	**13**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**50** U	5.0 U	5.0 U	5.0 U
Methylene chloride	µg/l	2,100	8,200	5	**3.9 J**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	*50 U*	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/l	91	340	5	*10 U*	5.0 U	**5.0**	**4.9 J**	5.0 U	5.0 U	5.0 U	5.0 U	*50 U*	5.0 U	5.0 U	5.0 U
Toluene	µg/l	530,000	530,000	1,000	10 U	**1.9 J**	5.0 U	5.0 U	5.0 U	5.0 U	**2.2 J**	5.0 U	**50** U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/l	16,000	51,000	100	10 U	**4.1 J**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**50** U	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/l	[redacted]	[redacted]	[redacted]	**1.8 J**	[redacted]	[redacted]	[redacted]	5.0 U	5.0 U	[redacted]	5.0 U	[redacted]	5.0 U	5.0 U	5.0 U
Vinyl chloride	µg/l	[redacted]	[redacted]	[redacted]	*10 U*	[redacted]	[redacted]	[redacted]	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*50 U*	*5.0 U*	*5.0 U*	*5.0 U*

Notes:
Only detected compounds listed.
All values in micrograms per liter (µg/l).
1) Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route from 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table F
2) Tier 1 Groundwater Remediation Objectives for Class I Groundwater from 35 IAC Part 742, Appendix B, Table E.
-- - Indicates there is no established screening criteria for this compound.
* - LCS or LCSD exceeds the control limits.
B - Compound was found in the blank and sample.
Bold - Indicates a detection of the noted compound.
[redacted] Highlighted result is above IEPA Class I groundwater standard.
IEPA - Illinois Environmental Protection Agency
Italicized - Indicates that the reporting limit is above Class I groundwater standard
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
µg/l - Micrograms per liter
U - Compound not detected
UJ - Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
VOCs - Volatile organic compounds

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Table 3
Grab Groundwater Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, Illinois

Compound	Units	Indoor Inhalation Exposure Route[1]		IEPA Class I Groundwater Standard[2]	Wall Street	Residential Area											
		Residential	Industrial/ Commercial		SB41-15	SB42-15	SB43-24	SB44-24	SB45-18	SB46-18	SB47-11	SB48-15.5	SB49-24	SB50-17	SB51-16	SB51-16 Duplicate
VOCs (SW846 8260B)					2/15/2012	2/15/2012	2/15/2012	2/15/2012	8/2/2012	8/2/2012	8/2/2012	8/2/2012	8/3/2012	8/3/2012	8/3/2012	8/3/2012
1,1,1-Trichloroethane	µg/l	1,000,000	1,300,000	200	5.0 U	5.0 U	5.0 U	**11**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	--	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/l	180,000	580,000	700	5.0 U	**1.5 J**	5.0 U	**4.4 J**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**6.8**	5.0 U	5.0 U
1,1-Dichloroethene	µg/l	24,000	74,000	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/l	1,800	5,900	70	5.0 U	5.0 U	5.0 U	5.0 U	**7.8 B***	5.0 U/UJ*	**1.1 JB***	5.0 U/UJ*	5.0 U/UJ*	5.0 U/UJ*	**0.55 JB***	**0.45 JB***
1,2-Dichloroethane	µg/l	54	220	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/l	26,000	82,000	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	µg/l	--	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/l	3,500,000	3,500,000	70	5.0 U	5.0 U	5.0 U	5.0 U	**38**	5.0 U	5.0 U	5.0 U	5.0 U	**3.7 J**	5.0 U	5.0 U
Dichlorodifluoromethane	µg/l	3,000	9,200	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene chloride	µg/l	2,100	8,200	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/l	91	340	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	µg/l	530,000	530,000	1,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/l	16,000	51,000	100	5.0 U	5.0 U	5.0 U	5.0 U	**0.98 J**	5.0 U	5.0 U	5.0 U	5.0 U	**1.0 J**	5.0 U	5.0 U
Trichloroethene	µg/l	[redacted]	[redacted]	[redacted]	5.0 U	5.0 U	5.0 U	[redacted]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**4.1 J**	5.0 U	5.0 U
Vinyl chloride	µg/l	[redacted]	[redacted]	[redacted]	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*	*5.0 U*

Notes
Only detected compounds listed.
All values in micrograms per liter (µg/l).
1) Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route from 35 Illinois Administrative Code (IAC) P
2) Tier 1 Groundwater Remediation Objectives for Class I Groundwater from 35 IAC Part 742, Appendix B, Table E.
-- - Indicates there is no established screening criteria for this compound.
* - LCS or LCSD exceeds the control limits.
B - Compound was found in the blank and sample.
Bold - Indicates a detection of the noted compound.
[redacted] Highlighted result is above IEPA Class I groundwater standard.
IEPA - Illinois Environmental Protection Agency
Italicized - Indicates that the reporting limit is above Class I groundwater standard
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
µg/l - Micrograms per liter
U - Compound not detected
UJ - Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
VOCs - Volatile organic compounds

Table 3
Grab Groundwater Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, Illinois

Compound	Units	Indoor Inhalation Exposure Route[1]		IEPA Class I Groundwater Standard[2]	Golf Course				
		Residential	Industrial/ Commercial		MW10 (5-9)	MW10 (9-14)	MW10 (69-74)	MW10 (89-94)	MW10 (99-104)
VOC's (SW846 8260B)					10/30/2012	11/1/2012	10/31/2012	10/31/2012	10/31/2012
1,1,1-Trichloroethane	µg/l	1,000,000	1,300,000	[illegible]	**11**	*500 U*	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	--	--	--	5.0 U	500 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/l	180,000	580,000	700	**22**	500 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/l	24,000	74,000	[illegible]	5.0 U	*500 U*	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/l	1,800	5,900	70	5.0 U	*500 U*	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/l	54	220	5	5.0 U	*500 U*	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/l	26,000	82,000	[illegible]	**0.91 J**	[illegible]	5.0 U	5.0 U	5.0 U
Chloroethane	µg/l	--	--	--	5.0 U	500 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/l	3,500,000	3,500,000	[illegible]	**62**	[illegible]	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	µg/l	3,000	9,200	--	5.0 U	500 U	5.0 U	5.0 U	5.0 U
Methylene chloride	µg/l	2,100	8,200	5	5.0 U	*500 U*	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/l	91	340	5	5.0 U	*500 U*	5.0 U	5.0 U	5.0 U
Toluene	µg/l	530,000	530,000	1,000	5.0 U	500 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/l	16,000	51,000	100	5.0 U	[illegible]	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.0 U	5.0 U	5.0 U
Vinyl chloride	µg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.0 U	5.0 U	5.0 U

Notes:
Only detected compounds listed.
All values in micrograms per liter (µg/l).
1) Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route from 35 Illinois Administrative Code (IAC) P
2) Tier 1 Groundwater Remediation Objectives for Class I Groundwater from 35 IAC Part 742, Appendix B, Table E.
-- - Indicates there is no established screening criteria for this compound.
* - LCS or LCSD exceeds the control limits.
B - Compound was found in the blank and sample.
Bold - Indicates a detection of the noted compound.
[illegible] Highlighted result is above IEPA Class I groundwater standard.
IEPA - Illinois Environmental Protection Agency
Italicized - Indicates that the reporting limit is above Class I groundwater standard.
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
µg/l - Micrograms per liter
U - Compound not detected
UJ - Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
VOC's - Volatile organic compounds

