

## **AWI RESPONSE AT B.E. PAYNE WTP**

An AWI Filter Underdrain System at Louisville's B.E. Payne WTP composed of underdrain laterals fed from a feedbox installed at one end of each filter encountered a problem - filter media was discovered in the backwash circuit. The underdrain system had been in operation for roughly five years when a call was placed to AWI seeking help in figuring out why filter media was appearing where it should not be.

### **THE PROBLEM**

AWI Senior Process Engineer, Tad Bassett, immediately flew to the site and began an evaluation. The conclusion from his evaluation was that during assembly when the underdrain laterals were bolted to the feedbox, the gasket between the laterals and the feedbox was displaced as the laterals were maneuvered into position for attachment. The gasket was displaced at the narrowest point of gasket contact and compression such that the edge of the gasket projected into the path of the backwash water as it flowed down the lateral. Over time more of the gasket was pulled into the path of flow and the gasket material eroded. The result was a space between the lateral and the mating surface on the feedbox through which media could pass compromising the underdrain system.

### **THE SOLUTION**

Following examination of the underdrain laterals with eroded gaskets, AWI concluded that no one knew for certain that other laterals would not experience a similar problem at the lateral to feedbox connection. Because of that uncertainty, AWI replaced not just the problematical gaskets but all of the lateral to feedbox gaskets throughout the facility. Replacement of those gaskets was done by AWI without passing the cost along to the Owner despite the fact that the repairs were made years after the conclusion of the warranty for the underdrain system.

The lateral to feedbox connection which caused problems at B.E. Payne WTP had been made successfully for laterals at literally hundreds of filter underdrain installations prior to this installation. Rather than arguing the point, AWI took the approach of developing a connection between the lateral and feedbox making it easier for any installing contractor to install correctly.

Two changes were made to the lateral to feedbox connection to simplify the process of making the connection properly:

1. Rather than welding nuts to the back side of the feedbox into which connecting bolts had to be threaded during installation, threaded studs were welded onto the feedbox. This change meant that the gasket can be slid over the studs and properly positioned before the lateral connection is made.
2. Two quarter inch gaskets are used at each lateral to feedbox connection to provide a gasket thickness which insures proper compression when the connection is made. The narrow portion of the gaskets at the bottom of the lateral to feedbox connection is now held in place using a retainer clip to both add extra compression to the gaskets and provide a lip that precludes the gasket ever sliding into the path of the backwash flow.

Figure 1 provides perspective on how the lateral to feedbox connection is now made. In the years since this connection was changed, the gasket problem that surfaced at the B.E. Payne WTP has not reappeared.

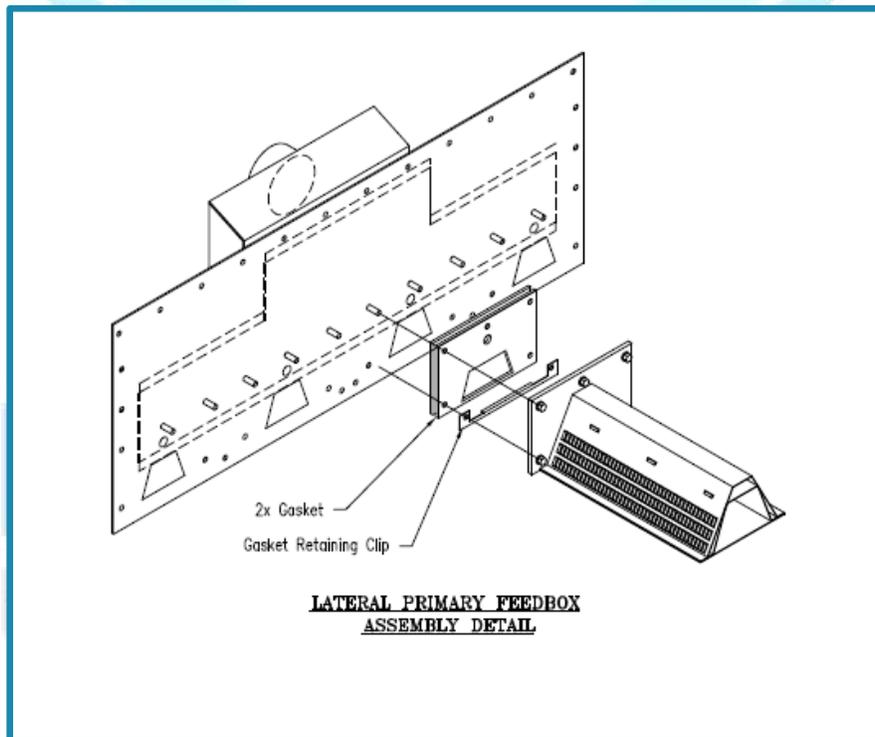


Figure 1 – Exploded view of the current AWI lateral to feedbox connection.

Figure 2 is a view of the gasket retaining clip and the photos in Figure 3 show a clip prior to installation.

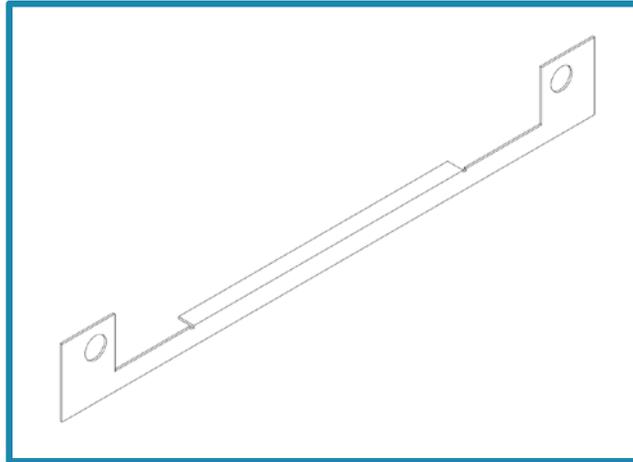


Figure 2 – Close-up drawing of the gasket retaining clip with lip.



