

**VILLAGE OF YELLOW SPRINGS, OHIO
RESOLUTION 2018-10**

**ADOPTING A WELLHEAD PROTECTION PLAN UPDATE AND ENCOURAGING
SOURCEWATER PROTECTION EDUCATION AND ACTIVITIES**

WHEREAS, access to safe, clean drinking water is a necessity for all living beings; and

WHEREAS, the Village of Yellow Springs operates a water treatment plant that uses groundwater to produce safe drinking water for our residents and businesses; and

WHEREAS, a Wellhead Protection Plan was previously created and last updated in 2001; and

WHEREAS, such plan was in need of a more recent update to ensure that existing possible contaminant sources were posing no immediate threat and that no new possible contaminant sources were present; and

WHEREAS, the Village of Yellow Springs Environmental Commission has completed such an update which is hereto attached and also recommends that educational information and activities regarding safe drinking water and sourcewater protection be distributed generally to the Village population; and

WHEREAS, it is vital to the protection of our water source to be vigilant in monitoring potential sources of pollution;

NOW, THEREFORE, BE IT RESOLVED that Council for the Village of Yellow Springs hereby:

Section 1. Adopts the Update to the 2001 Wellhead Protection Management Plan, entitled "Source Water Protection Management Plan Update", attached hereto as Exhibit A.

Section 2. Directs the Village Manager to take such actions as necessary to implement policies necessary to ensure compliance with the Plan.

Section 3. Instructs the Yellow Springs Environmental Commission to pursue such distribution of information and educational activities as they deem appropriate to educate the public in this regard.

Brian Housh, President of Council

Passed: 4-2-2018

Attest: _____
Judy Kintner, Clerk of Council

ROLL CALL:

Brian Housh __Y__ Marianne MacQueen __Y__ Judith Hempfling _Y__
Kevin Stokes __Y__ Lisa Kreeger __Y__

YELLOW SPRINGS SOURCE WATER PROTECTION MANAGEMENT PLAN (UPDATE TO 2001 WELLHEAD PROTECTION MANAGEMENT PLAN)

YELLOW SPRINGS ENVIRONMENTAL COMMISSION

FEBRUARY 2018

BACKGROUND

In 2015, the Yellow Springs Village Council requested that the Environmental Commission (EC) review and update the village's Wellhead Protection Management Plan, which was approved in 2001. The 2001 plan assessed potential sources of pollution located within the village source water protection area, presented strategies for controlling those sources, described the village's water quality monitoring program, and outlined past (and potential future) efforts to educate the public and elected officials about source water protection issues and strategies. The EC initially identified three areas to focus its update: 1. Determine whether the 1-year and 5-year time-of-travel zones¹ delineated in the 2001 report needed to be re-calculated; 2. Identify any new potential sources of contaminants within the 1-year and 5-year time-of-travel zones; and 3. Conduct outreach to villagers about the contents of the plan, as well as actions that villagers can take to help protect the quality of Yellow Springs drinking water. As the update progressed, the EC determined that it would also be valuable to examine the "source control strategies" recommended in the 2001 plan – that is, the specific actions that were recommended for minimizing the risk of each of the potential sources of contaminants. The EC decided to first examine the strategies recommended for Morris Bean & Company, the highest-risk source of potential pollutants in the source water protection area. In a subsequent phase of the update, the EC will examine the strategies recommended for other potential sources of pollutants, such as agricultural land, residential sewage systems, and more.

In 2015, the Environmental Commission embarked on this work by making contact with the Ohio EPA's Source Water Assessment and Protection (SWAP) program (previously the Wellhead Protection Program) southwest regional representative, and was advised to develop a Village Contingency Plan prior to updating the Wellhead Protection Management Plan. Patti Bates, Village Manager, and Brad Ault, Water Treatment Superintendent, undertook this task, and the Contingency Plan was approved in fall 2015. Due to staff turnover at the Village Waste Water Treatment Plant, the focus on planning the new water treatment facility, and scheduling conflicts between Environmental Commission and the EPA, work on the Wellhead Protection Management Plan update began in earnest in 2016. Concurrently, the Environmental Commission worked with Tecumseh Land Trust to establish priority conservation easement areas in the Village, focusing on properties within the 1- and 5-year time of travel zones as delineated in the 2001 plan.

