

ISOLUX 302M ARSENIC ADSORPTION IN ELECTRONICS MANUFACTURING WASTE WATER

Project Background:

An electronics manufacturing process produces a wastewater effluent that contains approximately 20-30 ppm of arsenic. The wastewater treatment process consists of centrifugal removal of solids, followed by filtration using three sets of progressively finer filters, following by ion exchange removal of the arsenic. The treated wastewater is discharged to the local Sewer Authority.

Project Challenge:

The wastewater treatment process is expensive because of the relatively low arsenic capacity of the ion exchange resin. The customer desires to replace the ion exchange part of the overall process with less expensive adsorption technology, thereby reducing operating costs.

Initial Laboratory Evaluation:

Samples of the process wastewater were evaluated for treatment using Isolux's patented zirconium based adsorptive media technology. The evaluation was performed on a laboratory scale using Isolux 302M media. In order to determine optimum performance, the tests were run at pH ranges from 2 – 7.5. The raw wastewater, with a pH of 9.2, was adjusted with hydrochloric acid.

The pH adjusted wastewater was allowed to flow at 120 ml/hr through a column containing a bed of 2 grams of 302M media. The raw wastewater contained 13.2 ppm of arsenic. Each experiment was run until obvious breakthrough has occurred. The following represents the results of the testing.

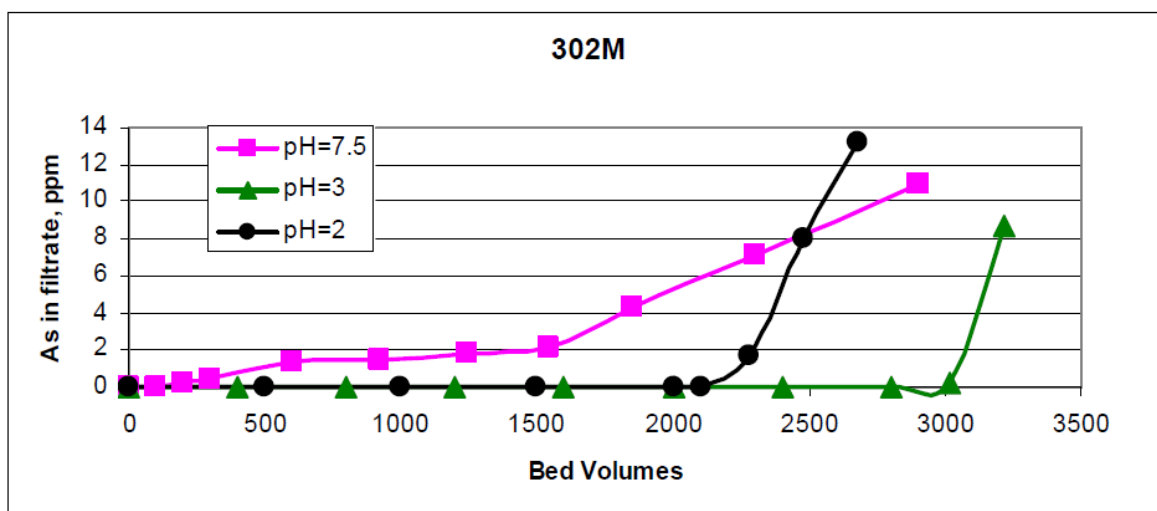


Figure 1. Laboratory Results On 20-25 ppm Wastewater Stream

Conclusions:

1. Isolux 302M media can be used to remove arsenic from a relatively concentrated electronics manufacturing process wastewater stream.
2. Performance can be optimized by lowering the pH to approximately 3.
3. At this pH, Isolux 302M media will reduce the arsenic concentration to a non-detectable level.
4. At optimum pH, this performance can be maintained to approximately 3,000 bed volumes.

Project Implementation:

On the strength of the test results, a full-scale system was designed and installed utilizing Isolux's cartridge-based technology. Isolux supplies its media in specially designed cartridges which minimize direct operator contact with the media. For this application a redundant system was designed using two, 12" diameter vessels operating in series. A piping manifold at the top enables either vessel to operate in the lead position. Each vessel holds four (4) Isolux cartridges.

For pH control, Isolux's patented Solid Acidifier technology was chosen. This technology is based on use of a solid media to adjust pH. This system is inherently safer and more reliable than use on metering pumps, controllers, and hazardous inorganic acids.

The flow diagram for the completed process is shown below.

