



January 3, 2014

Ms. Michelle Kaysen
USEPA Region 5, Mail Code LU-9J
77 West Jackson Boulevard
Chicago, IL 60604

Mr. Kevin Turner
USEPA Region 5
8588 Route 148
Marion, IL 62959

RE: Final Interim In-Home Effectiveness Monitoring Plan, Hartford Petroleum Release Site, Hartford, Illinois

Dear Ms. Kaysen and Mr. Turner:

This Final Interim In-Home Effectiveness Monitoring Plan has been prepared to outline the protocols that will be used during routine (e.g., weekly, monthly, and quarterly) monitoring, as well as Mississippi River stage triggered event-based monitoring at the Hartford Petroleum Release Site (Hartford Site) located in Hartford, Illinois. These protocols have been previously submitted to the United States Environmental Protection Agency (USEPA) and Illinois EPA via email and subsequently discussed during several meetings held between May and September 2013.

ROUTINE IN-HOME MONITORING

Routine in-home monitoring will be conducted on a weekly, monthly, and quarterly basis to determine if the in-home mitigation measures are effective at preventing migration of volatile petroleum related constituents into structures present at the Hartford Site. The structures included in routine monitoring are summarized in Table 1 and the locations are shown on Figure 1. Table 1 also provides a summary of the sampling frequency on a structure-by-structure basis.

Weekly Monitoring

Currently, there are twelve structures at the Hartford Site in which in-home monitoring activities are being performed on a weekly basis including: 107 W Birch, 117 W Birch, 125 W Birch Front, 125 W Birch Rear, 129 W Birch, 119 W Cherry, 119 W Date, 504 N Delmar, 516 N Delmar, 715 N Delmar, 507 N Olive, and 610 N Old St. Louis. In-home monitoring will be conducted within these structures depending upon access permission.

Monthly and Quarterly Monitoring

Excluding the 12 structures described above, there are an additional 32 structures in which monthly monitoring will be performed between October 2013 and January 2014, in conjunction with the soil vapor extraction system effectiveness monitoring. Table 1 provides a summary of those structures where



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routine effectiveness monitoring will be performed. Monthly monitoring will be performed to provide additional data for evaluating the role of the soil vapor extraction system on controlling vapor migration into overlying structures. Subsequent to the January 2014 event, the monitoring frequency may be reduced to quarterly (as identified on Table 1) depending upon the evaluation of the effectiveness monitoring results and assessment of an appropriate monitoring frequency.

INTERIM IN-HOME EVENT-BASED MONITORING

For the purpose of the in-home event based monitoring program, an “event” is triggered by a rise in the Mississippi River stage to 14.5 feet (410 feet above mean sea level) as measured above the Mel Price (a.k.a., Alton) Lock and Dam, followed by an additional 2-foot rise over a 24-hour period. Once an event is triggered, another event cannot be triggered until at least one week later, if there is a subsequent two-foot rise in the river over a 24-hour period. Therefore, after an initial event, any subsequent 2-foot increase in the river stage over a 24-hour period (if the river remains above 14.5 feet) that occurs at least 8 days after the start of an event is considered a new event. In contrast, if another 2-foot increase occurs over a 24-hour period (assuming the river remains above 14.5 feet), prior to 8 days following the start of an event, this will not be considered a new event.

The Mississippi River stage at Mel Price Lock and Dam will be tracked using the Advanced Hydrologic Prediction Service from the National Weather Service. The Advanced Hydrologic Prediction Service identifies a 7-day forecast projection for the tailwater depth which can be used to forecast a potential event. The river stage levels shall be reviewed and recorded daily.

Once an event has been triggered, monitoring will be performed, as soon as access can be obtained, in the 34 structures listed on Table 1. Depending upon access being granted, monitoring will be performed every other day within each of these structures for a period of seven days, unless a longer time-frame is requested by the USEPA.

IN-HOME ACCESS

Apex will contact each property owner to obtain access for routine and event-based monitoring. For the weekly monitoring events, Apex will attempt to arrange for the next week’s access while present with the property owner or tenant during monitoring. For monthly, quarterly, and event-based monitoring (and weekly, if access has not been pre-arranged during in-home monitoring), up to two attempts will be made to arrange for access by contacting the property owner or tenant via telephone (or other means such as text or email as preferred by the homeowner or tenant). If access cannot be obtained during the two documented attempts, a third in person visit to request access will be coordinated with the USEPA.



