June 5, 2008

Mr. John Smith, Chairman
ABC Public Service District
P.O. Box 123
Small Town, West Virginia 23456

RE: ABC PSD Public Water Supply
PWSID #000000
Orange County

Dear Mr. Smith:

On May 29, 2008, a sanitary survey of the ABC Public Service District's public water system was conducted in accordance with the requirements of the West Virginia Public Water Systems Legislative Rule (WVPWSLR). Future surveys will be conducted at least every three years in accordance with the WVPWSLR.

We appreciate the efforts of your staff, in operating the water system in compliance with the requirements of the WVPWSLR. They are doing an excellent job overall, although several deficiencies were noted, as summarized below. It is anticipated that the guidelines provided herein will help you to understand and comply with the operational requirements imposed by the WVPWSLR.

There are several attachments to this report including water quality data for samples collected during the survey. The eight integral components of a sanitary survey are addressed in this report. Deficiencies are summarized as follows:

Summary of Sanitary Survey Deficiencies

Significant Deficiencies:

1. The Main Water tank is not fenced.

2. The Secondary Water tank security fence is in very poor condition.

Moderate Deficiencies:

1. Distribution system accountability between July 2007 and April 2008 was less than the state recommended value of ≥85%.

Minor Deficiencies:

None.

West Virginia CSR 16-1-9a requires you to provide a written response to the Philippi District Office, within 45 days of receipt of this report, for each deficiency noted. More details on the deficiencies and recommendations can be found within the body of the report.

If this office can be of further assistance, please advise.

Sincerely yours,

Mark T. Dickey, Engineering Technician
Environmental Engineering Division

Craig R. Cobb, P.E., Supervising District Engineer
Environmental Engineering Division

CRC:MTD:jc

pc: John Johnson, General Manager
Orange County Health Department
WV Public Service Commission
Robert N. Hart, P.E., Manager, EED

Sanitary Survey

ABC Public Service District
Public Water Supply
P.O. Box 123
ABC, WV 23456
ABCpsd@suddenlink.net

Surface Water Producing System
PWSID #0000000

Orange County

Conducted and Prepared by:

_____
Mark T. Dickey, Engineering Technician

_____
Craig R. Cobb, P.E., Supervising District Engineer

West Virginia Bureau for Public Health
Office of Environmental Health Services
Environmental Engineering Division
Philippi District Office

Conducted on: May 29, 2008

Table of Contents

Attachments

A - Laboratory Results
B - Plant Schematic
C - Summary of Construction Permits
D - Key System Elevations
E - Turbidity Spike after Filter Backwash
Turbidity, 15-minute downloads, 4/15/2008
F - CT – Calculations
G - Selected Photos

Summary

The ABC PSD operates a community public water supply in southeastern Orange County, West Virginia, including the communities of ABC and XYZ. The water system treats surface water from the Maumee River to comply with the provisions of the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) of the Safe Drinking Water Act (SDWA), and the provisions of the WVPWSLR. Specific mapping of the locations of key water system components is no longer provided due to security concerns resulting from the terrorist attacks of September 11, 2001. The system currently serves about 1000 residential customers, 80 commercial customers, and two resale customers, for a total customer base of 1080. The current system population is calculated as follows: 1080 x 2.41 = 2603 persons.

The water supply is classified as a Class II, surface water, producing system. Monitoring currently includes daily metering of the water production, tests of the free and total chlorine residuals, and daily monitoring of the raw, settled, and treated water turbidity and pH, and the raw and treated water alkalinity, iron and calcium hardness, and the treated water temperature. Other monitoring performed includes monthly bacteriological sampling, lead and copper sampling, Phase II, II-B and V sampling for nitrates, inorganics, regulated VOCs, and regulated SOCs. Additional weekly monitoring of the giardia cyst log inactivation, monthly monitoring of the raw and treated water total organic carbons (TOCs) and quarterly sampling for disinfection byproducts (DBPs) are being conducted. A yearly Consumer Confidence Report (CCR) is issued every year on or before July 1. Quarterly sampling for disinfection by-products under the S2D/DBPR, Initial Distribution System Evaluation (IDSE), is scheduled to be conducted during May, August and November 2009, and February 2010. Raw water sampling every two weeks for E. coli bacteria was initiated on 1/9/2008, with analyses performed by REIC Labs. The IDSE and LT2 sampling plans have been approved by the Philippi District Office (i.e., the IDSE on 10/17/2007 and the LT2 on 3/7/2008).

Statutory Requirements:

1. Install a security fence around the Main Water Tank site and repair or replace the fence around the Secondary Water Tank.

2. Continue to insure that an adequate staff of certified operators is in charge of the water system. There are currently five Class II operators, one Class III operator and one OIT operator on staff. This operator staffing is considered to be acceptable because the WTP is operated about 80 hours per week. Operators are reminded to renew their licenses every two years. Class I operators must obtain at least 12 continuing education hours (CEHs) every two years and Class II and higher certified operators must obtain at least 24 CEHs every two years before they can renew their licenses.

3. Continue to submit a copy of the completed monthly operational report (MOR) to the Environmental Engineering Division (EED) at the end of each month. Currently, the EW-90, 90A and 90B forms are being used. The EW-90C is submitted on a quarterly basis. Keep copies of the MORs on file for at least five years.

4. Continue to insure that all chemical additives are NSF-60 approved for use in public drinking water supplies.

5. Continue to collect at least three total coliform samples each month, in accordance with the approved sample site plan. It is noted that you are currently using the certified lab at the WV Office of Laboratory Services. Test results for the past 12 months were reviewed, with satisfactory test results reported. Continue to keep bacteriological test results on file for at least five years. Five sample areas are now being used. Submit a revised sample site plan to the Philippi District Office for approval, as appropriate, as additional customers are added to the distribution system.