¹ A time-of-travel zone represents the surface area overlying the portion of aquifer supplying water to the well within a certain time period.

This report describes the efforts undertaken by the Environmental Commission, the Village Manager and the Water Treatment Superintendent to update portions of the 2001 plan, the results of the update, and their strategy for communicating those results and other information on source water protection to villagers. The report authors would like to thank Megan Marhelski from the Ohio EPA and Jessica D’Ambrosio of the Nature Conservancy in Ohio for their assistance.

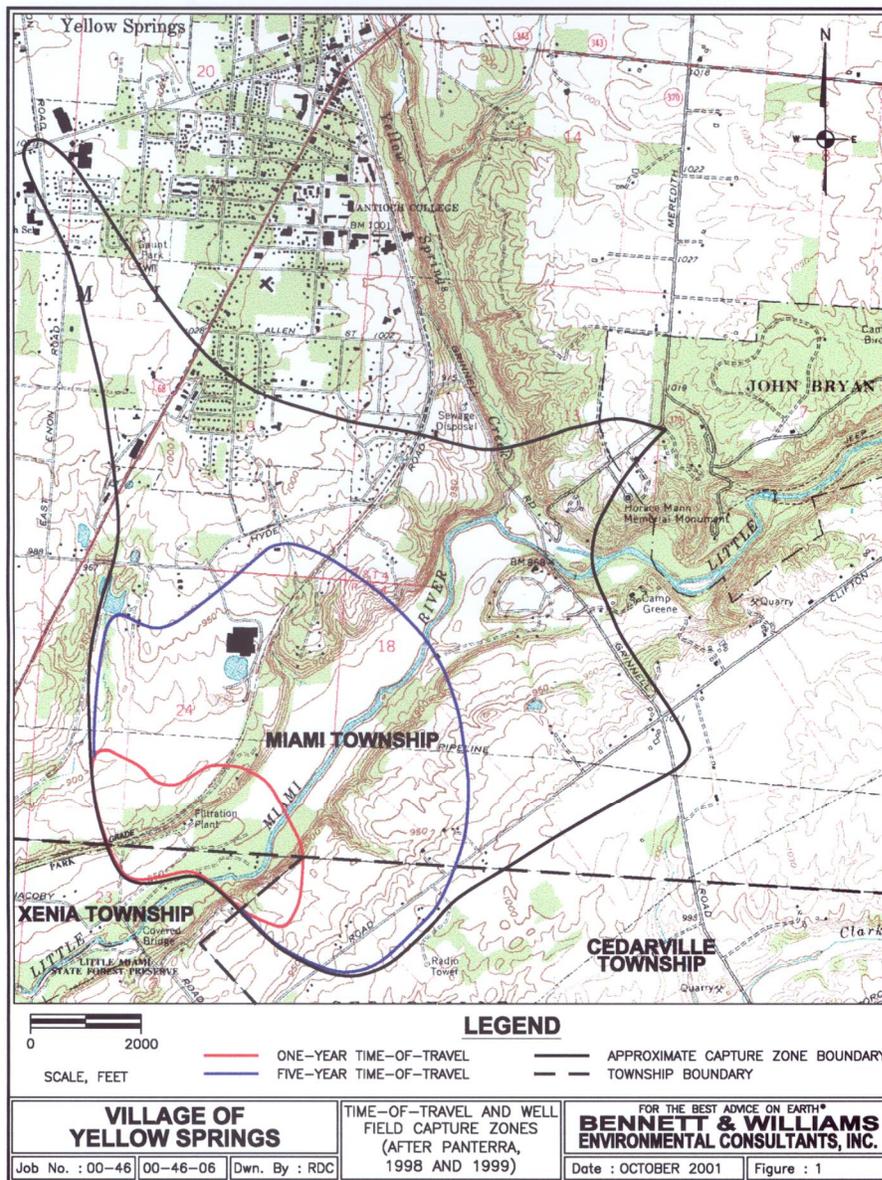
TIME-OF-TRAVEL ZONE UPDATE

One- and five-year time-of-travel zones were delineated for the Yellow Springs wellfield as part of the 2001 Wellhead Protection Management Plan². These zones are shown in map 1. The delineation of the time-of-travel zones is based on hydrogeologic parameters and the amount of water pumped at the wells³. Because the hydrogeologic parameters have not changed since 2001, and the volume of water used by the village in 2016 was less than the amount used in 2001, the Ohio EPA determined that the 2001 time-of-travel zones were still valid and did not urgently need to be re-delineated at this time. Yet, due to the hydrogeologic complexity of the area underlying the Yellow Springs wellfield and capture zone, and the fact that modeling methods and other relevant technologies have evolved in the twenty years since the original time-of-travel zones were delineated, the EC recommends reassessing the time-of-travel zones when possible, especially if the amount of water used by the village increases significantly.

² The following steps were taken to calculate the time-of-travel zones for the 2001 Wellhead Protection Management Plan: 1. construct a detailed potentiometric surface map including flow lines; 2. measure the hydraulic gradient of the potentiometric surface; 3. calculate ground water velocities, using known and estimated aquifer parameter values; and 4. use these velocities and travel times (one year and five years) to calculate the distance to the one- and five-year time-of-travel boundaries. SOURCE: page B-13 “Wellhead protection area delineation and potential pollution source inventory,” Panterra Corp, June 1998.

