

85-gal Drum and NucFil- 007LS Filters

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788



CH2MHILL
Plateau Remediation Company

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85-gal Drum and NucFil-007LS Filters

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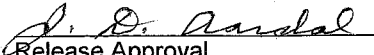
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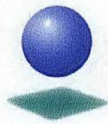
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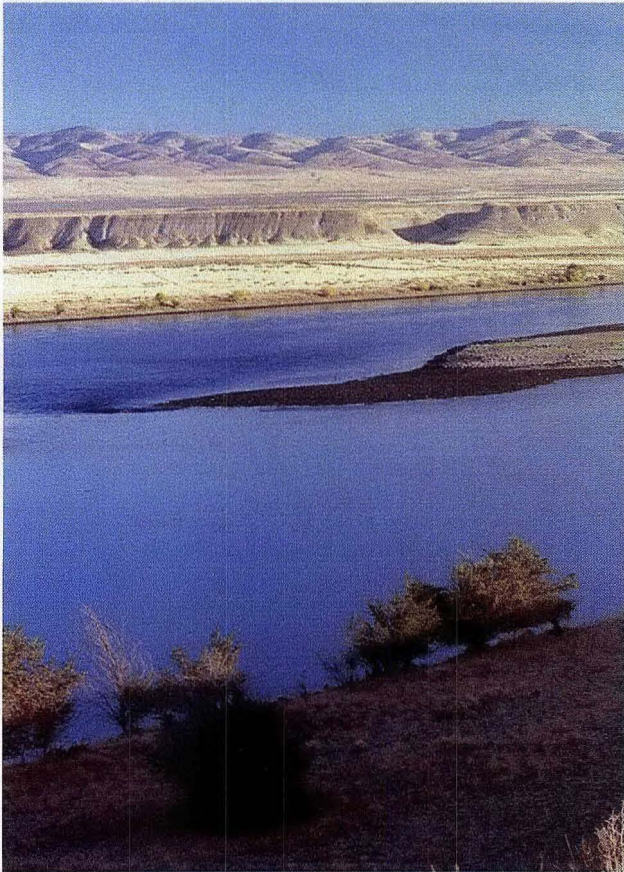
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Loss of DOT 7A Type A Certification using NucFil-007LS Filters

Presented to: **Contractors Transportation
Management Association Workshop - 2009**

Presented by: **J. B. "Woody" Woodbury , Packaging
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Background

- **55-gallon drums were overpacked into 85-gallon drums**
- **A NucFil-007LS long-stem filter was installed**
 - NucFil certified the use of NucFil-007LS filters in 85-gallon drums as DOT 7A Type A
 - Wood wedges were used during the tests to center and stabilize the inner 55-gallon drums
- **During inspection, a few filters were found to be loose, canted, and/or with RTV seals broken**
 - No contamination or loss of container integrity
- **Discovered in November 2008**

