Health Care Facility Vapor Intrusion (VI) Assessment and Mitigation

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Initial Call Scenario (Day 1):

- Local Environmental Attorney Call:
  - Seeking environmental, vapor intrusion (VI) and worker safety assistance at a health care clinic (late Jan ’25)
- Odor Complaints by Personnel over Past 2 Months
  - Described as ‘acetone’, ‘anti-freeze’ and ‘gas smell’
  - Odors became stronger over past week
- Maintenance Staff Overcome by Fumes – Collapses
  - Injured from fall & overnight hospital stay

Initial Call Scenario (Con't):

- Response by IDEM Emergency Response & Local Fire Marshal
  - Facility inspection (find elevated VOCs in basement)
  - Basement wall crack (Floor to Ceiling) w/highest VOCs reading
  - Recommend Facility Evacuation
- Client Concerns
  - OSHA citation and worker compensation claims
- Measures by Maintenance Personnel
  - Caulk/seal the large basement wall crack
- Monitoring Program Initiated by Clinic

Desktop Assessment of Facility (Day 2)

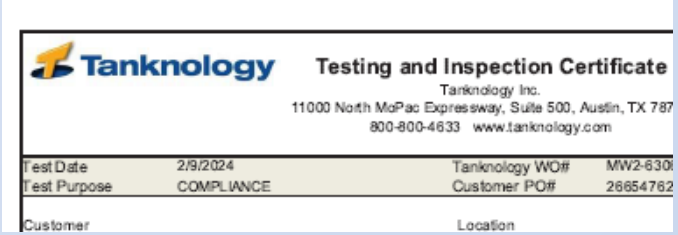
- Utilize IDEM ‘What is in my Neighborhood’
  - Leaking Underground Storage Tank (LUST) Site to north (Rank of Medium Priority)
  - Dry cleaner and laundry facilities (3x) to the northeast
  - LUST Site (Rank: Low Priority) to northwest
  - State Cleanup No Further Action Site (NFA) to northwest
- Phase I Environmental Site Assessment (3 yrs old)
- Digital Copies of Building & Floor Plans
- Specifics on Implemented Monitoring Program
  - Methods, locations and equipment

Desktop Assessment of Facility (Con't)

- Building Configuration:
  - 2 Stories with a Basement
  - Basement 15,350 SF
  - 1st Floor 44,300 SF (includes connected additions)
  - Poured concrete walls, no floor drains, and no open sumps
  - 2020 last interior construction conducted
  - Offices, reception, exam areas on 1st floor, mechanical facilities, lab, offices, storage in basement
  - Elevators, staircases, and dumbwaiters connect floors
- Location of Cracks:
  - Basement exterior foundation wall (north wall)
  - Crack mitigation measures & photographs (pre- & post-)
  - Floor condition - unknown (covered in carpet or floor tiles)

Desktop Assessment – Proximity (Con't)

- Active Gas Station North of Site
  - 2017 LUST incident
  - 2023 State regulatory violations
  - 2025 (Jan) inspection with violations
- IDEM Issues Request for Release Investigation
  - Clinic vapor intrusion indicated basis of request
  - Filing of IDEM Initial Incident Report
  - Inspection and testing of fueling system
  - Completion of 2 soil borings & sampling
  - Investigation of utility corridors for petroleum



Tanknology

Testing and Inspection Certificate

Tanknology Inc.
11000 North MoPac Expressway, Suite 500, Austin, TX 787
800-800-4633 www.tanknology.com

Test Date	2/9/2024	Tanknology WO#	MW2-630
Test Purpose	COMPLIANCE	Customer PO#	26654762

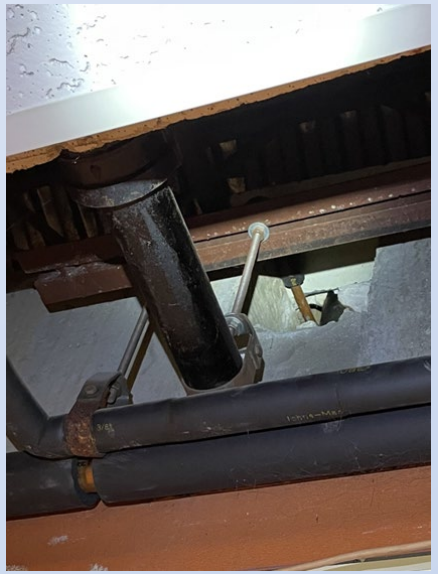
Customer Location

2nd Facility Evacuation (Day 4)