³ Source: Page 16, “Wellhead protection area delineation and potential pollution source inventory,” Panterra Corp, June 1998.

Map 1. One- and five-year time-of-travel zones around the Yellow Springs wellfield.



SOURCE CONTAMINANT UPDATE

The 2001 Wellhead Protection Management Plan identified Morris Bean & Company (Morris Bean) as the highest-risk potential source of pollution, followed by the Yellow Springs wastewater treatment plant and the Vectren natural gas pipeline. Other potential pollution sources were listed as residential heating fuels, electric transmission lines, septic systems, stored agricultural chemicals, and others.

The 2016 assessment of potential *new* contaminant sources was conducted using multiple methods. Staff at the Ohio EPA searched state databases to identify any regulated activities occurring within the one- and five-year time-of-travel zones. Possible regulated activities included Superfund sites, oil and gas wells, injection wells, mines, point sources that discharge pollutants under the National Pollutant

Discharge Elimination System, and hazardous waste that is managed as part of the Resource Conservation and Recovery Act.

In addition, the Yellow Springs Village Manager and Water Treatment Superintendent sent questionnaires to the residents of the Vale, Funderburg Farms and Hydebrook Farms, which are located within the five-year time-of-travel zone, and the Riding Center, which is located adjacent to it, asking whether their use of potential contaminants such as heating oils, septic systems, fertilizers or manure had changed since the 2001 report. The Village Manager also inquired with the Green City Combined Health District to determine whether septic inspections in the Vale had revealed any problems. Finally, the Village Manager and Water Treatment Superintendent searched for obvious land use changes within the one- and five-year time-of-travel zones using Google Earth and by driving through the area and conducting a “windshield survey.”

