Groundwater Contamination in Pullman, Michigan

Review of State Environmental Records for the Pullman Road & 109th Avenue Site (MDEQ/EGLE Site ID 03000163)

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Executive Summary

This report summarizes the review of 1,147 public records from Michigan's Department of Environment, Great Lakes, and Energy (EGLE) Remediation Information Data Exchange (RIDE) database covering a two-decade response to groundwater contamination in the village of Pullman, Lee Township, Allegan County. The records document the detection of industrial chemical contamination in community drinking water wells, the state's response and remediation efforts, and the status of the project until database records end in 2011.

Pullman Road and 109th Avenue was home to the Pearl Creamery until 1953 and later, until 2004, to Pullman Industries Inc. (PII), a manufacturer of metal parts and trim for the automotive industry. Industrial solvents and degreasers used in the manufacturing process, primarily tetrachloroethylene (PCE) and trichloroethylene (TCE), were present in the soil and groundwater beneath and around the property. These are chemical compounds commonly used in industrial settings that can pose health risks at elevated concentrations in drinking water.

In 1991, the Michigan Department of Public Health (MDPH) was notified of concerns about drinking water quality among Pullman community members. Testing confirmed that a number of residential and commercial wells had been contaminated by underground leaks of these industrial chemicals. Subsequently, both state and local agencies undertook a response sustained over the years that included well replacement, scientific investigation, and planning for groundwater remediation. Those efforts are the subject of this report.

Scale and Nature of the Contamination

Investigations conducted from 1993 through 2010 identified contamination across a wide area of the Pullman community. At least 87 wells were tested, with contamination confirmed at least in 53 of them. State-funded assessments estimated the underground contamination plume at approximately 1,200 feet long by 300 feet wide, extending in a southwestward direction toward Scott Creek.

Chemical concentrations detected were at times exceptionally higher than residential health standards. PCE was detected in soil at levels up to 34 times the residential protection criteria, and TCE was found in groundwater at up to 24 times the safe drinking water threshold. The PII plant site was identified as the primary source of contamination, with leaking storage containers and an underground tank on the property confirmed as release points. The contamination plume was naturally bounded on the south by Scott Creek, which appeared to act as a hydraulic barrier preventing further southward spread, though the creek itself was identified as a probable recipient of discharging contaminated groundwater.

State Response and Remediation Activities

Michigan's Department of Environmental Quality (MDEQ) coordinated the response to the contamination over a period of approximately 15 years. Key actions included:

- 1991–1997: Bottled water was supplied to approximately 30 affected households while regular soil and groundwater testing (which continued at least until 2011) was conducted and longer-term solutions were developed.
- 1996: MDEQ authorized $1 million in Quality of Life Bond funds to investigate the contamination and begin remediation planning.
- 1997: Between 29 and 37 new, deeper residential wells were installed across the community to replace contaminated ones. Six properties that could not obtain sufficient water from the new wells were later connected to a shared Type III well, which became operational in March 2001.
- 1997: Engineering firm ABB completed a detailed site investigation confirming the PII property as the contamination source and defining the extent of the plume.
- 1998-1999: PII undertook a series of on-site cleanup actions, including the removal of contaminated tanks, drums, and sludge, and a short-term soil vapor extraction trial that reportedly reduced soil chemical concentrations by approximately 50%.
- 2000: MDEQ awarded a $1.3 million contract to engineering firm Harding ESE (later MACTEC) to design and install a permanent groundwater pump-and-treat remediation system and operate it for 10 years.
- 2002–2005: FTCH completed a comprehensive remedial investigation, a feasibility study, and a pilot Air Sparging/Soil Vapor Extraction test at the site, all in preparation for a permanent remediation system. The pilot test demonstrated that the proposed approach could be effective.

Liability Determination

A central issue throughout the response was the question of legal responsibility. The original Pullman Industries dissolved in 1985, and a new corporation with the same name was formed immediately thereafter. MDEQ determined in November 1999 that the current Pullman Industries was not a legally liable party as the underground tank most responsible for the release had been installed by Pearl Creamery (the original occupant of the site) before the current company came into existence. This determination was internally debated, with at least one MDEQ attorney disagreeing in writing with the conclusion.

Notwithstanding the liability determination, Pullman Industries cooperated voluntarily with remediation efforts. The company contributed at least $125,000 toward the installation of the shared Type III well and donated the land on which it was located. The company also donated the factory site's property to the Bloomingdale School District in 2004; the building was demolished in 2007, and the site was converted to a sports field and bus parking lot.

Project Status and Unfinished Work

In March 2006, the MACTEC/FTCH engineering contract was closed out prior to the completion of its principal deliverable, which was the design and installation of the groundwater remediation system. Available records cite funding limitations as the reason, though no document is conclusive on this aspect. No successor contract was awarded, and no alternative remediation plan was put in place at least until 2011, when EGLE records end.