Table 4
Soil Gas Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, IL

Compound	Units	Outdoor Inhalation Exposure Route[1]			Indoor Inhalation Exposure Route[2]		Main Building (Exterior Sample Locations)				Wall Street					Morris Street		
		Residential	Industrial/ Commercial	Construction Worker	Residential	Industrial/ Commercial	SG1-5	SG1-12	SG2-5	SG2-13	SG3-5	SG3-13	SG4-5	SG4-5 Duplicate	SG4-13	SG5-5	SG5-10	SG6-5
VOC (TO15)							12/21/2011	12/21/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011	12/22/2011
1,1,1-Trichloroethane	ug/m³	870,000,000	870,000,000	89,000,000	6,600,000	41,000,000	**410,000**	**71,000**	**63**	**6.7**	**550**	**5.3**	**1.1**	**1.6**	**44**	**25,000**	**52,000**	**14,000**
1,1-Dichloroethane	ug/m³	870,000,000	1,300,000,000	90,000,000	690,000	4,200,000	2300 U	**1,100**	**2.8**	0.81 U	**42**	**9.8**	0.81 U	0.81 U	**510**	300 U	640 U	280 U
1,1-Dichloroethene	ug/m³	520,000,000	820,000,000	5,300,000	240,000	1,600,000	**8,900**	**5,500**	**1.1**	0.79 U	11 U	**1.7**	0.79 U	0.79 U	**500**	**32,000**	**54,000**	**27,000**
Chloroform	ug/m³	110,000	200,000	290,000	110	920	*2,800 U*	*490 U*	**7.7**	0.98 U	**23**	1.7 U	0.98 U	0.98 U	4.3 U	*360 U*	*770 U*	*330 U*
cis-1,2-Dichloroethene	ug/m³	1,100,000,000	1,100,000,000	1,100,000,000	1,100,000,000	1,100,000,000	2,300 U	390 U	0.79 U	0.79 U	**120**	**22**	0.79 U	0.79 U	3.5 U	300 U	620 U	270 U
Methylene chloride	ug/m³	6,100,000	12,000,000	5,100,000	5,600	45,000	5,000 U	860 U	1.7 U	1.7 U	24 U	3.0 U	1.7 U	1.7 U	7.7 U	650 U	1,400 U	590 U
Tetrachloroethene	ug/m³	360,000	690,000	970,000	[redacted]	[redacted]	[redacted]	*680 U*	1.4 U	1.4 U	19 U	**2.6**	1.4 U	1.4 U	6.0 U	510 U	*1,100 U*	460 U
trans-1,2-Dichloroethene	ug/m³	120,000,000	190,000,000	12,000,000	85,000	510,000	2,300 U	390 U	0.79 U	0.79 U	**30**	1.4 U	0.79 U	0.79 U	3.5 U	300 U	620 U	270 U
Trichloroethene	ug/m³	1,700,000	3,300,000	1,500,000	[redacted]	*12,000*	[redacted]	[redacted]	**70**	*1.1 U*	[redacted]	**11**	1.1 U	1.1 U	4.8 U	**940**	[redacted]	**470**
Vinyl chloride	ug/m³	780,000	3,000,000	3,000,000	290	4,800	*1500 U*	250 U	0.51 U	0.51 U	7.2 U	0.89 U	0.51 U	0.51 U	2.3 U	190 U	*400 U*	170 U

Notes:
Only detected compounds listed
All values in micrograms per cubic meter (ug/m3).
1) Tier 1 Soil Gas Remediation Objectives for the Outdoor Inhalation Exposure Route from 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table G.
2) Tier 1 Soil Gas Remediation Objectives for the Indoor Inhalation Exposure Route from 35 IAC Part 742, Appendix B, Table H.
Bold - Indicates a detection of the noted compound.
[redacted] Highlighted result is above one or more screening criteria.
Italicized - Indicates that the reporting limit is above one or more screening criteria.
U - Compound is not detected.
VOC - Volatile organic compounds

Table 4
Soil Gas Sample Results
Volatile Organic Compounds
GE Morrison Facility
Morrison, IL

Compound	Units	Outdoor Inhalation Exposure Route[1]			Indoor Inhalation Exposure Route[2]		Morris Street								Main Building (Exterior Sample Locations)			Morris Street
		Residential	Industrial/ Commercial	Construction Worker	Residential	Industrial/ Commercial	SG6-10	SG7-5	SG7-10	SG8-5	SG8-10	SG8-10 Duplicate	SG9-5	SG10-5	SG11-5	SG12-5	SG12-5 Duplicate	SG13-5
VOC (TO15)							12/22/2011	12/23/2011	12/23/2011	12/23/2011	12/23/2011	12/23/2011	12/23/2011	12/23/2011	12/28/2011	12/28/2011	12/28/2011	12/28/2011
1,1,1-Trichloroethane	ug/m^3	870,000,000	870,000,000	89,000,000	6,600,000	41,000,000	**19,000**	**310**	**4,400**	**3.1**	**130**	**160**	**1.2**	1.1 U	**1.5**	1.1 U	1.1 U	1.1 U
1,1-Dichloroethane	ug/m^3	870,000,000	1,300,000,000	90,000,000	690,000	4,200,000	290 U	6.5 U	**880**	0.81 U	**170**	**200**	**38**	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U
1,1-Dichloroethene	ug/m^3	520,000,000	820,000,000	5,300,000	240,000	1,600,000	**43,000**	**690**	**26,000**	0.79 U	**240**	**260**	**14**	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
Chloroform	ug/m^3	110,000	200,000	290,000	110	920	*350 U*	7.8 U	*170 U*	0.98 U	**6.2**	**6.1**	**2.2**	0.98 U	0.98 U	0.98 U	0.98 U	0.98 U
cis-1,2-Dichloroethene	ug/m^3	1,100,000,000	1,100,000,000	1,100,000,000	1,100,000,000	1,100,000,000	290 U	**7.8**	140 U	0.79 U	**150**	**160**	**32**	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
Methylene chloride	ug/m^3	6,100,000	12,000,000	5,100,000	5,600	45,000	630 U	14 U	*310 U*	1.7 U	6.3 U	3.5 U	**3.5**	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Tetrachloroethene	ug/m^3	360,000	690,000	970,000	[redacted]	[redacted]	490 U	11 U	240 U	1.4 U	4.9 U	2.7 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
trans-1,2-Dichloroethene	ug/m^3	120,000,000	190,000,000	12,000,000	85,000	510,000	290 U	6.3 U	140 U	0.79 U	**19**	**20**	**2.5**	0.79 U	0.79 U	0.79 U	0.79 U	0.79 U
Trichloroethene	ug/m^3	1,700,000	3,300,000	1,500,000	[redacted]	*12,000*	**740**	**120**	**190**	*1.1 U*	**100**	**80**	**72**	1.1 U	**1.1**	**1.2**	**1.2**	1.1 U
Vinyl chloride	ug/m^3	780,000	3,000,000	3,000,000	290	4,800	190 U	4.1 U	90 U	0.51 U	1.9 U	1.0 U	**48**	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U

Notes:
Only detected compounds listed.
All values in micrograms per cubic meter (ug/m3).
1) Tier 1 Soil Gas Remediation Objectes for the Outdoor Inhalation Exposure Route from 35 Illinois Administrative Code (IAC) Part 742, Appendix B, Table
2) Tier 1 Soil Gas Remediation Objectives for the Indoor Inhalation Exposure Route from 35 IAC Part 742, Appendix B, Table H.
Bold - Indicates a detection of the noted compound.
[redacted] Highlighted result is above one or more screening criteria.
Italicized - Indicates that the reporting limit is above one or more screening criteria.
U - Compound is not detected.
VOC - Volatile organic compounds

Table 5
Groundwater Sample Results
Golf Course Irrigation Wells
Morrison, Illinois

Compound	Units	IEPA Class I Groundwater Standard[1]	GW-N.WELL-2012	GW-DUP01-2012 (Duplicate of GW-N.WELL-2012)	GW-S.WELL-2012
VOCs (SW846 8260B)			8/8/2012	8/8/2012	8/8/2012
1,1,1-Trichloroethane	µg/l	200	510	620	5.0 U
1,1-Dichloroethene	µg/l	7	710	850	5.0 U
cis-1,2-Dichloroethene	µg/l	70	010 J	120 J	5.0 U
Trichloroethene	µg/l	5	5,000	6,100	**0.93 J**

Notes:

Only detected compounds listed.