6. Continue to collect ten lead and copper samples in accordance with the Lead and Copper Rule as directed by the EED, central office. Samples must be analyzed by a certified laboratory. Submit lab results to the EED. Keep copies of the lead and copper results on file for at least 12 years.

7. Continue to collect Phase II, II-B, and V samples for nitrates, inorganics, regulated VOCs and regulated SOCs as required. Continue to collect radiological samples as required.

8. Continue quarterly monitoring for DBPs under the Stage 1 Disinfectants Disinfection By-Products Rule (S1D/DBPR), with samples collected from the maximum residence time (MRT) location. Sample for Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAA5s) once per quarter. Continue monthly sampling for raw and treated water TOCs, under the S1D/DBPR.

9. Continue to issue a yearly CCR by July 1st each year based on the system data of the previous calendar year. Keep copies of your CCRs on file for at least five years.

10. Continue to obtain engineering construction permits for any water main extensions in excess of 1000 feet, or for any new storage tanks or booster pump stations (BPSs), or for major upgrades to the treatment facility.

11. Continue to test and record the total chlorine residual in the water supply every day in accordance with the requirements of the WVPWSLR using approved DPD chlorine residual testing equipment. Insure that a minimum total chlorine residual of 0.2 ppm is maintained in all portions of the distribution system at all times (i.e., 0.5 to 1.0 ppm recommended). Particular attention must be given to storage tanks during the hot summer months.

12. Continue to monitor the treated water turbidity in accordance with the LT1ESWTR. The rule requires that the treated water turbidity be $\leq$0.3 NTU at least 95% of the time, monitored and recorded every 4 hours of plant operation, and never >1.0 NTU. Also continue monitoring the turbidity of each filter effluent continuously, and continue to download turbidity values every 15 minutes to an Excel spreadsheet.

13. Begin conducting IDSE sampling for disinfection by-products under the S2DBPR, and continue monitoring the raw water E. coli sampling under the LT2ESWTR in accordance with the sampling plans which were recently approved by the Philippi District Office.

Recommendations:

1. Continue to implement the formal backflow prevention program by insuring that all commercial and industrial customers' backflow prevention equipment is tested by a certified tester every 12 months. Keep copies of the certification test results on file for at least 24 months. Copies of the Cross-Connection and Backflow Prevention Manual and the Cross-Connections and Backflow Regulations are available from this office upon request, or can be downloaded from our website at www.wvdhhr.org/oehs/eed.

2. Provide information to your customers, as appropriate, on the dangers and possible remedies associated with thermal expansion. Information on thermal expansion is available from this office upon request.

3. Notify the Philippi District Office whenever a new Boil Water Notice (BWN) is issued due to a water main break or some similar event which may result in contamination of the water distribution system.

4. Continue to update the inventory of water distribution mains, which are in service, as appropriate, and revise mapping to accurately reflect the locations of all mains as new extensions are added to the system.

5. Continue to carefully document distribution system accountability and maintain an ongoing program to identify and eliminate sources of unaccounted-for water losses (i.e., leaks, slow meters, unaccounted-for hydrant use, tank overflows, etc.) with the goal of accounting for at least 85% of all produced and/or purchased water. Test or replace all service meters on a 10 year schedule in accordance with Public Service Commission (PSC) guidelines.

6. Continue to modify chlorine application points as appropriate, to maintain DBPs at levels which are consistently below the maximum contaminant level (MCL) of 80 ug/l for TTHMs and 60 ug/l for HAA5s, while meeting a giardia cyst log inactivation of at least 3.0.

7. Use filter-to-waste piping when returning filters to service after a backwash cycle, to insure that turbidity spikes are not delivered to the clearwell.

Source Water

Raw surface water is pumped from the raw water pumping station on the Maumee River to the treatment facility. River water enters a concrete inlet chamber and then passes through perforated piping into the raw water wet well. Water volumes provided have always been adequate to meet system demands, even during periods of drought. Information on the raw water pumping station is included in the Pumping Facilities section of this report and in Attachment G. Potential sources of contamination may include natural wildlife and agricultural runoff, lumbering, and industrial and municipal wastes, in addition to runoff of materials from WV state highways. A summary of coliform bacteria sample results for the past five years is provided below:

Date	Total coliforms/100 ml	E. coli/100 ml
4/26/2004	17,267	776
4/25/2005	8,375	227
4/27/2006	468.3	3.0
4/30/2007	1325	<10
5/20/2008	6428	135

A sample of the raw water was collected during the survey for analyses of selected chemical and microbiological parameters. Test results are provided in Attachment A, and indicate a generally satisfactory raw water quality for those parameters analyzed, which can be treated to comply with the mandates imposed by the SDWA, as amended, and the WVPWSLR.

Treatment

The water treatment plant (WTP) is a "complete treatment" facility, in that it includes chemical coagulation, flocculation, sedimentation, filtration, and disinfection of the raw source water. Fluoridation is also practiced. The WTP was originally constructed in 1970 under construction permit 1234, issued on April 26, 1970. The WTP was extensively upgraded in 2003 under construction permit 12,345 issued on August 25, 2002. A summary of the April 2008 MOR is provided below, which provides current information on the actual pumping, chemical feed and filtration rates:

Summary of EW-90 Monthly Report, April 2008

Plant operation	343.0 hours (11.43 hrs/day average)
Water produced	9,348,000 gallons (454 gpm average; 311,600 gpd average)
Filter area	180 ft^2 (3-60 ft^2 filters) (2.53 gpm/ ft^2 average)
Soda ash, pre-fed	73 lbs. (1.0 ppm average, 3 days only)
Soda ash, post-fed	1373 lbs. (17.6 ppm average)
Alum, pre-fed	86 lbs. (1.1 ppm average, 3 days only)
NaF, post-fed	182 lbs. (2.3 ppm average, 1.03 ppm F @ 98% chemical purity)
DelPAC 2020, pre-fed (~10.4 lbs/gal)	599.9 lbs., (7.7 ppm average)
$KMnO_4$, pre-fed	3.75 lbs. (0.05 ppm average)
Chlorine gas, pre-fed, split-feed	97.0 lbs. (1.2 ppm average)
Chlorine gas, post-fed,split-feed	132.0 lbs. (1.69 ppm average)
Backwashes	54 (total), each filter 18 times (average BW interval = 19.05 hours)
Backwash water	309,000 gallons (metered), 3.3%