In November 2008, MDEQ formally classified the Pullman project as "Approved Partial Closure," indicating that the project remained open but that further action was contingent on the availability of additional funding. The agency estimated that approximately $1.55 million in additional funds would be needed to complete the project, including 10 years of operation and maintenance of a remediation system. Total state expenditures on the project through 2008 stood at approximately $1.16 million.

Planned remediation actions not carried out included the installation of the permanent groundwater pump-and-treat system (the core deliverable), a permanent soil vapor extraction deployment, and the cleaning of contaminated drainage and piping infrastructure inside the former PII building. Bloomingdale Public School's demolition of the factory structures removed the physical contamination source from the site.

Well testing results from 2006 through 2011 showed a substantial improvement, with virtually all tested wells returning results below harmful thresholds. This trend may reflect a combination of natural attenuation over time and the effectiveness of earlier remediation activities. However, the state's records end in 2011, and no assessment of the status of the underground plume is available in the public record after that date.

Outstanding Questions

After this review, several important questions remain without definitive answers:

- Current status of the plume: The lack of technical studies after 2011 raises doubts about the current status of the plume and its migration pathway.
- Long-term well safety: While well testing between 2006 and 2011 showed largely favorable results, the 2008 MDEQ status report served as a reminder that, absent an effective remediation system, both regular and replacement wells remained at risk from the plume. No sampling, monitoring, or assessment reports are available in EGLE's database to clarify how contamination levels evolved in the last 15 years.
- Scott Creek water quality: Engineering reports identified the creek as a probable discharge point for contaminated groundwater. No water quality assessment of the creek is included in the EGLE records to understand its current status.
- Remediation system implementation: The project was left in "Approved Partial Closure" status in 2008. Whether any further remediation was ever planned or undertaken is not reflected in the EGLE records.

Background

The Pullman Road and 109th Avenue facility, located within the village of Pullman in Lee Township, Allegan County, originally housed the Pearl Creamery and later, from 1953 until 2001, Pullman Industries Inc. (PII). This site came to the attention of Michigan's Department of Environmental Quality (MDEQ) in 1991, when several residential water supply wells in Pullman were discovered to be contaminated with a variety of volatile organic chemicals (VOC) stemming from gasoline constituents, industrial solvents and degreasers, and cleaning compounds. Pullman Industries, which fabricated metal parts and trim for the automotive industry, was found to be the source of the soil and groundwater contamination, which created a large underground plume and ultimately impacted at least 57 wells and the nearby Scott Creek.

The original Pullman Industries dissolved in 1985, and a new entity also called Pullman Industries was formed that same year and began operating at the property. In 1999, an MDEQ review of corporate records concluded that the old entity had legally dissolved and the new entity was a non-liable party for contamination at the property. The "new" Pullman Industries ceased manufacturing at this location in 1998, and for the next three years it was used as warehousing. In 2001, the plant ceased all operations and the property became vacant. Pullman Industries donated it to the Bloomingdale School District in 2004, which demolished the plant building in 2007 and transformed the site into a sports field and a bus parking lot. What was labeled at MDEQ as the "Pullman Ave and 109th Ave" project started in 1991 and appears to have ended in 2006, although there is no formal project closeout record available. During this period, the MDEQ and the Allegan County Health Department (ACHD) worked together to conduct hundreds of water well sample testing events at over 80 wells across the community. The MDEQ spent approximately $1.16 million on activities intended to monitor, scope, and remediate the contamination plume, and prevent its further expansion.

This report is based on a detailed review of the 1,147 public records available at the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Remediation Information Data Exchange (RIDE) database under the location ID for Pullman (03000163). The review included resident notification letters, lab testing results, project management and contracting documentation, work plans, site reports, internal memos, and e-mail communications. The review has been done manually and supported later for summarization purposes by an Artificial Intelligence system. EGLE records start in 1977 (with a handful of exceptions dating back to 1951) and end in 2011.

Chronological Narrative

This section provides a chronology of events related to soil and groundwater contamination in Pullman, as documented in the EGLE database. The contamination, primarily involving tetrachloroethylene (PCE), trichloroethylene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA), affected almost 60 residential and commercial wells from 1991 through at least 2011, when the EGLE records end.

1991: First Detection

The contamination crisis in Pullman came to light in 1991, when residents began complaining of bad odors in their residential water.[1] The first formal contamination detection notice in the EGLE database was sent by the Michigan Department of Public Health (MDPH) on May 9, 1991, to a residential address at 860 56th Street, near Pullman Elementary School.[2] Later that same year, on November 15, 1991, Pullman Industries, Inc. (PII) notified the Michigan Department of Natural Resources (MDNR) of a potential involuntary contamination incident involving lead paint at its facility. State authorities determined that there were "no adverse environmental problems" stemming from the self-reported incident.[3]

1993: Contamination Confirmed Across Dozens of Wells

The period from March 1993 through April 1994 marked a significant escalation in the understanding of the contamination's scope. MDNR conducted sampling tests at more than 50 wells across Pullman, confirming that at least 27 were contaminated with a variety of pollutants, including PCE and TCE. This systematic investigation came more than 2 years after the first contamination had been reported.[4]