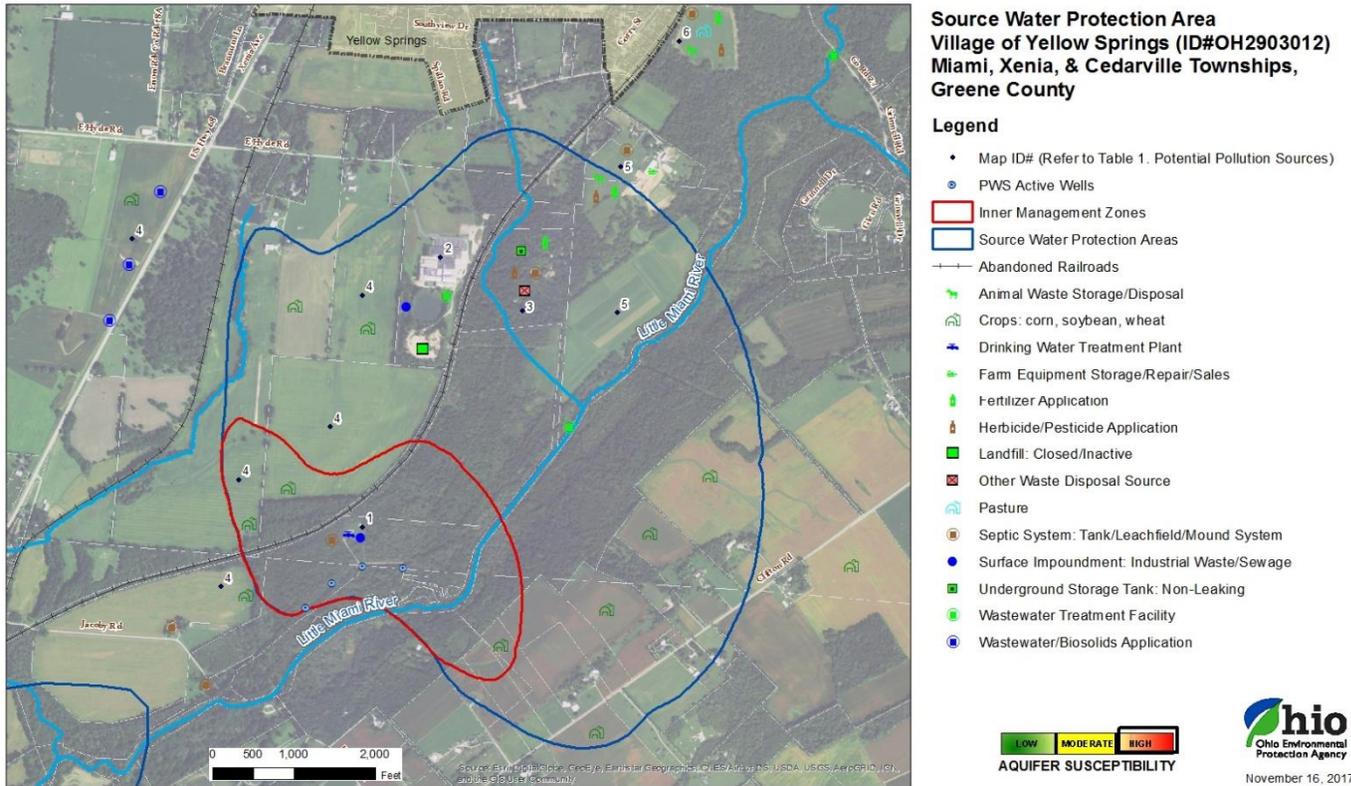
Based on the above searches, inquiries, and questionnaires, the EC determined that the potential sources of pollution identified in the 2001 report had not changed their uses of potential contaminants, and no new potential pollution sources were identified. The most noteworthy change was the establishment of a sewer connection between Morris Bean and the Village of Yellow Springs wastewater treatment plant and the deconstruction, dredging and backfilling of Morris Bean’s on-site sanitary sewer plant (discussed in detail later in this report). Details of the entire list of potential pollution sources identified in the 2016 review are shown in Table 1; their locations are shown in Map 2.

Table 1. Updated (2017) list of potential pollution sources within the one-year and five-year time-of-travel zones of the Yellow Springs wellfield. Source: Ohio EPA.

| Facility Name (number in parentheses corresponds to ID number in Map 2) | Time-of-travel zone | | Priority/Risk level | Potential pollutant source(s) |
|---|---------------------|--------|---------------------|---|
| | 1-year | 5-year | | |
| Point sources | | | | |
| Water Treatment Plant (1) | x | | Low | Fluoride, sodium hypochlorite, phosphates, diesel fuel |
| Morris Bean & Company (2) | | X | High | Aluminum foundry; chemical storage/use/disposal; Process wastewater discharges; Sanitary water discharges |
| The Vale (3) | | X | Low | Septic systems; heating fuel; buried tank; hazardous household wastes; vehicle maintenance/storage; lawn chemical application |
| Hydebrook Farms (4) | x | X | Low | Livestock manure storage, application, & disposal; Septic System; Fertilization/ Pesticide Storage, Application & Disposal; Machinery Maintenance |
| Funderburg Farm (5) | | X | Low | Livestock manure storage, application, & disposal; Septic System; Fertilization/ Pesticide Storage, Application & Disposal; Machinery Maintenance |
| The Riding Center (6) | | X | Low | Livestock manure storage, application, & disposal; Septic System; Fertilization/ Pesticide Storage, Application & Disposal; Machinery Maintenance |
| Non-point sources | | | | |
| Natural Gas Pipelines | | X | Low | Condensate from pipeline release |

