

Light Non-Aqueous Phase Liquids (LNAPL) Workgroup

Monday December 15

1 to 3 pm

**One Winter Street, 2nd floor Conf. “A”
(Please see sign-up sheet)**

Ken Marra, P.E.

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<http://www.mass.gov/dep/cleanup/lnaplwg.htm>



LNAPL in the sub-surface

1930s

Fundamental principles in oil industry
and petroleum engineering



1970s

Part of environmental assessment and
remediation



2005/2008

LSPA White Papers
“LNAPL and the Massachusetts
Contingency Plan”



LNAPL Assessment

Thickness ?

Relative Permeability ?

Mobility ?

Continuous Separate Phase ?

Residual Saturation ?

Monitoring Well ?

Concentration ?

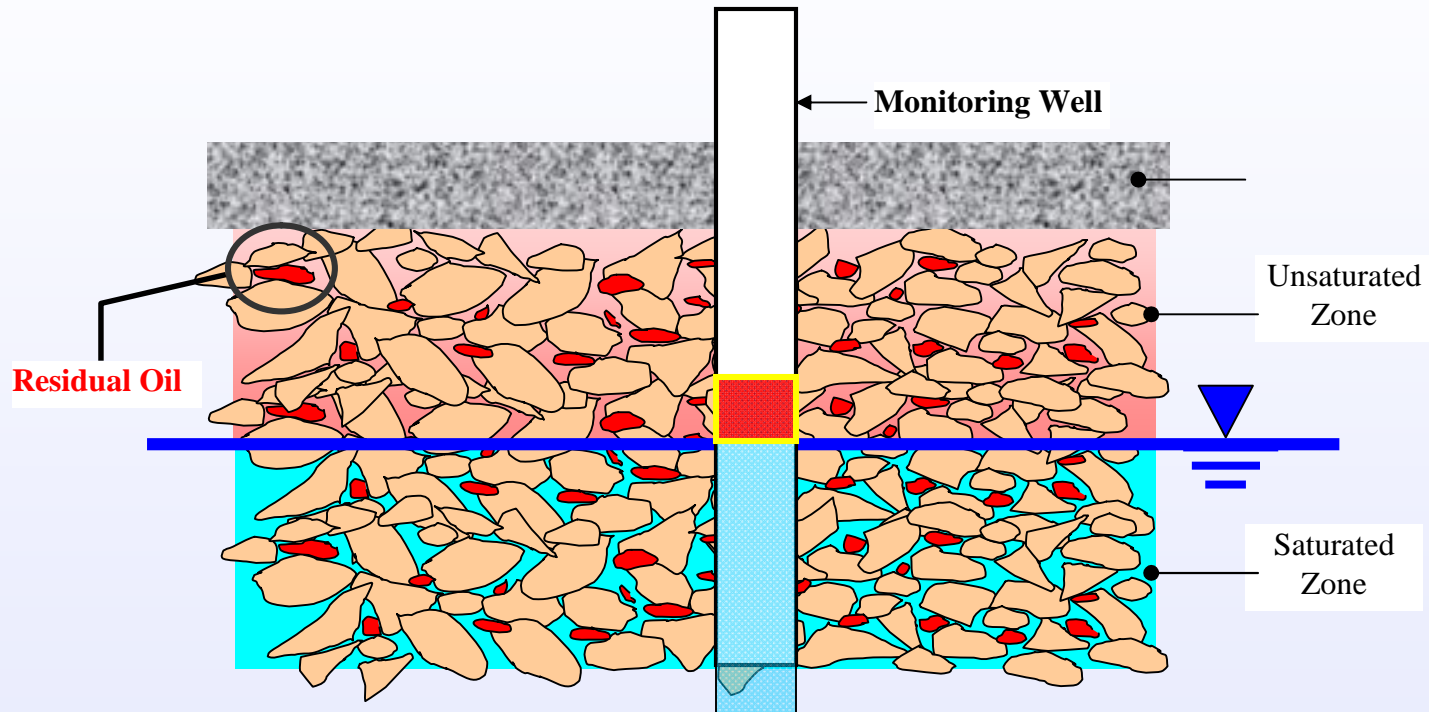
Viscosity ?

Conceptual Site Model ?



LNAPL Assessment

Monitoring Well vs “True” Formation



LNAPL Regulatory Issues

310 CMR 40.0996(6):

“The presence of non-aqueous phase liquids (NAPL) having a thickness equal to or greater than 1/2 inch in any environmental medium shall be considered a level which exceeds Upper Concentration Limits.”

Effect on Permanent Solutions?



Permanent Solutions After 5 Years

Tier Classified Sites

	LNAPL > 1/2"		All Petroleum Sites		All Sites	
	#	%	#	%	#	%
no RAO	183	42.9	1681	30.3	3387	31.9
RAO C	74	17.3	506	9.1	993	9.3
RAO A or B	162	37.9	3279	59.1	6101	57.4
RAO unspecified	8	1.9	80	1.4	147	1.4
Total	427	100	5546	100	10,628	100



Permanent Solutions after 5 Years

Tier Classified Sites

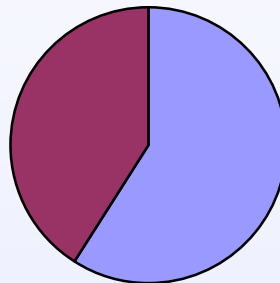
LNAPL > 1/2 inch



37.9%

162 of 427

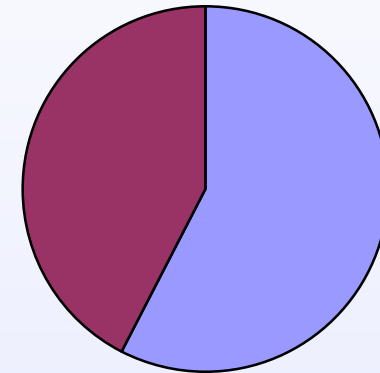
All Petroleum Sites



59.1%

3279 of 5546

All Sites



57.4%

6101 of 10,628

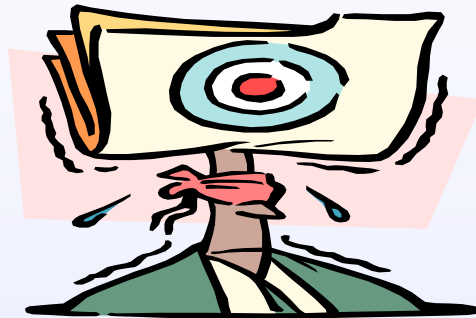


LNAPL Workgroup Topics

- Conceptual Site Model
- Potential exposure pathways
- Principles of LNAPL mobility and “Residual Oil Saturation”
- Previous studies, existing empirical data sets, federal and state policies
- Analytical data requirements and methods
- Implementation under existing regulations
- Possible future regulatory changes



Questions?



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