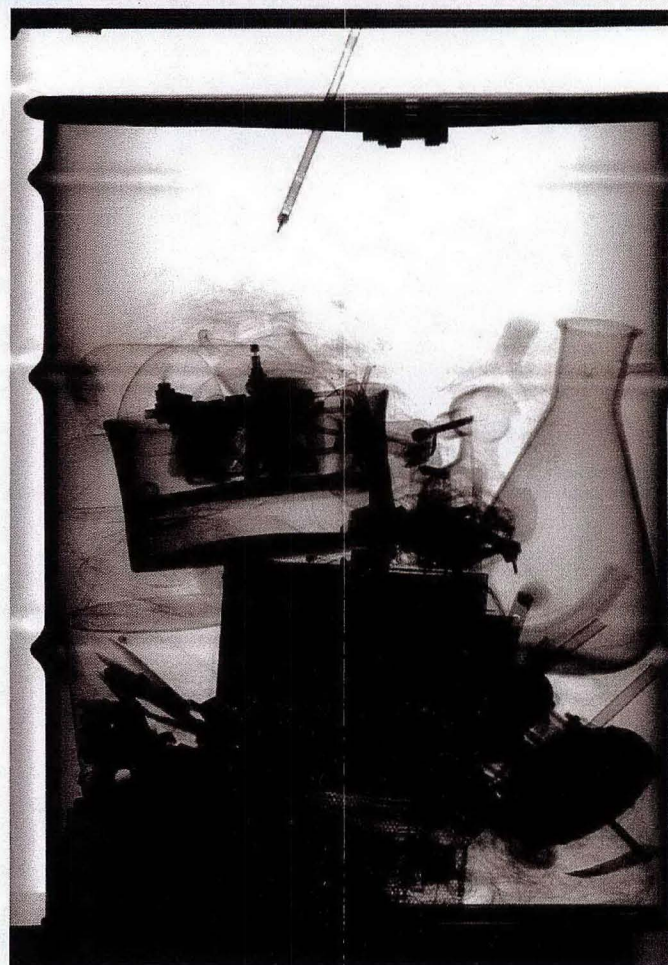
Example



Possible Causes

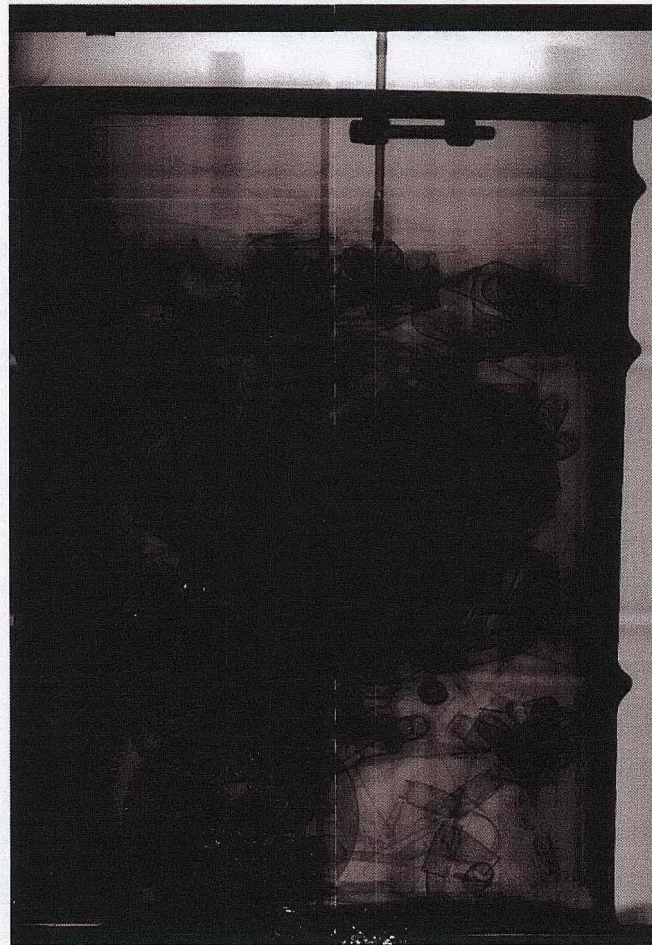
- **Configuration:** Per NucFil test report, 6 wooden wedges were required to keep 55-gallon drum from moving inside 85-gallon overpack during handling
- **During handling drums were rolled on the bottom chine, dropped onto their base, and/or fork-lifted over rough terrain**
 - The wedges worked loose and fell to the bottom of the inner-outer drums annulus
 - 80% plus failure rate

Radiograph – No wedges



0053251 11/04/2008 84% 90

Radiograph – With wedges



0044355 10/22/2008 92% 90



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Possible Causes (continued)

- **Why did they fail?**
 - **Wedge design was inadequate**
 - **Proper number not installed**
 - **Wedges were not installed properly**

Status

- **85-gallon drums no longer met**
 - Onsite Safety Analysis Report for Packaging (SARP) requirements
 - Department of Transportation (DOT) Specification 7A Type A
- **Shipment of 007LS configured containers halted (onsite and offsite)**
- **Both Skolnik and Myers contracted to conduct DOT testing of the drums without the wedges in place to evaluate packaging integrity**

Test Plan

- **Each manufacturer was asked to prepare 6-drum configurations, 3 light (136 kg) and 3 heavy (204 kg)**
- **NucFil installed the NucFil-007LS filters**
- **To simulate handling prior to DOT testing**
 - **Drums were rolled on their chins for 20 feet (minimum) and then allowed to fall onto their bases**
 - **They were also loaded on a forklift or truck and transported over rough terrain at least ¼ mile at speeds of 5 – 10 mph**

Test Plan cont.

- **Testing consisted of 49 CFR (Transportation) requirements**
 - **173.465 (Type A Packaging Tests)**
 - Free drop (Inverted four-foot drop)
 - Penetration (3.3-foot) bar (6 kg) dropped adjacent to the filter head
 - Stacking and water spray test documentation
 - **178.608 (Vibration standard)**
 - One hour on vibration stand and subsequent leak test
- **Filters sent to NucFil for analysis after testing**

Test Results

- **Skolnik test results**
 - Heavy drum (204 kg) configuration failed
 - Light drum (136 kg) configuration passed
 - All subsequent tests passed
 - Draft Test Report received May 18
- **Myers test results**
 - Heavy drum (204 kg) configuration passed
 - Light drum (136 kg) not tested
 - All subsequent tests passed except pending Vibration Test
 - Scheduled week of May 25

Conclusion

- **The light-weight Skolnik configuration can be recertified as a DOT Specification 7A Type A package**
- **The Skolnik heavy-weight configuration will require overpacking, lid replacement, or repackaging prior to shipment as a DOT Specification 7A Type A package**
 - **The containers may be shipped within a Type A or Type B shipping container under their present configuration**
- **Both the heavy-weight and light-weight Myers configuration can be recertified as a DOT Specification 7A Type A package**