Application of a Bimetallic Solvent Paste Technology for PCB Removal from Older Structures on DoD Facilities

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BTS Technology Objectives and Rationale
- Prior to 2010, PCBs were extensively used in impregnated paints, coating materials, and adhesives. As these properties enhanced structural integrity, increased durability, and provided long-lasting properties.
- Developing and transitioning to field and demonstrating a pilot scale solution method for the removal and destruction of PCBs found on DoD structures.
- Formulating a treatment method (BTS) for various PCB conformal coatings.
- Demonstrating the effectiveness of BTS on a wide range of substrates/substrate structures at three sites.
- Developing an approach to achieve the protocol for an application protocol.
- Develop a cost and performance reports for tool evaluation and use when addressing PCBs found on existing facilities.

Technical Approach
- BTS consists of ethylene/methylene dicarboxylic acid to 10% of total liquid volume of fusign solution.
- BTS has two functions (Figure 1).
- Detach PCBs from weathered coating or other material such as paint.
- Rapidly degrades the remaining PCBs.
- Via acidic reduction in the presence of iron catalysts, in mg/l.

The slurry BTS is used to extract the PCBs out of the paint or other material into the slurry.

Technology Development
- BTS developed by researchers from NASA and UCF.
- Demonstrated rapid and complete destruction of PCBs in aqueous/alkaline systems containing acetone (CA-UC), and in 37% specific ethanol.
- Significantly faster compared to traditional solvent extraction and degradation techniques. BTS has been shown to be as effective as 96% as a solution to this challenge has been achieved with BTS in 4-6 hours of exposure to BTS.

Selection of Demonstration Sites
- Operational and regulatory considerations at four sites to demonstrate effectiveness and potential for all four.
- Each site has unique characteristics associated with specific PCBs and/or material; the choice of solvents incorporated into BTS is specific to the metals/cleaning fluid.
- Additional technical information for each site is detailed in the application report for each site.

Field Demonstration
- Vertical Integration Building (VIB)
- The vertical integration building (VIB) was selected for initial testing due to the vertical configuration and environmental conditions. Initial testing of it was conducted in a laboratory for testing, evaluation, and destruction of PCBs.
- The slurry BTS was used to treat (VIB) application for laboratory testing. Fielding of BTS on site.
- PCBs were detected in concentrations of 3 to 4.4 mg/l.

Results from VIB
- Field demonstration conducted on the VIB structural components in July 2020. BTS simple and sample obtained that of the vertical integration building (VIB) application results are presented in the following.
- Field demonstration results.

Conclusions to Date
- Demonstrate the removal of PCBs from painted surfaces.
- Stable removal from painted metal and painted concrete.
- High-throughput evaluation for multiple applications.
- Potential use of a non-toxic, non-acidic solution.

Ramping Work
- Currently ramping has been completed on the two fields.
- Laboratory scale and scale demonstration ongoing.
- Possible full mobilization is being evaluated. Support from the Japan Regional Outreach Center in Yokohama, Japan are available for evaluation.
- Additional evaluations for BTS application for evaluating performance with BTS and BTS field work on the types of material at the site.

Results from Badger Army Ammunition Plant
- Army collected a number of samples from various materials for benching of BTS to confirm concentrations and the results of the BTS to test PCBs in these materials.
- Samples were collected including painted concrete, wood, and metal and found to contain.
- PCB concentrations from 16.8 to 26.0 mg/l.

Field Demonstration Cont’d
- Technical Progress Badge
- Technical progress badge.
- Field demonstration conducted on the VIB structural components in 2020. BTS simple and sample obtained that of the vertical integration building (VIB) application results are presented in the following.
- Field demonstration results.

Figure 10: slurry BTS in action

Figure 14: polishing damage before

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