| | | | | |
|-----------------------------------|---|---|--------|--|
| Residential heating fuels | x | X | Low | Release from tanks (aboveground or underground) |
| Private Sewage/Septic Systems | x | X | Low | Untreated Sanitary wastewater discharges; Improper disposal of Household Hazardous waste |
| Improperly Abandoned Water Wells | x | X | Medium | Spills/releases/runoff directly into wells and aquifer |
| Household Hazardous Wastes | x | X | Low | Improper disposal of wastes |
| General lawn and garden chemicals | x | X | Low | Improper application of chemicals |
| Farmland | x | X | Medium | Livestock manure; Septic Systems; Fertilization/ Pesticide/Chemical Application, storage & runoff; Machinery maintenance |
| Roads | x | X | Low | Accidents |
| Electrical transformers | x | X | Low | Spill/releases from damaged transformer |

Map 2. Yellow Springs source water protection area and locations of potential sources of contaminants (1=the YS water treatment plant; 2=Morris Bean, 3=the Vale, 4=Hydebrook Farms, 5=the Riding Center; 6=Funderburg Farm). The red polygon indicates the 1-year time-of-travel zone; the blue polygon indicates the 5-year time-of-travel zone. See Table 1 for the names corresponding with the numbers on the map. Source: Ohio EPA.



EDUCATION PLAN

The YSEC proposes the following educational activities be undertaken to communicate the results of the update and share strategies to improve water quality with Yellow Springs residents and other stakeholders:

| Activity/Product | Goal | Responsible |
|--|--|-----------------|
| Post the 2001 plan and update on the Village website | Ensure villagers are aware of the original plan and update | Village Manager |
| Write letter to the editor describing update in YS News | Ensure villagers are aware of the original plan and update | YSEC |
| Develop brochure describing the source water protection concept and practical actions that individuals can take to avoid polluting | Empower villagers to protect water quality in the source water protection area | YSEC |

| | | |
|---|---|-----------------|
| Inform Miami, Xenia and Cedarville township trustees and zoning officials about the location of the wellhead protection area and implications of their zoning decisions | Ensure that zoning within the wellhead protection area protects water resources | Village Manager |
| Create an education video about source water protection and the new YS water treatment plant. | Teach YS residents about drinking water treatment and the new YS water treatment plant. | YSEC |

SOURCE CONTROL STRATEGIES: MORRIS BEAN & COMPANY

Morris Bean & Company is an aluminum casting foundry that employs approximately 100 people and is located on the southern outskirts of Yellow Springs, within the source water protection area’s five year time-of-travel zone. As in the 2001 report, Morris Bean’s waste stream status is currently designated as a “conditionally exempt small quantity generator,” which means that it “never accumulates more than 2000 pounds of hazardous waste onsite and generates less than 220 pounds (or roughly 25-30 gallons) in a calendar month.”⁴ On November 9, 2017, EC committee member Deanna Newsom met with two Morris Bean representatives at the Morris Bean facility and was given a tour of the plant and the opportunity to ask questions about the strategies recommended in the 2001 report.