-- - Indicates there is no established screening criteria for this compound.

* - LCS or LCSD exceeds the control limits.

1) Class I Groundwater Standard from 35 Illinois Administrative Code Part 742, Appendix B, Table E.

Bold - Indicates a detection of the noted compound.

Highlighted result is above IEPA Class I groundwater standard.

IEPA - Illinois Environmental Protection Agency

Italicized - Indicates that the reporting limit is above Class I groundwater standard.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

µg/l - Micrograms per liter

U - Compound not detected.

UJ - Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

VOCs - Volatile organic compounds

Table 6
Surface Water Sample Results
Golf Course Ponds
Morrison, Illinois

Compound	IEPA Derived Water Quality Criteria				SW-N.POND-2012	SW-DUP01-2012 (Duplicate of SW-N.POND-2012)	SW-NPOND-20121031	SW-SPOND-20121102	SW-N.POND-013013
	Aquatic Life Criteria		Human Health Criteria						
VOCs (SW846 8260B)	**Acute**	**Chronic**	**HTC**	**HNC**	9/11/2012	9/11/2012	10/31/2012	11/2/2012	1/30/2013
1,1,1-Trichloroethane	4,900	390	-	-	**140* / J**	**120* / J**	**3.1 J**	5.0 U	5.0 U
1,1-Dichloroethene	3,000	240	-	120	**110**	**92 J**	**2.3 J**	5.0 U	5.0 U
cis-1,2-Dichloroethene	-	-	-	-	**35 J**	**34 J**	**4.0 J**	5.0 U	**1.9 J**
Trichloroethene	12,000	940	-	26	**600**	**710**	**19**	5.0 U	**6.9**

Notes:
Only detected compounds listed.
1) IEPA Derived Water Quality Criteria from 35 Illinois Administrative Code Part 302.10 and Part 302.540.
Concentrations in micrograms per liter (ug/L).
* - LCS or LCSD exceeds the control limits.
Bold - Indicates a detection of the noted compound.
Highlighted result is above one or more IEPA Derived Water Quality Criteria.
HTC - Human Threshold Criteria
HNC - Human Non-Threshold Criteria
IEPA - Illinois Environmental Protection Agency
Italicized - Indicates that the reporting limit exceeded one or more screening criteri
J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
U - Compound not detected
VOCs - Volatile organic compounds

APPENDIX A

IEPA LETTER DATED MARCH 18, 2015

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

(217) 524-3300

March 18, 2015

Mr. Lewis S. Streeter
Project Manager
General Electric Company
319 Great Oaks Boulevard
Albany, NY 12203

RECEIVED - ALBANY
MAR 24 2015
GE CORPORATE

Re: 1950350007/Whiteside County
Morrison/Morrison Well Contamination
SF/Tech File

Dear Mr. Streeter:

The Illinois EPA has reviewed the October 22, 2014 *Response to IEPA Comments – Focused Site Investigation Addendum Report* (received October 24, 2014/Illinois EPA Log No. 14-57918) prepared by MWH Americas, Inc. and the October 20, 2014 *Response to Comments on May 15, 2014 Focused Site Investigation Report Addendum* (received October 24, 2014/Illinois EPA Log No. 14-57917) prepared by ARCADIS U.S., Inc.

The October 22, 2014 *Response to IEPA Comments – Focused Site Investigation Addendum Report* prepared by MWH Americas, Inc. is conditionally approved. The following comments were generated as a result of this review.

1. As discussed on page 14 in the document, three (3) well nests (MW11, MW12, MW13) were installed south of Rock Creek to provide further analysis of the groundwater flow regime and to delineate the groundwater divide. These well nests must remain installed in the event that additional information is required to further verify the groundwater flow regime and/or additional sampling of these wells is required.

The October 20, 2014 *Response to Comments on May 15, 2014 Focused Site Investigation Report Addendum* prepared by ARCADIS U.S., Inc. is conditionally approved. The following comments were generated as a result of this review.

1. Section 4 in the document provides a Tier 3 evaluation for the indoor inhalation exposure route for the off-site properties referenced in Sections 4-4.1.10 in the document. Specifically, the Tier 3 evaluation proposes exposure route exclusion for the indoor inhalation exposure route at these off-site properties with the condition that the sub-slab depressurization system (SSDS) at 304 Oak Street remains in operation. On March 12, 2015 the Tier 3 evaluation was presented to the Illinois EPA Cleanup Objectives Review and Evaluation Group (CORE) for consideration. The Illinois EPA CORE group approved the Tier 3 proposal with the following comments:

    a. The Illinois Uniform Environmental Covenants Act (UECA) instrument will be relied upon to create a perpetual environmental covenant that the SSDS at 304 Oak Street remains in operation.

    b. Section 4.2 in the document states that no vacant lots are present in the off-site area, and no spaces are present that would facilitate construction of new buildings where the indoor inhalation route might be complete. Furthermore, land use in the area is not expected to change.

    In regards to the golf course property, the future use must be addressed. Specifically, no land use restriction or covenant is in effect which would prevent redevelopment of the golf course into an alternate land use (e.g., residential). The Illinois EPA questions what steps will be taken to certify that land use at the golf course property will remain consistent with the current use and/or what steps will be taken to evaluate the indoor inhalation exposure route if the land use changes in the future.

2. Table 1 in the document shows that off-site groundwater sampling results were compared to the 35 IAC 742 Appendix B.Table I groundwater remediation objectives (ROs) for the indoor inhalation pathway. Additional discussion should be provided to verify why these ROs were used in lieu of the 35 IAC Appendix B.Table H ROs. Based on the nature of the off-site groundwater plume of volatile compounds downgradient of the site, it would be possible that contamination may be possible within 5 feet vertically or horizontally of a building or man-made pathway, prompting comparison of groundwater results to the 35 IAC 742 Appendix B.Table H ROs. Additional discussion must be provided.

All future submittals to the Illinois EPA should include one (1) original and one (1) copy of each document.

The Illinois EPA requests a fourteen (14) day, at a minimum, advance notice of any remedial activities at the Remedial Site so Agency personnel can schedule site visits during those activities.

If you have any questions, please feel free to contact me at (217) 557-1409 or e-mail me at todd.hall@illinos.gov.

Sincerely,

Todd Hall

Todd Hall, Project Manager
Voluntary Site Remediation Unit
Remedial Project Management Section
Division of Remediation Management
Bureau of Land

cc: Gerald T. Karr
Senior Assistant Attorney General
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Nadine Weinberg
ARCADIS U.S., Inc.
482 Congress Street, Suite 501
Portland, Maine 04101

Greg Richardson - DLC

Bureau of Land Division File

Table 1
Off-Site Shallow Groundwater Sampling Results
GE Morrison Facility
Morrison, Illinois

ompound	Units	Residential Groundwater Remediation Objectives		SB-35-20	SB40-12	SB40-12 Duplicate	SB42-15	SB43-24
		Table H (a)	Table I (b)	2/14/2012	2/14/2012	2/14/2012	2/15/2012	2/15/2012
VOCs (SW846 8260)								
1,1,1-Trichloroethane	µg/l	1,000,000	1,300,000	**850**	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/l	4,400,000	4,400,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/l	180,000	750,000	**67**	5.0 U	5.0 U	**1.5 J**	5.0 U
1,1-Dichloroethene	µg/l	24,000	61,000	**690**	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/l	1,800	35,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	µg/l	0.65	29	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane (EDB)	µg/l	3.5	73	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	µg/l	140,000	160,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/l	54	500	**13 J**	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/l	120	670	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	µg/l	79,000	79,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	µg/l	10,000,000	220,000,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/l	1,000,000,000	1,000,000,000	200 U	20 U	20 U	20 U	20 U
Benzene	µg/l	110	410	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/l	6,700,000	6,700,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/l	3,100	170,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	µg/l	--	--	50 U*	5.0 U*	5.0 U*	5.0 U*	5.0 U*
Carbon disulfide	µg/l	67,000	170,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	µg/l	20	52	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/l	26,000	130,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	µg/l	70	170	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/l	3,500,000	3,500,000	**14 J**	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/l	140	420	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	µg/l	2,600,000	2,600,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	µg/l	3,000	6,800	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	µg/l	370	1,300	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene (Cumene)	µg/l	2,700	6,200	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl Acetate	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	µg/l	--	--	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	µg/l	2,100	12,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl-tert-butyl ether	µg/l	1,900,000	30,000,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	µg/l	310,000	310,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/l	91	260	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	µg/l	530,000	530,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/l	16,000	58,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/l	--	420	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/l	340	1,100	**170**	5.0 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	µg/l	26,000	62,000	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	µg/l	28	65	50 U	5.0 U	5.0 U	5.0 U	5.0 U
Xylenes, Total	µg/l	30,000	96,000	150 U	15 U	15 U	15 U	15 U

