

**UPPER OCONEE BASIN WATER AUTHORITY
OPERATIONS COMMITTEE
BEAR CREEK RESERVOIR
FEBRUARY 20, 2013
2:00 P.M.**

MINUTES

Members Present:

Chris Thomas, Committee Chairman
Jock Connell
Gary Duck
Eric Klerk

Others Present:

Jim Dove, NEGRC Executive Director
Mott Beck, NEGRC Executive Assistant
Chip Ferguson, Atkinson & Cullen
Hill Baughman, Jacobs
Jimmy Cofer, Jacobs
Ken Moore, Jacobs

CALL TO ORDER AND APPROVAL OF JANUARY MEETING MINUTES

Chairman Chris Thomas called the meeting to order at 2:00 p.m. He asked for a motion to approve the minutes of the January meeting. Such a motion was made by Mr. Gary Duck and seconded by Mr. Jock Connell. The motion passed unanimously.

MONTHLY EPD REPORT

Operations were normal during the past month and in compliance with EPD rules and regulations. EPD Safe Dams requested an Emergency Action Plan, and a draft copy has been given to them for review and comment. When their comments are received; the Plan will be updated and forwarded to the Authority and the Jackson County Sheriff's Department.

DROUGHT CONTINGENCY PLAN

A discussion was held regarding the drought level. Even though there has been significant rainfall, it was the consensus of members to remain in the Level II at this time. Staff will continue to monitor drought indicators and rainfall.

UPDATE ON VFD FOR RIVER PUMP STATION

Staff advised that an incomplete quote was received for this service. When additional information is included in the quote and returned, it will be presented to the Committee for review. This endeavor will require approximately 40 hours of engineering support.

CHLORINE LINE REPLACEMENT ENGINEERING PROPOSAL

Staff indicated that materials used in existing chlorine lines would not be recommended today, and other material options are being explored. Staff also discussed leaving the present lines in place and running replacement lines in another location. The cost of this replacement will be between \$250,000 and \$400,000. A full bid package is being prepared and will be presented to the Committee at its March meeting.

OPERATIONS AND MANAGEMENT

As mentioned earlier, there have been no regulatory issues with operations of the facility. The new vehicle included in this year's budget has been ordered and will arrive within the next two weeks. Staff continues to move forward with capital items. The reservoir remains at full pool.

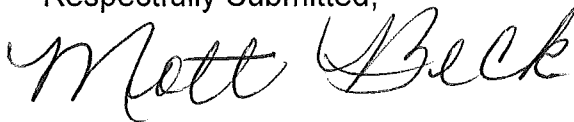
OTHER BUSINESS

The next meeting will be held at the Regional Commission on March 20th at 2:00 p.m.

ADJOURNMENT

There being no further business, the meeting was adjourned at 2:35 p.m.

Respectfully Submitted,

A handwritten signature in cursive script that reads "Mott Beck".

Martha "Mott" Beck
UOBWA Secretary

The piping system is a dual wall, polyethylene system using the PE80 resin offered by Asahi. The fittings are injection molded, dual wall polyethylene with mitered joints. The fitting are thermally welded to the pipe sections in the field. There also are some locations where leaks have been reported at flanged connections. This same piping material was used for the chlorine dioxide, alum, fluoride, ammonia, caustic and corrosion inhibitor feeds systems. All the chemical feed system piping used the same dual wall system. All the chemical feed systems were installed in an in common trench. The pipe was supposed to be bedded in sand.

The chlorine system uses chlorine gas that is educated into water, using a gas chlorinator. Based on the size of the chlorinators and the design water flowrate, the maximum chlorine concentration is ~2,100 ppm.

The breaks have been primarily located at fittings in the system. Most breaks reportedly occurred where the fitting has broken at the seam in the mitered joint or at gaskets where flange connections are located. I have attached.

Several sections of chlorine solution pipe where leaks have been collected for examination. The samples show blistering of the interior carrier pipe surface. There also is evidence of some blistering of the exterior and interstitial surfaces although this is much less pronounced. To date, none of the leaks appear to have occurred as a result of failure of the pipe wall. However, it is felt that continued exposure to chlorine solution will eventually cause the existing pipe wall to fail.