On August 20, 1993, MDNR approved the supply of bottled water to 3 contaminated addresses. This arrangement would eventually extend to approximately 30 households and continue until 1997.[5] Four days later, on August 24, a second residential contamination notice was added to the EGLE database, this one for a property at 5582 109th Avenue (Rcor Terra).[6]

September 1993 brought an additional environmental concern: a contractor wrote to MDNR requesting permission to remove contaminated soil from a leaking underground storage tank (LUST) site at the former Pullman Marathon/Pullman Auto Body Shop at 5593 109th Avenue. The tank had leaked solvents into the surrounding soil, and the MDNR contractor was managing the cleanup. No further documentation on this incident appears in the EGLE database.[7]

By November 1993, MDNR had moved to formally hold Pullman Industries accountable. On November 12, the agency notified PII that its plant was in noncompliance with environmental regulations and demanded a series of timely remedial steps.[8] On that same date, MDNR also formally notified Lee Township that 7 types of contaminants had been detected in the Township's own well.[9] Twelve days later,

[1] This is cited in MDEQ Site Summaries and other background documents, such as ID138.
[2] ID10 and ID11.
[3] ID12.
[4] ID69.
[5] ID6.
[6] ID13.
[7] ID4.
[8] ID93.
[9] ID92.

on November 24, PII acknowledged potential responsibility and contracted the engineering firm Gove Associates to pursue remedial solutions.[10] An internal MDNR memo written two and a half years later, in July 1996, would characterize those solutions as "very limited."[11]

1994–1995: Health Advisories and Expanding Investigations

On June 10, 1994, the MDPH issued a formal Health Advisory for Pullman and provided Lee Township with a status update confirming that more than 20 contaminated wells had been detected across the community.[12]

Nearly a year later, on April 28, 1995, MDNR issued a Michigan Environmental Response Act (MERA) Authorization. That document confirmed 20 wells as contaminated with another 20 suspected but unconfirmed, noted that VOC sampling was being conducted at over 70 wells in the area, and acknowledged an ongoing investigation around a designated Act 307 site. Critically, it recommended that the Township begin evaluating alternative water supply options and suggested that FY95 Quality of Life bond funds be tapped to address the contamination.[13]

1996: State Funding Secured and Investigation Deepened

On July 9, 1996, a Lee Township contractor (Alpha GeoSciences) produced an alternative water supply options report, funded by MDPH, and presented its findings to affected residents at a community town hall meeting. The report delimited the affected area to 54 residential buildings, 15 commercial establishments, an industrial facility (the PII plant), the township hall, and a school, comprising as many as 250 people. The report deemed only 2 realistic water supply alternatives: replacing individual contaminated wells with deeper wells or developing a Type I water supply system. The report categorized the latter as a cleaner solution but a costlier one, while the former was a more economic option but potentially vulnerable to contamination.[14] The MDNR chose well replacement.

The following month, on August 20, 1996, the Michigan Department of Environmental Quality (MDEQ, the successor to the MDNR) authorized $1 million in Quality of Life Bond funds to remediate the contamination. The funding was intended to define the extent of the problem, remove the contamination source, and dispose of it responsibly. At this stage, PII had not yet been formally confirmed as the sole or primary contamination source.[15]

On September 6, 1996, MDEQ contracted the engineering firm ABB to identify the contamination source area. ABB's fieldwork, conducted between March and April 1997, involved collecting samples from 38

[10] ID94.
[11] ID138.
[12] ID71.
[13] ID47.
[14] ID143.
[15] ID136.

locations at and around the PII site. The resulting report, completed on July 9, 1997, was highly consequential. It identified a shallow aquifer 4 to 7 feet underground and confirmed that the primary contaminants in soil and groundwater were PCE, TCE, and 1,1,1-TCA. Twelve additional contaminants were also identified. Crucially, the report confirmed that the contamination plume originated at the Pullman Industries site, with 3 leaking barrels and an underground cistern or tank on PII's property identified as the sources. The plume was estimated to extend 1,200 feet long by 300 feet wide. This report became the basis for requiring PII to take responsibility and implement remedial action.[16]

In parallel, on October 11, 1996, MDEQ requested $200,000 from the approved $1 million Bond funds to install 29 replacement wells, decommission the contaminated wells, and monitor 49 additional wells at risk.[17] By September 1997, between 29 and 37 replacement wells were installed across Pullman.[18]

1997–1999: PII Remediation and Liability Negotiations, and Installation of a Type III Well

Beginning in July 1997, MDEQ initiated engagement with Pullman Industries regarding formal remediation actions.[19] PII generally demonstrated a willingness to cooperate, though at the same time it proactively sought to limit its legal exposure.[20] The company's remedial commitments included conducting an environmental audit, the removal and cleanup of the contaminated cistern, 4 contaminated water drums, and sludge; and the installation and two-week-long operation of a portable Soil Vapor Extraction (SVE) system.[21] After some delay, these actions finally took place in April 1998.

