

Pollution Prevention in Enforcement

Village of South Charleston, Ohio

The Village of South Charleston installed an ultraviolet (UV) disinfection system at its wastewater treatment plant as part of an enforcement settlement with Ohio EPA.

The UV system has helped the village to go beyond compliance with its NPDES permit and has eliminated the use of chlorine gas and chemicals used for dechlorination.

The project has eliminated risks to workers and the community associated with using and storing chlorine gas.

Introduction

Businesses and governments in Ohio and across the nation are realizing substantial environmental and financial benefits from incorporating pollution prevention into their standard operating practices. Pollution prevention (P2) has begun to be incorporated into everyday business decisions. P2 avoids or reduces generation of waste at the source.

Pollution prevention also can be incorporated into environmental enforcement settlements via P2 supplemental environmental projects (SEPs). SEPs are environmentally beneficial projects that a violator agrees to undertake when settling an enforcement action. P2 SEPs use P2 techniques to reduce waste generation or releases to the environment beyond what is required by law.

Ohio EPA has developed a number of case studies that document the inclusion of P2 SEPs in enforcement settlements. This case study was developed by OPP and Ohio EPA's Division of Drinking and Groundwater (DDAGW), with input from the Division of Surface Water (DSW), to illustrate the benefits of using pollution prevention in enforcement cases.

Description of Village

The Village of South Charleston (the village) is a small town of 1,650 inhabitants, located in Clark County. The village is located in southwestern Ohio's green rolling farm country, about 10 miles southeast of Springfield. The village's drinking water and wastewater treatment plants serve about 660 customers, composed of families and businesses.



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Enforcement Case

Violations alleged by DDAGW involved the designation of the village's water wells as a surface water source. The wells were designated as "surface water" because they could not meet ground water criteria. Because of this classification, the village was required to filter the water, or bring the drinking water wells up to current standards, neither of which were completed at the time the violations were written.

The Pollution Prevention SEP

During enforcement negotiations with the village, DDAGW suggested to the village that it might want to preform a P2 SEP. The village's engineering consultant (already on staff) developed the idea of installing an ultraviolet (UV) disinfection system in the villages wastewater treatment plant. Although this project was not a water supply project, it was acceptable to DDAGW because it would reduce the amount of chlorine in the village's wastewater treatment system effluent to the stream.

Inclusion of the P2 SEP did not significantly change the rate of settling the enforcement case, but did slightly extend negotiations.

Incentives

The village was able to mitigate 75% of the calculated penalty with the P2 SEP. This amount is a larger percentage of the penalty than what is usually accepted by Ohio EPA, because the penalty did not include a large "profit" for operating in noncompliance.

The UV disinfection project was attractive to the village and the Agency because it would not only reduce chlorine in the stream, but would reduce the risk to workers and the community posed by using, storing and hauling the chlorine gas. City employees had also complained about the odor of the chlorine gas when they went about their daily duties at the plant.

In addition, the project provided a solution to a problem that the village was facing regarding the need to update its antiquated wastewater treatment system. The village was beginning to investigate upgrade alternatives, but had not identified a specific project.

Implementation

A UV system manufactured by Infilco-Degremont was purchased through Russel H. Smith Equipment Company for approximately \$24,000. In conjunction with the unit, the village had to install an underground concrete vault in order

to house the UV system below grade, and tie into the existing piping. The entire system cost the village approximately \$35,000 to purchase and install. The additional costs (\$11,000) came from installation of the concrete vault to house the UV system, installing metal hatches for access to the vault, electrical work, and engineering costs. All the engineering for the project was done in-house, with assistance from the village's engineering consultant.

The disinfection system uses ultraviolet radiation to transfer electromagnetic energy from the source lamp to the unwanted organism's genetic material. The irradiated cell can no longer replicate and reproduce.

The village's system is composed of two units, each possessing 8 ballasts and 16 lamps. The units are set up in parallel, but only one unit is used under typical flow conditions. The second unit is only used after significant precipitation and storm events.