MONITORING ACTIVITIES

Under the Interim In-Home Effectiveness Monitoring Plan, the monitoring activities performed within each structure during routine monitoring or a river stage triggered event will include:

- The indoor air within the structure will be screened using a flame ionization detector (FID) and photoionization detector (PID) for total organic vapor (TOV) and lower explosive limit (LEL). This field screening will be performed within the lowest occupied space within the structure, as well as the basement. Indoor air within the first floor and basement will initially be screened while travelling through the house to the sub-slab soil vapor probes. If the indoor air TOV measurements are equal to or exceed 10 parts per million by volume (ppmv), and cannot be attributed to an alternative source within the structure, then additional screening of the lowest occupied space will be performed.
- The pressure or vacuum in each sub-slab soil vapor probe installed in a structure will be measured regardless of the total number of monitoring ports within the structure.
- The soil vapor in each sub-slab probe will be field screened for oxygen, LEL, and TOV by connecting a fixed gas meter, PID, and FID directly to each probe, unless water is observed within the probe while collecting the pressure measurements. Note, that if the oxygen concentration measured in a probe is measured below 16% then a dilution probe will be connected to the FID prior to directly screening the probe for TOV.
- If the TOV measured using the FID within a probe is equal to or exceeds 350 ppmv, then a soil vapor sample will be collected in a Tedlar bag from that probe. The collected soil gas sample will be further screened using an FID, PID, and fixed gas meter for TOV, LEL, oxygen, carbon dioxide, and methane. If the TOV concentration is equal to or exceeds 350 ppmv during direct screening (using the FID) within multiple sub-slab probes then a vapor sample will be collected within a Tedlar bag from the probe with the highest concentration (or from a probe selected by the field team if the TOV measurement in the slab-slab probes are the same).
- If the TOV measured using the FID within a probe is equal to or exceeds 350 ppmv, then a soil vapor and indoor air sample from the basement will also be collected for laboratory analysis. The soil vapor sample will be collected from the sub-slab soil vapor probe with the highest TOV screening level (or from a probe selected by the field team if the TOV measurements in the slab-slab probes are the same). The soil vapor sample will be collected in a batch certified clean, 6-liter passivated Summa canister and analyzed for volatile petroleum related constituents of concern using USEPA Method TO-15. The soil vapor sample will be collected using a minimum of a 200-milliliter per minute flow controller. The basement air sample will be collected using a batch certified clean, 6-liter passivated Summa canister. The basement air sample will be collected using a 24-hour flow controller and submitted for laboratory analysis of volatile petroleum related constituents using USEPA Method TO-15.



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- If the TOV measured using the FID within each of the sub-slab soil vapor probes is measured below 350 ppmv but the indoor air TOV is equal to or exceeds 10 ppmv, then an indoor air sample will be collected within the basement and/or crawlspace (if one is present within the structure). Basement or crawlspace air samples will not be collected if the source of the TOV measured using the FID can be attributed to an alternate source within the structure, such as a natural gas leak. The basement and crawlspace air samples will be collected using batch certified clean, 6-liter passivated Summa canisters. These samples will be collected using a 24-hour flow controller and submitted for laboratory analysis of volatile petroleum related constituents using USEPA Method TO-15. A soil vapor sample may also be collected from the sub-slab soil vapor probe with the highest TOV screening level (or from a probe selected by the field team if all the concentrations beneath the slab are the same) to assess the vapor intrusion pathway beneath the structure. The soil vapor sample will be collected in a batch certified clean, 6-liter passivated Summa canister and analyzed for volatile petroleum related constituents of concern using USEPA Method TO-15. The soil vapor sample will be collected using a minimum of a 200-milliliter per minute flow controller.