On December 18, 1997, the first formal meeting between MDEQ and PII to discuss the legal liability question took place.[22] A back-and-forth of letters between MDEQ and PII's legal advisors (Dean & Fulkerson) ensued over the following 2 years.[23] The liability question was formally resolved in November 1999. After consultations with the Attorney General's Office, MDEQ formally notified Dean & Fulkerson that PII was not considered a responsible or liable party for the contamination plume underneath the factory site, given that the leaking underground tank had been installed by Pearl Creamery, a prior occupant of the site, well before the current PII corporation came into existence.[24] At least one MDEQ attorney vigorously dissented from this decision in writing.[25] Despite being cleared of legal liability, PII

[16] ID185, ID245, ID267
[17] ID174.
[18] ID256. This entry includes the replacement record for each well, with addresses and well specifications.
[19] ID260.
[20] ID250.
[21] ID329.
[22] ID314.
[23] ID304, ID299, and others.
[24] ID369.
[25] ID384.

subsequently committed to contributing both funding and property to ongoing community remediation efforts, as described below in more detail.[26]

It was also during this period, in October 1997, that MDEQ discovered that 7 of the newly installed replacement wells were malfunctioning due to weak water flow. MDEQ decided to address this by connecting those affected wells to a shared Type III municipal well, to be owned by Lee Township.[27] MDEQ provided $100,000 to the Township in July 1998 for this purpose, added another $150,000 in May 1999, and extended the implementation contract through May 2001.[28] The Type III well was finally connected and fully operational in March 2001.[29] It was installed on a site donated by PII, and the company also contributed at least $125,000 toward its installation.[30] It is not 100% clear from the documentation whether PII paid for the shared well in full or only in part.

2000–2001: Potential Plume Expansion Recognized; Harding ESE Remediation Contract Initiated

By 1999, MDEQ had recognized that the contamination plume would inevitably migrate further downgradient, placing more than 20 additional wells at risk in the coming years.[31] In response, on August 8, 2000, MDEQ authorized $1.3 million to start developing a remediation system, a comprehensive groundwater pump and treatment system intended to prevent the plume impacting those threatened wells. The contract was awarded to Harding ESE as the primary engineering firm, with Fishbeck, Thompson, Carr, and Huber (FTCH) as a subcontractor.[32] Harding ESE's scope of work included updating the delineation of the plume, designing and installing the pump and treatment system (including an Air Sparging and Soil Vapor Extraction (AS/SVE) system), and operating and maintaining it for 10 years.[33] The initial expectation was that the system would be installed within 2 to 3 years.

2002–2003: Remedial Investigation Report; New Contaminants Found at the PII Site

In July 2002, FTCH produced a Remedial Action Investigation report confirming that PCE and TCE remained present in soil and groundwater samples, both at the PII site and beyond.[34] The report updated the plume's delineation: the contaminated core had migrated further downgradient toward Scott Creek, though no lateral expansion had occurred. Groundwater PCE levels near the PII plant were declining, but TCE levels at the downgradient edge were rising. Significantly, the report identified Scott Creek as a probable receptor of contaminants and noted that the creek appeared to function as a natural hydrologic

[26] ID371 and others.
[27] ID302, ID343.
[28] ID296, ID356, ID357, ID372, ID374.
[29] ID347.
[30] ID371.
[31] ID361.
[32] ID359, ID363.
[33] ID344, ID350, ID365.
[34] ID460, ID524.

barrier, limiting the plume's southward expansion. This finding was corroborated in a subsequent FTCH report issued in June 2004.[35]

In 2002, Pullman Elementary School connected to the Type III well system, which, with the school's addition, elevated the system's classification to a Type II well system.[36] Separately, Bloomingdale Public Schools had begun due diligence in preparation for acquiring the PII site. During fieldwork conducted in July and August 2003, Bloomingdale-contracted investigators discovered the presence of arsenic on the property as well as a pit containing contaminated waste metals and concrete slabs — additional contamination not previously documented.[37] By November 2004, Bloomingdale P.S. had assumed ownership of the PII site, with plans to demolish the plant structure and convert the property into school playgrounds and a bus parking lot.[38]

On November 10, 2003, FTCH and MDEQ discussed the township's fire department's intent to install a new well for firefighting purposes. An MDEQ technical evaluation concluded that intensive water extraction at that location could displace the plume's migration pathway, undermining remedial efforts already completed and those being planned, and creating a new environmental threat. The evaluation strongly recommended placing any new well (especially a high-intensity one) on the upgradient of the plume, away from the direction of flow.[39]

2004–2005: PII Sewers and Replacement Well Contaminated; $1.75M Committed to Date

In January 2004, FTCH proposed conducting a groundwater modeling study to help guide the design of the groundwater remediation system and placement of the system's wells.[40] The study confirmed that the fire department's well could hamper remediation efforts and should be placed on the upgradient of the plume. In April 2004, FTCH developed a work plan for a pilot AS/SVE system to be deployed at the PII site, intended to test its capacity to extract VOCs from soil and groundwater there over a 6-month period.[41]