EW-90A, pg.1, April 2008 (turbidity)	**EW-90A, pg. 2, April 2008 (turbidity)**
141 entries (at least one every 4-hours) maximum entry = 0.140 NTU 100% < 0.30 NTU, OK 99.3% $\leq$ 0.10 NTU.	No excursions reported.

EW-90B, April 2008 (chlorine monitoring)	**EW-90C (July 07-May 08)**
141 entries, at least 4 per day. Minimum entry = 1.3 ppm, OK.	Average Raw TOC = 1.71 mg/l Average Treated Water TOC = 1.02 mg/l, OK Average Column C = 1.17, OK

Water Quality, EW-90, April 2008			
Water Parameter	**Raw Water**	**Settled Water**	**Treated Water**
Free chlorine, ppm	-	-	1.5 – 1.9, free, WTP
Total chlorine, ppm	-	-	1.2 – 1.7, total system
pH, std. units	6.8 – 6.8	6.4 – 6.8	7.8 – 8.1
Turbidity, NTU	1.8 – 35.2	0.9 – 4.1	0.02 – 0.06 (also see EW-90A)
Iron, ppm	0.02 – 0.03	-	0.01 – 0.02
Total alkalinity, ppm	5 - 11	-	17 – 27
Calcium hardness, ppm	11 - 12	-	11 - 12
Temperature, ^{O}F	-	-	43 – 58

All parameters are analyzed daily, unless otherwise indicated. A review of the MORs indicates an acceptable treated water quality for all reported parameters.

During the May 29, 2008, survey, the adequacy of the disinfection process was reviewed. The operations staff performs a CT-calculation every week, by measuring the pH, temperature, and free chlorine residual at the effluent end of each unit process and then calculating the giardia cyst log inactivation of the entire treatment facility. The "CT-calculation" for May 25, 2008, is attached (Attachment F). The calculation used the actual data, with a log inactivation of 6.87 determined. The calculation indicates that adequate disinfection is taking place. . EPA and the State of West Virginia require a giardia cyst log inactivation of at least 3.0 (i.e., 99.9%

removal).

During the May 29, 2008, survey, data was collected during the backwash (BW) of filters #1, #2 and # 3. Backwash data is summarized on the attached Excel spreadsheet (Attachment E). Media depths, BW rates, and bed expansions for the three filters were measured during the visit, with generally acceptable values determined. It is suggested that the operations staff make use of the F-T-W piping, for 5 to 10 minutes after placing the filters back into service following a backwash cycle, to insure that turbidity spikes are not discharged to the clearwell.

Chemical feed equipment was reviewed during the survey, as summarized below:

a. Alum was pre-fed as the primary coagulant during only 3-days. Alum has been replaced primarily with DelPAC 2020. It is fed with a double-headed W & T feeder. The reported feed rates for April 2008 ranged from 6 to 18.3 ppm.

b. Soda ash is pre-fed, usually only when alum is fed. Soda ash was pre-fed only three times in the month of April, at reported feed rates between 6 and 13.9 ppm.

   Soda ash is post-fed to help maintain the pH and alkalinity of the treated water. It is mixed at a concentration of 25 lbs/50 gallons, in a 50-gallon solution barrel. It is fed using an old W&T series 44-747 feeder set on 5% of the 2nd fastest belt speed. Reportedly the feeder is set to dose ~ 14 ppm. During April 2008, an average feed rate of 17.6 ppm was reported.

c. Sodium Fluoride is post-fed from a saturator with a Mech-O-Matic peristaltic feeder. The feeder is rated at 60 gpd and 25 psi (max). The feeder is set on 6 of 10, so a fluoride feed rate of about 0.99 ppm can be calculated. During April 2008, the average NaF feed rate was reported to be 2.3 ppm (1.02 ppm fluoride, assuming 44.3% fluoride by weight at a chemical purity of 98%).

d. Potassium permanganate ($KMnO_4$) is pre-fed to help oxidize naturally-occurring iron, manganese and organics in the raw water. It is mixed at 16 oz. per 50gallon in a 50-gallon solution barrel. It is fed with an LMI feeder rated at 2.0 gph and 50 psi (max). At feeder settings of 50% and 40%, a dose rate of about 0.035 ppm can be calculated. The reported feed rate for April 2008 was 0.05 ppm.

e. DelPAC 2020 is pre-fed as the primary coagulant. It is being fed with a Stenner feeder rated at 85 gpd and 25 psi (max). The feeder is set on 3 of 10 with a # 2 tube (32 ppm max), so a feed rate of about 9.6 ppm can be calculated. During April 2008, the average DelPAC feed rate was reported to be 7.7 ppm.

f. Chlorine is pre-fed and post-fed from 150-pound gas cylinders using Regal cylinder-mount rotameters rated at 0-25 lbs/24 hours. During the recent survey a "pre" dose rate of 5 lb/24 hours (~0.92 ppm) was observed, and a "post" dose rate of 7 lbs/24 hours (~1.28 ppm) was observed. During April 2008, an average dose rate of 1.2 ppm pre-chlorine and 1.7 ppm post-chlorine was reported. The outside chlorination building is equipped with a platform scale, vent fan, room light and heater. There is a problem with icing on the doors of the fiberglass chlorination building, so plans have been made to install a pole building over the fiberglass chlorination building.