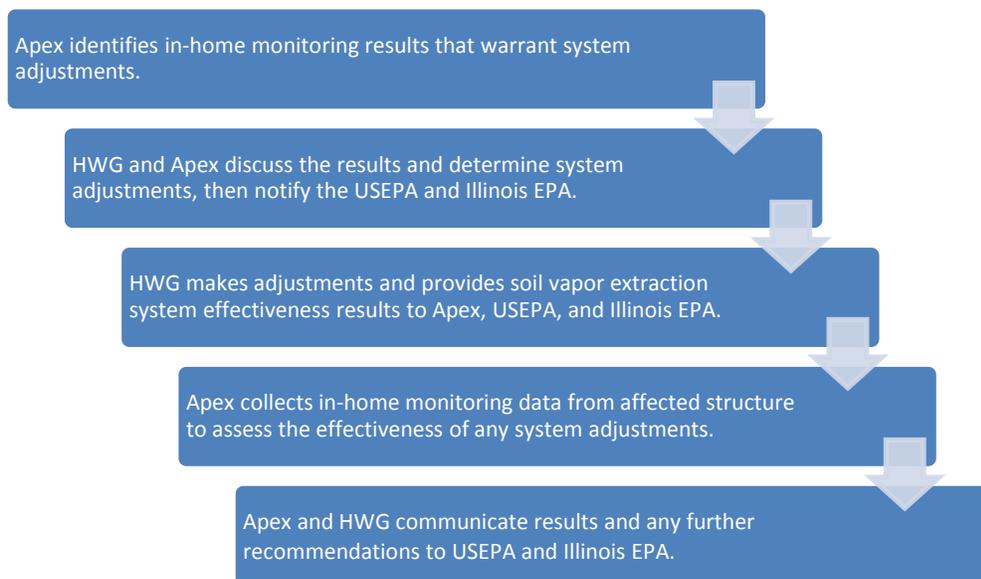
Representatives from the USEPA Region 5 and Illinois EPA (listed in Table 2), will be contacted by email if any of the TOV measurements (conducted using the FID) in the sub-slab probes are equal to or exceed 350 ppmv or the indoor air concentration is equal to or exceeds 10 ppmv within a structure. If the indoor air analytical results reported by the laboratory exceed the comparison values listed in Table 5-1 of the 2007 Effectiveness Monitoring Plan, a needs assessment evaluation and/or contingency measures (e.g., vapor removal from nearby monitoring wells, ventilation of the indoor air or crawlspace air, temporary relocation of residents in the structure, etc.) will be conducted in accordance with the March 14, 2007 Contingency Plan. Where alternate sources, such as natural gas leaks, are identified, routine in-home monitoring or event based monitoring will be discontinued within that structure. In addition, measures to remove these alternate sources from the structure will be discussed, in the presence of the USEPA, with the property owner. Routine monitoring will be resumed once Apex has been notified that these mitigation measures were completed.

COMMUNICATION PROCEDURES

There are numerous interested parties at the Hartford Site, including the USEPA, Illinois EPA, Hartford Working Group (HWG), Village of Hartford, residences, business owners, and others. The HWG is currently responsible for operation of the soil vapor extraction system, a key component in controlling vapor migration into overlying structures. Therefore, it is important that Apex and the HWG provide information to each other regarding effectiveness of the soil vapor extraction system and the vapor intrusion pathway within structures at the Hartford Site on a timely basis. Information will be shared between Apex and the HWG to ensure that the effectiveness of the soil vapor extraction system and in-home mitigation measures.



In general, in-home monitoring results will be provided to the USEPA, Illinois EPA, and HWG on a weekly basis. This communication will occur via email, unless the in-home monitoring results indicate a significant change in the sub-slab soil vapor and/or indoor air quality that may require a modification to the soil vapor extraction system. The following flowchart provides the process that will be used for communication between Apex, HWG, USEPA, and Illinois EPA if modifications to the soil vapor extraction system appear to be warranted:



Contact information for the USEPA, Illinois EPA, Apex, and HWG are provided in Table 2.

MITIGATION MEASURES INSPECTION AND MAINTENANCE ACTIVITIES

Mitigation measures have been installed in many of the structures that will be monitored as part of the Interim In-Home Effectiveness Monitoring Plan. In-home mitigation measures could include patching of cracks in the basement floor and walls, a low-permeability vapor barrier emplaced in the crawlspace (historically referred to as flowable fill), ventilation blower(s) in the basement, ventilation blower in the crawlspace, sub-slab depressurization system, combustible gas and carbon monoxide meters, a Dranjer® seal within basement floor drain(s), or AllerAir™ 5000 Series indoor air purifying system(s). Inspection and maintenance of these measures will be performed routinely within the structures included on Table 1. Inspection and maintenance activities will include the following activities.

- The integrity of the basement floor and walls, as well as the flowable fill in the crawlspace (where applicable) will be visually inspected quarterly to determine if any cracks have developed. If any cracks are noted within the basement floor, walls, and/or flowable fill, they will be sealed using a durable caulk or hydraulic cement, as needed.