- VOCs (Total) in the Basement Increase (50 ppm)
- Management Evacuates the Basement
- Legal Recommends Closure of the Building
- Relocate Physician Practices to Other Buildings
  - Minimize patient care interruption
  - Keep staff & patients safe
- Consult with Vapor Intrusion Professional
  - Recommend a limited assessment / interim indoor air sampling
  - Mobilization ASAP (same day)

VI Site Assessment (Day 4/5)

- Evening Following the 2nd Evacuation
- Visual Inspection of Facility (basement, walls, ceiling, HVAC, foundation penetrations, etc.)
- Screen Indoor Air Using VOC Detector and LEL meter
  - Low VOCs (4 ppm), no LEL response, and little or no odors
- Wall Penetrations Observed Above Ceiling Tiles
  - Some penetrations open to exterior soil
- Recommend Penetrations Sealed, as Feasible



Indoor Air Sampling (Day 4/5)

- Sample by Method TO-15 w/ 6-Liter Summa canisters during overnight for 8-hour duration
  - 2 Samples in basement (rooms of highest readings & odors)
  - Analysis expedited for full list of VOCs (60 compounds)
  - Results Report only low level of Benzene (2.3 and 3.1 ppm)
- Request Lab to Review Test Results (GC/MS Output)
  - Hits of Pentane, Butane, Methane (Non TO-15 compounds)
- Environmental/VI Professional Recommendations:
  - Limited Site Investigation of facility exterior
    - Soil borings and sampling of soil, groundwater, and soil gas
  - Design and Installation of a Vapor Mitigation System

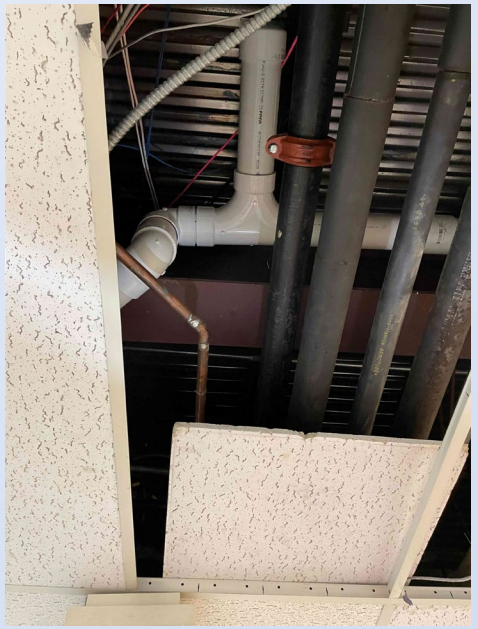
Limited Site Investigation (Preliminary Steps)

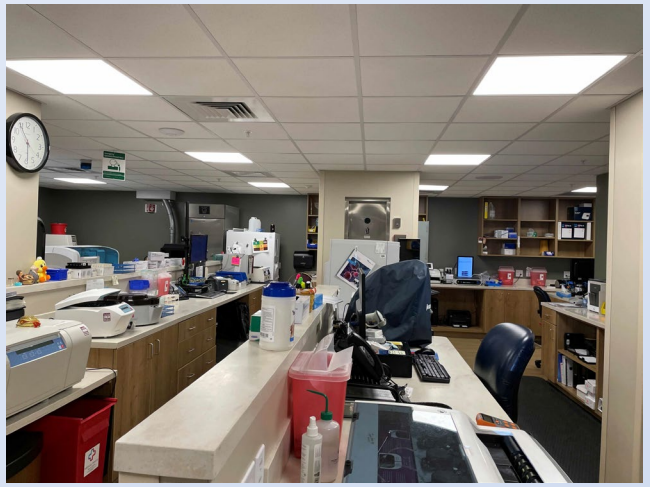
- Underground Utilities
  - Request and review utility maps, call 811, schedule private locate contractor
- Screen Contaminant Sources Proximate to Site
  - Review recent Phase I ESA report (3 yrs old)
  - IDEM Virtual File Cabinet (VFC) records review
- Regional Hydrology
  - Surface water locations, well locations, and groundwater flow direction

VI Mitigation – Design & Testing (Day 17/18)

Facility Challenges:

- No exterior access due to centrally located basement and much larger upper floor
- Basement below ‘open’ reception/ waiting area
- Basement ceiling space with mechanical, electrical, and fire suppression equipment
- Clinical laboratory located in a portion of the basement