Periodic calibration of all chemical feeders is strongly endorsed. Feeders should be calibrated at least once each year or whenever the chemical concentration is changed. This office is available for assistance upon request in performing feeder calibrations. System authorities are reminded to ensure that all chemical additives are NSF-60 approved.

A sample of the treated water was collected during the survey for analyses of selected chemical and

microbiological parameters. Laboratory results are attached which indicate satisfactory results for all parameters analyzed.

Distribution System

The ABC PSD distribution system contains about 60 miles of mains, ranging in size from 2 to 10 inches in diameter. Pipe materials include varying classifications of PVC pipe, including C-900, and class 150 – 250 pipe, cast iron, transite pipe and galvanized iron pipe. The pipeline inventory is updated yearly to reflect changes. Construction permits are required from the EED for any extensions which exceed 1000 feet or which exceed 6 inches in diameter (i.e., per policy guideline DW-20, available from this office upon request). Mapping of the distribution system is on file at the water system office.

As has already been noted in the report summary, the system currently serves about 1000 residential customers and 80 commercial/industrial/public customers, for a total customer base of 1080. The current system population is calculated as follows: 1080 x 2.41 = 2603 persons. All customers are metered. PSD officials have changed out all of the system's service meters since 1990. Replacement (and/or testing) of all service meters every 10 years is endorsed, in accordance with PSC guidelines.

Distribution system accountability is normally determined on a monthly basis. Records for July 2007 through April 2008 indicate that 98.157 million gallons (MG) of water was produced during the period, with 58.861 MG (60.37%) sold. During the 10 month period, 3.435 MG (3.46%) was reported to be used at the WTP and 20.386 MG (20.56%) was listed as "accounted-for losses" (i.e., tank overflows and documented leaks from hydrants and mains), with 15.474 MG (15.6%) listed as "unaccounted-for losses". It would seem appropriate for system authorities to eliminate the 20(+)% of "accounted-for losses" as expeditiously as possible, as this represents a considerable loss of revenue to the water utility. An aggressive program to systematically locate and eliminate "unaccounted-for losses" is also endorsed. The State of West Virginia recommends an accountability of at least 85%. System authorities may consider obtaining outside assistance in locating and repairing leaks, as appropriate, in an effort to meet or exceed the 85% accountability value.

There are reportedly 110 fire hydrants on the distribution system. System flushing is reported to occur as needed, using fire and flushing hydrants. Valves are also exercised during routine flushing. This office has hydrant flow sheets available for estimating hydrant flow rates.

Any customer's service setter which is equipped with a check valve or pressure regulator valve, integral to the meter setter, may experience problems associated with thermal expansion. A copy of a thermal expansion handout is available from this office upon request, which describes the problems and possible solutions associated with thermal expansion.

ABC PSD has adopted a cross-connection control program. Commercial customers which have installed cross-connection protection equipment are being tested by a certified tester. Tim Smith and John Doe are both certified testers. ABC PSD has on file the certified tests for several commercial customers for the past two years. ABC officials are still working with a few commercial customers to install backflow preventers. Section 8.4.a of 64CSR15, requires that all backflow prevention equipment must be tested by a certified tester at least every 12 months.

Finished Water Storage

The water system contains five storage tanks with a total storage volume of 833,000 gallons. Based on an average water demand of about 311,600 gpd, an average tank turnover rate for the ABC, Business Park and Main Water Tanks (which fill and draw together) of about 1.95 days can be calculated. Captioned photos of the tanks are provided in Attachment G. Data on the storage tanks is summarized below:

Storage Tank Data				
Tank	**Volume (gal.)**	**Base Elevation (MSL)**	**Overflow Elevation (MSL)**	**Comments**
Main Water	300,000 (24' tall)	2440' (±)	2464' (±)	Welded steel, painted. Last painted ~1997. Paint in poor condition. Access ladder is not locked. No fence.
ABC Tank	200,000 (37' tall)	2421.6' (±)	2458.6' (±)	Welded steel, painted. Cleaned and inspected in 2005. Fenced and locked.
Secondary Water Tank	100,000 (24' tall)	2480' (±)	2504' (±)	Welded steel, painted. Paint in fair condition. Fence needs repaired.
Business Park Tank	108,000 (25.18' dia. x 29.10' tall)	2430.5' (±)	2458.5' (±)	Glass lined, bolted steel. Fenced and in excellent condition.
Osceola Tank	125,000 (19.58' dia. x 55.92' tall)	2489' (±)	2546' (±)	Glass lined, bolted steel. Fenced and in excellent condition.

It is pertinent to note the general flow schematic in the distribution system. Treated water is transferred by the high service pumps to the ABC, Main Water and Business Park tanks, which fill and draw together. The Osceola BPS (located beside the ABC Tank) draws from the ABC Tank and transfers water to the Osceola Tank. The Main Water BPS runs continuously, and draws from the Main Water Tank to maintain a line pressure of 75-80 psi to system customers. The Secondary Water Tank BPS transfers water to the Secondary Water Tank.

Additional comments on the tanks are summarized as follows:

Main Water: This tank was last painted in 1998 and was judged to be in poor condition. The tank is scheduled to be repainted, on the outside, in 2008 or 2009. The tank site is not currently fenced. The access ladder on the tank and the valve pit were not locked. However, in response to the 9/11/2001 terrorist attacks, fencing of storage tanks is considered to be a top priority. So, the lack of a fence at this tank site has been listed as a significant deficiency. This tank was not climbed.

ABC Tank: This tank fills from the WTP. The inside of the tank was cleaned and inspected in 2006. The tank is telemetered to the WTP. The top access hatch and access ladder were locked. Perimeter fencing was installed around the tank and the BPS.