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- Both combustible gas and carbon monoxide meters will be visually inspected and a self-test of the carbon monoxide meter will be conducted on a quarterly basis.
- Blowers used for sub-slab depressurization, indoor ventilation, or crawlspace ventilation will be visually inspected and started (if not already running) to confirm normal operation on a quarterly basis. If a blower is damaged or not operational, it will be repaired or replaced.
- Dranjer® seals will be cleaned using water during each in-home monitoring event to remove any potential blockage within the floor drain(s). If a blockage is noted and cannot be cleared by running water through the drain, then the Dranjer® seal will be removed from the drain and manually cleaned or replaced.
- Particulate filters and granular activated carbon (GAC) filters present in the AllerAir™ air purifiers will be inspected on a quarterly basis. This will include a visual and olfactory (to identify any sour odor emanating from the filter exhaust) inspection. If a sour odor is noted in the GAC filter or the particulate filter appears to be full of dirt and dust, then these filters will be replaced. At a minimum the particulate and GAC filter will be replaced on three year intervals.

Vapor Recovery beneath the Hartford Community Center

Supplemental vapor removal has been routinely performed beneath the Hartford Community Center located at 715 North Delmar Street, since October 2011. Vapor recovery is typically initiated when elevated TOV concentrations are measured in the deep soil vapor probe CC7D, most likely due to fluctuations in water levels, and is performed by inducing a vacuum using a soil vapor extraction port installed in the basement of the Community Center (SVE-P20S). This port is temporarily connected to soil vapor extraction well HSVE-20S, located in a locked fenced-in area on the north side of the Community Center using approximately 40-feet of 2-inch diameter flexible hose. During future monitoring events, if TOV concentration within the deep sub-slab soil vapor probe CC7D (or any other sub-slab vapor probe at the Community Center) is equal to or exceeds 350 ppmv, supplemental vapor recovery from port SVE-P20S will be initiated. Apex will coordinate with the HWG, USEPA, and Illinois EPA in accordance with the communication procedures previously described herein.

REPORTING

The results of the routine and event triggered in-home effectiveness monitoring will be tabulated and submitted to the USEPA and Illinois EPA within a brief memo on a quarterly basis. This memo will also provide details regarding any maintenance items that might have been performed to the mitigation measures installed within each structure listed on Table 1. The quarterly memo will also summarize any discrepancies from the proposed schedule and monitoring activities described herein. Finally, any modifications to the Interim In-Home Effectiveness Monitoring Plan will be proposed to the USEPA and Illinois EPA within the quarterly memos.



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If you have any questions regarding the In-Home Monitoring Plan, please contact Keith Rittle at (307) 755-4832 or Paul Michalski at (513) 429-7452.

Sincerely,
Trihydro Corporation

Paul Michalski, P.G.
Team Leader

Shannon Thompson, P.E.
HHRA/VI Group Manager

24S-004-001

Attachments

cc: Chris Cahnovsky – Illinois EPA
Thomas Miller – Illinois EPA
Thomas Binz – Professional Environmental Engineers, Inc.
James Sanders – Apex Oil Company, Inc.
Hartford Working Group Members (electronically)

TABLES

**TABLE 1. PROPOSED INTERIM IN-HOME EFFECTIVENESS MONITORING SCHEDULE
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS**

