

**Revised Project Charter Outline  
for the Sustainable & Healthy Communities Research Program**

**Project Number & Title**

3.62 Environmental Releases of Oils and Fuels

**Project Lead and Deputy**

Robyn Conmy, NRMRL (Project Lead)  
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**Project Period**

FY16 – FY 19

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## Project Summary

EPA is responsible for assessing environmental releases of oil from multiple sources, including fuel from leaking underground storage tanks. These releases occur in communities throughout the country, potentially affecting human health and the environment through their impacts on water quality (including drinking water supplies), or through direct human exposure to toxic constituents. The project is divided into three focus areas: oil spill science and response, leaking underground storage tank (LUST) science and management, and the impacts to community public health and ecosystems. Research on oil spills and leaking underground storage tanks will be used by the Office of Solid Waste and Emergency Response (Office of Underground Storage Tanks (OUST) and Office of Emergency Management (OEM)) and Office of Water to develop guidance and rulemaking with respect to preparation for and response to releases. In addition to the Agency Program Offices and Regions, research for this charter is conducted in support of States, Tribes and, other regulatory authorities. For oil spill science and response, new protocols for chemical agents and other additives, developed by ORD, will be used to inform regulatory actions and guidance. The private sector will use these protocols to advance remediation / response technologies for various conditions and oil products. Also, a portion of impact assessment may be conducted through NRDA (Natural Resource Damage Assessment) and RESTORE Act (Resources and Ecosystems Sustainability, Tourism Opportunities and Revived Economy of the Gulf Coast) efforts. Research on the fate and transport of fuels and their constituents, using laboratory, field, and modeling approaches will be used to reduce the backlog of LUST sites. Research will address ways to improve our ability to minimize environmental and human impacts from these environmental releases.

## Project Description

### Problem and Decision Context

Innovative research approaches described within the SHC 3.62 Charter (Environmental Releases of Oils, including Fuels) help to achieve more efficient and effective management of oil spills, including fuel. Research products allow for the development of improved protocol and guidelines to improve regulations and response efforts to protect communities from exposures to environmental releases of oils and fuels. ORD provides critical products to OUST and OEM, where key science questions include:

- What response products and actions are effective on oil spills in a wide range of environmental settings to minimize environmental and human consequences?
- What management, assessment and/or remediation approaches are needed for minimizing environmental damage and human and ecological exposures from leaking underground storage tanks?

The overarching project goals are to (1) develop decision-support tools (e.g., models) for determining risk to communities from fuel and oil spills and leaking storage tanks, (2) develop methods and protocols in support of the National Contingency Plan (NCP), including for testing of chemical agents and other additives listed on the Product Schedule, and (3) develop new approaches and tools for evaluating exposure to populations and ecosystems and subsequent impact to communities. We aim for research products to be incorporated into efforts within the SHC program, EPA Program Offices, Regions and community stakeholders addressing and providing sustainable solutions for managing environmental releases of fuels and oils. Measures of success would be reflected in the application of these research products during decision-making activities, including planning.

## Outputs

3.62.1 Tools for improved characterization, response and remediation of oil and fuels, to improve emergency response and other cleanup activities; expected completion date: FY 16

Science question: How can we better characterize, respond to, and remediate contamination from new as well as existing fuels and oils to minimize human exposures and environmental damage?

Description: This output will provide new conceptual and predictive tools to characterize and remediate contamination by fuels, and will also provide biological and chemical treatment approaches to improve effectiveness and timeliness of oil spill response and cleanup activities. Conceptual and predictive tools to assist in triaging sites for cleanup and the development of tools to protect community public health and reduce impacts to community resources so site remediation decisions can be more effective and timely. This work will advance community sustainability, especially by protecting and restoring water resources and ecosystems that have been impacted or contaminated by oil, benefitting public health and environmental resources. This effort will build on previous work with fuel and oil contamination, with attention to newer types of fuels and oils, and the environments in which they will be present.

3.62.2 Tools for evaluating temporal and spatial impacts of fuels/oils site cleanup on public health and the environment, for use in oil spill response and in site remediation, restoration and revitalization; expected completion date: FY17

Science question: How can we better determine the type, degree and extent of impacts of fuel and oils spills on community public health and their resources, especially those that are temporally and spatially removed from the original contamination?

Description: This output will provide tools to help communities and site managers to better evaluate and predict the potential public health impacts of fuels and oil spills, so they can identify and address those impacts to advance public health through prevention measures and improved response technologies to minimize impacts to their resources. This effort will build on previous contaminant fate and transport characterization work, which is necessary to evaluate exposure to populations and impacts to ecosystem services

that will affect human health and the environment. This will involve assessment of appropriate metrics for oil spill response, and for remediation, restoration, and revitalization, in the context of potential changes due to various factors, such as climate change.