On September 16, 2004, FTCH produced a sampling report conducted at 9 sumps and manhole sites at the PII facility, examining whether the storm sewer and floor drainage system had become a vector for contamination. The results showed varying concentrations of VOCs and other contaminants, though it remained unclear whether the sewer system itself had leaked into the soil.[42] MDEQ acknowledged internally that this dimension of the PII site had been overlooked in prior investigations.[43] A work plan

[35] ID723.
[36] ID557.
[37] ID550, ID632.
[38] ID566, ID781.
[39] ID593, ID594, ID723.
[40] ID673
[41] ID565, ID609, ID649, ID651, ID729.
[42] ID760.
[43] ID779.

stemming from this report was not issued until February 4, 2005, nearly a year after the original sampling in March 2004, illustrating a pattern of slow institutional response that had characterized the remediation effort since 1993.[44]

On February 7, 2005, MDEQ reported that VOCs had been detected in 3 consecutive sampling rounds (between August 2004 and January 2005) at a replacement well at 885 Pearl Street, the home of a former Township supervisor. This well, drilled in 1997 and reaching a depth of 134 feet, was the first replacement well found to be contaminated. In response, MDEQ indicated that it was considering encouraging the Township to develop "a municipal water supply system for the whole area."[45]

In July 2005, an internal MDEQ memo noted that approximately $1.75 million had been committed to the Pullman project to date, with an additional $1 million commitment expected through the project's planned closure in 2015 to support a 10-year operation and maintenance phase.[46] An August 29, 2005 MDEQ site status report indicated that project closure had been revised from 2011 to 2015 due to ongoing delays in approving the groundwater remediation solution.[47]

2006–2007: MACTEC Remediation Contract Closed Abruptly; PII Site Demolished

In March 2006, the MACTEC/FTCH contract, which was the primary vehicle for all active remediation work in Pullman, was abruptly closed out, just a few months after being extended through 2015. No documented rationale was provided beyond a brief reference to a lack of available funding.[48] With this contract terminated and no replacement contract or request for proposals documented in the EGLE database, contamination remediation efforts appear to have effectively ceased at that point.

In November 2006, as the MACTEC contract was all but terminated and no successor arrangement was in place, MDEQ's 2007 Action Plan included a $1 million request for "the remedy" at the Pullman and 109th Avenue project, along with $200,000 for 10 years of operation and maintenance.[49] There is no documentation in EGLE referencing the approval or implementation of that funding.

In May 2007, MDEQ personnel abandoned (i.e., decommissioned) a set of wells at the PII site that had been installed for the SVE system and periodic sampling, suggesting that active monitoring and remedial work at the source site was coming to an end.[50]

In October 2007, Bloomingdale Public Schools proceeded with the demolition of the PII plant structure. Working with Villa Environmental Consultants, the school district excavated the facility's drainage and

[44] ID746.
[45] ID743, 827.
[46] ID874.
[47] ID871.
[48] ID915, ID939, ID944, ID945, ID979.
[49] ID966.
[50] ID965, ID990.

piping systems, removed contaminated sediments, cleaned production areas, and closed the plant's production wells.[51] With this work completed in accordance with Bloomingdale P.S.' Due Care plan, the PII site itself was considered environmentally safe from that point forward.

2008–2011: Project on an Indefinite Hold; Virtually No Contamination Detected Through 2011

A November 21, 2008, MDEQ site status report formally classified the Pullman project as "Approved Partial Closure" (APC), effectively on hold pending the availability of funding to install the groundwater remedial action system. The report noted that $1.55 million in FY2010 and FY2011 funds would be needed to complete the project, including the 10-year operation and maintenance phase, and warned that "downgradient and replacement wells continue to be at risk from the plume." Total expenditures to that point stood at $1.156 million.[52]

On March 25, 2008, a contamination notice was issued to the Township's fire department after 3 types of VOCs were detected at their well.[53] This was the first new contamination detection noted in the EGLE records since January 2006.[54] The fire department well would prove particularly difficult to decontaminate, with contamination records persisting into 2009.[55]

Groundwater and soil sampling were conducted periodically and systematically throughout Pullman from 1993 through 2010, encompassing hundreds of sampling events across at least 87 addresses, as documented in an October 2010 summary report.[56] The final 250 or so EGLE entries, spanning 2006 through 2010, are dominated by well testing records, and virtually all of them produced non-detections or trace detections below harmful thresholds. This pattern suggested that most tested wells in Pullman had been cleared of VOC contamination by 2011, though no formal record exists to confirm this.

The EGLE records come to an end in early 2011.

An April 2009 EGLE entry, MDEQ's ERD File Inventory, helps document the project's trajectory, confirming that PII contamination documentation dated back to 1991, that the primary remediation contracts (ABB and Harding ESE/MACTEC) ran from 1996 to 2006, and that no follow-up project had been initiated in the 3 years since MACTEC's contract closed in 2006. The inventory lists 27 major reports, most of which are included in the RIDE files for consultation.

[51] ID1000, ID1001.
[52] ID1063.
[53] ID1082.
[54] ID743, ID827, ID933.
[55] ID1047.
[56] ID1123.