Secondary Water Tank: This tank is primarily used for fire protection. There are about 15 homes on this tank. The tank operates at a level of 12' – 18'. Based on the reported operating levels and a daily pumping rate of ~15,000 gpd from the Secondary Water BPS, an average turnover rate for this tank of about 4.2 days can be calculated. The paint condition of the welded-steel tank was judged to be in generally good condition, with some oxidation of the paint and some graffiti on it. The access ladder and top hatch are locked, but the security fencing is in poor condition around the tank site and needs to be either repaired or replaced. This tank was also cleaned and inspected during 2006. There is no telemetry on this tank.

Business Park Tank: This tank was built in 2004 and is in excellent condition. It is filled from the WTP and it is telemetered to the WTP. The access ladder and top access hatch are locked, and the tank site is secured with a perimeter fence with a locked entrance gate. This tank was climbed to check for sediment accumulation in the tank bottom and chlorine residual. There was no sediment accumulation in the tank, and the total chlorine residual was measured to be 0.27 ppm, which is low. It is necessary to insure that total chlorine residuals do not fall below 0.2 ppm (0.5 to 1.0 ppm recommended).

Osceola Tank: This tank is an Aquastore tank which was built in 2005 and is in excellent condition. It fills from the ABC tank through the Osceola BPS and it is telemetered to the WTP. The tank operating levels are between 48' and 53'. Based on an average daily pumping rate of ~20,000 gpd from the Osceola BPS, and the reported operating levels, an average turnover rate for this tank of about 5.6 days can be calculated. The access ladder and top access hatch are locked, and the tank site is secured with a perimeter fence with a locked entrance gate.

General tank operation and maintenance should include periodic inspections for paint condition (inside and out), sediment accumulation, and scheduled removal of sediment as necessary. Tank sites should be mowed several times each year, as appropriate. The chlorine residual of each tank should also be checked several times per year, especially during the summer months. Chlorine booster equipment may be necessary to insure that total chlorine residuals do not fall below 0.2 ppm (0.5 to 1.0 ppm recommended). Ladder cages, access hatches, and valve vault hatches should always be locked, and (since the 9/11/2001 terrorist attack) fencing of all tanks is required. The current edition of the Public Water System Design Standards, 64CSR77, section 9.1.d, requires that "Fencing, locks on access manholes, and other necessary precautions shall be provided to prevent trespassing, vandalism, and sabotage."

Pumping Facilities

Pumping facilities associated with the ABC PSD water system are summarized as follows:

Raw Water Pumps:
Three 5-HP, Crane Deming, series 7360, 330-gpm @ 29' TDH, submersible pumps are normally ran with 2 pumps together to transfer raw water from the Maumee River to the treatment facility. The 5 HP, 3-phase drive motors are rated at 230/460 volts, 15.2/7.6 amps, 1150 rpm.

High Service Pumps:
Two Crane Deming 5-stage Pumps rated at 450-gpm @ 356' TDH are driven by (2) 60-HP, 3-phase motors are rated at 460 volts and 3560 rpm. The pumps are alternated to transfer treated water from the WTP to the ABC, Main Water and Business Park Tanks.

Backwash Pumps:
One ITT AC, model 600 pump rated at 1000gpm @ 90'TDH (175 psi max), is driven by a 10 HP, US Electric Motor, rated at 230/460 volts and 26.6/13.3 amps, 1165 rpm. The BW pump can operate at up to 1000 gpm, to provide a maximum BW rate of ~16.7 gpm/ft^2 for each of the 3-60 ft^2 filters. The BW pump is controlled with a variable speed drive unit. It is noted that an 8-inch double check valve assemble (DCVA) is in place to prevent any possible backflow of spent backwash water into the treated water flow stream.

Main Water BPS:
The BPS is housed in a secure building and contains dual Grundfos Vertical Pumps, series C, rated at 55gpm @ 245' TDH. The drive motors are 7.5-HP Baldor motors, variable speed, rated at 3450 rpm, 230 volts, 60-hz., 1-phase. According to the daily log between April 2 and May 28, 2008, 162,000 gallons were pumped or an average of 2,893 gpd.

Secondary Water BPS:
The BPS is housed in a secure block building and contains a Berkley centrifugal pump rated at 72 gpm. The drive motor is a 5-HP Magmatek Motor rated at 3500 rpm. The pump is regulated on a timer and runs about 3 – 4 hours a day. The telemetry is broken. The Secondary Water BPS pumps water to the Secondary Water Tank.

Osceola BPS:
The BPS is housed in a secure block building, located inside the fence with the ABC Tank. The BPS contains two Grundfos Pumps, model CR32-2-2, rated at 150 gpm @ 115.1' TDH. The drive motors are 7.5-HP Baldor motors, rated at 3450 rpm, 230 volts, 60-hz., 3-phase. According to the daily log at the BPS, Pump #1 had operated 36 hours between April 30 and May 28, 2008 (inclusive), and Pump #2 had operated 36 hours during the same period. Thus, it can be surmised that Pump #1 and Pump #2 had operated a total 72 hours or an average of ~2.57 hours per day during the period. The pumps are set to turn on at a tank level of 48.2' and off at 52.0'. The pumps run two cycles per day and about 10,000 gallons per cycle. This indicates a daily water transfer rate of ~20,000 gpd, for the period.