## Focus Areas

**OIL SPILL FOCUS AREA** - Atypical oil spills (e.g., deep sea and prolonged), such as the 2010 Deepwater Horizon (DWH) Gulf of Mexico spill, have resulted in heightened awareness by emergency responders and scientists, on both the capabilities and limitations of the spill response methods available for use today (viz., conventional booming and skimming, *in-situ* burning, bioremediation, and the application of dispersants), but also on the equally important ecological and human health concerns associated with certain spill mitigation technologies<sup>1</sup>. Ecological issues concerning dispersant and dispersed oil toxicity on deep sea and surface flora and fauna, their ultimate fate in the environment, and the effects of chemical agent use on oil impacted shorelines and wetlands are of concern. These concerns are expressed by not only Federal, state and local governments but also by the impacted communities, especially those who rely on aquatic resources for their livelihood (e.g. fishermen). Additionally, smaller spills occur throughout the country (over land and inland waters), also have similar human health, ecological, and economic concerns for impacted communities. Efforts under this Focus Area align with the 2011 ORD Oil Spill Research Strategy Document where research related to oil spills will target at least two aspects of response: (1) spill preparedness via product testing protocols and, (2) innovative spill response options tailored to specific oils and environments, including sustainability dimensions of competing actions. This includes research to:

- Develop a better understanding of the impacts of oil spills and dispersants application on the environment.
- Develop a better understanding of the environmental impacts of oil spills, including non-petroleum oils, on coastal (including shoreline) and inland environments.
- Develop innovative and more sustainable technologies to assess and mitigate the impact of oil spills.

Oil Spill Emerging Issue: The shipment of oils across the U.S. to refineries has drastically increased in recent years (e.g., Midwest to the Gulf of Mexico shipment via the Mississippi River is up 13-fold since 2010, monthly barge and tanker shipment to the Gulf Coast is now ~3.8 million barrels) (source Wall Street Journal, 02/02/14. Additionally, 75% of the oil from the Bakken formation is transported

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<sup>1</sup> Report to the President: *Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling*, National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling  
[http://www.oilspillcommission.gov/sites/default/files/documents/DEEPWATER\\_ReporttothePresident\\_FINAL.pdf](http://www.oilspillcommission.gov/sites/default/files/documents/DEEPWATER_ReporttothePresident_FINAL.pdf)

via rail, of which 25% ships through the emerging Albany, N.Y. hub for subsequent delivery to refineries. This doubled the volume of crude bound for Atlantic coast in 2013 (source: NY Times; 02/28/14). These rail lines traverse lands within the Great Lakes watershed. Not only is the increased volume of concern, but also the change in oil type, where diluted and synthetic bitumen is produced from the Bakken Formation and Canadian oil sands formations. These products are particularly difficult to remediate and exhibit chemical and physical behavior unlike other crude oils. Research is needed on the characterization of the oil composition, and on its fate and transport to establish appropriate response and remediation methods.

#### Oil Spill Products:

- Report on the evaluation of optimum mixing speeds for OEM's proposed Baffled Flask Test for the dispersant effectiveness protocol.
- Report on the development of a Surface Washing Agent effectiveness protocol for products on the NCP Schedule.
- Documented approach on the development of a fluorescence library for petroleum oils.
- Report on wave tank simulations characterizing the effect of dispersant on dispersion effectiveness during surface and deep ocean oil spills; a decision support tool.
- Report on the biodegradation and toxicity of diluted bitumen crude oils to determine fate of bitumen discharged in water.
- Propose an efficacy test protocol for solidifiers listed on the NCP Product Schedule.

**LUST FOCUS AREA** - Approximately 600,000 underground storage tanks are regulated by EPA's program. Underground storage tanks exist at more than 213,000 sites located near population centers, putting indoor air and drinking water resources at potential risk. Leaks are common and, despite cleanup of more than 436,000 releases, there is a backlog of some 78,000 releases awaiting cleanup<sup>2</sup>. Fuel composition in the U.S. can change rapidly with mandates for biofuel use and industry response with new fuel components which have potential impacts on tank integrity and contaminant plume behavior and extent. Plumes of volatile organic compounds (VOCs) migrate with ground water and can contaminate municipal supply wells, private drinking water wells, or migrate into human-occupied buildings via transmission through underlying soil. Tanks research is focused on understanding, modeling, and remediating contaminant plumes resulting from leaks from underground storage tanks, and their impacts on buildings and water supplies, both private and public. This focus area aims to:

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<sup>2</sup> Semiannual Report of UST Performance Measures, End of Fiscal Year 2013 (October 1, 2012-September 30, 2013). UST Program Facts, December 2013, Accessed at [www.epa.gov/oust](http://www.epa.gov/oust).