Notes:

Bold indicates a detection of the noted compound.

(a) Illinois EPA Section 742, Appendix B, Table H - Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route - Diffusion and Advection

(b) Illinois EPA Section 742, Appendix B, Table I - Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route - Diffusion Only

-- = Indicates there is no established Remediation Objective

* = LCS or LCSD exceeds the control limits

B = Analyte was detected in the associated method blank

Illinois EPA = Illinois Environmental Protection Agency

J = Estimated concentration

µg/l = Micrograms per liter

U = Compound not detected

UJ = Indicates the analyte was analyzed but not detected.

VOCs = Volatile organic compounds

Table 1
Off-Site Shallow Groundwater Sampling Results
GE Morrison Facility
Morrison, Illinois

ompound	Units	Residential Groundwater Remediation Objectives		SB44-24	SB-45-18	SB46-18	SB47-11	SB48-15.5
		Table H (a)	Table I (b)	2/15/2012	8/2/2012	8/2/2012	8/2/2012	8/2/2012
VOCs (SW846 8260)								
1,1,1-Trichloroethane	µg/l	1,000,000	1,300,000	**11**	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/l	4,400,000	4,400,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/l	180,000	750,000	**4.4 J**	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/l	24,000	61,000	**15**	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/l	1,800	35,000	5.0 U	**7.8 B***	5.0 U*	**1.1 JB***	5.0 U*
1,2-Dibromo-3-chloropropane	µg/l	0.65	29	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane (EDB)	µg/l	3.5	73	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	µg/l	140,000	160,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/l	54	500	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/l	120	670	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	µg/l	79,000	79,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	µg/l	10,000,000	220,000,000	5.0 U	5.0 U	5.0 U	*5.0 U*	5.0 U
2-Hexanone	µg/l	--	--	5.0 U	5.0 U	5.0 U*	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/l	1,000,000,000	1,000,000,000	20 U	20 U	20 U*	20 U	20 U
Benzene	µg/l	110	410	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/l	6,700,000	6,700,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/l	3,100	170,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	µg/l	--	--	5.0 U*	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	µg/l	67,000	170,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	µg/l	20	52	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/l	26,000	130,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	µg/l	70	170	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/l	3,500,000	3,500,000	5.0 U	**38**	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/l	140	420	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	µg/l	2,600,000	2,600,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	µg/l	3,000	6,800	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	µg/l	370	1,300	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene (Cumene)	µg/l	2,700	6,200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl Acetate	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	µg/l	2,100	12,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl-tert-butyl ether	µg/l	1,900,000	30,000,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	µg/l	310,000	310,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/l	91	260	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	µg/l	530,000	530,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/l	16,000	58,000	5.0 U	**0.98 J**	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/l	--	420	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/l	340	1,100	**8.5**	5.0 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	µg/l	26,000	62,000	5.0 U	5.0 U*	5.0 U	5.0 U*	5.0 U*
Vinyl chloride	µg/l	28	65	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Xylenes, Total	µg/l	30,000	96,000	15 U	15 U	15 U	15 U	15 U

Notes:

Bold indicates a detection of the noted compound.

(a) Illinois EPA Section 742, Appendix B, Table H - Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route - Diffusion and Advection

(b) Illinois EPA Section 742, Appendix B, Table I - Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route - Diffusion Only

-- = Indicates there is no established Remediation Objective

* = LCS or LCSD exceeds the control limits

B = Analyte was detected in the associated method blank

Illinois EPA = Illinois Environmental Protection Agency

J = Estimated concentration

µg/l = Micrograms per liter

U = Compound not detected

UJ = Indicates the analyte was analyzed but not detected.

VOCs = Volatile organic compounds

Table 1
Off-Site Shallow Groundwater Sampling Results
GE Morrison Facility
Morrison, Illinois

ompound	Units	Residential Groundwater Remediation Objectives		SB49-24	SB50-17	SB51-16	SB51-16 Duplicate	MW10 (5-9)
		Table H (a)	Table I (b)	8/3/2012	8/3/2012	8/3/2012	8/3/2012	10/30/2012
VOCs (SW846 8260)								
1,1,1-Trichloroethane	µg/l	1,000,000	1,300,000	5.0 U	5.0 U	5.0 U	5.0 U	**11**
1,1,2,2-Tetrachloroethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/l	4,400,000	4,400,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/l	180,000	750,000	5.0 U	**6.8**	5.0 U	5.0 U	**22**
1,1-Dichloroethene	µg/l	24,000	61,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/l	1,800	35,000	5.0 U*	5.0 U*	**0.55 JB***	**0.45 JB***	5.0 U
1,2-Dibromo-3-chloropropane	µg/l	0.65	29	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane (EDB)	µg/l	3.5	73	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	µg/l	140,000	160,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/l	54	500	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/l	120	670	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	µg/l	79,000	79,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	µg/l	10,000,000	220,000,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone (MIBK)	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/l	1,000,000,000	1,000,000,000	20 U	20 U	20 U	20 U	20 U
Benzene	µg/l	110	410	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/l	6,700,000	6,700,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/l	3,100	170,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	µg/l	67,000	170,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	µg/l	20	52	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/l	26,000	130,000	5.0 U	5.0 U	5.0 U	5.0 U	**0.91 J**
Chloroethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	µg/l	70	170	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/l	3,500,000	3,500,000	5.0 U	**3.7 J**	5.0 U	5.0 U	**62**
cis-1,3-Dichloropropene	µg/l	140	420	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	µg/l	2,600,000	2,600,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	µg/l	3,000	6,800	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	µg/l	370	1,300	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene (Cumene)	µg/l	2,700	6,200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl Acetate	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	µg/l	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	µg/l	2,100	12,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl-tert-butyl ether	µg/l	1,900,000	30,000,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	µg/l	310,000	310,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/l	91	260	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	µg/l	530,000	530,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/l	16,000	58,000	5.0 U	**1.0 J**	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/l	--	420	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/l	340	1,100	5.0 U	**4.1 J**	5.0 U	5.0 U	**13**
Trichlorofluoromethane	µg/l	26,000	62,000	5.0 U*	5.0 U*	5.0 U*	5.0 U*	5.0 U
Vinyl chloride	µg/l	28	65	5.0 U	5.0 U	5.0 U	5.0 U	**7.9**
Xylenes, Total	µg/l	30,000	96,000	15 U	15 U	15 U	15 U	15 U

Notes:

Bold indicates a detection of the noted compound.