Proposed Structures for Effectiveness Monitoring	Proposed Routine Monitoring Frequency	Included in Event Based Monitoring	Mitigation Measures
107 W Birch	Weekly	Yes	Foundation Sealed, AllerAir Purifier
117 W Birch	Weekly	Yes	Ventilation System
119 W Cherry	Weekly	Yes	Ventilation System
119 W Date	Weekly	Yes	Ventilation System
125 W Birch	Weekly	Yes	Ventilation System
125 W Birch Rear	Weekly	Yes	Ventilation System
129 W Birch	Weekly	Yes	Foundation Sealed, AllerAir Purifier (2)
504 N Delmar	Weekly	Yes	Ventilation System
507 N Olive	Weekly	Yes	Sub-Slab Depressurization System, AllerAir Purifier
516 N Delmar	Weekly	Yes	Ventilation System, AllerAir Purifier
610 N Old St. Louis	Weekly	Yes	Foundation Sealed, AllerAir Purifier (2)
715 N Delmar	Weekly	Yes	Ventilation System, AllerAir Purifier, Sub-Slab Vapor Extraction
100 W Cherry	Monthly/Quarterly	Yes	Foundation Sealed
101 E Birch	Monthly/Quarterly	Yes	Sub-Slab Depressurization System, AllerAir Purifier
101 E Forest	Monthly/Quarterly	Yes	Ventilation System
102 W Date	Monthly/Quarterly	Yes	Foundation Sealed
104 W Elm	Monthly/Quarterly	Yes	Ventilation System
107 W Forest	Monthly/Quarterly	Yes	Ventilation System
111 W Date	Monthly/Quarterly	Yes	Foundation Sealed
112 W Birch	Monthly/Quarterly	Yes	Sub-Slab Depressurization System, AllerAir Purifier
116 E Watkins	Monthly/Quarterly	Yes	Ventilation System
118 E Elm	Monthly/Quarterly	Yes	Ventilation System
118 W Birch	Monthly/Quarterly	Yes	Foundation Sealed, AllerAir Purifier
118 W Elm	Monthly/Quarterly	Yes	Foundation Sealed
119 W Birch	Monthly/Quarterly	Yes	Ventilation System
122 W Watkins	Monthly/Quarterly	Yes	Ventilation System
125 E Forest	Monthly/Quarterly	Yes	Ventilation System
142 E Watkins	Monthly/Quarterly	Yes	Ventilation System
201 N Olive	Monthly/Quarterly	Yes	Ventilation System
309 N Olive	Monthly/Quarterly	Yes	Ventilation System

**TABLE 1. PROPOSED INTERIM IN-HOME EFFECTIVENESS MONITORING SCHEDULE
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS**

Proposed Structures for Effectiveness Monitoring	Proposed Routine Monitoring Frequency	Included in Event Based Monitoring	Mitigation Measures
310 N Delmar	Monthly/Quarterly	Yes	Ventilation System
501 N Olive	Monthly/Quarterly	Yes	Foundation Sealed
518 N Delmar	Monthly/Quarterly	Yes	AllerAir Purifier
101 E Watkins	Monthly/Quarterly	--	Foundation Sealed
102 E Date	Monthly/Quarterly	--	Ventilation System
114 E Forest	Monthly/Quarterly	--	Ventilation System
118 W Cherry	Monthly/Quarterly	--	Ventilation System
122 W Cherry	Monthly/Quarterly	--	Foundation Sealed
122 W Date	Monthly/Quarterly	--	Foundation Sealed
123 E Elm	Monthly/Quarterly	--	Foundation Sealed, AllerAir Purifier
126 E Elm	Monthly/Quarterly	--	Ventilation System
127 E Elm	Monthly/Quarterly	--	Foundation Sealed
128 W Cherry	Monthly/Quarterly	--	Ventilation System
138 W Forest	Monthly/Quarterly	--	Ventilation System
619 N Olive	--	Yes	Foundation Sealed, Monitoring discontinued until natural gas leaks within the home are repaired