- Develop an improved conceptual model for petroleum hydrocarbon plume formation and migration from lab, field and modeling studies, which accounts for the spatial and temporal features that control plume migration.
- Develop a better understanding of fuel behavior at the water table and impacts to water supply wells from water table fluctuation caused by cycles of drought/extreme precipitation due to climate change.
- Develop the capacity to identify areas with high density of private wells, potentially leaking tanks, redevelopment sites and their proximities to water supplies.

LUST Emerging Issue: The impact of inadequate site characterization is being recognized as contributing to backlogged LUST sites and increased costs. Improved site characterization methods, such as Laser-induced fluorescence and membrane interface probe technologies, are providing a new capability to characterize the location of leaked fuels. The ability to bring these types of data into model-based assessment for decision-making is addressed in the LUST focus area of this project.

LUST Products:

- Documented approach on private well-mapping research that describe protocols for determining well densities, proximity-driven risks to water supply wells, and redevelopment corridor locations.
- User's Guide for PVI-Screen Model including distributable software.
- Report on ethanol corrosion studies and on-going tech support to states
- Report on gasoline composition, including expanded information for state agency use.
- Report on modeling hydrocarbon transport from sources located in various positions relative to the water table in support of backlog reduction, including supporting documentation for assessing subsurface impacts of fuel hydrocarbons, given variation in spatial and temporal features controlling transport.
- Report on density of domestic water well locations and proximity to LUST and potential brownfields sites, through the use of GIS tools.

## Nature of the Work

The innovative research proposed in this project includes expertise in geo-spatial modeling, petroleum chemistry, biodegradation, optical sensing, hydrosol physics, regulatory acts, wave tank simulations, numerical model development, field and lab study expertise, and on-site and off-site contract management. The nature of the work includes

- Identifying information gaps pertaining to oil spills and LUST;
- Developing improved oil spill surveillance tools and/or methodologies;
- Developing new protocols for the National Contingency Plan Product Schedule;

- Integrating lines of evidence collected during spills for improved decision-making activities;
- Developing spatial and temporal information on risks to surface and ground water receptors;
- Creating new conceptual and integrated models for transport of fuels and assessing impacts of contaminants under conditions of characterization uncertainty;
- Developing methods to incorporate models into GIS mapping tools to assess public health and ecosystems;
- Evaluating effectiveness of remediation to recovery to revitalization;
- Evaluating best available oil spill science to determine their utility in strengthening SHC research.

## Collaboration

Work conducted through this charter is supported through collaboration with the following:

Federal Agencies: National Oceanic and Atmospheric Administration, U.S. Coast Guard, Department of Interior's Bureau of Safety and Environmental Enforcement and U.S. Geological Survey.

EPA (outside of ORD): Office of Solid Waste and Emergency Response / Office of Emergency Management and Office of Underground Storage Tanks; *Office of Enforcement and Compliance Assurance; Office of Water and Regions 1-10.*

State or Other Organizations: State Underground Storage Tank Regulatory Agencies, Association of State and Territorial Solid Waste Management Officials, Interstate Technology Regulatory Commission and Tribes, Department of Fisheries and Oceans Canada.

Planned and/or anticipated collaborations within ORD (contribution to and from): SHC 1.61 (Structured Decision Making with inclusion of SDM in contaminated site management); SHC 1.62 (EnviroAtlas, incorporation of relevant GIS-based information on ecosystems into geo-spatial modeling for risk assessment); 2.61 (Community-based EGS, incorporation of EGS function and valuation in managing contaminated sites); SHC 2.62 & 2.63 (Community public health and vulnerable populations, addressing cumulative exposures to communities within and across regulatory programs, and GIS-based approach to addressing potential public health exposures); SHC 3.61 (Contaminated Sites, addressing cross-programmatic clean-ups); 3.63 (SMM, addressing cross-programmatic clean-ups); SHC 4.61 & 4.62 (Sustainability assessment and applications, evaluating the use of TRIO, Total Resources Impact & Outcomes, for environmental release of oils). Additional collaboration will be sought from the CSS, SSWR and ACE Programs regarding ecotoxicity of dispersed oil to organisms and air emissions from in situ burning.

## Assumptions/Constraints

One constraint is oil procurement, which has become increasingly difficult in recent years, resulting in reduced access to oils for testing.