(a) Illinois EPA Section 742, Appendix B, Table H - Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route - Diffusion and Advection

(b) Illinois EPA Section 742, Appendix B, Table I - Tier 1 Groundwater Remediation Objectives for the Indoor Inhalation Exposure Route - Diffusion Only

-- = Indicates there is no established Remediation Objective

* = LCS or LCSD exceeds the control limits

B = Analyte was detected in the associated method blank

Illinois EPA = Illinois Environmental Protection Agency

J = Estimated concentration

µg/l = Micrograms per liter

U = Compound not detected

UJ = Indicates the analyte was analyzed but not detected.

VOCs = Volatile organic compounds

APPENDIX B

SL-SCREEN MODEL

Table 1
Human Health Exposure Assumptions
GE Morrison Facility
Morrison, Illinois

EXPOSURE PARAMETER	Units	Industrial Worker	Caretaker
C_s = initial soil concentration	µg/kg	SS	SS
ATc = averaging time for carcinogens [a]	years	70	70
ATn = averaging time for non-carcinogens [a]	years	25	25
ED = exposure duration [a]	years	25	25
EF = exposure frequency [b]	days/year	250	6
L_f = depth below grade to bottom of enclosed space floor [c]	cm	15	15
L_s = soil gas sampling depth below grade [b]	cm	152, 259, 610, and 853	152, 259, 610, and 853
ER = indoor air exchange rate [c]	1/h	0.93	0.93
SOIL PHYSICAL PARAMETERS[e]	**Units**		
Soil type [b]		Sample depth-specific	Sample depth-specific
T_s = average soil temperature [d]	°C	13	13
ρ_b^A = soil dry bulk density [c]	g/cm^3	1.5	1.5
n^v = total soil porosity [c]	unitless	0.43	0.43
θ_w = water-filled soil porosity [d]	cm^3/cm^3	0.15	0.15
θ_a = air-filled soil porosity [e]	cm^3/cm^3	0.28	0.28
D_A = apparent diffusivity	cm^2/s	CS	CS
D_a = diffusivity in air	cm^2/s	CS	CS
D_w = diffusivity in water	cm^2/s	CS	CS
H' = dimensionless Henry's law constant	atm-m^3/mol	CS	CS
K_d = soil-water partition coefficient (K_{oc} x f_{oc})	L/kg	CS	CS
f_{oc} = soil organic carbon fraction [b]	unitless	0.017	0.017

BUILDING PARAMETERS	Units	Facility
Building length [b]	cm	30,480
Building width [b]	cm	9,601
Building height [d]	cm	610
Q_{soil} = average vapor flow rate into building [d]	cm^3/s	83.33
X_{crack} = floor - wall seam perimeter [c]	cm	3,844
$Q_{building}$ = building ventilation rate [d]	cm^3/s	4.61E+07

Sources:

Illinois EPA (IEPA), 2013. Title 35 of the Illinois EPA Adminstrate Code Subtitle G part 742, Tiered Approach to Corrective Action Objectives (35 IAC 742). July. http://www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx

USEPA. 1989. Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002. December.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors.

Notes:

°C - degrees Celsius
µg/kg - micrograms per kilogram
atm-m^3/mol - atmosphere-cubic meter per mole
cm - centimeter
cm^2/s - centimeters squared per second
cm^3/s - centimeters cubed per second
cm^3/cm^3 - cubic centimeters per cubic centimeters
CS – chemical-specific
g/cm^3 - grams per cubic centimeter
J&E - Johnson & Ettinger
Kg - kilogram
L - liter
l/hr - liters per hour
m - meter
SS – site-specific

[a] Source: USEPA, 1989; 1991. Standard default value.
[b] Site-specific parameter.
[c] USEPA Johnson & Ettinger Model, Version 2.3, SL-SCREEN (USEPA, 2003) default parameter.
[d] Site-specific value calculated as follows: (building length x building width x building height x indoor air exchange rate)/3,600 seconds-hour. Indoor air exchange rate and equation were both obtained from IEPA, 2013.

Table 2
Human Health Inhalation Toxicity Values
GE Morrison Facility
Morrison, Illinois

COPC	CAS No.	URF $(\mu g/m^3)^{-1}$		RfC (mg/m^3)	
1,1,1-Trichloroethane	71556	NA		5.0E+00	I
1,1,2-Trichloroethane	79005	1.6E-05	I	2.0E-04	I
1,1-Dichloroethene	75354	NA		2.0E-01	I
1,2-Dichloroethane	107062	2.6E-05	I	7.0E-03	P
Methylene chloride	75092	1.0E-08	I	6.0E-01	I
Tetrachloroethene	127184	2.6E-07	I	4.0E-02	I
Trichloroethene	79016	4.1E-06	I	2.0E-03	I

Notes:

CAS No. - Chemical Abstracts Service number
COPC - chemical of potential concern
$\mu g/m^3$ - micrograms per cubic meter
mg/m^3 - milligrams per cubic meter
NA - not available
RfC - reference concentration
URF - unit risk factor

Toxicity Value Source

I - Integrated Risk Information System (IRIS) Database from U.S. Environmental Protection Agency's (USEPA's) Regional Screening Levels (RSL) table (USEPA, 2015)
P - Provisional Peer Reviewed Toxicity Values (PPRTVs) Appendix as cited in USEPA's RSL Table (USEPA, 2015)

Table 3

Cumulative Vapor Intrusion Risk Estimates for VOCs in Soil [a]
GE Morrison Facility
Morrison, Illinois

Soil COPC [b]	Maximum Detected Soil Concentration (ug/kg)	Sample Depth (ft bgs)	Industrial Worker ILCR (unitless)	Industrial Worker HQ (unitless)	Caretaker [c] ILCR (unitless)	Caretaker [c] HQ (unitless)
1,1,1-Trichloroethane	12,000	28	NA	0.000045	NA	0.0000011
1,1,2-Trichloroethane	2,900	20	4.3E-08	0.038	1.0E-09	0.00091
1,1-Dichloroethene	42,000	20	NA	0.017	NA	0.00041
1,2-Dichloroethane	1,100	28	7.0E-08	0.0011	1.7E-09	0.000026
Methylene chloride	300	28	2.3E-11	0.000011	5.5E-13	0.00000026
Tetrachloroethene	77	5	3.9E-10	0.00011	9.4E-12	0.0000025
Trichloroethene	130	8.5	4.2E-09	0.0014	1.0E-10	0.000034
		Cumulative ILCR/HI:	1E-07	0.06	3E-09	0.001
		USEPA Risk Range:	10^{-6} - 10^{-4}	1	10^{-6} - 10^{-4}	1

Notes:

[a] Risk estimates were derived using USEPA's Johnson and Ettinger (J&E) Model SG-SCREEN Version 2.3 (03/01). Based on measured soil properties, sand was selected as the soil type for the 5 ft bgs sample and sandy clay was selected as the soil type for all other samples. Building ventilation rate used was calculated using site-specific building dimensions and is equivalent to 4.61×10^{7}.

[b] COPCs are those VOCs with maximum detected concentrations that exceeded one or more (Tiered Approach Corrective Action Objectives) TACO Tier 1 soil screening criteria.

[c] Caretaker was assumed to only be onsite for four hours per month (6 days per year).

COPC - chemical of potential concern
HI - hazard index
ft bgs - feet below ground surface
HQ - hazard quotient
ILCR - incremental lifetime cancer risk
µg/kg - micrograms per kilogram
NA -not applicable
VOC - volatile organic compound

APPENDIX C

PROFESSIONAL ENGINEER AFFIRMATION

Appendix C - Professional Engineer Affirmation

"I attest that all site investigations or remedial activities, including review of laboratory data, that are the subject of this plan or report were performed under my direction and this document and all attachments were prepared under my direction or reviewed by me, and, to the best of my knowledge and belief, the work described in the plan or report has been designed or completed in accordance with the Act, 35 Ill. Adm. Code 740, and generally accepted engineering practices, and the information presented, including any qualified laboratory data, is accurate and complete."

Signature

Jonathan D. Pohl, PE

Name

MWH Americas, Inc.