When asked about the material compatibility, the Asahi representative indicated the PE80 polyethylene would not be recommended today for use with chlorine solution. The current 2002 Asahi Chemical Resistance Guide does not rate polyethylene as either acceptable or not acceptable in their current published table. We located the Asahi chemical resistance guide published in 1998, which probably is the guide that would have been used during design, and it shows use of polyethylene with chlorine solution as acceptable to 68 deg F

Some of the leaks occurred due to failure at the seam at the miter on fittings. A failure here could be the result of stress concentration resulting from cyclic thermal expansion/contraction of the pipe. Polyethylene has a large coefficient of thermal expansion and seasonal temperature difference in the soil surrounding the pipe could cause pipe to expand and contract. The expansion and contraction would tend to concentrate stress at bends in the pipe. It should be noted that current fitting design does not have the same mitered seam.

There were several reports that some of the piping may not have been installed with the proper bedding. One section of pipe that was examined showed that the pipe was flattened slightly. As the bends are more rigid, the flattening of the pipe, and not the fitting, could concentrate stress at the fitting causing it to fail. This type of deformation would most likely be caused by improper bedding. It should be noted that some of the piping is located under paved surfaces that see heavy traffic.

In summary, the exact cause of the repeated leaks is unclear. It probably is the result of some combination of material incompatibility of the polyethylene when used with the chlorine solution, improper installation resulting from a lack of proper bedding which allows the pipe to flatten excessively, and stress concentration at fittings due to thermal expansion/contraction of the pipe.

When asked about the current Asahi recommendation for piping materials, they currently recommend several options consisting of dual wall, Halar/polyethylene pipe, a dual wall, polyethylene using their PE100 polyethylene resin and their P100 RC Chem Proline product line.

Option A using a Halar carrier pipe is their most resistant and most expensive option. Option B uses a 3rd generation polyethylene called PE 100. Option C – PE 100 RC is their newest 4th generation polyethylene product that substantially improves the crack resistance of the polyethylene by providing some cross linking of the polyethylene. The properties of these options are shown below:

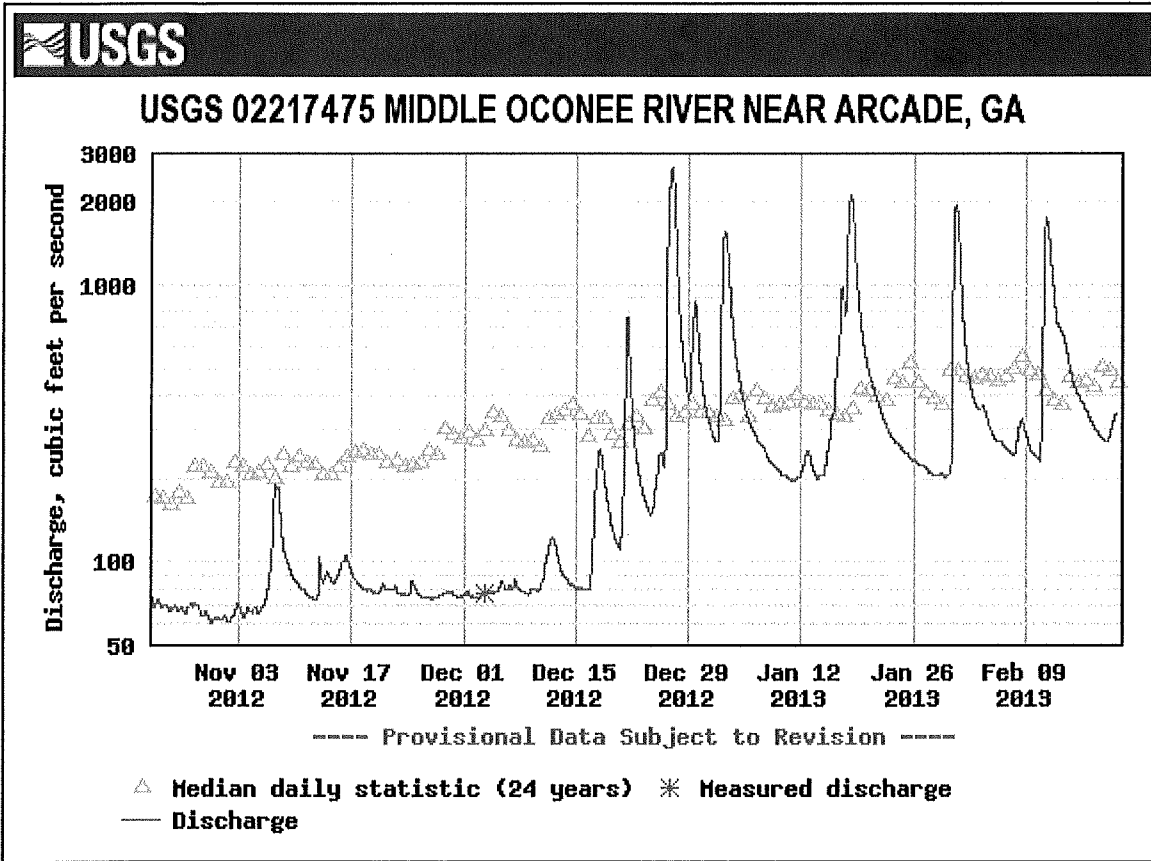
| ITEM ↓ | OPTION "A" - HALAR | OPTION "B" PE 100 | OPTION "C" PE 100-RC "Chem Proline®" |
|------------------------------------|-----------------------|----------------------|--|
| Service Life Expectancy | >20 years | 5 – 10 years | >10 years |
| Materials of Construction | HALAR X PP | PE 100 X PE 100 | PE 100-RC X PE 100-RC |
| Average Stress Crack Resistance | NA | 533 Hours | 14,648 Hours |

| ITEM ↓ | OPTION "A" - HALAR | OPTION "B" PE 100 | OPTION "C" PE 100-RC "Chem Proline®" |
|---------------------------------------|---|--|--|
| System Pressure Rating Primary | 150 psi – SDR21 | 150 psi – SDR11 | 150 psi SDR11 |
| Budgetary Pricing – 2" X 4" Pipe | \$1,480.00/ 5 meter (16.4') length | \$490.00/ 5 meter (16.4') length | \$560.00/ 5 meter (16.4') length |
| Budgetary Pricing – 2" X 4" 90 Ell | \$576.00 ea. | \$290.00 ea. | \$330.00 ea. |
| Welding Method | Stagger "Butt Fusion" | Simultaneous "Butt Fusion" | Simultaneous "Butt Fusion" |
| Est. time to do 1 weld | 20 minutes | 10 minutes | 10 minutes |
| Leak Detection | "Liquid Watch" point level Probe System | "Liquid Watch" point level Probe System | "Liquid Watch" point level Probe System |
| Tools Required | "Miniplast" 4" "Butt Fusion" Tool w/ Split Mirror | "Miniplast" 4" "Butt Fusion" Tool | "Miniplast" 4" "Butt Fusion" Tool |

The comparative cost of the pipe materials are as follows:

| | |
|--------------------------------|-------------------|
| Option A – Halar/polyethylene | \$90.24/LF |
| Option B - PE 100 dual wall PE | \$29.90/LF |
| Option C – PE 100 RC | <u>\$34.15/LF</u> |

Similarly, the fittings cost proportionally about the same as the pipe.



| Drought Indicator Averages | |
|-----------------------------------|------|
| Mar-12 | 1.25 |
| Apr-12 | 2.25 |
| May-12 | 2.25 |
| Jun-12 | 2.30 |
| Jul-12 | 2.08 |
| Aug-12 | 2.17 |
| Sep-12 | 2.41 |
| Oct-12 | 1.00 |
| Nov-12 | 2.00 |
| Dec-12 | 1.50 |
| Jan-13 | 0.33 |