

SECONDARY CONTAINMENT - DOUBLE TROUBLE ?



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SECONDARY CONTAINMENT

A background image of a sunset over a beach. The sun is low on the horizon, casting a warm glow over the sky and water. Several people are visible in the distance, standing on the beach. The overall scene is peaceful and scenic.

What is it?

How is it performing?

How is it repaired?

What is the future?


Broad gulf separating manufacturer's and typical end user's expectations

**Typical end user expects that system
will catch and store spills for long
periods of time (until I can get to it)**

A scenic view of a mountain valley. The foreground shows a wide, light-colored river or stream. The middle ground features a valley floor with some greenery and a small town or village. The background is dominated by high, rugged mountains with significant snow cover under a clear blue sky.

**Manufacturers expect systems to
“temporarily” contain fuel only until leak
is detected and cleaned-up**

**Temporary storage normally
considered to be 72 hours or less**

A person is seen climbing a tall, thin, leafless tree trunk. The person is positioned about halfway up the tree, facing away from the camera. The background is a clear, bright blue sky. The overall scene suggests a high-altitude or mountainous environment.

**Temporary storage
means close monitoring
is necessary**

Continuous leak detection

**Sumps must be
cleaned-up whenever
a spill occurs**

**Should leak detection
be relied on to ensure
integrity of secondary
containment?**



**Manufacturers don't expect long term
fuel exposure but ...**



Catastrophic Leaks Occur



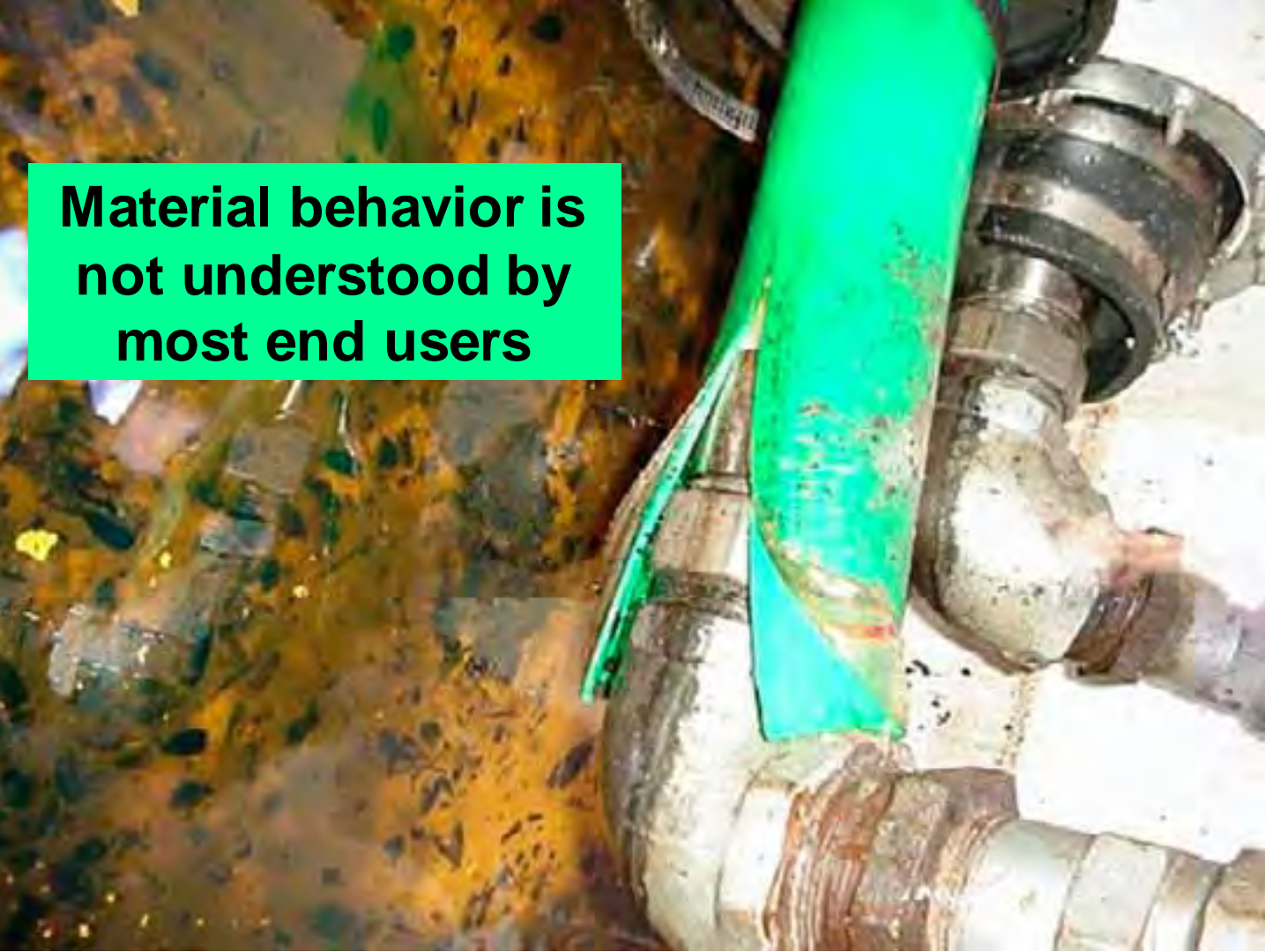
“Routine” Leaks Occur





**Maintenance Activities
Occur**

**Material behavior is
not understood by
