Light Non-Aqueous Phase Liquid (LNAPL) Initial Recovery and Interim Remedial Measures Guidance

Kevin F. Kratina, Chief, Bureau of Underground Storage Tanks

June 2011

http://www.amiadini.com/newsletters/environmental-enlightenment-084.html

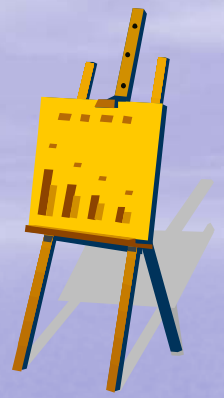
New Jersey Department of Environmental Protection
Site Remediation Program

Light Nonaqueous Phase Liquid (LNAPL) Initial Recovery and Interim Remedial Measures Guidance

Version 1.0
June 2011

http://www.nj.gov/dep/srp/guidance/srra/lnapl_guidance.pdf

LNAPL Presentations Today



- **Background**
- **Overview of the LNAPL Timeframes**
- **Guidance Document Review**

(Steve Ueland – Langan Engineering)

- **Technical Review of LNAPL Behavior**
- **Case Examples**

- **Questions and Answers**

Guidance Committee

Members:

Jeffrey Dey, The Resource Companies
John Donohue, Fuel Merchants
Jeffrey Farrell, PS & S
Joel Fradel, NJDEP
Kevin Kratina, NJDEP
Bob Mancini, Chevron Environmental Management
Jill McKenzie, NJDEP
B.V. Rao, G & R Environmental Services
Steven Ueland, Langan and LSRPA

Guidance Development

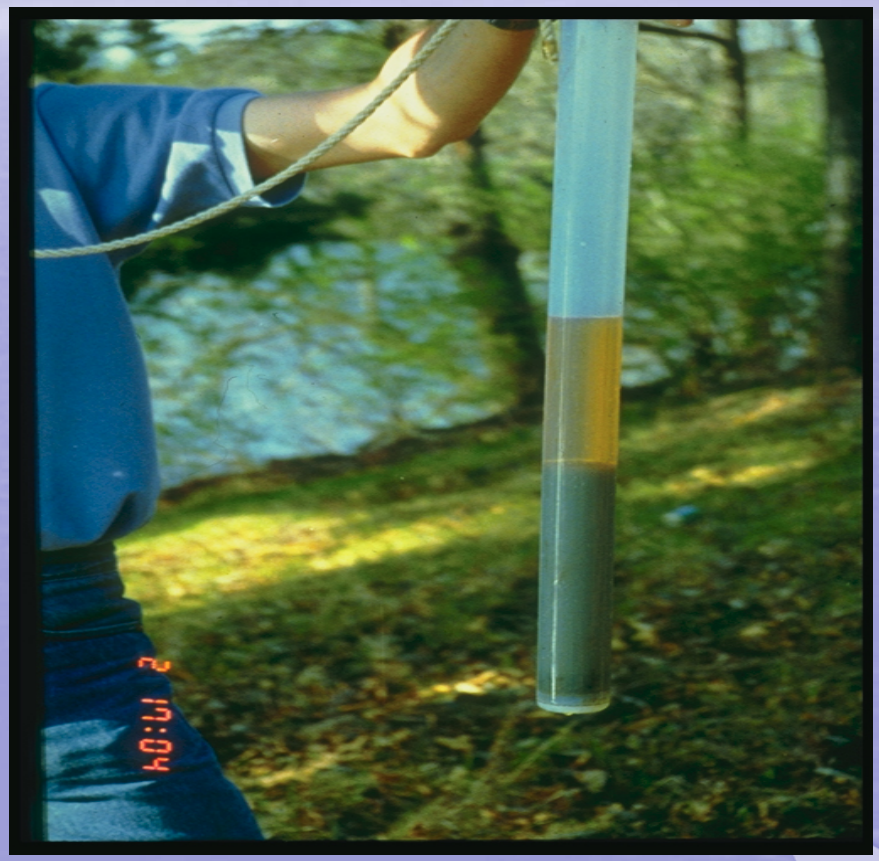
- 2/2010* – 1st Dept. Draft and Form Posted
- 6/2010 – 1st LNAPL Committee Meeting
- 12/2010* – Stakeholder Review
- 2/2011 – Reporting Section Posted
- 6/2011 – Final Guidance Posted

LNAPL Definition

- Per N.J.A.C 7:26E-1.8 – “hydrocarbons that exist as a separate and immiscible phase liquid when in contact with water and/or air, can exist as a continuous phase (mobile) and/or discontinuous mass (immobile) and is less dense than water at ambient temperature.”