Four Research Questions

The scope of work for this assignment included the following research questions:

1) What Are All the Sources of Data on Pullman Water Quality?

Please refer to Annex 4 (Most Relevant Documents) and Annex 5 (Top 25 Must-Read Documents).

2) What Determinations Have Been Made by Local/State Governments on Pullman's Water Quality, and When Were They Made?

EGLE records do not document any formal determinations by local or state government leading to restrictions or limitations on the location of wells in the Pullman community.

In 1994, in response to the emergence of over 20 VOC-contaminated wells, MDPH established a Health Advisory Area in Pullman, informed Lee Township that it could not guarantee monitoring, and recommended limiting the construction of new wells.[57] There's no additional information in EGLE on this matter.

In November 2003, MDEQ issued an internal memo discussing the potential impact on the plume if the fire department installed a new water supply well. The well would be located north of Scott Creek and 200 ft. south of the plume's southern boundary (near its downgradient). The report indicated that, depending on the frequency and the intensity of use by the fire department, the well could end up causing a shift in the migration path of the plume, which would render ineffective the remedial efforts implemented to date and create a new contamination path. In consequence, the report recommended installing the fire dept. well at a different location, either on the upgradient of the plume or south of Scott Creek, given that it serves as a natural barrier to the plume.[58] Later that month, the Allegan County Environmental Health team and MDEQ-Lansing, which produced the technical evaluation, exchanged emails on this subject. The former provided data on water usage levels by the fire dept. and informed that placing the well south of Scott Creek was not possible because that was outside of the Township's limits. The latter indicated that regardless of water usage levels, the proposed well location was not a good idea and insisted that the well be located upgradient to prevent hampering the remediation system.[59]

Separately and unrelated, an internal MDEQ draft memo (unspecified date sometime after 2009) discussed relevant facts to consider in relation to opening a new well for a day care located at 909 Pullman Ave.[60] The document did not describe any specific formal or informal limitations to doing so. There was only a recommendation to dig "the deeper the better," to sample the soil periodically on the

[57] ID79.
[58] ID593.
[59] ID594.
[60] ID1108.

way down the boring hole, and to consider connecting to the Type III well system in town. The document also recommended the local health dept. issue a temporary well permit that could be changed into a drinking water permit once the tested samples came back with non-detect results.[61]

3) What Tests, if Any, Have Been Conducted on Pullman's Monitoring Wells?

The EGLE database documents the installation of 23 monitoring wells in Pullman: three by Gove Associates in 1994, located at the PII plant site, and 20 by FTCH across the Pullman community in 2001. There are 7 abandonments documented: 2 at the PII site, 4 south of Scott Creek, and 1 north of Scott Creek. Between 1993 and 2011, monitoring wells were utilized for sampling on numerous occasions, mostly by ABB and FTCH.

The EGLE database includes at least 10 documents with maps displaying the location of monitoring wells, listed below. Please refer to Annex 3 for a series of maps of monitoring well locations.

Table 1. Monitoring Well Location Maps in the EGLE Database.

ID Number	Date	Document Title	Document Description
ID72	5/31/1994	Buchalco Pullman Industries Incorporated- Freed Gove Associates Incorporated - Installation and Sampling of Monitoring Wells	Map of 3 monitoring wells at the PII site, installed by Gove.
ID480	7/30/2001	Harding Lawson Associates- Proposed Monitoring Well Locations	Map of the 20 monitoring wells installed by FTCH.
ID524	7/24/2002	Fishbeck Thompson Carr and Huber Incorporated- Remedial Investigation	Figure 3, Page 24: FTCH monitoring well locations.
ID598	November 2003	Residential Well Investigation Map	Map of FTCH monitoring wells installed in proximity to 849 Pullman Ave.
ID669	1/21/2004	Mandle MDEQ- MacDonald Fishbeck Thompson Carr and Huber Incorporated - Flow Rate Estimates	Map with locations of 10 of FTCH's monitoring wells.
ID710	5/20/2004	Fishbeck Thompson Carr and Huber Incorporated- Drinking Water Well Contaminant Investigation	Report includes a monitoring well map and test results for 4 monitoring wells close to 849 Pullman Ave.
ID796	5/3/2005	Hefferan MDEQ- MacDonald Fishbeck Thompson Carr and Huber Incorporated - Information Regarding Monitoring Well Installations	Map with 5 new monitoring wells proposed by FTCH.
ID853	8/22/2005	Fishbeck Thompson Carr and Huber Incorporated- Groundwater Monitoring Report	Map of FTCH monitoring wells as of January 2005.
ID852	9/26/2005	Fishbeck Thompson Carr and Huber Incorporated- Groundwater Monitoring Report	Map of FTCH monitoring wells as of July 2005.
ID850	10/26/2005	Fishbeck Thompson Carr and Huber Incorporated- Quarterly Groundwater Monitoring Report	Map of FTCH monitoring wells as of April 2005.

[61] ID1108.