most end users**





**When secondary
containment works but
leak detection does not**



**When secondary
containment and leak
detection both fail**

SECONDARY CONTAINMENT

EXCAVATION LINERS

DOUBLE-WALLED TANKS

DOUBLE-WALLED PIPING

SUMPS

BULKHEAD FITTINGS

BOOTS

EXCAVATION LINER



DOUBLE-WALLED FRP TANKS



DOUBLE-WALLED STEEL TANKS



DOUBLE-WALLED COMPOSITE TANKS



COMPOSITE - STEEL WITH THERMOPLASTIC



CALIFORNIA INTEGRITY TESTING



**PERIODIC TANK TEST FOR
INTERSTITIAL TIGHTNESS**

Test Requirements

- **Vacuum Minimum = 15" Hg**
- **Test Period = 12 Hours**
- **Decrease > 5" = Fail**



SECONDARY INTEGRITY ?



REPAIRS ?



DOUBLE WALLED FRP - 3 OVER 2



DOUBLE WALLED FRP - INTEGRAL



SECONDARY INTEGRITY ?



DOUBLE WALLED - THERMOPLASTIC OVER FRP



SECONDARY CONTAINMENT ?



DOUBLE WALLED - SEMIRIGID THERMOPLASTIC



DOUBLE WALLED - COAXIAL THERMOPLASTIC



SECONDARY INTEGRITY ?



SECONDARY INTEGRITY ?



SECONDARY INTEGRITY ?



SECONDARY INTEGRITY ?



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REPAIRS ?



THERMOPLASTIC SUMPS



FRP SUMPS



STEEL SUMPS



SHALLOW DISPENSER PANS

Was even documented,
"one dollar bill found
in liner. photo taken"



SECONDARY CONTAINMENT - CAJUN



22 11:12AM

CAJUN LEAK DETECTOR



SECONDARY CONTAINMENT - REDNECK



MISSISSIPPI LEAK DETECTOR



TERTIARY CONTAINMENT ?



FRP SUMP INTEGRITY



THERMOPLASTIC SUMP INTEGRITY



THERMOPLASTIC SUMP INTEGRITY ?



STEEL SUMP INTEGRITY



SUMP BRACING



SUMP BRACING ?



SUMP INTEGRITY TESTING



8.23.2004 09:22

SUMP INTEGRITY



SUMP INTEGRITY



SUMP INTEGRITY



SUMP INTEGRITY



SUMP INTEGRITY



SUMP INTEGRITY



REPAIRS



REPAIRS



REPAIRS



REPAIRS ?



SECONDARY CONTAINMENT - "CHASE" PIPE



SECONDARY CONTAINMENT ?



SECONDARY CONTAINMENT ?



SECONDARY CONTAINMENT ?