Company

062057194

Registration Number

11/30/2015

Expiration Date

LICENSED PROFESSIONAL ENGINEER
JONATHAN D. POHL
062-057194
STATE OF ILLINOIS

June 16, 2015

EXHIBIT C

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-2829
BRUCE RAUNER, GOVERNOR LISA BONNETT, DIRECTOR

16 FEB 17 PM 3: 13

GE ELECTRIC CO
OEP / REGO

217/ 558-2564

February 10, 2016

Mr. Lewis S. Streeter
Project Manager
General Electric Company
319 Great Oaks Boulevard
Albany, NY 12203

Re: 1950350007 – Whiteside County
Morrison/Morrison Well Contamination
Superfund / Technical File

Dear Mr. Streeter:

The Illinois Environmental Protection Agency (Illinois EPA) has reviewed the June 18, 2015 *Remediation Objectives Report* (received June 19, 2015/ Illinois EPA Log No. 15-59751, but originally filed in LPC 1950355027), prepared by MWH Americas, Inc. under Consent Order No. 04 CH 28. This report also contains responses to three Illinois EPA comments on the Focused Site Investigation (FSI) Addendum Report which was conditionally approved by Illinois EPA in a letter written March 18, 2015.

The June 18, 2015 *Remediation Objectives Report* is **disapproved**. The following comments were generated as a result of this review.

Pg. 2-1. The GE response to Comment 1 cannot be conditioned upon obtaining continuing permission from the current landowner. These well nests must remain installed in the event that additional information is required to further verify the groundwater flow regime and/or additional sampling of these wells is required.

Pg. 2-1. GE response to comment 1) a) is acceptable to Illinois EPA

Pg. 2-1 and 2-2. The GE response to Comment 1) b) does not clearly demonstrate that land use on 100% of the golf course will not change. The GE response indicated most of the golf course is located within the 100-year flood plain. This wording appears to leave a portion of the golf course susceptible to a change in land use. No land use restriction or covenant is in effect which would prevent redevelopment of the golf course into an alternate land use (e.g., residential). The Illinois EPA again questions what steps will be taken to certify that land use at the golf course property will remain consistent with the current land use and/or what steps will be taken to evaluate the indoor inhalation exposure route if the land use changes in the future.

Pg. 2-2. The GE response to Comment 2 identifying Table I as the correct screening tool is acceptable, however, Footnote b, Table I indicates "Remediation objectives relying on this table require use of institutional controls in accordance with Subpart J."

Pg. 3-11, Section 3.5.4 Groundwater Ingestion Exposure Route. The GE statement "there is an IEPA-approved Groundwater Ordinance restricting the use of groundwater within the City of Morrison" cannot be verified. The Illinois EPA database indicates a proposed groundwater use ordinance was rejected in 2010. Apparently no other attempt has been made to have an ordinance approved. Please provide a certified copy of the proposed groundwater ordinance so that it can be reviewed by the Illinois EPA.

Pg. 3-11, Section 3.5.5 Indoor Air Inhalation Route. The GE Tier 3 Evaluation for down gradient properties was only conditionally approved (see above comment for GE response to comment 1) b).

Pg. 3-13, 3.5.6 Surface Water Exposure Route. The three surface water volatile organic constituent (VOC) samples collected from Rock Creek during a 1987 Phase I Remedial Investigation are too old (29 years) to be of value. GE will need to assess the current surface water conditions in Rock Creek.

Pg. 4-1 through 4-3, Section 4.0 Tier 3 Indoor Air Inhalation Evaluation. Illinois EPA is unable to review the Tier 3 proposal for the Main Building included in the ROR. A Review and Evaluation Licensed Professional Engineer (RELPE) would be necessary to review the proposal for the Illinois EPA.

Also, the small basement with a sump in the main building must be evaluated, and the data included in any Tier 3 evaluation. No samples were taken under the basement.

Additionally, justification must be presented for all the inputs included in the Tier 3 evaluation. The notes on Table 1 cite a USEPA default in Note c and an Illinois EPA default in Note d.

In table 3, Note a, cites SG - Screen Version 2.3. Should that be SL-Screen, or is it a different model? Note c, justification for caretaker time must include job duties, time to perform those duties, etc.

If you have any questions, please feel free to contact me at 217/ 558-2564 or E-mail me at joseph.dombrowski@illinois.gov.

Sincerely,

Joseph P. Dombrowski

Joseph P. Dombrowski, Project Manager
Bureau of Land
Remedial Project Management Section
State Sites Unit

Cc: Gerald T. Karr
Senior Assistant Attorney General
Environmental Bureau
Office of the Attorney General
69 West Washington Street, Suite 1800
Chicago, IL 60602

Kirk MacFarlane
The General Electric Company
640 Freedom Business Center Drive, 2nd Floor
King of Prussia, PA 19406-1322

David Powers
MWH Americas, Inc.
175 West Jackson Boulevard, Suite 1900
Chicago, IL 60604-2814

Greg Richardson, DLC

Bureau of Land Division File

EXHIBIT D

Lewis S. Streeter
Senior Project Manager

GE
Global Operations - Remediation
319 Great Oaks Blvd.
Albany, NY 12203

T 518 862 2712
F 518 862 2731
Lewis.Streeter@ge.com

March 15, 2016

Mr. Joseph Dombrowski
Illinois Environmental Protection Agency
Bureau of Land, Remedial Project Management Section
1021 North Grand Avenue East
PO Box 19276
Springfield, IL 62794-9276
One paper copy, one electronic copy via email

Re: Response to IEPA Comments, February 10, 2016
Remediation Objectives Report
Consent Order No. 04 CH 28
GE facility, 709 West Wall St., Morrison, IL

Dear Mr. Dombrowski:

The General Electric Company (GE) is submitting the attached responses to Illinois Environmental Protection Agency (IEPA) comments on the Remediation Objectives Report (ROR). The ROR was submitted to IEPA in June 2015 and comments were provided to GE in a letter dated February 10, 2016; received by GE on February 16, 2016. As you know, two of the comments (No. 7 and No. 9), requested collection of additional data. If IEPA concurs with the proposed approach to collecting this data, as discussed in the response to those comments, the data will be included in a revised ROR. Additional revisions to the ROR are also summarized in the attached responses.

Please contact me with any questions or comments, or if you need any additional information.

Sincerely,

Lewis S. Streeter
Senior Project Manager

LSS/bg

Attachment: Response to IEPA Comments dated February 10, 2016. Prepared by MWH, March 15, 2016

cc:

Division of Legal Counsel
Illinois Environmental Protection Agency
9511 West Harrison
Des Plaines, IL 60016-1563
C/O: Joseph Dombrowski
One paper copy

Gerald T. Karr
Senior Assistant Attorney General
Environmental Bureau
Office of the Attorney General
69 West Washington Street, Suite 1800
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One paper copy

Michelle Tebrugge
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MWH Americas, Inc.
175 W. Jackson Blvd, Suite 1900
Chicago, IL 60604-2814
Electronic copy via email

Nadine Weinberg
Environmental Resources Management (ERM)
One Beacon Street
Boston, MA 02108
Electronic copy via email

MWH

BUILDING A BETTER WORLD

March 15, 2016

ELECTRONIC DELIVERY
(via Lewis.Streeter@ge.com)

Mr. Lewis Streeter
General Electric Company
319 Great Oaks Boulevard
Albany, New York 12203

Subject: GE Morrison Facility – Response IEPA Comments dated February 10, 2016
Remediation Objectives Report
Consent Order No. 04 CH 28
709 West Wall Street, Morrison, Illinois

Dear Mr. Streeter:

MWH Americas, Inc. (MWH) has prepared the following responses to Illinois Environmental Protection Agency (IEPA) comments on the *Remediation Objectives Report (ROR)* prepared by MWH and received by the IEPA on June 19, 2015. The ROR also contained responses to three IEPA comments on the Focused Site Investigation (FSI) Addendum Report (MWH, 2015) which was conditionally approved by the IEPA in a letter written March 18, 2015. The following comments were provided to the General Electric Company (GE) in a letter written February 10, 2016 and received by GE on February 16, 2016.