The unusual thing about the implementation of this project is that the P2 SEP was identified at the start of negotiations and "fast-tracked" by the village, such that the UV unit was purchased, installed, and operational by the time the Orders were signed. Usually

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Orders are signed before a P2 SEP project can be completed. The UV project was completed in such a timely manner due (in part) to the seasonal nature of chlorination, which must begin by May 1 of each year, and runs through October 1. The UV unit was installed in April of 1997 and the Orders were journalized on May 1, 1997. In this case, the project did not extend the time frame necessary to fulfill the requirements of the Orders.

Maintenance

The new UV system requires limited maintenance. The bulbs can be cleaned periodically with food grade citric acid to extend their useful life. It is anticipated that one full unit (16 bulbs) will have to be replaced each year. Replacing the bulbs will cost the village about \$640 dollars per year, however the effectiveness of the lamps will be measured before they are replaced through routine maintenance.

Results

The system has performed well for the village and removes fecal coliform more effectively than the old chlorine system. This means that there is less fecal coliform and no chlorine going into the stream. It is no longer necessary to monitor the city's effluent for chlorine gas (or dechlorination products).

The village has been in compliance with effluent limits since the new system was installed. The village's NPDES permit was recently renewed, and fecal coliform is now the only regulated parameter.

The UV system saves the village a small amount of money each year. With the old system, the village spent about \$1,000 a year on chlorine and dechlorination compounds, which are no longer necessary, but the village anticipates spending approximately \$640 annually on new UV bulbs. Energy costs for the UV unit are about the same as for the old chlorine unit.

The UV system is less of a hassle for the city, which no longer has to monitor and maintain the delicate balance between chlorination and dechlorination byproducts in its wastewater effluent.

Discussion and Conclusions

This P2 SEP is an example of a relatively inexpensive project that a village or city can perform to help achieve compliance, improve the environment, and decrease risk to the community. Projects that improve the city's infrastructure, such as upgrades to water or wastewater treatment plants, can also include P2. Often these projects have previously been

identified by the city as desirable, but have not been implemented due to lack of funding, or other priorities. The P2 SEP facilitates implementation.

Inclusion of this P2 SEP facilitated settlement of the enforcement case between the village and Ohio EPA and provided benefits for both parties and for the environment.

While this P2 project was not directly related to the violations alleged by DDAGW, the village returned to compliance, and the P2 project helped the village go beyond compliance with the village's NPDES permit, by eliminating the use of chlorine gas.

The village is very happy with the new UV system. Village employees feel that the biggest advantage of switching to the UV unit was the elimination of the chlorine gas at the wastewater treatment plant. Using and storing chlorine gas increased the risk to village employees, the community and to the environment. By substituting UV light for chlorine in the disinfection process, there has been a substantial reduction in the risks associated with chlorine use as a result of this P2 project.

An added benefit to the village comes from not having to order and dispose of the chlorine gas cylinders. In the past the

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village has some trouble getting rid of the cumbersome cylinders. Now there are no cylinder to handle or dispose.

This P2 project could be done as a P2 SEP or completely independent of an enforcement action. Communities can use pollution prevention techniques (including source reduction and water and energy conservation) to go beyond compliance, and save public dollars.

Ohio EPA, Ohio citizens, and the environment all benefit from this P2 SEP, through:

- *settling the enforcement case and helping the village go beyond compliance,*
- *eliminating chlorine from the village's effluent to the stream,*
- *reducing fecal coliform loadings to the stream,*
- *decreasing risk to human health and the environment from potential re-releases of chlorine ,*
- *eliminating the need to balance chlorination and dechlorination by-products to disinfect the village's wastewater, and*
- *potentially reducing future regulatory oversight.*

This is one in a series of documents Ohio EPA has prepared to promote pollution prevention activities in Ohio and integrate pollution prevention into Ohio EPA programs. For more information, call the Office of Pollution Prevention at (614) 644-3469.

The Office of Pollution Prevention was created to encourage multi-media pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally sound recycling while avoiding cross media transfers. The Office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government, and the public.

Office of Pollution Prevention WWW address: www.epa.state.oh.us/opp