For monitoring well sample testing and results, please refer to the following documents:

Table 2. Monitoring Well Testing Results Documented in the EGLE Database.

ID Number	Date	Document Title	Document Description
ID78	5/3/1994	Fire and Environmental Consulting Laboratories Incorporated- 4-21-1994 Soil Sampling Results - K13827-14	Results from tests at 3 monitoring wells.
ID79	5/3/1994	Fire and Environmental Consulting Laboratories Incorporated- 4-25-1994 Groundwater Sampling Results - K13827-10	Results from tests at 3 monitoring wells.
ID477	6/12/2001	6-11-2001 Water Sampling Results - 0106084	Water sampling results.
ID471	8/7/2001	8-7-2001 - 8-9-2001 Water Sampling Results - 0108119	Water sampling results.
ID454	10/26/2001	TriMatrix Laboratories Incorporated- 10-9-2001 - 10-11-2001 Water Sampling Results - 35826-1	Water sampling results.
ID524	7/24/2002	Fishbeck Thompson Carr and Huber Incorporated- Remedial Investigation	Results from tests at 20 monitoring wells.
ID618	7/1/2003	6-26-2003 and 6-27-2003 Water Sampling Results - 30700006	Water sampling results.
ID681	12/1/2003	TriMatrix Laboratories Incorporated- 11-13-2003 Water Sampling Results - 36390-2	Water sampling results.
ID731	3/18/2004	3-17-2004 Water Sampling Results - 40300188	Water sampling results.
ID710	5/20/2004	Fishbeck Thompson Carr and Huber Incorporated- Drinking Water Well Contaminant Investigation	Report includes monitoring well map and test results for 4 monitoring wells close to 849 Pullman Ave.
ID741	9/20/2004	9-14-2004 - 9-16-2004 Water Sampling Results - 40900200	Water sampling results.
ID786	9/20/2004	9-15-2004 and 9-16-2004 Water Sampling Results - 40900201	Water sampling results.
ID823	1/21/2005	1-18-2005 - 1-20-2005 Water Sampling Results - 50100146	Water sampling results.
ID794	6/6/2005	TriMatrix Laboratories Incorporated- 5-16-2005 and 5-17-2005 Water Sampling Results - 36875-1	Water sampling results.
ID853	8/22/2005	Fishbeck Thompson Carr and Huber Incorporated- Groundwater Monitoring Report September 2004 and January 2005	Groundwater monitoring report.
ID852	9/26/2005	Fishbeck Thompson Carr and Huber Incorporated- Groundwater Monitoring Report July 2005	Groundwater monitoring report.
ID850	10/26/2005	Fishbeck Thompson Carr and Huber Incorporated- Quarterly Groundwater Monitoring Report April 2005	Groundwater monitoring report.

For information on monitoring well abandonments, please refer to the following documents:

Table 3. Monitoring Well Abandonments Documented in the EGLE Database.

ID Number	Date	Document Title	Document Description
ID692	7/8/2004	Fishbeck Thompson Carr and Huber Incorporated- Monitor Well Abandonment Records	Indicates that 4 monitoring wells in proximity to 849 Pullman Avenue were abandoned in May 2004.
ID755	1/5/2005	Fishbeck Thompson Carr and Huber Incorporated- Monitor Well Abandonment Record and Soil Boring Log	Indicates that 1 monitoring well (MW-10) was abandoned in January 2005.
ID965	2006	GSS- Request for Services	Abandonment of 2 monitoring wells at the PII site.
ID915	1/5/2006	Hefferan MDEQ- MacDonald Fishbeck Thompson Carr and Huber Incorporated - Information Regarding Monitoring Wells	Discussion about abandoning monitoring wells at the former PII site.
ID990	5/29/2007	MDEQ- Monitor Well Abandonment Record	Monitor well abandonment record.

4) What Is the Documented Extent of the Toxic Plume in the Community?

The estimated extent of the underground contamination plume is approximately 1,200 ft. long x 300 ft. wide. The most updated map available in EGLE is found in FTCH's 2005 Remedial Investigation Addendum.[62] For a visual comparison of the plume's migration movement over time, please refer to Annexes 10a, 10b, and 10c, which include technical drawings of the plume location from 1997 through 2005.

Key Figures

- **1991:** Year contamination was first confirmed in community wells.
- **87:** unique addresses tested (the universe of addresses tested).[63]
- **53**: unique addresses tested resulting in VOC detections.[64]
- **4:** unique addresses tested resulting in only unharmful VOC traces detected.[65]
- **30:** unique addresses tested resulting in no VOC detections ever.[66]
- **At least 250:** people estimated to have been impacted by the plume (1997 figure).[67]
- **29 to 37:** number of contaminated wells replaced with deeper wells by MDEQ in 1997.

[62] ID889.
[63] Appendix 12c (ID1123).
[64] Appendix 12c (ID1123).
[65] Appendix 12c (ID1123).
[66] Appendix 12c (ID1123).
[67] ID245.