“CHASE” PIPE INTEGRITY



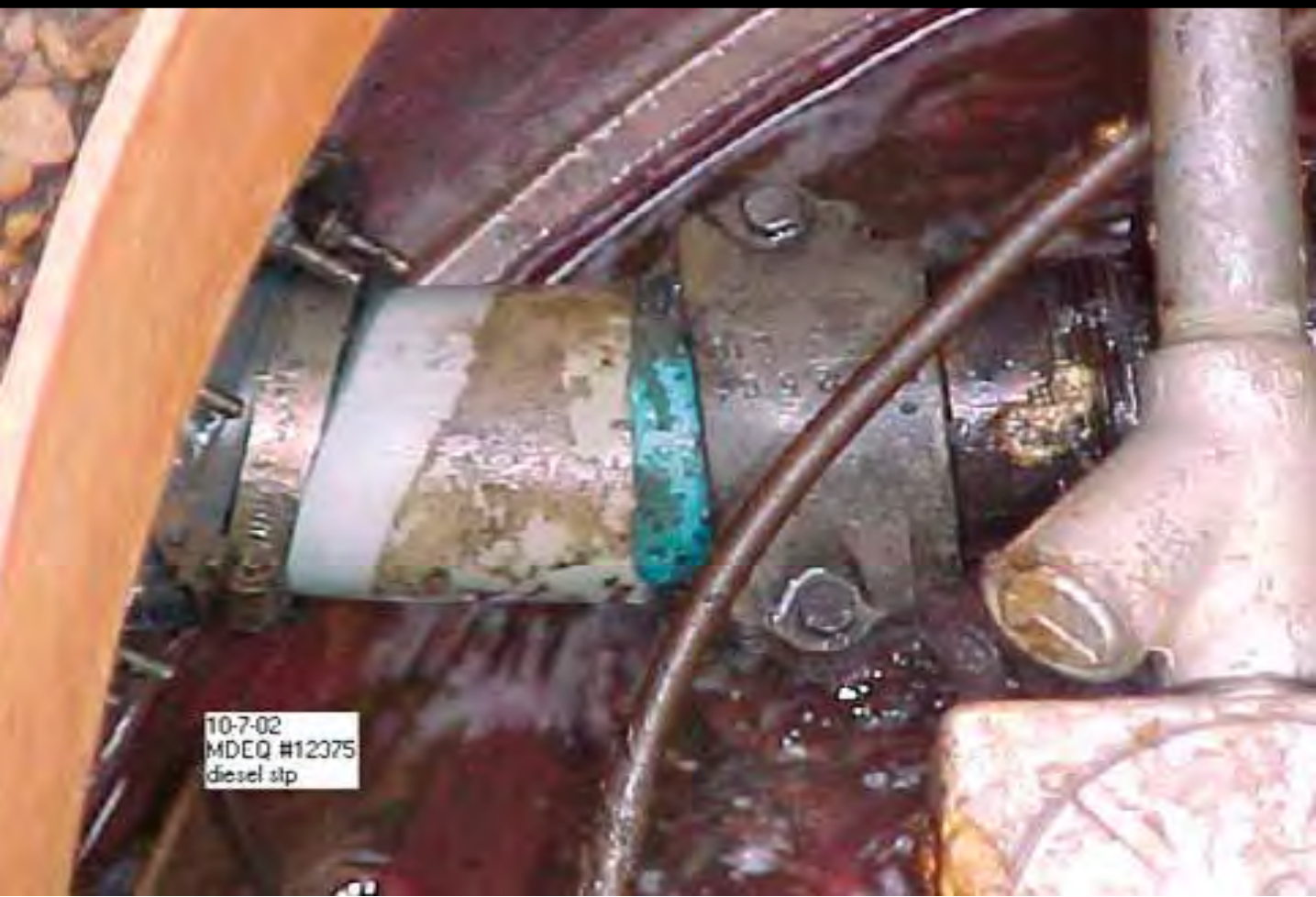
“CHASE” PIPE INTEGRITY



SECONDARY CONTAINMENT - BULKHEAD FITTINGS



BOOT SEAL INTEGRITY



10-7-02
MDEQ #12375
diesel slp

CONDUIT BOOT INTEGRITY



CONDUIT BOOT INTEGRITY



9-10-02
MDEQ #11457
conduit boot

PIPE BOOT INTEGRITY

Case #338
Frederick, MD
Environ
1 of 2



PIPE BOOT INTEGRITY



REPAIRS ?



REPAIRS ?



REPAIRS



CALIFORNIA TESTING

- Under dispenser containment (UDCs)
 - 79% of all UDCs failed in 2001 and 50% of all UDCs failed in 2004
 - Penetration fittings were determined to be the primary cause of failure



CALIFORNIA TESTING

- Tank top containment sumps
 - 53% of all containment sumps failed in 2001 and 28% in 2004
 - Penetration fittings were determined to be the primary cause of failure
 - 100% of HDPE sumps failed the testing in 2001



CALIFORNIA CONCLUSIONS

- SB898 (2001) & AB2481 (2003) test results:
 - 93% of all locations tested failed at least one secondary containment component



SECONDARY CONTAINMENT

What is it?

Practically anything

What is it intended to be?

