



Avtex Fibers Superfund Site: Time Critical Removal Action for Buildings

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- ***Keywords:*** manufacturing, National Priority List, Superfund, removal, demolition, piles, containerized, screening, segregation, minimization
- ***Abstract:*** The Avtex Fibers Superfund Site is a former rayon manufacturing facility located on 440 acres along the Shenandoaha River in Front Royal, Virginia. The Site was listed on the National Priority List in 1986, and EPA took Emergency Action when the manufacturing facility ceased operations in 1989.



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Abstract (Continued): EPA conducted numerous Removal and Remedial Actions from 1989 through September 1999, when FMC Corporation (a former property owner) took over EPA's work. The primary Superfund work since 1999 has been a Time Critical Removal Action (TCRA) for abandoned manufacturing buildings, which addresses the management / disposition of impacted demolition debris, a variety of waste piles, containerized waste, aboveground and subgrade structures and a carbon disulfide recovery system. Over 157,400 cubic yards of demolition debris, 15,500 cubic yards of waste piles, and thousands of containers of waste were generated during the EPA's cleanup and demolition work prior to 1999.



Time Critical Removal Action for Buildings

*Avtex Fibers Superfund Site
Front Royal, VA*



Avtex Fibers Superfund Site

- *440 acres along Shenandoah River - Front Royal, VA*
- *Mfg. Various fibers (Rayon, Polyester, etc.)*
- *American Viscose (1940 - 1962), FMC Corporation (1963 - 1976) & Avtex Fibers (1976 - 1989)*
- *Formally added to NPL, 10 June 1986*
- *EPA Emergency Action 1989*
- *EPA Removal and Remedial Actions 1989 - 1999*
- *FMC signed consent decree summer 1999*
- *TCRA for the Buildings 1999 to present*
- *WWW.AVTEXFIBERS.COM*



Avtex Fibers Superfund Site





Avtex Fibers Superfund Site





Avtex Fibers Superfund Site





Who's Involved

- *FMC (PRP)*
- *USEPA Region III*
- *VADEQ*
- *Warren County Economic Development Corp.*
- *USACE*
- *Community Stakeholders*
- *FMC, USEPA, USACE & EDC Contractors*



Site Issues

- **Site soils, groundwater and structures potentially contaminated with:**
 - ❖ *Carbon disulfide*
 - ❖ *Phenol*
 - ❖ *Sodium*
 - ❖ *Heavy metals (lead, arsenic, cadmium)*
 - ❖ *PCB*

- **Site impoundments and fill areas impacted by:**
 - ❖ *“Rayon manufacturing” wastes/by-products*
 - ❖ *Zinc hydroxide sludges*
 - ❖ *Fly ash*
 - ❖ *Boiler room sludges*



Work Prior to TCRA-Bldgs.

■ 1986 - 1999

- ❖ *Various investigative studies by Avtex, FMC and USEPA*
- ❖ *Limited clean-up activities*
- ❖ *USEPA planned to construct an on-site RCRA landfill to manage waste generated from the site clean-up*

■ 1997

- ❖ *USEPA demolition of 17 acres of buildings*



Time Critical Removal Action for the Buildings

- *FMC's alternative to USEPA landfill option*
- *Management/disposition of:*
 - ❖ *impacted demolition debris*
 - ❖ *variety of waste piles*
 - ❖ *containerized waste*
 - ❖ *above ground and subgrade structures*
 - ❖ *carbon disulfide recovery system*



Key Work Elements

- *Demolition Debris Management*
- *Accumulated Waste Management*
- *Carbon Disulfide System Remediation*



Demolition Debris Management

- ***157,400 CY of material***
- ***Mechanical screen to separate fractions***
 - ❖ *Coarse*
 - ❖ *Fines*
 - ❖ *Scrap*
 - ❖ *Solid waste*
- ***Decontamination of coarse fraction with wash station***
- ***Ship metals for scrap***
- ***Beneficial reuse of debris***



Demolition Debris Management





Demolition Debris Management





Debris Management

- **Challenge** - Minimize RCRA & off-site disposal, minimize handling, maximize on-site reuse & off-site recycling.
- **Obstacles** - Material was not completely characterized & not homogeneous, multiple work areas, each “pile” unique, regulatory approval for on-site reuse.
- **Solutions** - Mechanical screen to 3”(-), comprehensive sampling/analysis plan, visual clean standard, engage scrap vendor, negotiate reuse criteria.
- **Outcome** - Reduced off-site disposal by 40+%, 25% of the material was reused on site, 10% was recycled off site, >50% of off site disposal was non-RCRA.



Accumulated Waste Management

- *15,500 CY in waste piles*
- *10,000 CY of ACM*
- *Well over 5,000 containers*
- *16 PCB transformers*
- *2M gallon tank decontamination*



Accumulated Waste Management

- **Challenges** - Minimize RCRA waste, handling, T&D costs and sampling/analytical costs
- **Obstacles** - Wastes stored in multiple locations, wastes not completely characterized, incomplete inventory, wide variety of types of material and containers
- **Solutions** - Comprehensive sampling/analysis plan, composite sampling/analysis, consolidation, material inventory/tracking system
- **Outcome** - Accurate material inventory and record of activities, RCRA quantity reduced by 50+%, limited number of TSDFs, limited number of shipments



Accumulated Waste Management





Carbon Disulfide System Remediation

- ***Demolish two above ground storage tanks***
 - ❖ *Dispose of contents*
 - ❖ *Scrap tanks*
- ***Locate underground storage tank***
 - ❖ *Records search*
 - ❖ *Interviews*
 - ❖ *Test trenching*
- ***Remove UST contents***
- ***Excavate and remove tank***
- ***Restore area***



Carbon Disulfide System Remediation

- **Challenges** - *Decommission system safely and w/o contributing to environmental impact, find all components, generate minimal wastes for off-site disposal*
- **Obstacles** - *System unknown, little analytical info, material highly hazardous, carbon disulfide is a RCRA listed waste*
- **Solutions** - *Complete investigation of the system, isolate/segregate wastes, negotiate waste classification w/regulators, handle material under water, comprehensive HASP*
- **Outcome** - *All components of system found & removed/remediated, no safety issues, only UST contents RCRA, no soils impacted, steel recycled*



TCRA - Bldgs by the Numbers

- *\$30M for USEPA landfill compared to TCRA-Bldgs. EAC of \$12M*
- *Over 80,000 man-hours without a LWD*
- *175,000 CY of material managed*
- *50% reduction in RCRA material managed*
- *40% reduction in off-site disposal quantity*
- *25% of the demolition debris was beneficially reused on site*
- *10% of the demolition debris was salvaged/recycled off-site*



The Future at the Avtex Fibers Superfund Site

- *Management of 9,000 CY of RCRA characteristic fine fraction*
- *Decontamination of the remaining 25 acres of buildings*
- *Closure of 120 acres of industrial impoundments*
- *Soil and groundwater remediation*
- *O&M of WWTP*
- *Clean-up estimated to be complete by 2007*
 - ❖ *240-acre conservation park*
 - ❖ *160-acre business/technology park*
 - ❖ *40-acre recreation complex*



Wrap-up/Questions & Answers