## Project Charter Team Members

Robyn Conmy, NRMRL (Project Lead)  
Jim Weaver, NRMRL (Deputy)  
Thabet Tolaymat, MI Representative  
Fran Kremer, NRMRL  
Randy Parker, NRMRL  
Mace Barron, NHEERL  
Ronald Herrmann, NRMRL  
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Jorge SantoDomingo, NRMRL

## Task 1 Behavior, Fate and Effects of Oil and Spill Agents

Project Title: 3.62 Environmental Releases of Oils and Fuels

**Task 1 Title: Behavior, Fate and Effects of Oil and Spill Agents**

**Task 1 Lead: Robyn Conmy**

**Task 1 Start Date: FY16**

**Task 1 End Date: FY19**

### **Task 1 Description:**

Atypical oil spills have heightened awareness by emergency responders and scientists on the capabilities and limitations of spill response methods available for use today. For impacted communities, ecological and human health impacts associated with spilled oil and mitigation technologies (dispersants, surface washing agents) are of concern. Research in this task will focus on spill preparedness and determining potential impacts of mitigation technologies (dispersants, surface washing agents, solidifiers, etc) to communities and ecosystems with respect to the behavior, transport, fate and effects of spilled oil and fuels. These concerns are expressed by not only Federal, state and local governments but also by the impacted communities.

### **Task 1 Research Approach:**



Research in this task is dedicated to characterizing the behavior, fate and effects of various oils and spill agents. The exploration, production and shipment of oils within the U.S. has drastically increased in recent years. Not only is the increased volume of concern, but also changes in oil type, where diluted and synthetic bitumen is produced from the Bakken Formation and Canadian oil sands formations. These products are particularly difficult to remediate and exhibit chemical and physical behavior unlike other crude oils. In order to be protective of communities and ecosystems further research is needed on the chemical characterization, biodegradation, weathering and toxicity of oil and spill agents. This improves the understanding of their fate and transport to establish appropriate response, remediation and restoration methods. ORD meets quarterly with the OSWER OEM independently for the purpose of discussion and coordination of technical issues underlying the management of the program and the progress of ORD research. ORD and the Program Office also meet at the International Coordinating Committee on Oil Pollution Research meetings and National Response Team S&T meetings. ORD also supports OSWER through technical assistance to the Program Office and the National Contingency Plan.

**Task 1 Constraints:**

The main technical constraint is oil procurement, which has become increasingly difficult in recent years, resulting in reduced access to oils for experiments that align with product protocols. OSWER is expected to procure and receive two new oils in FY15 that serve as the new EPA Reference Oils for all product testing.

**Task 1 Dependencies:**

Support for this research is from the Oil Spill Liability Trust Fund.

**Task 1 Quality Assurance and Data Management Needs:**

- Research in this task is currently covered by existing QAPPs:
  - L-15405 (category 3, biodegradation)
  - L-14866-QP-1-6 (category 3, dispersant baffle flask test)
  - L-11068-QP-1-0 (category 3, genomic sequencing)
  - Additional or modified QAPPs may need to be developed for additional products as new research products are identified within the task.
  
- Will this Task involve large amounts of data that need a data management plan?
  - a. Large is of course a relative term, but typically file storage is not an issue for this task. A data management plan is in place and followed by the Technical Services Contract.

**Task 1 Products:**

For each Product to be developed under this task provide the following:

1. Documented approach on the development of fluorescence library for petroleum oils.
  - a. Product Contact – conmy.robbyn@epa.gov

- b. Product's Delivery Date – FY16
  - c. Product Description – Categorizing 3D High-Res fluorescence fingerprints for suite of oils chemically dispersed in water.
  - d. Product's Contribution to Output – 3.62.1
  - e. Product's Timeline (with milestones)
    - Q4 FY 15 QAPP development
    - Q1 FY 16 final selection and analyses of crude oils including bitumen
    - Q3 FY 16 draft report on petroleum oil fluorescence library,
    - Q4 FY 16 report on petroleum oil fluorescence library, STICS submission
  - f. Product's intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Yes to NCP Protocol Development Task
2. Journal article on oil plume simulations within a wave tank: implication for spill response preparedness.
- a. Product Contact – conmy.robyn@epa.gov
  - b. Product's Delivery Date – FY16
  - c. Product Description – Manuscript summarizing results of wave tank simulated oil plumes and documenting a calibration approach for field sensors during spills.
  - d. Product's Contribution to Output – 3.62.1
  - e. Product's Timeline (with milestones)
    - Q1 FY 15 manuscript reviewed in STICS
    - Q2 FY 15 manuscript sent to journal
    - Q1 FY 16 product completed
  - f. Product's intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Yes to NCP Protocol Development Task
3. Report the biodegradation and toxicity of diluted bitumen crude oils to determine fate of bitumen discharged in water.
- a. Product Contact – conmy.robyn@epa.gov; barron.mace@epa.gov
  - b. Product's Delivery Date – FY17
  - c. Product Description – Improved understanding of the degradation and toxicity of diluted bitumen blends. This is a high priority for OSWER and the Regions.
  - d. Product's Contribution to Output – 3.62.1 and 3.62.2
  - e. Product's Timeline (with milestones)
    - Q1 FY 16 revisions to QAPP
    - Q2 FY 16 biodegradation and toxicity studies begin
    - Q4 FY 16 evaluation of preliminary results
    - Q2 FY 17 draft report on diluted bitumen crude oil biodegradability and toxicity
    - Q4 FY 17 report on diluted bitumen crude oil biodegradability and toxicity, STICS
  - f. Product's intended user/customer/audience - OSWER OEM, Regions

