WALLKILL CORRECTIONAL FACILITY
TOWN OF SHAWANGUNK

Lead and Copper Abatement Program

Prepared for:

The New York State Department of Corrections

Prepared by:

The New York State Office of General Services

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Background

Routine water sampling conducted on March 6, 2003 at the Wallkill Correctional Facility for lead and copper analysis indicated both lead and copper levels in the distribution system in exceedence of New York State Department of Health (NYSDOH) standards. The correctional facility has been in contact with the Ulster County Department of Health regarding this problem and notices have been posted throughout the facility, as required by the NYSDOH, informing both inmates and staff of the levels with instructions that the water faucets and lines be flushed for a period of time prior to drinking the water.

Additional samples were subsequently collected on April 23, 2003 again from locations within the facility and also from other areas outside of the main facility buildings and from the individual wells to determine if other areas of the facility were similarly affected and also to determine the raw well water characteristics. First draw samples collected after having allowed the water to stand within the service line for the required six hours indicated considerably lower lead levels than previously detected but still indicated levels in exceedence of NYSDOH standards at two sites, the basement C side and in the maintenance building lunch room. Copper levels were only exceeded in the maintenance building lunchroom. The well samples, with the exception of the sample from well #4, were all in full compliance with NYSDOH standards for lead and copper. Copies of all samples results are included within the appendix of this report.

In addition to lead/copper analyses, the April 23 samples were also analyzed for alkalinity, hardness, ph, conductivity, iron, manganese, and Langlier's index. These were conducted to determine the level of corrosivity of the water and to determine the degree of treatment required to bring the water into compliance with NYSDOH standards. The sampling results were fairly consistent indicating a mildly corrosive water with an average Langlier's index of approximately –0.5 or negative 0.5 and a relatively neutral pH ranging from 7 to 7.3. Alkalinity and hardness were fairly consistent, averaging 115 mg/l ± and 150± mg/l respectively, throughout the filter run. Iron and manganese levels from the well supplies were also recorded. Both well #4 and well #19 exceeded NYSDOH standards for these two parameters. Earlier sample results for well #20, not currently connected to the system, also indicated iron and manganese levels in exceedence of NYSDOH standards.

Proposed Treatment Scheme

The characteristics of the raw water as determined by the recent sampling results indicate, again, only a mildly corrosive water with iron and manganese levels exceeding NYSDOH standards in three of the six wells. The other parameters tested for are acceptable. Accordingly, the water can be adequately with a blended poly-orthophospate sequestering agent that will not only address the corrosivity problem but will also sequester the iron and manganese.

We are proposing to use 'SeaQuest', a blended poly-orthophosphate manufactured by Aqua Smart, Inc. of Atlanta, Georgia. The product is an effective anti-corrosive and sequestering agent for drinking water distribution systems. Corrections is already using this product successfully at two other correctional facilities in the state. The product has the approval of the National Sanitation Foundation (NSF) for use in potable water systems. It consists of 77% polyphosphate and 23% orthophosphate plus a catalyst. The added benefit of this product is that it eliminates the need for post pH control products. Accordingly, it should not impact the chlorine demand or residuals in the distribution system. A copy of the manufacturer's literature describing the product is included in the appendix.

Proposed System Modifications

Recent improvements to the water system included modifications to the pump house immediately adjacent to well #17 and the connection of a new well, well #20, to the water system. The recent modifications also included the installation of new chlorinators and chemical feeders at the pump house, a new meter pit, new water meters, and the provision of a new chemical injection point to introduce polyphosphate into the water. The project was recently completed during last summer and fall. To address the corrosivity problem we are proposing several changes to the pump house project to introduce the blended poly-orthophoshate into the raw water at this location. This will provide treatment to the principal well supplies, wells 17 -20.

Wells #3 and #4 are independent and do not tie in with the main pump house. The original intent was to maintain these two wells on standby reserve basis, but have subsequently determined to utilize well #3 on a continual basis. As this well is located in a separate aquifer, pumping from well #3 will enable the facility to periodically rest and recharge the principal aquifer. Accordingly, a separate chemical feeder and injector will be provided and installed under a separate contract at well #3 to feed the blended poly-orthophosphate into this supply. Well #4, because of high iron, will be maintained strictly as a reserve supply.

As indicated on the attached drawing, two 6" diameter transmission mains convey the raw well water to the pump house. The one line directs water from wells #18 and #19 and the second line carries water from either well #17 or well #20. Wells #18 and #19 operate concurrently while well #17 and #20, the largest producers, will operate independently. After entering the pump house each of the two transmission mains run through either of two water meters and then combine into a common 12" header as it exits the building. The water from either well #17 or #20 will run through a new 4" Master Meter turbine flow meter with a flow transmitter and a 4/20 mA converter. A new 3" Master Meter is similarly being installed on the transmission line from well #18 and #19 also equipped to send a 4/20 mA signal to the chemical feeders.