The facility’s current process waste streams are as follows:

Table 3. Morris Bean Waste Streams, 2017. Source: Morris Bean.

| Waste type* | Where disposed | Changes since 2001 report |
|--|-------------------------------------|--|
| White sand with binder residue from molding process | On-site sand pile | None |
| Process water used for non contact cooling water and to wash out plaster | On-site settling ponds | Reduction in water use from 75,000-100,000 gallons/day in 2001 to approximately 55,000 gallons/day in 2017 |
| Waste penetrant oil and hydraulic oil | Off-site | None |
| Sanitary waste | Village wastewater treatment system | Changed from on-site treatment to village system |

*Note: The use of tire molding sand, which was used in 2001, has been discontinued.

In recent decades, there have been three areas of concern relating to potential groundwater contamination by the Morris Bean facility. The first was the detection of volatile organic compounds, or VOCs, in the village production and monitoring wells and the springs of the neighboring Glen Helen Nature Preserve in 1988. While the contaminants were not found in the village’s treated drinking water, in 1994 Morris Bean received a clean-up order from the Ohio EPA and was required to “pump and treat” its contaminated groundwater starting in 2000, which involved pumping the ground water from recovery wells and then through carbon canisters to remove contaminants. In 2007, testing revealed that ground water at the Morris Bean property met cleanup standards, and in 2009 the pump-and-treat

⁴ Source: 2001 Wellhead Protection Management Plan

system was closed down⁵. The subsequent Ohio EPA-approved closure plan required that all monitoring and recovery wells be properly abandoned, with all well casings removed and the wells sealed⁶.

Further VOC testing in 2012 found the presence of 1,1-dichloroethane in the village monitoring well at levels far below the EPA's maximum contaminant level, and no VOCs were found in drinking water samples⁷. Additional testing by the Ohio EPA of nearly 100 organic compounds in Morris Bean's outfall in 2013 revealed that all compounds were below the detectable limit except bis(2-ethylhexyl)phthalate, which was detected at levels more than seven times the EPA's maximum contaminant level at one sampling location (Morris Bean's outfall, just downstream from the settling pond), but was not detected at another location (the outfall tributary, further downstream)⁸. Morris Bean questioned the high outfall result for bis(2-ethylhexyl)phthalate, noting that the split sample that Morris Bean sent to an independent laboratory did not detect the presence of that chemical⁹. In 2017, as part of Morris Bean's NDPEs permit renewal, outfall was again tested for numerous VOCs, and this time no VOCs were detected¹⁰. Currently the Ohio EPA tests Yellow Springs wells annually for VOCs and other parameters, with recent results showing no VOCs detected above the EPA's maximum contaminant levels, or MCLs¹¹.

A second wastewater issue related to Morris Bean was the proper treatment of its sanitary waste, or sewage. Since the 1990s the Ohio EPA recommended that Morris Bean's inefficient on-site treatment facility, which was constructed in 1967, be upgraded or replaced, and in subsequent years various options were explored to do so. These included both the tapping into the village's sewage treatment plant and construction of a new on-site sewage treatment facility. Though not without controversy¹², in 2016 the decision was made to allow Morris Bean to process its sewage using the village's plant. The tap-in to the village's system occurred in January 2017, with the full cost of the lift station and tap in incurred by Morris Bean.

Finally, the third potential wastewater issue, which emerged after the 2001 report, was the development of natural sinkholes downstream of the facility's discharge location. The sinkholes were a concern because they could potentially allow wastewater to flow directly into the groundwater (and thus drinking water source) rather than along the permitted surface water pathway. The first sinkholes were reported to the EPA by the village in 2013, and Morris Bean addressed the problem in May 2016 by sealing the problematic sinkhole with a flexible mesh liner that cures like concrete, thus preventing entry of wastewater through the bedrock. The EPA inspected the sinkhole soon after installation of the liner and confirmed that it appeared to be working, but that they would be conducting further inspections. In addition, they required Morris Bean to notify their office within seven days of observing any new sinkholes¹³. According to Morris Bean staff, routine facility inspections include a review of the discharge area for evidence of recurrence of sinkholes, with the most recent inspection in December 2017 revealing no problems.

⁵ Source: http://www.epa.state.oh.us/portals/49/derrsites/morris_bean.pdf

⁶ Source: Morris Bean representative, by email December 2017.