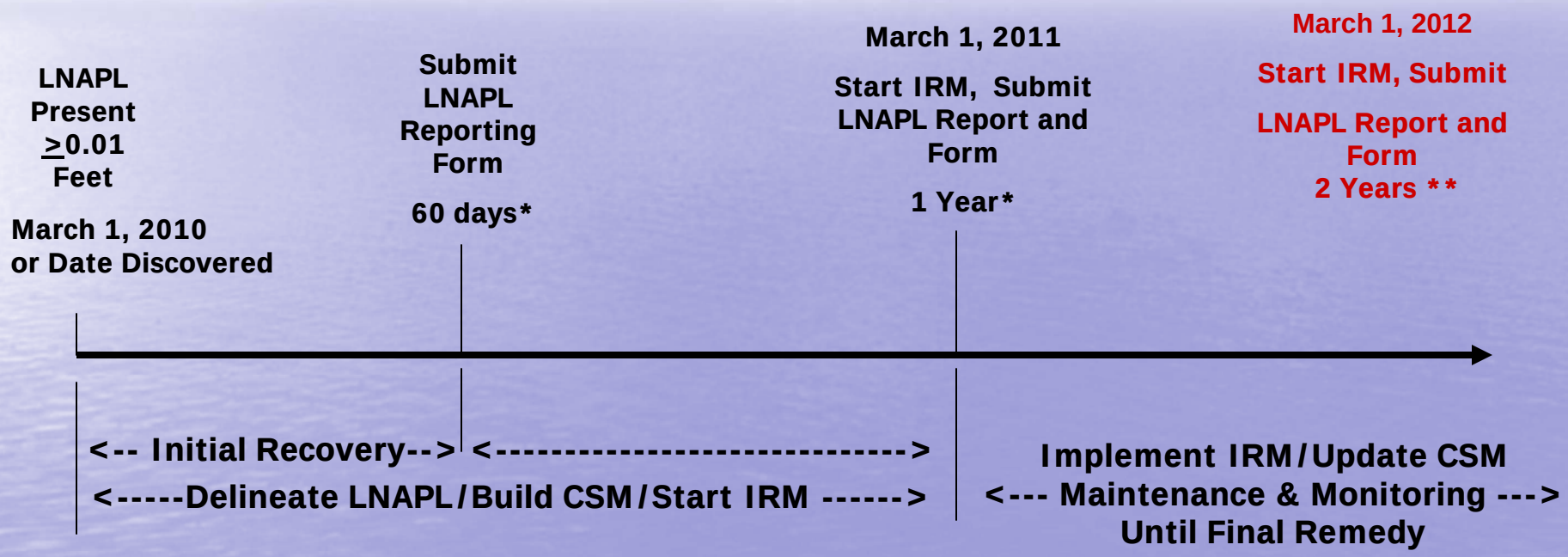
LNAPL Trigger

- **LNAPL Present ≥0.01 Feet in a "collection point"**



http://www.epa.gov/oust/graphics/misc0045.jpg

LNAPL Initial Recovery, Interim Remedial Measure Initiation and Reporting Timeline



* Regulatory timeframe - N.J.A.C. 7:26E-1.12

** Mandatory Timeframe - N.J.A.C. 7:26C-3.3

What Should I be doing?

0-60 Days from Discovery

- Immediately identify and stop LNAPL discharge
- Evaluate/protect receptors
- Conduct initial recovery - continue if applicable and
- Submit LNAPL Reporting Form

What Should I be doing?

0-365 Days from Discovery

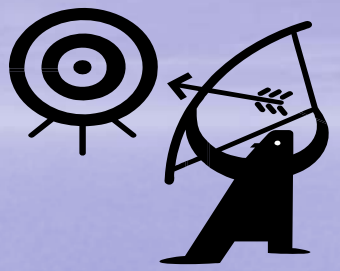
- Delineate the extent of LNAPL
- Continue with Initial Recovery – if applicable
- Protect/monitor receptors
- Build Conceptual Site Model
- Select and Start Interim Remedial Measure and
- Submit LNAPL Report and Form

What Should I be doing?

<u>> 1 year from Discovery</u>

- Implement IRM until final remedy;
- Update Conceptual Site Model as needed; and
- Monitor IRM, LNAPL and Receptors.

Overall LNAPL IRM Objectives

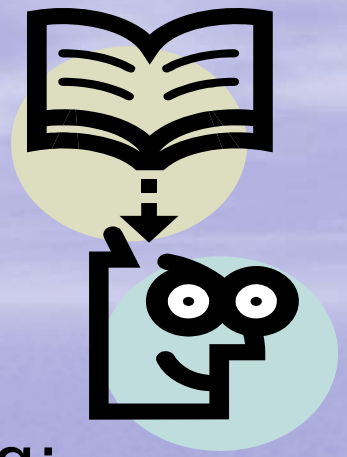


- Prevent LNAPL Migration
- Reduce Contaminant Mass (when practicable)

  Always.....