Monitoring/Reporting/Data Verification

System monitoring includes completion of MOR forms EW-90, EW-90A and EW-90B. Quarterly report EW-90C is also being used. Monthly reports are kept on file for at least five years. Routine monitoring currently includes daily metering of the water production, tests of the free and total chlorine residuals, and daily monitoring of the raw and treated water turbidity, pH, alkalinity, hardness, iron and temperature. Other monitoring performed includes monthly bacteriological sampling, lead and copper sampling, Phase II, II-B and V sampling for nitrates, inorganics, regulated VOCs, and regulated SOCs. Additional weekly monitoring of the giardia cyst log inactivation, monthly monitoring of the raw and treated water TOCs and quarterly sampling for DBPs are being conducted. A yearly CCR is issued every year on or before July 1. The turbidity of each filter effluent is monitored continuously and downloaded to an Excel spreadsheet every 15 minutes. A printout of the 15-minute filter effluent turbidity data for April 15, 2008, is attached as part of Attachment E. The total chlorine residual in the distribution system is checked daily. Laboratory testing equipment is summarized below:

- The Turbidity of each filter effluent is monitored continuously with a Hach 1720E in-line turbidimeter and downloaded every 15 minutes to the plant computer. A Hach 2100P turbidimeter is also available and is normally used to test raw and settled water samples and as a backup for the in-line units. The turbidimeters are cleaned and calibrated quarterly.

- Chlorine residuals are analyzed with a digital, Hach Pocket colorimeter. A DPD field test kit is also available for backup.

- The pH of the raw and treated water is monitored with a Bromothymol blue color wheel test kit, with a range of 5.5 to 8.5 standard pH units, in increments of 0.1 units.

- Total alkalinity is determined by titration using 0.02 N H_2SO_4. Bromcresol green methyl red indicator is used to determine the end point of the alkalinity titration.

- Calcium hardness is monitored with a Hach HA-4P test kit with the drop method. 1drop = 1gr/gal (17.1 ppm) . Samples are also taken periodically to the Craigsville PSD to titrate.

- Iron is analyzed with the Hach Iron Ferrozine method test kit with a range of 0.0 – 0.2 mg/l (low range).

- Manganese is determined monthly using a Hach MN-PAN test kit with a range of 0.0 – 0.7 mg/l.

- Temperature is determined using a thermometer.

- Fluoride is determined with a pocket colorimeter and AccuVac SPADNS reagent.

The operations staff is planning to purchase a Hach DR 2010 to run all parameters digitally. This office would endorse this plan.

Three bacteriological samples are normally collected each month from the water system in accordance with an approved sample site plan, for systems serving 2501 to 330 persons. The distribution system has been divided into five sample areas. All test results were satisfactory for the past year. Bacteriological sample results are kept on file for at least five years. Analyses are performed by the WV Office of Laboratory Services in South Charleston.

Lead and copper sampling is up to date through the 2005-2007 sampling period, with satisfactory results reported. Samples were collected on September 29, 2005, with "ND" reported by REIC Labs for both lead and copper. The next round of 10 samples must be collected between June 1 and September 30, during 2008, for the 2008-2010 sampling period (i.e., sampling must now be conducted during a specified year, every 3-years). Lead and copper test results must be kept on file for at least 12 years.

The most recent CCR was received by the EED on March 7, 2007. The certification form, confirming proper distribution to all customers, was received on April 26, 2007. Future CCRs must be submitted by July 1 each year based on the previous year's data. Keep copies of CCRs on file for at least five years.

Phase II, II-B, and V sampling (i.e., for nitrates, inorganics and regulated VOCs) is up to date through 2008, with satisfactory results reported by REI Consultants. Nitrates were last collected on February 19, 2008, with a result of 0.28 mg/l reported. Inorganics were collected on February 19, 2008, with satisfactory results reported by REI Consultants (i.e., all parameters were reported to be "ND" except Na = 10.5 ppm, F = 0.88 ppm and Ba = 0.0262 ppm, OK). Regulated VOCs were last collected on February 19, 2008, with a result of all "ND". Sampling for SOCs during 2008 is not required. Sampling for radionuclides is also not required for 2008. The operations staff is advised to follow the yearly monitoring guide which is provided by the OEHS/EED during January of each year.

Monitoring for DBPs (i.e., TTHMs and HAA5s) is conducted on a quarterly basis from the MRT location, the end of a 6-inch water main at Route 66/8 Mill Creek Road, as required by the Stage 1 Disinfection By-Products Rule (S1DBPR). All testing is performed by REI Consultants. Test results are summarized below for the past four quarters:

Date	TTHMs, ug/l	HAA5s, ug/l
1st Quarter 2008	23.8	12.3
2nd Quarter 2007	24.9	38.7
3rd Quarter 2007	51.2	85.4
4th Quarter 2007	32.8	35.8
Total for past 4 quarters	**132.7**	**172.2**
Running Annual Average RAA, past 4 quarters	**33.18, OK**	**43.05, OK**

It is noted that HAA5's for the 3rd quarter 2007 are above the above the MCL of 60 ug/l, although compliance is determined by the running annual average (RAA) calculation. All of the TTHM values reported above are well below the MCL of 80 ug/l.

Consideration might be given to pre-chlorinating even less (a trace thru the filters) and post-chlorinating more, in order to lower TTHM and HAA5 values. This option is practical because CT values are high. By removing naturally occurring organics from the raw water prior to adding chlorine to the treatment process, the formation of DBPs can be significantly reduced in most cases. However it is important to maintain at least a 3-log reduction of giardia cysts while finding a balance in the optimal dose rates of pre and post-chlorine.

Monthly monitoring for raw and treated water TOC is also performed. It was noted that the RAAs for raw and treated water TOCs were reported to be 1.71 mg/l and 1.02 mg/l between July 2007 and May 2008. Thus, TOC removals are in compliance with the provisions of the S1D/DBPR.

The Initial Distribution System Evaluation (IDSE) plan, required by the S2DBPR, was approved by the Philippi District Office on 12/27/2007. Quarterly IDSE samples will be collected on 5/15/09, 8/15/09, 11/15/09 and 2/15/2010 from a High THM location (Near Giles Residence) and from a High HAA5 location (leaving the WTP). E. coli monitoring as required by the LT2ESWTR is being conducted every 2-weeks, which began on 1/7/2008 and will end on 12/15/2009 (i.e., a total of 26 samples). The LT2 plan was revised by the Philippi District Office on 5/28/2008.