Remains to be answered

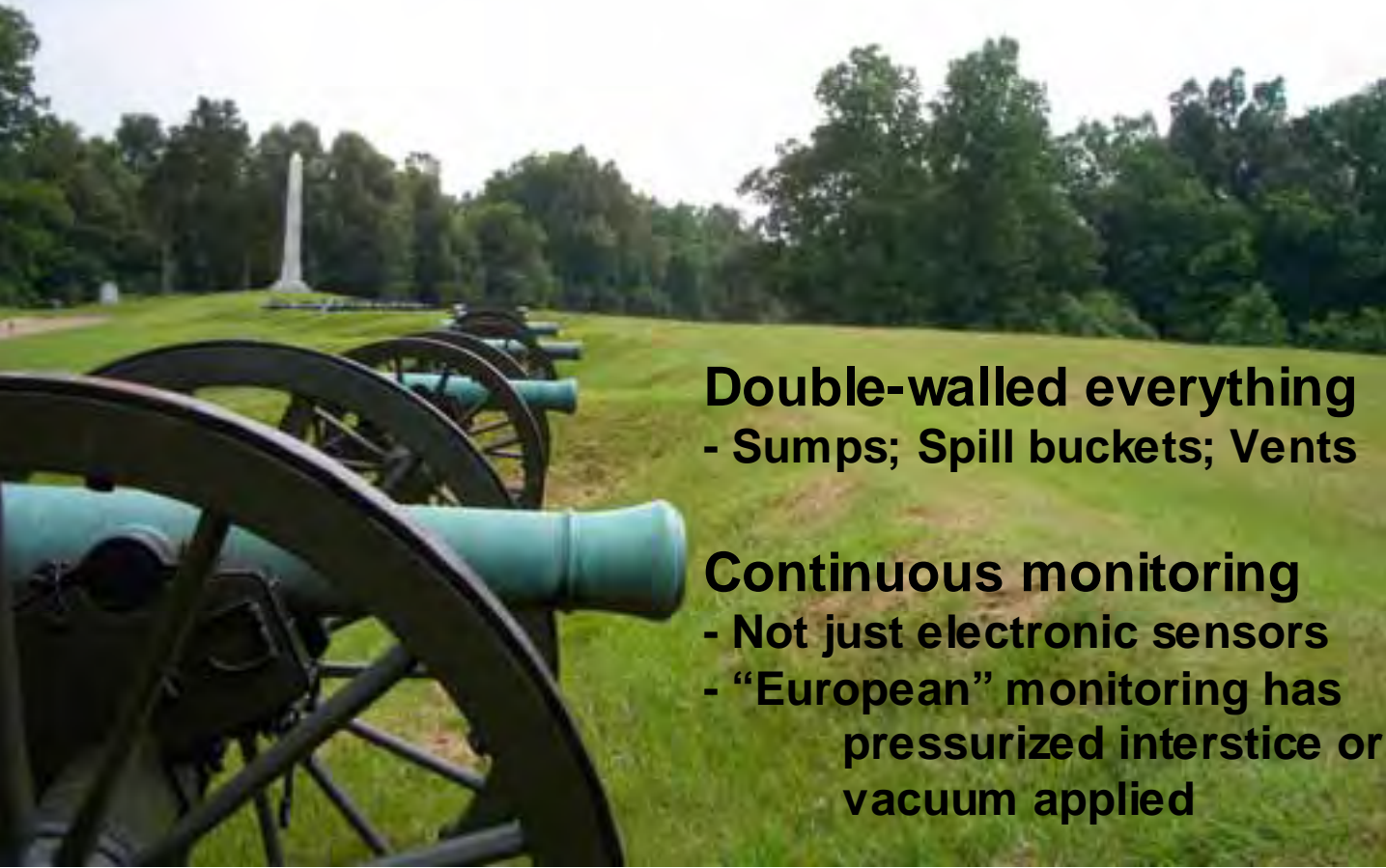
How is it performing?

Things could be better

How is it repaired?