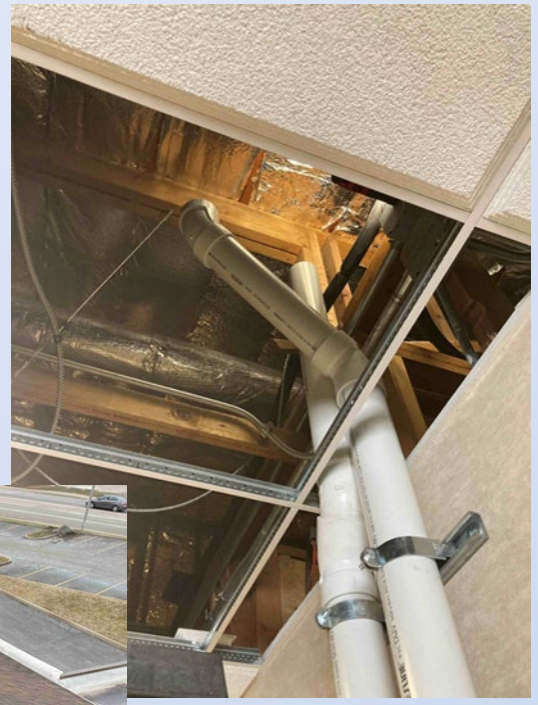


VI Mitigation – Design & Testing (Con't)

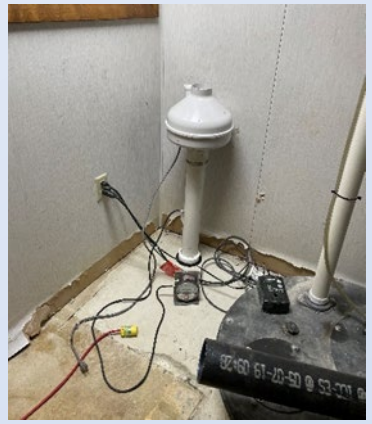
Facility Contractor Assistance:

- Knowledge of facility equipment & operations
- Trained to conduct work wearing a respirator

- Mechanical – Identify stack pipe location, core 2 floor levels from basement to roof
- Roofing – Roof penetrations and sealing of stack pipes and electrical
- Electrical – Install of power to roof penetration / fan location / breaker labeling
  - Wired temporary fans for removal of vapors during basement testing

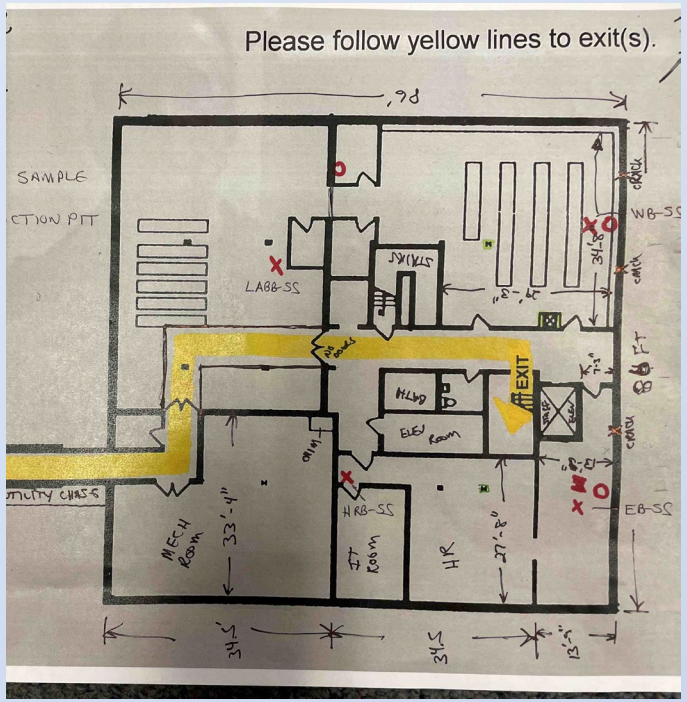


VI Mitigation – Design & Testing (Con't)



Diagnostics & PFE Testing

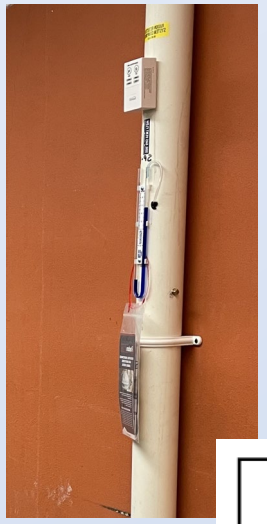
- Basement Testing – Cored Floor in target areas, installed vapor pins, conducted fan testing and measured pressure (PFE) across slab
- Installed 3 suction points & piped into east and west systems
- Utilized temporary fans (RP-145 & RP-265) for testing and preliminary VI control
- Goal of (– 0.004 in wc) not obtained across targeted VI Area (using available GX-3 & GX-4)