- g. Does this Product contribute to a Product under another Task? Yes to NCP Protocol Development Task
4. Report on wave tank simulations characterizing the effect of dispersant on dispersion effectiveness during surface and deep ocean spills, an FOSC decision support guide.
- a. Product Contact – conmy.robyn@epa.gov
  - b. Product’s Delivery Date – FY18
  - c. Product Description – Report on the evaluation of dispersant application at high flow rates and the effect on chemical composition, transport and droplet size distribution.
  - d. Product’s Contribution to Output – 3.62.1 and 3.62.2
  - e. Product’s Timeline (with milestones)
    - Q4 FY 16 collaborative experiments with DFO Canada
    - Q4 FY 17 evaluation of preliminary results
    - Q2 FY 18 draft report on diluted bitumen crude oil biodegradability and toxicity
    - Q3 FY 18 report on subsea oil plume simulations, STICS
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Yes to NCP Protocol Development Task
5. Report on crude oil dispersion in high salinity (brine) waters.
- a. Product Contact – conmy.robyn@epa.gov
  - b. Product’s Delivery Date – FY19
  - c. Product Description – Report on the dispersion of petroleum oils in brine / hyper saline waters. The Arctic and the Gulf of Mexico have naturally occurring brine pools. Recent oil leasing in regions of brine pools necessitates characterizing the natural and chemical dispersion of oils under these conditions.
  - d. Product’s Contribution to Output – 3.62.1 and 3.62.2
  - e. Product’s Timeline (with milestones)
    - Q2 FY 17 revisions to QAPP
    - Q3 FY 17 dispersion experiments conducted
    - Q1 FY 18 evaluation of preliminary results
    - Q2 FY 18 draft report on dispersion at high salinities
    - Q3 FY 18 report on dispersion at high salinities
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Yes to NCP Protocol Development Task

## Task 2 National Contingency Plan Protocol Development

Project Title: 3.62 Environmental Releases of Oils and Fuels

**Task 2 Title: Protocol Development for the NCP Product Schedule**

**Task 2 Lead: Robyn Conmy**

**Task 2 Start Date: FY16**

**Task 2 End Date: FY19**

### **Task 2 Description:**

The National Contingency Plan includes a Product Schedule for commercially available spill mitigation products (dispersants, surface washing agents, solidifiers, etc). New protocols for chemical agents and other additives, are developed by ORD and used to inform regulatory actions and provide guidance regarding product effectiveness. The latter assists in evaluating tradeoffs to potentially impacted communities and ecosystems. The private sector also uses these protocols to advance remediation / response technologies for various environmental conditions and oil products.

### **Task 2 Research Approach:**

Research products in this task allow for the development of improved protocol and guidelines to improve regulations and response efforts to protect communities from exposures to environmental releases of oils and fuels. ORD provides critical products to OSWER OEM and Regions that help to determine which response products and actions are effective on oil spills in a wide range of environmental settings to minimize environmental and human consequences. ORD meets quarterly with the OSWER OEM independently for the purpose of discussion and coordination of technical issues underlying the management of the program and the progress of

ORD research. ORD and the Program Office also meet at the International Coordinating Committee on Oil Pollution Research meetings and National Response Team S&T meetings. ORD also supports OSWER through technical assistance to the Program Office and the National Contingency Plan.

**Task 2 Constraints:**

The main technical constraint is oil procurement, which has become increasingly difficult in recent years, resulting in reduced access to oils for testing. OSWER is expected to procure and receive two new oils in FY15 that serve as the new EPA Reference Oils for all product testing.