IEPA Comment #1: Pg. 2-1. The GE response to Comment 1 cannot be conditioned upon obtaining continuing permission from the current landowner. These well nests must remain installed in the event that additional information is required to further verify the groundwater flow regime and/or additional sampling of these wells is required.

Response to IEPA Comment #1: The response will be revised as follows *"The monitoring wells installed south of Rock Creek will be included as part of the monitoring well network. These wells will be maintained as long as data is required from them."*

IEPA Comment #2: Pg. 2-1. The GE response to Comment 1) a) is acceptable to Illinois EPA.

Response to IEPA Comment #2: Comment noted.

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Suite 1301
Chicago, IL 60654

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FAX 312-831-3999
www.mwhglobal.com

IEPA Comment #3: Pg. 2-1 and 2-2. The GE response to Comment 1) b) does not clearly demonstrate that land use on 100% of the golf course will not change. The GE response indicated most of the golf course is located within the 100-year flood plain. This wording appears to leave a portion of the golf course susceptible to a change in land use. No land use restriction or covenant is in effect which would prevent redevelopment of the golf course into an alternate land use (e.g., residential). The Illinois EPA again questions what steps will be taken to certify that land use at the golf course property will remain consistent with the current land use and/or what steps will be taken to evaluate the indoor inhalation exposure route if the land use changes in the future.

Response to IEPA Comment #3: As noted in the ROR, there are no known plans for redevelopment of the Golf Course into an alternate land use. For most of the Golf Course property, change of the current use is not reasonably anticipated given that most of the course is located within the 100-year flood plain area as delineated by the Federal Emergency Management Agency. The attached ***Figure 1*** shows the extent of 100-year flood plain overlaid across the Golf Course property along with wetlands identified in the National Wetland Inventory. As shown on the attached figure, 85% of the Golf Course property north of Rock Creek is located within the 100-year flood plain. Both the City of Morrison and Whiteside County ordinances impose significant requirements (i.e., raising elevation of the lowest living space above the 100-year elevation) on any construction within the 100-year flood plain that would make any residential use cost prohibitive in the Morrison area. In addition, there are significant wetland areas on the property (***Figure 1***) that also make a change of use highly unlikely. Any change in land use (e.g., a residential development) now or in the future would require approval for the filling of a large area of wetlands (27 acres). Approval of the filling of such acreage is unlikely and would require significant and costly wetlands mitigation (e.g., 2 to 1 mitigation).

There is only a small area of the Golf Course downgradient of the GE plant that is outside of the 100-year flood plain area and north of Rock Creek. That area has been evaluated in the previous vapor intrusion assessment and the indoor inhalation exposure was found to be incomplete. GE conducted an assessment of the off-site residential properties and the Golf Course clubhouse located to the southwest of the plant. As presented in the Tier 3 Vapor Intrusion Evaluation, concentrations of volatile organic compounds (VOCs) in shallow groundwater and soil gas downgradient of the plant are low. The only property where soil gas was observed above Tier 1 Remediation Objectives (ROs) was non-responsive; however concentrations of VOCs in indoor air were below the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs). Nonetheless, an active sub-slab depressurization system (SSDS) prevents VOC impacts from reaching indoor air at non-responsive. For the remaining residential properties other than non-responsive, Site-related compounds of concern (COCs) were either not detected or were detected at concentrations several orders of magnitude below the soil gas ROs. Additionally, indoor air sampling data indicate that migration of site-related VOCs to indoor air is either not occurring or is not leading to exceedances of residential indoor air ROs. For the Golf Course clubhouse property, no Site-

[1] As noted in the Tier 3 evaluation, the evaluation does not present a direct comparison of results to Tier 1 ROs, and instead uses the sub-slab and indoor air data.

related COCs were detected above either the non-residential or residential indoor air ROs. In addition, only one Site-related COC was detected above the residential soil gas RO and this was only during one of four sampling events.

Based on the previous vapor intrusion assessment, the indoor air inhalation exposure pathway is incomplete for the off-site properties downgradient of the GE plant, including the portion of the Golf Course outside the 100-year floodplain and north of Rock Creek. Indoor air sampling indicates that Site related VOCs were not found in indoor air at these properties above the residential indoor air ROs. Therefore no land use restriction or covenant is warranted for the small remainder of the Golf Course property outside of the 100-year flood plain area and north of Rock Creek.

Any remedy selected for this Site will include long-term monitoring and reporting. GE will propose, as part of the remedial action plan, to include a periodic review of land use at the Site and in the vicinity of the Site, as part of the long-term monitoring plan for this Site. Such a plan could include periodic (e.g., annual) reporting to IEPA on the status of land use in the impacted areas, including on-site and downgradient of the Site.

IEPA Comment #4: Pg. 2-2. The GE response to Comment 2 identifying Table I as the correct screening tool is acceptable, however, Footnote b, Table I indicates "Remediation objectives relying on this table require use of institutional controls in accordance with Subpart J."

Response to IEPA Comment #4: MWH does not agree with this comment as it implies that institutional controls are necessary for the properties evaluated as part of the off-site vapor intrusion investigation. The Tier 3 Vapor Intrusion Evaluation (ARCADIS, 2014) did not use Table I as a screening tool, but rather it relied on sub-slab and indoor air data. The report presented shallow groundwater compared to Table I (and later to both Tables H and I as Appendix A to the ROR); however, this data merely provided a qualitative indication of the low degree of impact to shallow groundwater in the area of the off-site properties.

GE is committed to putting in place a Uniform Environmental Covenant Act (UECA) at non-responsi to ensure the SSDS remains in operation.

Based on the indoor air evaluation already completed and the fact that the inhalation exposure route is not complete the use of institutional controls for any other off-site properties is unwarranted.

IEPA Comment #5: Pg. 3-11, Section 3.5.4 Groundwater Ingestion Exposure Route. The GE statement "there is an IEPA-approved Groundwater Ordinance restricting the use of groundwater within the City of Morrison" cannot be verified. The Illinois EPA database indicates a proposed groundwater use ordinance was rejected in 2010. Apparently no other attempt has been made to have an ordinance approved. Please provide a certified copy of the proposed groundwater ordinance so that it can be reviewed by the Illinois EPA.

Response to IEPA Comment #5: A certified copy of the groundwater ordinance will be provided to IEPA under separate cover.

IEPA Comment #6: Pg. 3-11, Section 3.5.5 Indoor Air Inhalation Route. The GE Tier 3 Evaluation for down gradient properties was only conditionally approved (see above comment for GE response to comment 1) b).

Response to IEPA Comment #6: The first two sentences of 3.5.5 will be replaced with the following sentences: *"The indoor air inhalation exposure route for down gradient properties was excluded based on the results of Tier 3 Vapor Intrusion Evaluation, conditioned upon putting in place a UECA at* non-responsive *to ensure the SSDS remains in operation. However, the Tier 3 Evaluation did not address the indoor air inhalation exposure route for the Main Building."*

IEPA Comment #7: Pg. 3-13, 3.5.6 Surface Water Exposure Route. The three surface water volatile organic constituent (VOC) samples collected from Rock Creek during a 1987 Phase I Remedial Investigation are too old (29 years) to be of value. GE will need to assess the current surface water conditions in Rock Creek.

Response to IEPA Comment #7: MWH proposes to collect three surface water samples from Rock Creek at the locations shown on the attached ***Figure 2***. Rock Creek reaches a maximum of 20 feet in width, and the depth varies based on weather conditions. A single grab sample will be collected at approximately mid-depth in the center of the channel at each sampling location to represent the entire cross section.