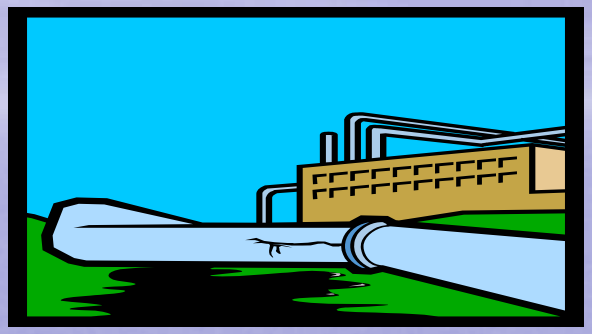
- Immediately stop any LNAPL Discharge
- Protection of human and ecological receptors part of decision making

LNAPL Guidance



- ✓ Identify LNAPL
- "Initial" LNAPL Recovery and Reporting;
- Undertake a LNAPL specific Remedial investigation (understand LNAPL body early-on) and Build a Conceptual Site Model;
- Start an Interim Remedial Measure and Monitoring;
- Reporting; and
- Conduct Monitoring.

Conduct “Initial” Recovery



- Within 60 days of discovery;
- Response could be
  - recovering LNAPL from an excavation, use of absorbents, bailing, vacuum extraction, skimmers, etc. (Appendix A lists some examples);
- For existing cases, if “initial” actions already taken, they count; or
- Extension an option (see ARRCs Subchapter 3)

Submit Initial Reporting Form

New Jersey Department of Environmental Protection

Site Remediation Program

LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) FREE PRODUCT REPORTING FORM

http://www.nj.gov/dep/srp/srra/forms/lnapl_free_product_reporting_form.pdf

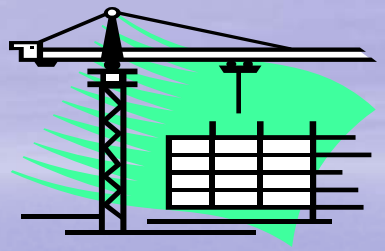
- Due 60 days from discovery
- Basic Information (Sections A, B, C1 and E)
- Reporting is outcome based…"how you responded"

“One Year Timeframe”

4 Actions to Accomplish:

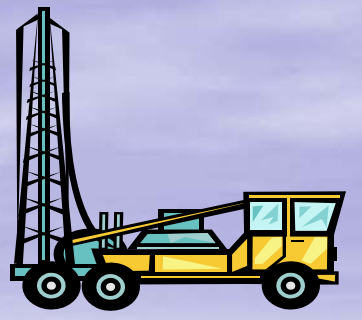
- Develop Conceptual Site Model
- Determine Extent of LNAPL
- Initiate an IRM and
- Reporting

Build a Conceptual Site Model
(scaled to meet site conditions)



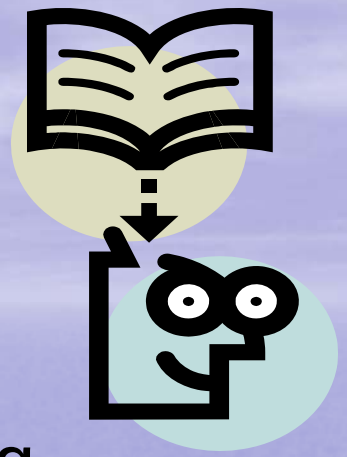
1) Understanding LNAPL Source(s)
2) LNAPL Chemical & Physical Characteristics
3) Site Specific Hydrogeology
4) Extent of LNAPL
5) Ground Water Flow
6) Potential Receptors and Migration Pathways
7) LNAPL Saturation, Mobility and Recoverability
8) Concentrations of related compounds in dissolved and vapor phase

Delineation Methods



- Appendix B of the Guidance provides some examples
- Test pits, soil cores, borings, well points, direct push with Laser Induced Fluorescence, Cone Penetrometer, permanent wells, etc.
- Regular well gauging (LNAPL migrating or function of water elevation change)

LNAPL Guidance



- ✓ Identify LNAPL
- ✓ “Initial” LNAPL Recovery and Reporting
- ✓ Undertake a LNAPL specific Remedial investigation (understand LNAPL body early-on) and Build a Conceptual Site Model
- Initiate an Interim Remedial Measure and Monitoring
- Reporting and
- Ongoing Monitoring

Initiate an IRM in 1-Year

- Screen conditions against LNAPL Remedial Technologies – Appendix A (ITRC 2009) and API Interactive Guide (2004)
- Implement IRM

Types of Operational Monitoring

- Suggesting MW network within and around LNAPL Body
- Monitor Receptors and
- IRM Monitoring – Section IX (examples for IRMs using GW extraction, total fluids and surfactant injections)

IRM - Points of Clarification

- User is reminded that 7:26E-6.1(d) does require LNAPL treatment or removal when practicable, and containment when not practicable.
- The LNAPL IRM does not have to be a final remedial decision.
- The IRM may or may not be the same as the initial recovery method.
- The IRM does not have to be “completed” in the 1 year from LNAPL discovery.