As part of the on going improvement project a new meter paced chemical feed pump is being provided, an LMI chlorinator, Model #A941-450 H.I. This pump will provide chlorination to either well #17 or well #20 through a new injector installed in the 12"

main. An existing meter paced chemical feeder, a LMI Model #A741 – 150 FS will similarly inject sodium hypochlorite through an existing injector in the 12" main prior to exiting the building. This feeder to provide chlorination to wells #18 and #19.

Two additional chemical feed pumps are being provided as part of this contract, both LMI's, Model #A941-450SI complete with a solution tank. These were being provided initially to inject polyphosphate into the raw water to sequester both iron and manganese. These feeders will now be utilized to introduce the blended poly-orthophosphate into the raw water in place of the polyphosphate. Two new injection points are being proposed to better introduce the blended orthophosphate. The first will be located in the 6" tee on the line from wells #17 and #20, immediately after the transmission main enters the pump house. The second to be located in the 6" transmission main from wells #18 and #19, again immediately after the main enters the building.

Proposed Blended Poly-Orthophosphate Application Rates

The chemical application rate for the blended poly-orthophosphate agent is dependent upon several factors including the total hardness of the raw water, the iron and manganese levels, and an added factor to carry a residual throughout the distribution system. Basically, the manufacturer of SeaQuest has established the following formula to determine the application rate:

Fe + Mn + CaCO3/200 + Residual = Total Blended Poly-Orthophosphate (SeaQuest)

The iron, manganese, hardness, and residual are all expressed in parts per million (ppm). The residual value is usually set at 0.15 ppm.

The combined iron and manganese levels for wells #17 -#20 vary for each of the wells and also on each sampling date as listed below.

Well	Date	Iron (Fe) (ppm)	Manganese (Mn – ppm)	Hardness (CaCO3 – ppm)
#17 (275 GPM)	4/23/03	0.112	0.151	140
	12/02/02	1.13	0.906	
#18 (35 GPM)	4/23/03	0.053	0.10	70
	12/02/02	0.060	0.011	
#19 (90 GPM)	4/23/03	0.932	0.813	166
	4/16/02	0.069	0.140	142
#20 (250 GPM)	4/10/02	0.469	0.397	223

Based upon the recorded analytical results, the application rates will also vary for each well. As wells #18 and #19 are pumped concurrently the application rate would be either 0.94 ppm or 2.043 ppm of SeaQuest depending upon the date the samples were collected. Similarly, the chemical requirements for wells #17 and #20 would be 1.50 ppm, 2.88 ppm or 2.20 ppm depending upon which well is operating and which sample result is used. Additional samples will be collected to more correctly determine the required dosage levels. In the interim, in order to initiate the application of the blended poly-orthophosphate agent we are proposing an application rate of 1.50 ppm. Given past experience with SeaQuest, utilizing a lower dosage initially will reduce the amount of collected material from being removed to rapidly from the pipe surfaces in the distribution system. This will similarly reduce the frequency of flushing required and associated consumer complaints. Depending upon new sampling results from the wells and the distribution system future adjustments to the dosage rates may be required. Any proposed adjustments will be first submitted to the Ulster County Department of Health for their review and endorsement.

Sampling

Additional sampling will be conducted after the chemical treatment system is operable and the blended poly-phosphate injection has been initiated. The sampling protocol is as follows:

- Samples will again be collected from each well for iron, manganese, pH, hardness, and Langlier's Index to more accurately determine the levels of SeaQuest required to adequately treat the water. These will be repeated annually.

- Samples will be collected on a daily basis for the initial three months to monitor the chlorine residual as the water enters the distribution system. Samples will be collected from a tap in the old chlorination station immediately adjacent to the water storage tank. Adjustments to the chlorine feed rate will be made as required. After the initial three months the frequency of the sampling will be reduced from daily to weekly at this location.

- THM samples will be collected and analyzed monthly for the first three months from a remote location in the distribution system and then annually thereafter.

- Distribution system samples will be collected and analyzed for lead and copper beginning three months after the initiation of the SeaQuest injection into the water. The sample locations for the lead and copper analyses will be the same as those previously utilized for the initial and follow-up sampling, March 06,2003 and April 23, 2003.

- Sampling results will be submitted to the Ulster County DOH quarterly for the first year and then annually thereafter.

Flushing

As the initial injection of the blended poly-orthophosphate will result in the sloughing off of collected material from the interior of the distribution system piping a weekly flushing program will be initiated to remove the released material from the mains. The actually frequency may be reduced depending upon the degree of the problem. As the number of consumer complaints and degree of released material is found to be decreasing the flushing frequency may be reduced. As the water is distributed to both the Wallkill Correctional Facility and Shawangunk Correctional, the actual flushing locations will be determined separately by each correctional facility.