**Task 2 Dependencies:**

Support for this research is from the Oil Spill Liability Trust Fund.

**Task 2 Quality Assurance and Data Management Needs:**

- Research in this task is currently covered by existing QAPPs:
  - L-10539-QP-1-4 (category 1, surface washing agent effectiveness test)
  - L-14866-QP-1-6 (category 3, dispersant baffle flask test)
  - L-101976 (category 4, solidifier effectiveness test)
  - Additional or modified QAPPs may need to be developed for additional products as new research products are identified within the task.
  
- Will this Task involve large amounts of data that need a data management plan?
  - a. Large is of course a relative term, but typically file storage is not an issue for this task. A data management plan is in place and followed by the Technical Services Contract.

**Task 2 Products:**

For each Product to be developed under this task provide the following:

6. Report on screening of two potential reference oils for dispersant effectiveness, chemical characterization and toxicity.
  - a. Product Contact – conmy.robbyn@epa.gov; barron.mace@epa.gov
  - b. Product’s Delivery Date – FY17
  - c. Product Description – New Reference Oil screening for OSWER
  - d. Product’s Contribution to Output – 3.62.1
  - e. Product’s Timeline (with milestones)
    - Q1 FY 16 analytical chemistry and DE testing begins
    - Q2 FY 16 toxicity testing of oils begins
    - Q4 FY 16 evaluation of results
    - Q1 FY 17 feedback from OSWER
    - Q3 FY17 report submitted to OSWER
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Behavior, Fate and Effect of Oil Task

**\*note that this product was a special request and funded directly from OSWER for rule-making purposes.**

7. Report on the development of a Surface Washing Agent effectiveness protocol for products on the NCP Schedule with new reference oils.
  - a. Product Contact – conmy.robyn@epa.gov
  - b. Product’s Delivery Date – FY17
  - c. Product Description - Developing new Surface Washing Agent effectiveness protocol for OSWER OEM and NCP Product Schedule.
  - d. Product’s Contribution to Output – 3.62.1
  - e. Product’s Timeline (with milestones)
    - Q1 FY 14 protocol development
    - Q3 FY 14 testing of surface washing agent protocol
    - Q1 FY 15 evaluation of results
    - Q2 FY15 report preparation on surface washing agent protocol
    - Q4 FY15 report on surface washing agent protocol for OSWER review
    - Q2 FY16 procurement of potential reference oils
    - Q3 FY16 testing of SWA with new oils
    - Q3 FY17 report on performance of SWA with new oils
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Behavior, Fate and Effect of Oil Task
  
8. Peer-reviewed journal article on the evaluation of optimum mixing speeds for OEM’s proposed Baffled Flask Test for the dispersant effectiveness Protocol.
  - a. Product Contact – conmy.robyn@epa.gov
  - b. Product’s Delivery Date – FY16
  - c. Product Description – Determining the ideal mixing speed for NCP Subpart J dispersant effectiveness test for OSWER OEM.
  - d. Product’s Contribution to Output – 3.62.1
  - e. Product’s Timeline (with milestones)
    - Q1 FY 15 QA plan with collaborators established
    - Q2 FY 15 experimental analysis of mixing energies in BFT conducted
    - Q1 FY 16 evaluation of results
    - Q2 FY16 report on mixing speeds
    - Q4 FY16 report on mixing speeds for OSWER review
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Behavior, Fate and Effect of Oil Task
  
9. Characterizing new reference oils for agent effectiveness testing.
  - a. Product Contact – conmy.robyn@epa.gov
  - b. Product’s Delivery Date – FY17

- c. Product Description – Full characterization, behavior and effectiveness testing of new reference oils for the NCP Product Schedule. OSWER is providing funds to ORD in FY16 for this targeted project.
  - d. Product’s Contribution to Output – 3.62.1
  - e. Product’s Timeline (with milestones)
    - Q3 FY 16 OSWER to procure new potential reference oils
    - Q4 FY 16 ORD to begin oil characterization and dispersion testing
    - Q2 FY 17 evaluation of results
    - Q4 FY17 report preparation on behavior of new oils
    - Q2 FY18 report on behavior of new oils for OSWER review
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Behavior, Fate and Effect of Oil Task
10. Propose an efficacy test protocol for solidifiers listed on the NCP Product Schedule.
- a. Product Contact – conmy.robyn@epa.gov
  - b. Product’s Delivery Date – FY18
  - c. Product Description - Developing new solidifier effectiveness test for OSWER OEM and NCP Product Schedule.
  - d. Product’s Contribution to Output – 3.62.1
  - e. Product’s Timeline (with milestones)
    - Q4FY 15 review of solidifier QAPP and analyses thus far
    - Q2 FY 16 preparation for a round robin of solidifier experiments
    - Q1 FY 17 evaluation of results, expectation of additional testing
    - Q3 FY17 report preparation on solidifier protocol
    - Q1 FY18 report on solidifier protocol for OSWER review
  - f. Product’s intended user/customer/audience - OSWER OEM, Regions
  - g. Does this Product contribute to a Product under another Task? Behavior, Fate and Effect of Oil Task