Figure 3 – Close-up view of a gasket retaining clip with lip prior to installation.

## LESSON LEARNED

A substantial portion of the business done by AWI is replacement of problematical filter underdrains supplied by others. Filter underdrain failures are far from uncommon – just open an internet browser, bring up the Google Search Engine, and type in the words “Filter Underdrain Failure”. The result will provide perspective regarding the reliability of some filter underdrain designs.

The AWI experience at B.E. Payne WTP was instructive in that AWI learned the value of a long term commitment to customers in today's business environment. Repairing the filter underdrains at B.E. Payne WTP without cost to the Owner despite the fact that the underdrains supplied by AWI were well out of warranty and the problem was with a connection that had been made successfully thousands of times in the past was a good business decision. The staff at B.E. Payne WTP and others involved have been very gracious in sharing the story of how AWI has stood behind its product.

A key element that led to a successful outcome at B.E. Payne WTP is an AWI Filter Underdrain design that can be repaired at a cost which is relatively modest when compared to grouted in place alternatives or, even worse, a legal challenge. Any problem with an AWI Filter Underdrain can be dealt with using a shovel, wrench, and torque wrench rather than having to jackhammer out the filter underdrains and start all over. This is significant because AWI has repeatedly helped to deal with problems that were clearly not the responsibility of AWI – things like peeling paint on a gullet wall that plugged the underdrain laterals or contaminated backwash water that caused similar problems. In each case, what could have been a disaster became a very manageable issue because the underdrain laterals could readily be removed, cleaned, and put back into service at modest cost.

### THE AWI RESPONSE

Long term customer relationships have clearly benefitted AWI through positive word of mouth comments from existing customers and repeat business. Experience at B.E. Payne WTP helped to crystallize in everyone's mind at AWI the value of long term customer support. Our challenge is how to put this value into words.

B.E. Payne WTP taught us that problems don't always surface within the customary one year warranty period. We also learned that AWI benefits from supporting the customer well after a one year warranty has expired. AWI is going to support its customers even though a warranty has expired – it's good business. Perhaps just as important is a clear understanding of who is responsible. In the case of B.E. Payne WTP, installation of the gaskets was done improperly by the installing contractor but arguing that the contractor should bear the cost of repairs would have dramatically delayed addressing the customer's problem. The conclusion that AWI reached is that we must take great care in supervising the installation of our filter underdrains and be prepared to assume responsibility for their installation once we have signed off that the installation work was done properly. The result is a single source of responsibility for the customer and AWI is willing to assume that responsibility.

From the perspective of a customer, good intentions are fine but the ultimate question is what kind of binding commitment is a company willing to make to its customers? At AWI, we want to

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address that question in a very positive fashion. We now provide our customers with a written five year warranty covering both the filter underdrains as a product and the contractor's installation of those underdrains once we have signed off that the installation has been accomplished in accordance with our instructions. The result is the five year warranty language shown in the attachment that follows. We encourage customers to include this warranty their project specifications. If we are going to stand behind our product and support customers on a long term basis, we feel that customers should have that commitment in writing so they know they will be supported over the long haul. The AWI warranty is our strong statement that we will support our customers.



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**AWI WARRANTY**

**PHOENIX**

FILTER OPTIMIZATION COMPONENTS

### 3.04 FILTER UNDERDRAIN WARRANTY

- A. The filter underdrain manufacturer's warranty will extend for a period of five (5) years from the date that the document certifying that the filter underdrains are properly installed is signed. The filter underdrain warranty will cover the cost of the following items:
- Repair or replacement of any failed filter underdrains, fasteners, and appurtenances supplied by the filter underdrain manufacturer.
  - Any movement or removal of filter media necessary to effect needed repairs.
  - Removal of any filter underdrain components and appurtenances which have failed to provide proper service including any required demolition.
  - Reinstallation of repaired or replaced filter underdrains.
  - Reinstallation of any filter media removed for the purpose of the covered warranty work.
- B. The filter underdrain manufacturer will guarantee the structural integrity of the filter underdrains and underdrain system when that system is subjected to operating differential pressures up to 10 psi as measured in the feed piping which supplies backwash water to the filter underdrains. (This statement means that with all of the media retention shots plugged a static head of 23 feet can be applied to the filter underdrain system without said system sustaining damage.) This guarantee does not apply to damage caused by water hammer events because water hammer is a function of system hydraulic characteristics which are beyond the control of AWI.
- C. The filter underdrain manufacturer is not responsible for the concrete upon which the filter underdrains are installed under the terms of this warranty. The filter underdrain manufacturer will not be responsible if contaminated backwash water causes the underdrains to plug resulting in differential pressures exceeding 10 psi. System operating pressures within the filter underdrains will be continuously monitored and recorded by the user.
- D. The filter underdrain manufacturer will pay the cost of all warranty related repairs and the Owner will not be required to pay for any of the warranty-related activities identified in this warranty statement. The Owner will be responsible for providing a nearby laydown area for the storage of filter media removed during any warranty related activities as well as any utilities required to perform the warranty work.