Field personnel will collect the samples from Rock Creek by using an open-mouth bottle sampler attached to a telescoping rod or equivalent. In order to avoid disturbance of bottom sediments, field personnel will not enter the waters of Rock Creek to collect the sample.

The sample containers will be filled directly from the bottle sampler into the sample containers (40 milliliter glass vials, pre-preserved with hydrochloric acid) provided by the laboratory. The samples will be delivered to Test America Laboratories (or equivalent) for analysis of VOCs using USEPA Method 8260B. Field collection procedures including sampling, sample handling, and quality assurance/ quality control will follow the *FSI Work Plan* (MWH, 2011) which was approved by the IEPA for use at this Site on November 15, 2011.

The results of the surface water samples will be provided to the IEPA within the Revised ROR.

IEPA Comment #8: Pg. 4-1 through 4-3, Section 4.0 Tier 3 Indoor Air Inhalation Evaluation. Illinois EPA is unable to review the Tier 3 proposal for the Main Building included in the ROR. A Review and Evaluation Licensed Professional Engineer (RELPE) would be necessary to review the proposal for the Illinois EPA.

Response to IEPA Comment #8: GE agrees to the use of a RELPE to review the Tier 3 Indoor Air Inhalation Evaluation.

IEPA Comment #9: Also, the small basement with a sump in the main building must be evaluated, and the data included in any Tier 3 evaluation. No samples were taken under the basement.

Response to IEPA Comment #9: To evaluate the sump in the main building, MWH proposes the collection of one aqueous sample for VOC analysis. The sample will be collected with a bailer and analyzed for VOCs by USEPA Method 8260B. Field collection procedures including sampling, sample handling, and quality assurance/ quality control will follow the IEPA-approved *FSI Work Plan*.

To evaluate the basement in the main building, MWH proposes using existing soil matrix data collected adjacent to the basement during the FSI. Soil borings SB-11 (north), SB-33 (west) and SB-23 (south) were drilled on three sides of the basement. Soil boring SB-23 was drilled immediately adjacent to the basement along West Morris Street. In addition, soil gas and grab groundwater samples were collected in West Wall Street and on the east side of the basement. The Tier 3 Evaluation will be revised to include an evaluation of the basement using the sump data and available soil matrix data and include the results in a Revised ROR.

IEPA Comment #10: Additionally, justification must be presented for all the inputs included in the Tier 3 evaluation. The notes on Table 1 cite a USEPA default in Note c and an Illinois EPA default in Note d.

Response to IEPA Comment #10: Please note that default assumptions based on IEPA Administrative Code Subtitle G Part 742 will be footnoted to identify this source. Two assumptions, 'depth below grade to bottom of enclosed space floor' and 'floor – wall seam perimeter', are based on USEPA default values provided in the 2003 SL-Screen Model, as described in Footnote "c" on Table 1. The revised tables will be included within the revised Tier 3 Evaluation

IEPA Comment #11: In table 3, Note a, cites SG - Screen Version 2.3. Should that be SL-Screen, or is it a different model? Note c, justification for caretaker time must include job duties, time to perform those duties, etc.

Response to IEPA Comment #11: Yes, Footnote "a", should reference the SL-Screen Model; Table 3 has been revised accordingly. Please note that Footnote "b" in Table 1 – Human Health Exposure Assumptions will be updated to describe the caretaker's responsibilities and exposure duration. Consequently, Footnote "c" in Table 3 has been removed and will be included within the revised Tier 3 Evaluation.

If you have any questions or comments on these responses to IEPA comments please feel free to contact me at 312-831-3064.

Sincerely,

MWH AMERICAS, INC.

David Powers, PG
Project Manager

cc: MWH File

Attachments

Figure 1 – Site Features Map
Figure 2 – Proposed Rock Creek Surface Water Sampling Locations

ATTACHMENTS

Figure 1
Site Features Map
GE Morrison Facility
709 West Wall Street
Morrison, Illinois

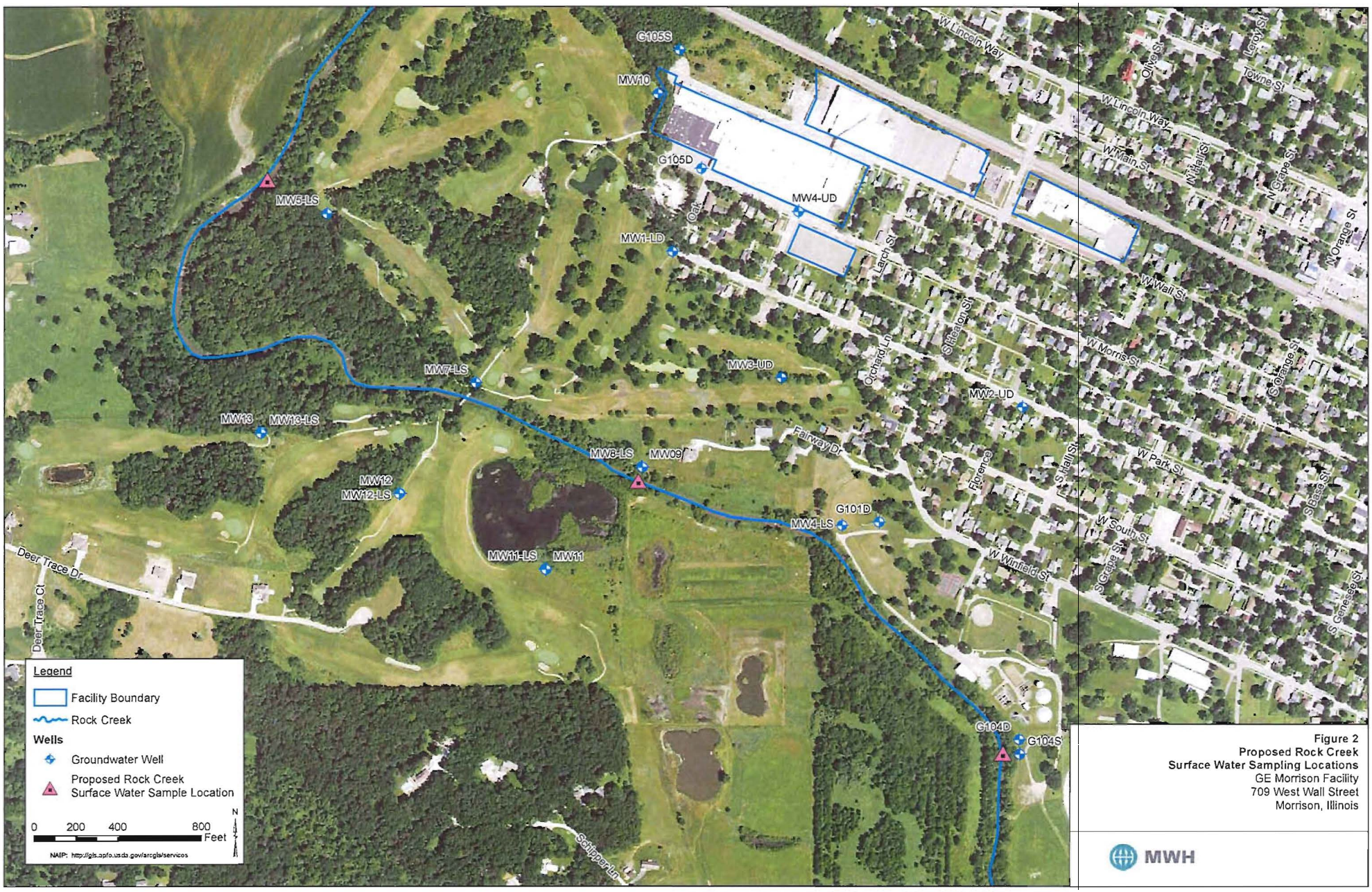

Figure 2
Proposed Rock Creek
Surface Water Sampling Locations
GE Morrison Facility
709 West Wall Street
Morrison, Illinois

MWH