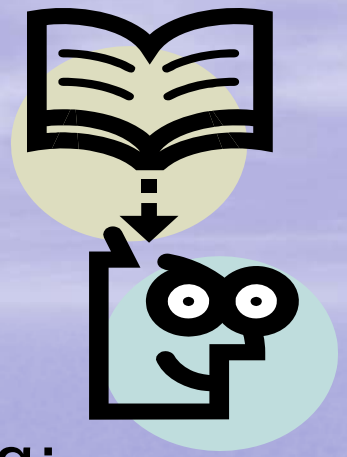
IRM - Points of Clarification (continued)

- IRM could be monitoring only for sites with low solubility/high viscosity LNAPL, little or no dissolved GW contamination and poor mass recovery, (Guidance suggests that the LNAPL Report in this situation include a discussion of future LNAPL Plans).
- If IRM is not effective and new approach is needed to meet objectives, timeframes do not restart. New approach gets reported in final RI/RAW key document.

IRM - Points of Clarification (continued)

- If product disappears/reappears (i.e. not a new release), timeframes do not restart. May need to refine CSM and modify IRM to meet objectives.
- “IRM” does not have to remove “all” the LNAPL but rather meet the performance metrics for the selected method. LNAPL final remedy decisions, outside the scope of this document, are based on N.J.A.C. 7:26E-6.1(d).
- If product appears, and is from a new release, timeframes start again and new form etc. is required.

LNAPL Guidance



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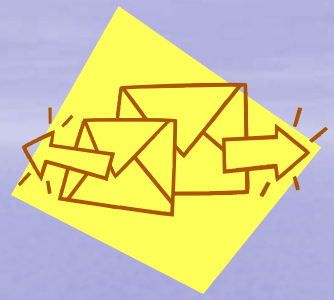
- Reporting; and
- Monitoring

IRM Report & Form Due at 1-Year

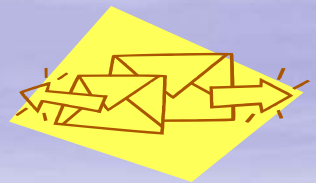


- LNAPL Source and Extent
- Effectiveness of initial recovery effort, and IRM if already implemented
- Description/Justification for IRM
- Discussion of IRM endpoints\performance metrics and
- Operational Monitoring Plan

IRM Performance Metrics and Monitoring

- Metrics set by LSRP\Consultant based on CSM and selected IRM designed to prevent migration and accomplish mass reduction (See ITRC 2009 Section 4.2.3);

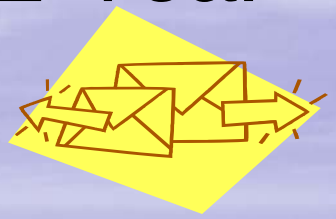
IRM Report & Form Due at 1-Year (continued)



Report should include one of the following:

- LNAPL removal complete w/monitoring plan;
- LNAPL removal not complete – initiated IRM until IRM goals/endpoints met (i.e. IRM Objectives); or
- LNAPL remaining but removal/treatment is not practicable (include technical rationale supporting this conclusion) with monitoring plan.

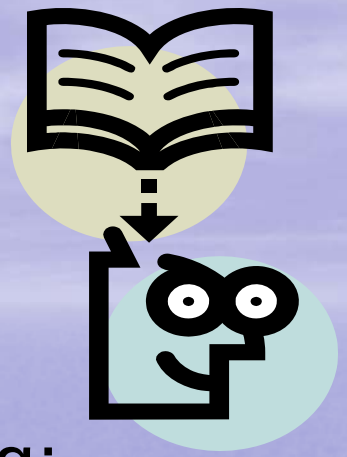
IRM Report & Form Due at 1-Year (continued)



Appendix C – “Contents of a Typical LNAPL Free Product Interim Remedial Measures Report”

(Designed to support report preparation)

LNAPL Guidance



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KEEP PROGRESSING TILL FINAL REMEDY!

Contact Information

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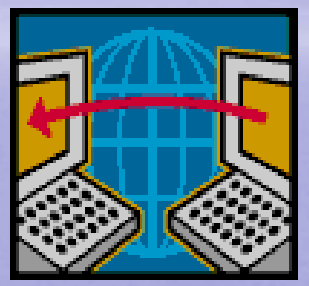

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