

# 2016 ITRC PROJECT PROPOSAL

## Remediation Projects Only

### [LNAPL-3]

**Instructions:** The Interstate Technology and Regulatory Council (ITRC) requests proposals for ITRC projects **in the remediation area only** for a 2016 start. Proposals should be submitted according to the process outlined in the [2015 ITRC Request for Proposals - Remediation Projects](#) and [2015 ITRC Project Selection Process and Criteria – Remediation Projects](#), which are also available on the ITRC website ([www.itrcweb.org](http://www.itrcweb.org)) under About ITRC – Planning.

Proposals must be prepared using this proposal template. The page limit for the proposal is 5 pages, and the proposal must be printable on a standard black and white laser printer. Only one Microsoft Word file containing the proposal will be accepted (other formats or attachments will not be considered). The file size must be less than 5 MB. Proposers are reminded to present a proposal with a well-focused scope that ITRC can address (e.g. the proposal should be technical in nature and not policy-oriented; research or demonstration projects are not valid). Receipt will be acknowledged by email within one business day of proposal receipt. It is the responsibility of the proposer to follow up, if receipt confirmation by ITRC is not received.

Questions can be addressed to Christophe Tulou, ITRC Director, [ctuloucontractor@ecos.org](mailto:ctuloucontractor@ecos.org), 202-266-4933.

*Please use brief statements or bullet items to input the requested information*

#### PROPOSAL DATE:

Today, 2015

#### Proposal Contact

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#### Proposals Topical Area

**CHAR / CONT:** LNAPL, LNAPL CSM, transmissivity, natural source zone depletion (NSZD)

#### Proposal Summary

Since 2007, ITRC has been a national leader in producing technical and regulatory guidance documents (guidance) and training courses on light non-aqueous phase liquids (LNAPL). Specifically, ITRC has published two documents, LNAPL-1 and -2 (2009), focused on an overview of the understanding, at the time, of natural source zone depletion (NSZD) and evaluating remedies based on improved quantification metrics. The metrics include effective solubility for compositional based risk, LNAPL transmissivity for recoverability, and multiple

lines of evidence for LNAPL body stability. Furthermore, ITRC has produced a three-part internet-based and two day classroom training courses that has trained over 15,000 participants since 2009. Even with this significant historic exposure, the demand for LNAPL training still remains high as evidenced by current training statistics.

*Problem Statement:* The ITRC LNAPL internet-based training Parts 1 and 2, and Day 1 of the 2-day classroom training are not based on an ITRC guidance document, even though ITRC's policy is to base all training on ITRC guidance or similar documents. When the LNAPL team was formed from the former U.S. EPA Remediation Technology and Development Forum (RTDF), their document, *A Decision-Making Framework for Cleanup of Sites Impacted with Light Non-Aqueous Phase Liquids (LNAPL)* was produced but without associated training. This document included a practical checklist for developing LNAPL conceptual site models which is still the basis for understanding and effectively managing LNAPL impacted sites. Due to the need to quickly transfer this information to the target audiences, ITRC made an exception to its policy and developed Parts 1 and 2 of the internet-based courses based, in part, on the RTDF work as well as on other basic scientific concepts documented only in scientific journal articles. Other than through the training courses, these concepts remain relatively undocumented by ITRC.

Although recent Australian CRC Care (Cooperative Research Centre for Contamination Assessment and Remediation of the Environment) documents and the CL:AIRE UK (Contaminated Land: Applications in Real Environments United Kingdom) LNAPL Illustrated Handbook have included these concepts, these groups are not widely recognized in North America. These documents are also not complete in covering all of the aspects now included in the ITRC training. Furthermore, the application of these scientific principles over the past ten years has led to improved understandings such as how the basic concepts of relative permeability, capillary pressures and residual saturation affect recoverability and are well quantified via LNAPL transmissivity parameter. In addition, significant new technical understanding, regulatory know-how and application, case studies, early response practices, and field tested approaches (collectively, "new science") have been and continue to be developed since the publication of LNAPL-1 and -2 (2009). Examples of this include conceptual models of LNAPL distribution and mechanisms that lead to sheens, and how capillary pressures can lead to confined or perched LNAPL conditions.

Throughout the 5 years that the LNAPL classroom training has been offered, the training team has iteratively incorporated much of the new science through each offering. However, the curriculum has reached a point such that there is more new science presented (Day 2) than what was captured in the original ITRC LNAPL documents. Therefore, this proposed project looks to develop:

- a comprehensive up-to-date web-based guidance document that converts (from hard copy format) the fundamentals capture in the original ITRC LNAPL documents and incorporate the cutting edge new science developed since their publication
- provide a one-stop information portal with job and learning aides for regulators and practitioners, including managing early response to new LNAPL releases

- provide an evergreen resource to support and supplement the internet-based and classroom training offerings.

