

# Secondary Containment Testing

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# Introduction

- KWA has conducted hundreds of evaluations of leak detection equipment since 1990
- This presentation outlines some of our thoughts based on our experience

# KWA Test Facility



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# Tank Area



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# Topics of Discussion

- SB 989 Requirements for Secondary Containment Testing
  - Industry Standard Considerations
  - Evaluation of Performance of Sump Leak Detection Systems

# 1. Industry Standard

- None Specified in SB 989
- Three Options
  - Manufacturer Standard
  - Industry Standard
  - Approval of California Registered Engineer
- Currently accepted “Standard” is 0.25 inches in 24 hours

# Industry Standard (cont.)

- This can be scaled to other time periods
- Example – 0.01042 inches per hour is equivalent to 0.25 in/24 hrs
- Problem – Time to achieve successful test is dependent on size of sump and sensitivity of the leak detector
- Needs a volume, surface area, or leak rate specified

# Sensitivity of Leak Detector

- Sensitive methods can detect smaller changes in level
- Minimum detectable level change (MLC) is the smallest level change that the method is capable of detecting reliably
- MLC is a quantitative description of the methods performance
- There are test procedures to determine the MLD

# Table 1. Time to Detect a Leak of 0.1 gal/h For Various MLC's

Sump Diameter (in)	MLC (inches)			
	0.001 (min)	0.005 (min)	0.02 (hrs)	0.25 (hrs)
12	0.3	1.5	0.1	1.2
18	0.7	3.3	0.2	2.8
24	1.2	5.9	0.4	4.9
30	1.8	9.2	0.6	7.6
36	2.6	13.2	0.9	11.0
42	3.6	18.0	1.2	15.0
48	4.7	23.5	1.6	19.6
54	5.9	29.7	2.0	24.8
60	7.3	36.7	2.4	30.6

## Table 2. Smallest Leak that can be Detected in 24 hrs with a Change of 0.25 Inches

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# What This Means

- Without a size or rate specification there is no way to determine if a method meets the 0.25 inch per day requirement
- Tester can base performance claims on a small sump that cannot be achieved on a large sump

# Suggestions

- A statement should be included in the regulations that relates the leak rate to sump size
- Or, the worst case conditions could be applied to all sumps
- Or, an industry standard acceptable to the regulatory community could be developed

# Procedural Suggestion for Testers

- Calibrate each Sump
  - ◆ Add specified volume of water to the sump (e.g., one gallon)
  - ◆ Record the volume change per unit level for each sump (e.g., gal/in)
  - ◆ Relate the level change during the test to a volume loss
- Check this against the State Requirements

## 2. Performance Evaluations

- Some vendor claims are based on equipment resolution
- These may not take into account the variability in an actual test
  - Float stickage
  - Vibration and wind effects
  - Sump distortion immediately after filling
- Performance Evaluations can quantify the performance of the method
- They can determine if the manufacturer meets the industry standard

# Outline of Evaluation Process

- Equipment is installed in test cell according to Mfg's Instructions
- Test cell is allowed to stabilize
- Increments of water are removed
- Change in level is calculated and compared with measured level changes

# Other Considerations

- Evaluator must recognize the salient features of the method before a proper test can be designed
- Some latitude in the protocol must be provided for this purpose

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# Example Data Sheet

A	B	C	D	E	F
Test No	Volume of Water Removed (ml)	Calculated Level Change (in)	Sensor Reading* (in)	Measured Level Change (in)	Increment Difference Measured - Calculated (E - C)
1	22.0	0.00214		0.00278	0.00064
2	22.0	0.00214		0.00286	0.00072
48	20.4	0.00199		0.00255	0.00056
49	19.2	0.00187		0.00231	0.00044
50	20.6	0.00201		0.00217	0.000158

\* Not applicable to this evaluation

n = no of data sets =	
Bias = average of all data sets =	
stdev = standard deviation =	
MLC = K*stdev =	
Cal. Coeff = inches/ml =	0.0000975
K = tolerance factor for 95% =	

# What This Means

- Some type of independent evaluation must be conducted by a qualified organization to keep everyone on the same playing field
- One approach is to use the methods for water sensor testing described in the federal EPA Automatic Tank Gauge Protocol

# Next Steps

- KWA will provide these testing services to anyone who needs them
- Other organizations may also provide similar services
- Comments on the testing protocol are welcome
- The procedures are still under development

# Contact Information

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“A city where death is redundant”