- **1,200 × 300 ft.:** estimated dimensions of the contamination plume (1997 figure).[68]
- **Up to 34×:** PCE level detected in soil at the source site in excess over the residential protection limit.[69]
- **Up to 24×:** TCE level detected in groundwater in excess over the safe drinking water threshold.[70]
- **1999:** Year that PII was determined to be a non-liable party.
- **$1,750,000 (approx.):** Documented state commitments for the Pullman Ave and 109th Ave project.[71]
- **$1,160,000 (approx.):** Documented state expenditure for the Pullman Ave and 109th Ave project.[72]

Conclusion

The PII contamination episode represents a two-decade environmental response effort that was ultimately left incomplete. The record documented in the EGLE/RIDE database, which spans 1,147 records from 1977 to 2011, reveals a pattern of incremental progress that was unfortunately undermined by the slow pace of institutional action, funding constraints, and a questionable liability determination.

Five overarching conclusions emerge from this review:

The Contamination Was Extensive and Confirmed Late

VOC contamination from the Pullman Industries facility impacted at least 57 wells across the Pullman community,[73] reaching concentrations up to 24 times the residential drinking water criteria for TCE and 34 times the criteria for PCE in soil.[74] The plume extended approximately 1,200 feet long by 300 feet wide and reached the waterflow of Scott Creek.[75] Despite the first odor complaints arising in 1991, systematic sampling confirming the scope of contamination did not begin until 1993, and the primary source was not formally identified until the ABB report in 1997,[76] a 6-year gap from first detection to confirmed source attribution. On the other hand, once VOC testing started, it was extensive and systematic across the Pullman community for 18 years (1993-2011).[77]

The Institutional Response Was Chronically Slow

Even though MDEQ officials appear to be generally proactive and responsive, institutional response actions lagged significantly behind the need. The first contamination case emerged in 1991, but broader community testing did not take place until 1993. Bottled water supply began in 1991, but replacement wells were not installed until 1997. The Type III municipal well was not operational until March 2001, even though defective replacement wells were detected in 1997. The $1.3M remediation contract with Harding ESE/MACTEC was awarded in 2000 but the groundwater pump-and-treat system — its central deliverable — was never designed or installed before the contract was abruptly closed in March 2006. A

[68] ID245.
[69] ID871.
[70] ID871.
[71] ID1063.
[72] ID1063.
[73] ID1123.
[74] ID245, ID524.
[75] ID245, ID524.
[76] ID245.
[77] ID1123.

work plan to clean out the contaminated PII plant sewage and piping system, identified as a contamination vector during sample testing in February 2004, was not issued until February 2005 and never implemented. The project was formally classified as "Approved Partial Closure" (on indefinite hold) in 2008 without having yet delivered on its core objective to operate a remediation system. EGLE records do not document any successor awards after that.

The Liability Determination Was Contested and Consequential

MDEQ's November 1999 decision to clear the current Pullman Industries of any liability was internally disputed: at least one MDEQ attorney dissented in writing. The decision effectively foreclosed any legal avenue to compel PII to fund a full remediation response. Despite this, PII voluntarily contributed at least $125,000 and donated property for the Type III well.[78] The EGLE database does not document any subsequent attempt by MDEQ to pursue alternative liable parties or secure private funding for the unimplemented remediation system.

Scott Creek Was Both a Critical Environmental Boundary and a Contamination Receptor

Multiple FTCH reports from 2002 through 2005 identified Scott Creek as both a natural boundary limiting the plume's southward migration and a probable receptor of VOC discharges from contaminated groundwater. VOCs related to the PII leakage were not detected south of the creek throughout the monitoring period, confirming its role as a barrier.[79] However, groundwater VOCs were found to discharge into the creek near Pullman Road, raising unresolved questions about creek water quality and downstream ecological impacts. FTCH's 2005 Remedial Investigation Addendum recommended continued quarterly monitoring and hydrologic assessment of the creek; neither was carried out following the MACTEC contract closure in 2006.[80]

The Contamination Source Was Removed, But the Plume Was Not Remediated

The physical source of contamination was effectively eliminated when Bloomingdale Public Schools demolished the PII plant in October 2007, with Villa Environmental Consultants managing the removal of the plant's drainage, piping, and production wells, as well as contaminated parts of the physical structure. By the time EGLE records closed in 2011, well testing data showed that the vast majority of tested wells were returning non-detections, a positive development attributed in part to natural attenuation.[81] However, the plume was never actively remediated: no pump-and-treat system was installed, no AS/SVE system was permanently deployed after the 2005 pilot, and the contaminated plant piping network was never cleaned out before Bloomingdale Public Schools demolished it. As of 2008, MDEQ still identified downgradient and replacement wells as being "at risk."[82] Whether the plume has since dissipated entirely through natural attenuation, or continues to migrate, is not documented in the available record.

[78] ID371.
[79] ID524, ID723, ID889. Per the FTCH investigation in ID710, VOC contamination detected in 2002 at 849 Pullman Ave. was determined to be unrelated to the PII site.
[80] ID889.
[81] ID889.
[82] ID1063.