⁷ Source: <http://ysnews.com/news/2013/10/epa-cites-morris-bean-for-discharge-2>

⁸ Source: <http://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=371889>

⁹ Source: Morris Bean representative, by email January 2018.

¹⁰ Source: Ned Sarle, Ohio EPA

¹¹ Source: Brad Ault, Yellow Springs Water Treatment Superintendent

¹² Source: <http://ysnews.com/news/2016/07/village-council-morris-bean-sewer-request-raises-concerns>

¹³ Source: <http://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=451381>

The recommended strategies to minimize the potential for groundwater contamination by Morris Bean, and an update on those strategies as of 2017, are listed in Table 4.

Table 4. Status update on Morris Bean source control strategies recommended in the 2001 Wellhead Protection Management Plan.

| 2001 Recommended Strategy | 2017 Status Update |
|---|---|
| Verify compliance with current regulations regarding materials use, handling, storage, reporting and other regulations. | Under Morris Bean’s current NDPEs ¹⁴ permit, an independent laboratory tests water in Morris Bean’s large on-site settling pond monthly for total suspended solids and pH, and quarterly for oil and grease. VOCs are not tested on a regular basis. |
| Establish communication lines for assessing the current interim actions being conducted to mitigate the existing groundwater contamination at the facility. | The interim actions required by the Ohio EPA were completed in July 2011. |
| Educate workers regarding waste handling, spill prevention, containment and clean-up procedures. | Material handlers and maintenance crews participate in a training course that covers emergency response and the safe handling and proper storage of chemicals. Passing this course requires an exam. In addition, all other Morris Bean staff participates in a shorter version of this course. |
| Establish an early notification plan to alert the village in the event of a spill or release from the facility. | Morris Bean’s early notification plan involves contacting the Ohio EPA and the Greene County Emergency Response. |
| Review inspection reports and compliance history for the Morris Bean wastewater treatment plant. | Wastewater plant is no longer in use. Morris Bean now discharges to the village’s wastewater treatment system. |
| Review options, costs and possible timeframe for connecting Morris Bean to village wastewater treatment plant. | Morris Bean’s on-site sanitary sewer system and treatment plant have been eliminated, with sanitary wastewater connected the Yellow Springs wastewater treatment plant effective January 31, 2017. Up to 600 gallons per day of rinse water from the use of the penetrant Zyglo is also allowed to enter the wastewater treatment plant ¹⁵ . |
| Evaluate success of strategy implementation. | In progress. |

¹⁴ National Pollutant Discharge Elimination System, which requires a permit for all facilities discharging pollutants from a point source to waters of the state. NPDES permits are valid for five years.

¹⁵ Source: <http://ysnews.com/news/2016/07/village-council-morris-bean-sewer-request-raises-concerns>

CONCLUSION

A joint effort by the Ohio EPA, the Yellow Springs Village Manager, the Water Treatment Superintendent and the YS Environmental Commission to update specific elements of the 2001 Wellhead Protection Management Plan has determined that 1) the 2001 one-year and five-year time-of-travel zones are still adequate and do not urgently need to be re-delineated; 2) there were no new potential source of contaminants in the Yellow Springs source water protection area; and 3) an updated set of outreach activities are planned for 2018.

Related to future plan updates and the specific source control strategies that were examined in this update, the EC makes the following recommendations:

- Given the importance of clean drinking water and the speed at which pollutants can enter the source water area, in future we recommend updating the Wellhead Protection Management Plan at least every five years;
- Given the hydrogeologic complexity of the area underlying the Village's wellfield and capture zone and the development of new delineation techniques in the 20 years since the original plan was written, we recommend re-delineating the Village's 1- and 5-year time of travel zones;
- Due to the sporadic detection of VOCs in Village monitoring wells over the past 30 years, we recommend that the Village test its operating wells and monitoring wells at least bi-annually for relevant VOCs and other by-products of industrial processes;
- Consistent with Morris Bean's current monthly monitoring of water quality variables in the on-site settling pond, we recommend that the company conduct sinkhole surveys monthly and report the results of those surveys to the Village Manager;
- We recommend that Morris Bean add the Village Manager to the early notifications contacts in its Emergency Response Plan.