No clear standards

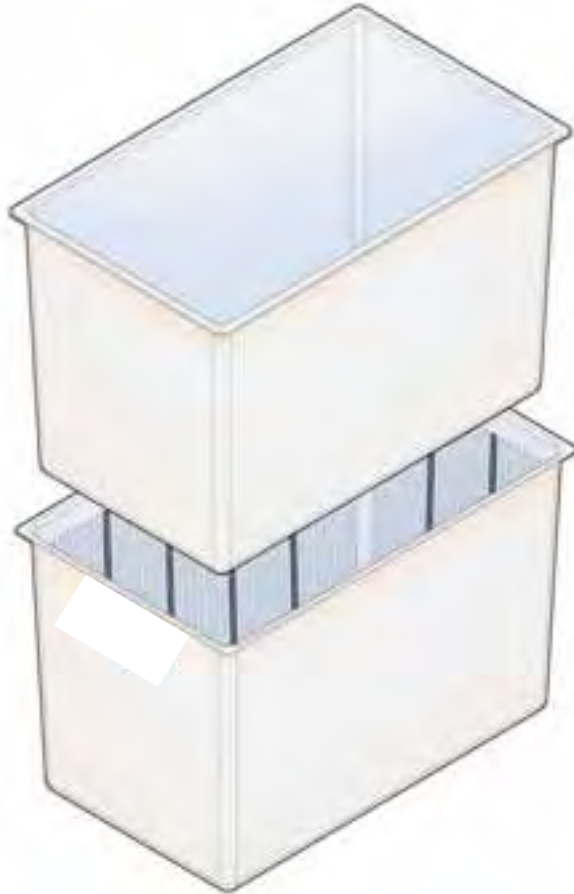
What Does the Future Hold?



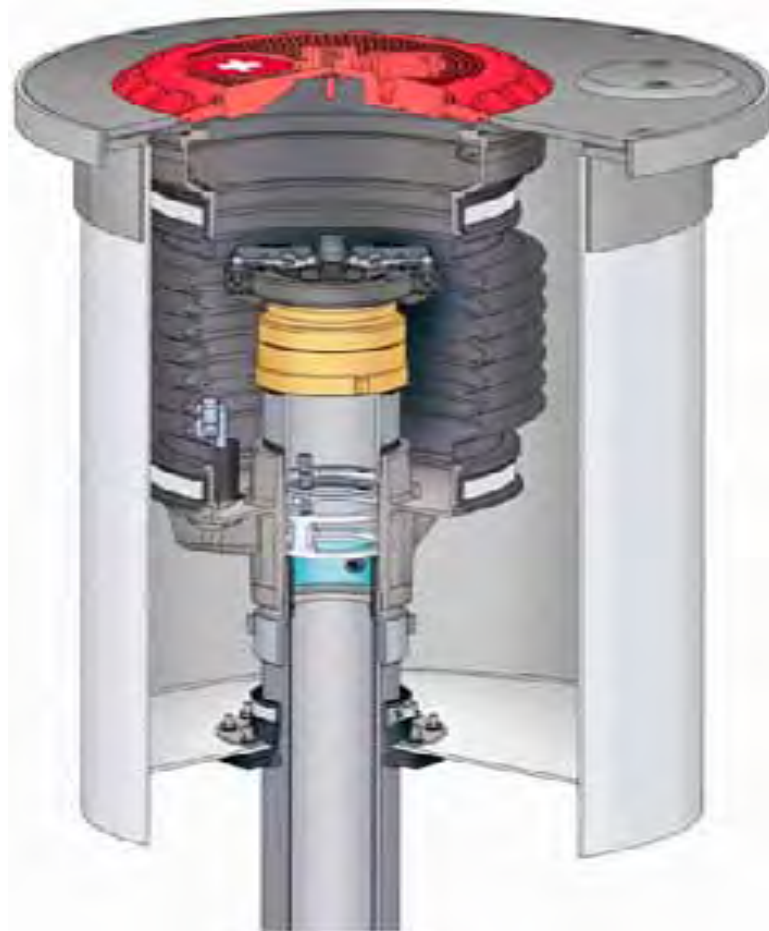
Double-walled everything
- Sumps; Spill buckets; Vents

Continuous monitoring
- Not just electronic sensors
- “European” monitoring has
pressurized interstice or
vacuum applied

DOUBLE-WALLED SUMPS



DOUBLE-WALLED SPILL BUCKET



“SECONDARILY CONTAINED” VENT LINES



IS THERE ANY HOPE?



SECONDARY CONTAINMENT MUST BE:

Tighter - withstand groundwater intrusion

Stronger - withstand burial and traffic conditions

Compatible - withstand long term fuel exposure



An aerial photograph of a vast, eroded canyon. The canyon walls are steep and layered with various shades of brown, tan, and reddish-brown, indicating different geological strata. A winding road or path is visible on the left side of the canyon floor. In the foreground, a river or stream flows through the canyon, its surface reflecting the sky. The overall scene is one of natural grandeur and erosion.

Changes to UL 971 standard

Create UL standard for sumps (2447)



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