Water System Management/Operations

Personnel associated with the operation of the ABC PSD public water system are summarized below:

Certified Operators			
Name	**Certification**	**License #**	**Expiration**
Richard Wayne, General Manager	Class 2	2010008278	1/31/2010
Terry Wayne, Chief Operator	Class 2	2010008281	1/31/2010
Craig Ray, Operator	Class 2	2010006423	1/31/2010
Lundy Bailey, Operator	Class 3	2009000136	2/14/2009
Tim McClung, Operator	Class 2	2008005049	8/31/2008
Norma Cogar, Operator	Class 2	2009012647	10/02/2009
Joseph Garland	OIT	2010013061	3/31/2010

Renewal of all operators' licenses at the same time is encouraged, as this provides a corporate incentive to renew operators' licenses on time. All operators are reminded to renew their licenses every two years. Class 1 operators must obtain at least 12 continuing education hours every two years before they can renew their licenses. Class 2 and higher certified operators must obtain at least 24 (CEHs) every two years before they can renew their licenses.
Management staff includes:

Management	
ABC	General Manager
DEF	Chairman
HIJ	Board Member
KLM	Board Member
NMOP	Water Office Manager
QRST	Water Office Secretary

Phone numbers: 304-555-5555, WTP.
304-777-7777, PSD Office.

The water system is professionally and competently managed.

Operator Compliance with State Requirements

The ABC PSD public water system is a Class II, community public water supply, surface water source. There are five certified, Class 2 operators, one Class 3 operator and one OIT currently working for the water system. Thus, the water system is in compliance with of the mandates imposed by the WV Public Water Systems Operator Regulations, Title 64, Series 4, April 18, 2007.

Attachment C

ABC PSD Permit Summary		
Permit	**Date**	**Comments**
351	5/26/1945	Install complete water works system, Town of ABC, WV
2921	1/16/1968	Install under E.D.A. Project No. 03-1-00255 for the ABC Public Service District, Orange County, Contract # 1, water distribution system and appurtenances. Contract # 1 includes the following approximate lineal feet of water mains; 5200 LF of 8"; 15,550 LF of 6"; 43,000 LF of 4"; 16,000 LF of 2-1/2"; and 3000 LF of 1-1/2". There will also be approx. 8000LF of service lines. This permit is contingent upon the contractor using care to avoid sewers, manholes, septic tank subsurface disposal fields, and other possible sourced of pollution when installing the water mains, service lined, and water meters----- ABC Public Service District, Orange County, WV.
2950	3/14/1968	Install 8", 6", 4", 2-1/2", 1-1/2" and 1" water mains, a 0.3 MG steel reservoir, two 10" raw water perforated intake pipes, three 185 gpm submersible raw water pumps, verti-floc mixing facilities, 121,260 gal sedimentation basin, three 7'6" x 8'0" rapid sand and anthrafilt filters, 1,080 gpm wash water pump, float type rate controllers, a 30,000 gallon clearwell, gas chlorinator in a separate room, fluoride feeder, two 360 gpm @ 315' TDH turbine type finished water pumps, chemical feeders, laboratory facilities, and all other necessary appurtenances to treat and distribute water from the Maumee River to serve the ABC PSD.
8283	12/10/1981	Install a saturator and chemical feed pump to initiate a fluoridation program.
9447	8/8/1985	9100' of 6" PVC water mains and a 200,000 gallon storage tank.
15,492	1/10/2003	Install 5850' of 6" mains and one 103,000 gallon storage tank, to serve existing and proposed customers at the Orange County Business Park .
15,682	6/24/2003	29,800' of 8-inch mains, 31,700' of 6-inch mains, 3420' of 4-inch mains, 6490' of 2-inch mains, 2 PRV stations, 1-150 gpm BPS, 1-127,000 gallon tank. Also to upgrade the 320 gpm WTP to a 450 gpm WTP. Major improvements to consist of replacement of the existing raw water pumps with 3-225 gpm pumps, replacement of existing filters with 3-60 sq. ft. dual media (silica sand and anthracite) filters with a maximum filtration rate of 3.75 gpm/sq.ft., a Tonka Simulwash backwash system, and a new header/lateral underdrain system, replacement of existing H.S. pumps with two 450 gpm pumps, add a new chlorination/dechlorination building, add new telemetry controls, replace filter float valves with controls, upgrade the power system, and all necessary valves, controls and appurtenances. The system will serve ~122 new customers.
15,710	7/16/2003	Install 600-feet of 6-inch water line and one 53 gpm duplex BPS, to serve 20 existing customers and 3 new customers in the Main Water area of ABC PSD.