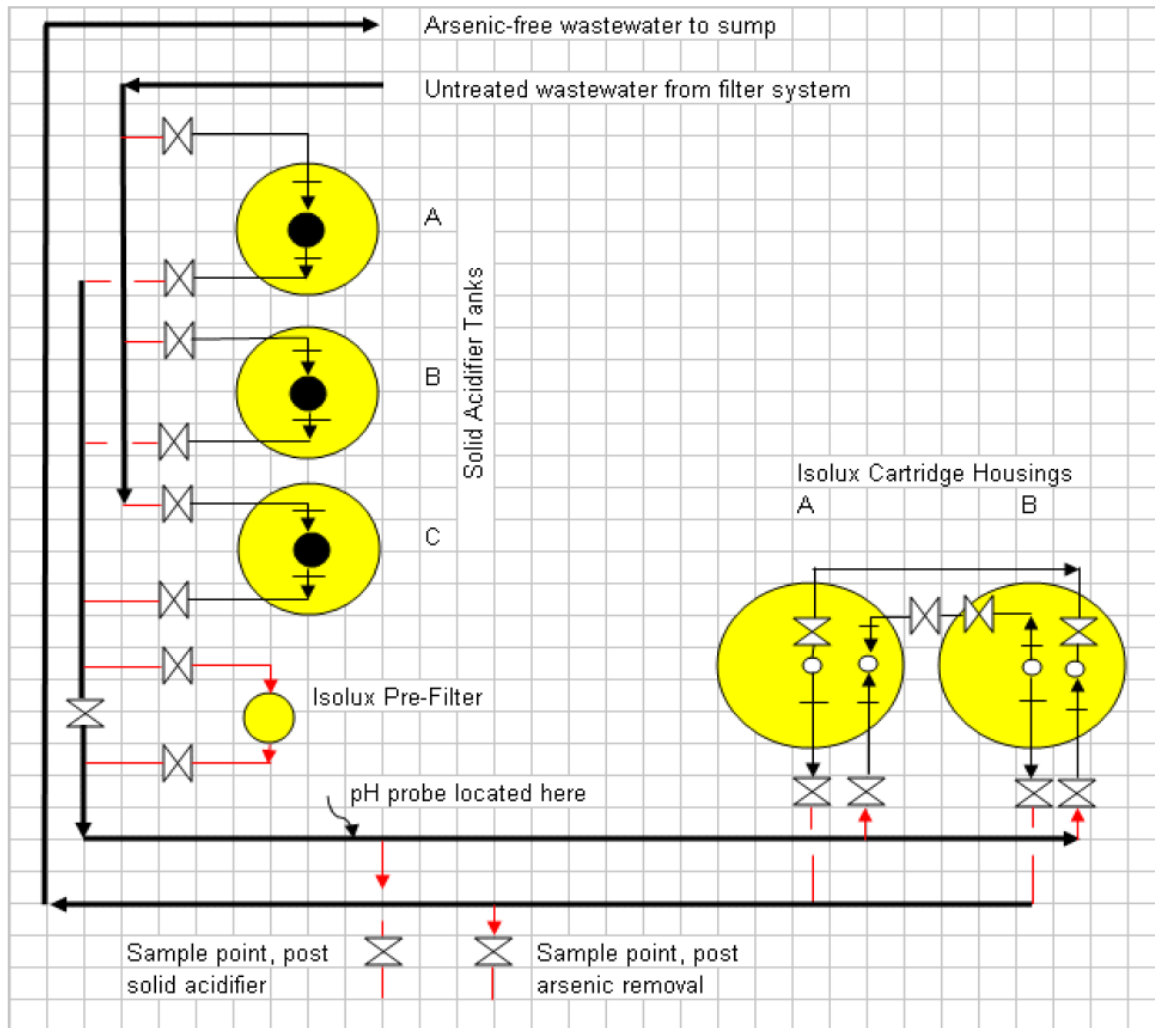


Figure 2. Isolux Arsenic Removal System Flow Diagram

Project Evaluation:

As of December, 2007, the system has been in operation for just over one year. The customer reports that all of their expectations have been satisfied. The process wastewater routinely meets the arsenic limitations imposed by the local Sewer Authority, and significant savings are being realized versus the previous arsenic removal process using ion exchange.

Each set of four Isolux cartridges typically reduces the arsenic content of the wastewater from 20-30 parts per million to under 5 parts per billion for a volume of approximately 21-24,000 gallons.

As a result of their experience, the customer has specified Isolux Technology for a new electronics manufacturing facility currently in the planning stages.