## Task 3 Research to Support LUST Program Planning and Backlog Reduction

Project Title: 3.62 Environmental Releases of Oils and Fuels

**Task 3 Title: Research to Support LUST Program Planning and Backlog Reduction**

**Task 3 Lead: Jim Weaver**

**Task 3 Start Date: FY16**

**Task 3 End Date: FY19**

### **Task 3 Description:**

Approximately 600,000 underground storage tanks are regulated by the EPA, where one third of the sites are located near population centers, putting indoor air and drinking water resources at potential risk. Leaks are common and, despite cleanup of more than 436,000 releases, there is a backlog of some 78,000 releases awaiting cleanup. Fuel composition in the U.S. can change rapidly with mandates for biofuel use and industry response with new fuel components which have potential impacts on tank integrity and contaminant plume behavior and extent. Plumes of volatile organic compounds (VOCs) migrate with ground water, contaminating municipal supply and private drinking water wells; or migrate into human-occupied buildings via transmission through underlying soil. Tanks research is focused on understanding, modeling, and remediating contaminant plumes resulting from leaks from underground storage tanks, and their impacts on buildings and water supplies, both private and public.



**Task 3 Research Approach:**

Research in this task is dedicated to the fate and transport of fuels and their constituents, using laboratory, field, and modeling approaches in order to reduce the backlog of Leaking Underground Storage Tank (LUST) sites. This task aims to better identify areas with high density of private wells, potentially leaking tanks, redevelopment sites and their proximities to water supplies; develop an improved conceptual model for petroleum hydrocarbon plume formation and migration from lab, field and modeling studies; and improve the understanding of fuel behavior at the water table and impacts to water supply wells, which are influenced by climate change. In order to be protective of communities and ecosystems, further research is needed on these methods. ORD meets quarterly with the Office of Underground Storage Tanks (OUST) for the purpose of discussion and coordination of technical issues underlying the management of the program and the progress of ORD research. ORD also supports OUST through technical assistance to the program office itself and to various state agencies. This includes organizing the scientific poster session at the National Tanks Conferences.

**Task 3 Constraints:**

Lack of Inadequate site characterization is being recognized as contributing to backlogged LUST sites and increased costs.

**Task 3 Dependencies:**

Support for this research is from the Leaking Underground Storage Tank Trust Fund.

**Task 3 Quality Assurance and Data Management Needs:**

- Research in this task is currently covered by existing QAPPs:
  - NRMRL QAPP #G-19367 Quality Assurance Project Plan for Ground Water Mapping Applications in the Sustainable Healthy Communities Research Program
  - NRMRL QAPP #G-16976 Development of On-Line Tools to Support Site Assessment, Response and Remediation
  - NRMRL QAPP #G-17997 Evaluating Effects of Water in Ethanol Biofuels on Mild Steel Used to Construct Under Ground Storage Tanks that Store Motor Fuels
  - NRMRL QAPP #G-19959 Evaluation of Hydrocarbon Transport in an Aquifer
  - NRMRL QAPP #G-18803 Streamline Modeling for Ground Water Contaminants to Support Research in the SHC Program.
- Additional or modified QAPPs may need to be developed for additional products as new research products are identified within the task.
- Will this Task involve large amounts of data that need a data management plan?
  - a. Large is of course a relative term, but typically file storage is not an issue for this task. A data management plan will be developed for the appropriate parts of this task.

**Task 3 Products:**

For each Product to be developed under this task provide the following:

11. Mapping Private Wells and Site Densities of LUST (Assessment of domestic water well locations and proximity to LUST and potential brownfields sites)
  - a. Product Contact – weaver.jim@epa.gov
  - b. Product’s Delivery Date – FY15/17
  - c. Product Description – Report describing pilot application of methodology to determine private well density and proximity to leaking underground storage tanks or other contaminated sites. Private well locations are known, at best, to a measure of density. Private well density products from this task inform research in Task 2.62.5 Public Health Conditions of project 2.62, and task 3.61.5 Tools for Evaluating the Temporal and Spatial Impacts of Contaminated Sites.
  - d. Product’s Contribution to Output – 3.62.1 and 3.62.2
  - e. Product’s Timeline (with milestones)
    - Q3 FY 15 draft report on Oklahoma pilot project for estimating private well density
    - Q1 FY 16 revised QAPP G-19367 for mapping applications to reflect well density estimates
    - Q1 FY 17 draft report on co-estimation of private well and LUST density
    - Q3 FY 17 completed report on co-estimation of private well and LUST density
  - f. Product’s intended user/customer/audience - OSWER OUST, Regions, States
  - g. Does this Product contribute to a Product under another Task? The methods and results have potential application within the EnviroAtlas, and support tasks in Contaminated Sites (3.61) and Community Public Health & Well-Being (2.62).
  
12. User’s Guide for PVI-Screen Model including distributable software.
  - a. Product Contact – weaver.jim@epa.gov
  - b. Product’s Delivery Date – Q4 FY 16
  - c. Product Description – User’s guide and software for the PVI-Screen model for assessing uncertainties in petroleum vapor intrusion.
  - d. Product’s Contribution to Output – 3.62.1 and 3.62.2
  - e. Product’s Timeline (with milestones)
    - Q4 FY 15 software and user’s guide for distribution to reviewers
    - Q4 FY 16 peer-reviewed user’s guide and software for distribution
  - f. Product’s intended user/customer/audience – OSWER OUST, Regions, States
  - g. Does this Product contribute to a Product under another Task? No
  
13. Report on ethanol corrosion studies and on-going tech support to states.
  - a. Product Contact – weaver.jim@epa.gov
  - b. Product’s Delivery Date – Q4 FY16
  - c. Product Description – Report on long-term ageing and corrosion of steel tank sections in ethanol gasoline
  - d. Product’s Contribution to Output – 3.62.1 and 3.62.2
  - e. Product’s Timeline (with milestones)

- Q4 FY 15 revised QAPP G-17997
- Q1 FY 16 final sampling of steel tank sections
- Q3 FY 16 draft report on weathering results
- Q2 FY 17 final report on ethanol weathering of steel tank sections
- f. Product's intended user/customer/audience - OSWER OUST, Regions, States
- g. Does this Product contribute to a Product under another Task? No

14. Report evaluating gasoline composition, including expanded information for state agency use.

- a. Product Contact – weaver.jim@epa.gov
- b. Product's Delivery Date – Q4 FY 17
- c. Product Description – Report describing data on gasoline composition from various nationwide data sources
- d. Product's Contribution to Output – 3.62.1 and 3.62.2
- e. Product's Timeline (with milestones)
  - Q1 FY 16 Revised QAPP G-16976 for data evaluation
  - Q2 FY 17 Draft report on gasoline composition
  - Q4 FY 17 Final report on gasoline composition
- f. Product's intended user/customer/audience - OSWER OUST, Regions, States
- g. Does this Product contribute to a Product under another Task? No

15. Models of hydrocarbon transport from sources in support of backlog reduction

- a. Product Contact – weaver.jim@epa.gov
- b. Product's Delivery Date – FY19
- c. Product Description – Software and user's guides for evaluating transport from released gasoline, based on field observation of petroleum hydrocarbon distribution in various geologic settings.
- d. Product's Contribution to Output – 3.62.1 and 3.62.2
- e. Product's Timeline (with milestones)
  - Q3 FY15 Revision of QAPPs G-19959 and G-18803
  - Q3 FY16 Completion of test set of physical model experiments for model testing
  - Q3 FY 17 Initial testing of transport model
  - Q3 FY 18 Draft report on model and testing, including user's guide
  - Q3 FY 19 Completed report and software.
- f. Product's intended user/customer/audience - OSWER OUST, Regions, States
- g. Does this Product contribute to a Product under another Task? No

16. Plume transport tool for National Enviroatlas.

- a. Product Contact – weaver.jim@epa.gov
- b. Product's Delivery Date – FY17

- c. Product Description – Software and user’s guides for evaluating transport from released gasoline in simplified settings for use as a planning tool in the EnviroAtlas
- d. Product’s Contribution to Output – 3.62.1 and 3.62.2
- e. Product’s Timeline (with milestones)
  - Q3 FY15 Revision of QAPP G-16976
  - Q3 FY 16 Initial development and testing of transport model approaches
  - Q1 FY 17 Draft report on model and testing, including user’s guide
  - Q3 FY 17 Completed report and software.
- f. Product’s intended user/customer/audience - OSWER OUST, Regions, States
- g. Does this Product contribute to a Product under another Task? Contributes tool(s) to the EnviroAtlas.