SECONDARY CONTAINMENT

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)
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
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
DOUBLE-WALLED FRP 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?
DOUBLE WALLED FRP - 3 OVER 2
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 ?
REPAIRS?
FRP SUMPS
STEEL SUMPS
SHALLOW DISPENSER PANS

Was even documented, "one dollar bill found in liner. photo taken"
TERTIARY CONTAINMENT?
FRP SUMP INTEGRITY
THERMOPLASTIC SUMP INTEGRITY
THERMOPLASTIC SUMP INTEGRITY?
SUMP BRACING
SUMP BRACING ?
SUMP INTEGRITY
SUMP INTEGRITY
SUMP INTEGRITY
SUMP INTEGRITY
SUMP INTEGRITY
REPAIRS
REPAIRS ?
SECONDARY CONTAINMENT - “CHASE” PIPE
SECONDARY CONTAINMENT?
“CHASE” PIPE INTEGRITY
“CHASE” PIPE INTEGRITY
CONDUIT BOOT INTEGRITY
CONDUIT BOOT INTEGRITY
PIPE BOOT INTEGRITY
PIPE BOOT INTEGRITY
REPAIRS
• 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
• 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
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
Changes to UL 971 standard
Create UL standard for sumps (2447)
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