Attachment D

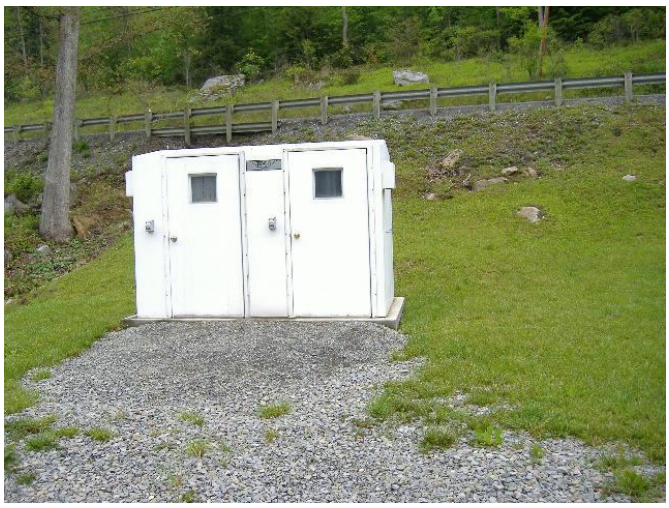
ABC PSD Key System Elevations		
System Component	**Elevation**	
Raw water pump station		2195 ' (±) MSL
WTP/office, floor elevation Top of sed. basin		2210 ' (±)MSL 2215 ' (±) MSL
Main Water BPS		2360 ' (+) MSL
Red Book Secondary Water BPS		2270 ' (+) MSL
Osceola BPS		2448 ' (+) MSL
Main Water Tank	base elevation: overflow elevation:	2440 ' (±) MSL 2464 ' (±) MSL
ABC Tank	base elevation: overflow elevation:	2421 ' (±) MSL 2458 ' (±) MSL
Circle Brook Secondary Water Tank	base elevation: overflow elevation:	2480 ' (±) MSL 2504 ' (±) MSL
Business Park Tank	base elevation: overflow elevation:	2430 ' (±) MSL 2458 ' (+) MSL
Osceola Tank	base elevation: overflow elevation:	2489 ' (±) MSL 2546 ' (±) MSL

ABC PSD
Public Water System
Selected Photos
photos by C. Cobb, P.E., 5/28/2008
and Mark Dickey, ET, 5/28/2008
OEHS/EED

The photo above, left, shows the raw water intake structure on the Maumee River. Flow from the river enters the concrete box and then passes through the pipe perforations into the raw water wet well. The right photo shows the makeshift impoundment on the river, made with river rocks, which helps to pool river water at the intake.

The left photo above is looking into the raw water wet well, which contains three 5 HP Crane Deming raw water pumps, each rated at 330 gpm. Normally two pumps operate together to transfer ~450 to 500 gpm to the water treatment facility. The photo at right shows the intake structure which is partially covered to conserve heat during the winter months.

Prefed chemicals are injected into the raw water line, inside a below-grade concrete vault, which contains an in-line static mixer. During the recent survey DelPAC 2020 and chlorine gas were being prefed at this location. KMnO4 was also being prefed, but it was being added at the first stage flocculation unit.



The gas chlorination building is located across the driveway from the WTP. This building also houses an SO_2 feed system which is used to dechlorinate filter backwash water. During the recent survey chlorine gas was being pre-fed at about 5 lbs/24 hours (0.92 ppm) and postfed at about 7 lbs/24 hours (1.28 ppm).

There are two sides to the chlorine/SO_2 building. The photo above is looking into the right side of the building which houses the 150-lb chlorine gas and SO_2 gas cylinders. The cylinders in use are chained to platform scales. The room is equipped with a vent fan, light and room heater.

After being dosed with the primary coagulant, DelPAC 2020, and chlorine, the water enters a 3-stage flocculation chamber. Each of the three drive units in the upper left photo mixes the water at a progressively slower rate, to form a floc which then settles out in the sedimentation basin. The 3-stage flocculator holds about 17,500 gallons, thus providing a theoretical detention time of about 38.8 minutes (i.e., assuming a production rate of 450 gpm). The sedimentation basin holds about 171,000 gallons, thus providing a theoretical detention time of about 6.3 hours.


Three 60 ft^2 filters (left photo above) provide final filtration of the water to comply with the requirements of the LT1ESWTR which requires a combined filter effluent of $\leq$0.3 NTU at least 95% of the time. The right photo above shows the $KMnO_4$ feeder which is located in the filtration room.


The two photos above show additional chemical feeders which add fluoride and soda ash (left photo) and the primary coagulant, DelPAC 2020 (right photo).

The ABC tank is filled by the high service pumps at the WTP. The inside of the tank was cleaned and inspected in 2005. The tank is telemetered to the WTP.

The Business Park tank is also filled by the high service pumps at the WTP. This tank is an Aquastore, glass-lined, bolted-steel tank. The 108,000-gallon tank is 29 feet tall. Key tank facilities are secured with a perimeter chain link fence which was installed in 2004.

The 300,000-gallon Main Water Tank is a welded-steel, painted tank which fills from the high service pumps at the WTP. The tank needs painted and secured with a perimeter fence.

The Osceola Tank (left photo) is filled from the ABC Tank through the Osceola BPS (right photo). The tank is telemetered to the WTP. The tank operating levels are between 48' and 53'. The Osceola tank holds ~125,000 gallons. The Osceola BPS is located beside the ABC Tank, locked inside the same perimeter fence.

The Osceola BPS is housed inside a locked brick building. The BPS contains two Grundfos Pumps, rated at 150 gpm @ 115.1' TDH. According to the daily log at the BPS, Pump #1 had operated 36 hours between April 30 and May 28, 2008 (inclusive), and Pump #2 had operated 36 hours during the same period. Thus, it can be

surmised that Pump #1 and Pump #2 had operated a total 72 hours or an average of ~2.57 hours per day during the period. The pumps run two cycles per day and about 10,000 gallons per cycle. This indicates a daily water transfer rate of ~20,000 gpd, for the period.

The Secondary Water Tank is primarily used for fire protection. The paint condition of the welded-steel tank was judged to be in generally good condition, with some oxidation of the paint and some graffiti on it. The security fencing is in poor condition around the tank site and needs to be either repaired or replaced. There is no telemetry on this tank.

The Secondary Water BPS is housed inside a locked brick building (left photo). The pump is regulated on a timer and runs about 3 – 4 hours a day. The telemetry is broken. The Secondary Water BPS pumps water to the Secondary Water Tank.

The Main Water BPS is housed in a secure building. According to the daily log between April 2 and May 28, 2008, 162,000 gallons were pumped or an average of 2,893 gpd.

Dual Grundfos Vertical Pumps, series C, rated at 55gpm @ 245' TDH, run continuously, and draws from the Main Water Tank to maintain a line pressure of 75-80 psi to system customers.