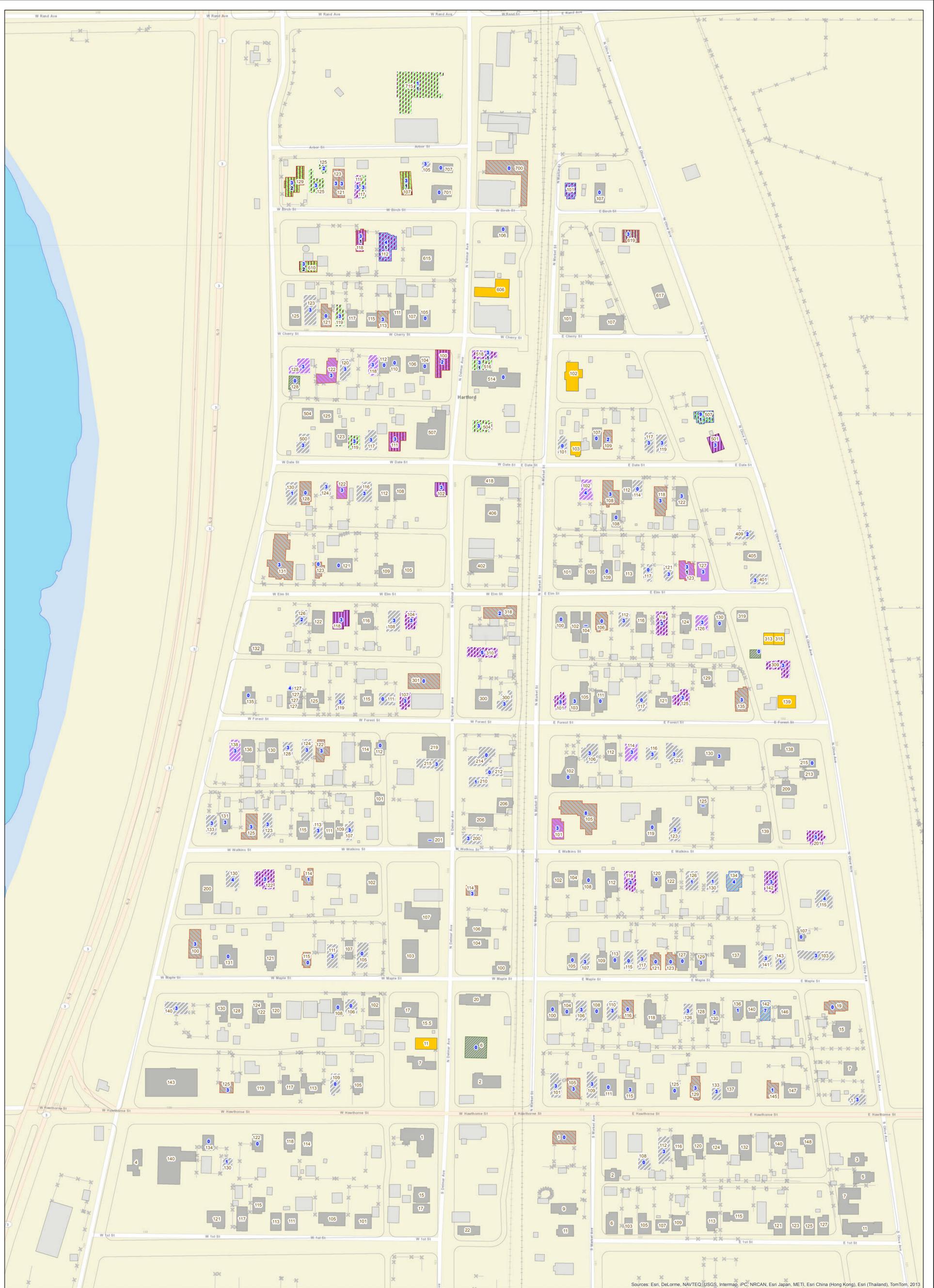
Notes:

-- Not included in monitoring program

**TABLE 2. INTERIM IN-HOME EFFECTIVENESS MONITORING CONTACT LIST
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS**

Contact	Mobile Phone	Office Phone	Email
United States Environmental Protection Agency			
Kevin Turner	618-525-3665	--	turner.kevin@epa.gov
Michelle Kaysen	815-207-3269	312-886-4253	kaysen.michelle@epa.gov
Tom Binz	314-581-0975	314-550-4208	tbinz@pe-engrs.com
Illinois Environmental Protection Agency			
Tom Miller	618-346-5154	618-346-5120	tom.miller@illinois.gov
Trihydro Corporation on behalf of Apex Oil Company			
Justin Pruis	618-704-5301	307-755-4861	jpruis@trihydro.com
Paul Michalski	307-399-4804	513-429-7452	pmichalski@trihydro.com
Todd Aseltyne	419-309-0603	513-429-7454	taseltyne@trihydro.com
URS Corporation on behalf of Hartford Working Group			
Robert Mooshegian	314-791-2469	314-743-4106	robert.mooshegian@urs.com
Kelly Hurst	314-809-4323	314-743-4213	kelly.hurst@urs.com

FIGURE



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

EXPLANATION

- | | | |
|--|-------------------------------|--|
| Building Demolished | Combustible Gas Meter Present | Primary Building on Parcel |
| Ventilation Fan/Blower Mitigation System | SSDS Present | Outbuilding on Parcel |
| Slab Sealed | EBMP | Fence |
| Monitoring Frequency | | |
| Quarterly | Building's Street Number | Number of Sub-Slab Monitoring Points Installed |
| Weekly | | Number of All-Air Units Installed |



FIGURE 1
IN-HOME MONITORING LOCATIONS
APEX OIL COMPANY
HARTFORD, ILLINOIS