

# B-Tec™ bioreactor

## *Processes for* Decontamination of Water and Air

### O V E R V I E W

TVA has developed and patented B-Tec Bioreactors (U.S. Patent Nos. 6,461,510 and 6,599,423) that simultaneously destroy water and airborne contaminants (including odors) in one simple step — reducing the cost, complexity, and footprint normally associated with separate water and air treatments. As contaminated water and air pass through the packing of the B-Tec process, the microbes consume the target pollutants or odors, converting them into small amounts of water, carbon dioxide, and salts. The B-Tec Bioreactors can be used in a variety of applications for water/air or air decontamination ranging

from site restoration to industrial compliance. Contaminants destroyed include a wide variety of VOCs and chlorinated solvents, such as BTEX, MTBE, methylene chloride, TCE, and TCA, as well as ammonia, hydrogen sulfide, and odors in wastewater treatment.

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### A D V A N T A G E S

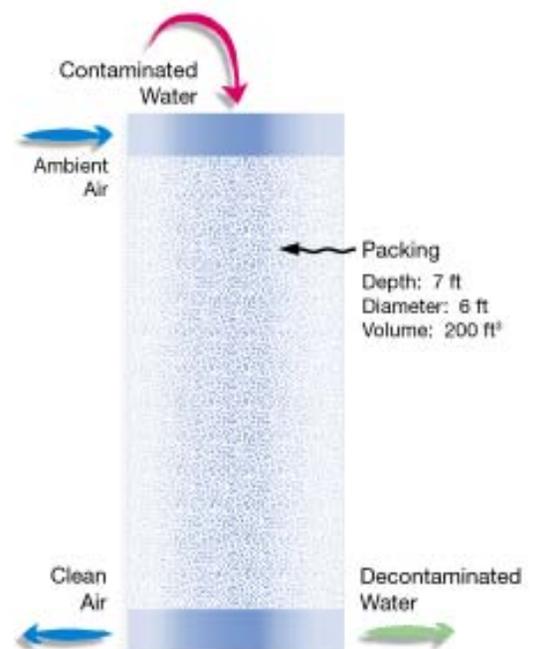
- *Single-step water and air cleanup*
  - *Dramatic cost savings*
  - *Removal and destruction of pollutants and odors*
  - *No contaminated off-gases*
  - *No secondary waste streams*
  - *Destruction of VOCs, ammonia, H<sub>2</sub>S, and odors*
  - *Automated/remote operation; minimal labor*
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## The B-Tec Advantage

Air stripping and biological treatments in open aerated basins or trickling filters allow volatilization and release of contaminants and odors to the atmosphere, causing air pollution. In some cases, these contaminated off-gases or odors are treated with processes such as carbon adsorption, scrubbing, biofiltration, or incineration. Carbon adsorption and scrubbing merely transfer the contaminants to other media; removal of the contaminants from these media and destruction or safe disposal of the contaminants is still necessary. Expensive incineration can generate and release toxic by-products to the atmosphere. All of these extra process steps result in greater complexity, larger footprint, and higher costs. But the B-Tec Bioreactor's patented process uses only one simple step to simultaneously destroy both the water contaminants and the airborne contaminants volatilized from the water in the same processing unit. This simplification reduces process footprint and treatment costs

while eliminating contaminated off-gases or odors. Total treatment costs (capital plus O&M costs) using B-Tec Bioreactors are as low as a few pennies per 1000 gallons of treated water. B-Tec treatment costs are much lower than existing methods, such as those reported in EPA Report 542-R-00-013, and in the Naval Facilities Engineering Command (NAVFAC) "Ex Situ Ground Water Treatment Technologies Evaluation Tool" at [http://enviro.nfesc.navy.mil/erb/erb\\_a/restoration/technologies/sel\\_tools/tools/ExSituGW/default.htm](http://enviro.nfesc.navy.mil/erb/erb_a/restoration/technologies/sel_tools/tools/ExSituGW/default.htm).



## Mobile B-Tec Demonstration Unit

TVA is currently demonstrating a mobile B-Tec Bioreactor at the Environmental Research Center in Muscle Shoals, Alabama, to optimize process parameters for commercial deployment. The fully automated bioreactor, which is six feet in diameter and contains seven feet of packing, can be monitored and controlled remotely. This 200-cubic-foot demonstration bioreactor has achieved more than 98% VOC destruction at a water rate of 46,000 gallons per day (gpd) and VOC concentration of 9 ppm and 100% VOC destruction at a water rate of 32,000 gpd and VOC concentration of 13 ppm — with zero release of airborne VOCs at both rates. During 2004, the demonstration unit is being tested to develop parameters for treatment of other contaminants, such as ammonia, VOCs, odors, and COD. In 2005, plans include use of the B-Tec process for onsite removal of ammonia from ash pond water or other wastewaters at a coal-fired power generation plant.



*B-Tec Bioreactor Mobile Demonstration Unit*

**B-Tec**<sup>TM</sup>  
*bioreactor*



*TVA's B-Tec system destroys both water and air contaminants in one simple step. This dramatically reduces capital and operating costs over other conventional systems, while eliminating any contaminated off-gases or other secondary waste streams. Let us demonstrate how B-Tec can simplify your operations and reduce your treatment costs.*

**For more information, contact:**

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