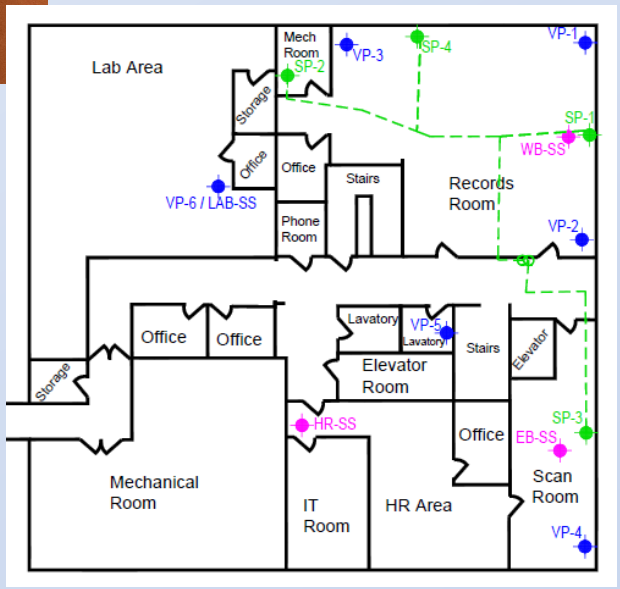


VI Mitigation – Installation (Day 24/25)

2nd Mobilization

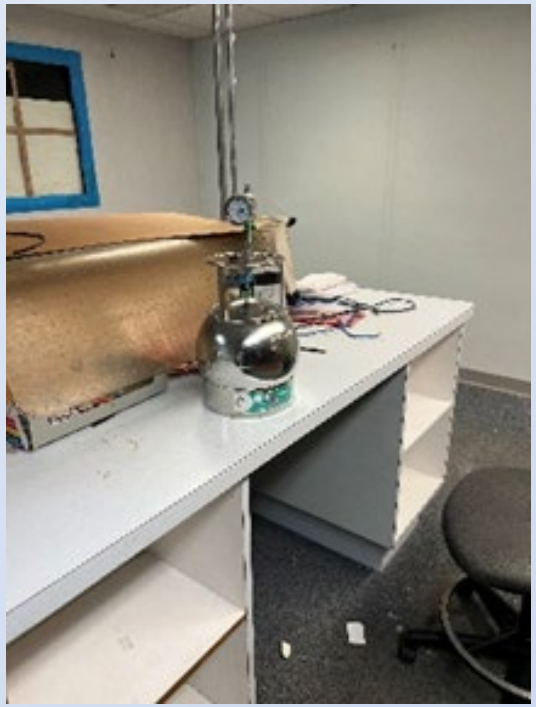
- GX-5 Fans (5.2 in wc) installed (snowy sloped roof)
- Operation evaluated with the stronger fans
  - PFE testing of all vapor pins
- Addition of suction point on east system
  - Flow balanced on east system
  - Goal of (-0.004 in wc) achieved across VI target area
  - Flow alarms and labels installed





VI Confirmation Testing (Day 30)

- Paired Indoor Air Sampling Conducted
- Approximately 2 Weeks Following VI Mitigation System (VIMS) Start-Up
- 6 Samples by Method TO-15 with 8-hr Duration
  - 4 samples in basement, 1 on main floor above, & 1 ambient sample
- All Results Below IDEM R2 Indoor Air Commercial Published Levels (PLs)
- Management Able to Resume Clinic Operations



Other VI Mitigation Measures

- Spray Foam Contractor – Client had upper basement walls and penetrations sealed
- Floor and Walls Sealed – Client had basement floor and walls prepped and sealed in 2 rooms w/ highest VOCs

Limited Site Investigation (Day 16/17)

- Limited Site Investigation (Field):
  - 5 Soil borings and collection of soil, soil gas and groundwater samples
  - Borings focused on up-gradient side of facility (north and east)
  - Soil Gas samples along utility corridors
  - 6 paired VI samples in facility (indoor air, sub-slab vapor, exterior air)

Site Investigation Results (Day 16/17)

- Soil: Below IDEM R2 Resident PLs
- Groundwater: > IDEM R2 GW PLs
  - 4 northern boring report gasoline VOCs
  - Highest in northeast parking lot boring
- Soil Gas: < IDEM R2 Vapor PLs
  - Report detection of GRO and multi-VOCs
- Sub-Slab (in building): > R2 Comm. PLs
  - GRO compounds w/highest results in basement along north wall/upgradient
  - Concentrations 2-4 X decrease (N to S)
  - GW within 6 to 8 ft of basement slab

Current Status (8+ months)

- Investigation of upgradient gas station is on-going
  - 3 rounds of subsurface investigation completed
    - Limited impacts identified to date
  - Sampling performed to edge of clinic property (results pending)
- IDEM given 1-year for delineation of petroleum impacts
- Petroleum system inspection violations not been addressed
- IDEM perceives no immediate harm to human health based on success of the VI mitigation system

Questions?

Thank You!