An ancillary issue developing between ITRC teams and products particularly focused on petroleum related issues (perhaps others) is the loss of consistency in the conceptualizations of the source characteristics and subsequent fate and transport behaviors in the subsurface. While this issue is larger than just this proposed LNAPL team, it has impact on how the guidance should be ultimately written and presented such that consistency is better maintained. Specifically, the ITRC PVI team utilizes LNAPL as a potential source of petroleum vapor intrusion; yet, inconsistently describe the LNAPL source characteristics when compared to the conceptual model described by members of the LNAPL training team. Both issues (LNAPL behavior and PVI) culminate in the processes associated with NSZD, where significant new science is being developed associated with measuring and further understanding the processes of LNAPL undergoing NSZD. Likewise, a cross-connection of the LNAPL team with the newly formed TPH Risks team will be needed to ensure consistency is maintained in both documents, particularly as it relates to LNAPL compositional changes undergoing active recovery or passive attenuation approaches. Each of these issues (LNAPL, PVI, and TPH Risks) will need to be made consistent with previous and ongoing ITRC documentation.

*Approach:* Significant historic (RTDF) and new science on LNAPL, LNAPL Conceptual Site Model (CSM) development, transmissivity, and NSZD is already available to form the basis of a comprehensive LNAPL guidance document. The sources of information include:

- RTDF information currently undocumented by ITRC but incorporated in the LNAPL internet-based and classroom (Day 1) trainings
- new science incorporated into the ITRC LNAPL classroom training (Day 2)
- State guidance that have incorporated the ITRC LNAPL-1 and -2 guidance
- ASTM LNAPL CSM and transmissivity documents and proposed updates
- API LNAPL portal under development (which could potentially be switched to ITRC as the platform)
- Other Resources: CRC Care, CL:AIRE UK LNAPL Illustrated Handbook, ANSR, Lustline, ASTSWMO, etc.

These various resources will be reviewed along with other relevant ITRC guidance documents to ensure consistency in the conceptualizations and recommendations of contaminant fate and transport behavior. The ITRC documents include (but are not limited to) LNAPL-1, LNAPL-2, VI-1, VI-1A, PVI-1, RMCS-1 (in draft), TPH-1 (initiates in 2016), etc. In order to maintain a cross-connectivity and consistency between the various ongoing teams, individual ITRC LNAPL Team members should be designated to reach out to the TPH and PVI training teams (perhaps others) on a continuous basis.

*Barriers addressed:* If the ITRC classroom training discontinues, the following shortfalls would develop:

- historic RTDF information (Day 1) will remain essentially unavailable to State regulators and industry/consulting practitioners (target group)

- new science will not be captured in a comprehensive, open resource for the target group
- potential inconsistencies between various ITRC teams (LNAPL, PVI, TPH Risks, Complex Sites, etc.) may remain
- guidance on early response practices to LNAPL releases does not currently exist
- college undergraduate programs do not currently cover, nor do many practitioners receive graduate course work on multi-phase source characterization or remediation. ITRC is seen as a primary knowledge transfer for this information in the form of continuing education following formal academic training.

*Schedule:* This project would follow a three (3) year schedule in order to produce a comprehensive web-based LNAPL guidance document containing knowledge originating from the RTDF to the new science developed since the publications of ITRC LNAPL-1 and -2 (2009). In addition, internet-based training will be developed to transfer this comprehensive guidance to target audiences.

### **Proposed Personnel**

Project managers from all regulatory programs (e.g. RCRA, UST, voluntary clean up, certain CERCLA) dealing with petroleum hydrocarbons and/or LNAPL issues.

Petroleum industry, oil services, and environmental consultants, suppliers, and vendors

Academic institutes developing new science in the areas of LNAPL CSMs, LNAPL management strategies, transmissivity, and NSZD.

Confirmed State interest \*: CA (Paul Cho), CO (Erik Gessert), MO (Laura Luther), MN (Tom Higgins, Paul Stock), MT (Jeff Kuhn), VA (Karen Haley), ...

State interest to be confirmed: IL, IN, KY, MI, UT, WY,...

Confirmed IAP interest: American Petroleum Institute, BP, XOM, ...

Academia: Colorado State University, University of British Columbia, Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), ...

\* personal communications made with the identified individuals; may or may not be the State resource participating on the team

### **Summary of Deliverables (primary project product(s))**

Comprehensive web-based LNAPL technical and regulatory guidance document that converts (from hard copy format) LNAPL-1 and -2, the fundamentals captured in the original ITRC LNAPL internet and classroom trainings, and incorporates the cutting edge new science developed since their publication

Updated LNAPL internet-based training with the potential to generate a natural follow-on project to create an LNAPL classroom training Part 2 offering

Web portal containing job and learning aides for regulators and practitioners dealing with LNAPL, including managing early response to new LNAPL releases

A preliminary plan on how to maintain an evergreen web portal and web-based guidance document as new LNAPL science is developed. This process would be further refined in

association with how ITRC in general decides on maintaining up to date web-based guidance documents. This plan would be incorporated into the implementation phase.

**Targeted Users (who will use products generated by this project?)**

State and federal regulators in CERCLA, RCRA, UST, voluntary programs

Remediation groups within integrated petroleum and services companies

Environmental consulting firms, suppliers, and vendors supporting LNAPL management and clean up sites