

Environmental Research in the Petroleum Refining and Oil and Gas Industries



RTI International has provided decades of technical leadership in environmental research of the petroleum refinery, petrochemical, and oil and gas industries. We offer our in-depth knowledge of refining industry process emissions to solve air pollution and environmental problems in the United States and abroad.

Overview

RTI engineers and scientists have an in-depth understanding of the emissions, emissions control technologies, process operations, and process optimization opportunities in the petroleum refining, petrochemical, and oil and gas industries. RTI has worked closely with the U.S. Environmental Protection Agency (EPA) and refining industry to develop and implement environmental standards that affect refinery, petrochemical, and oil and natural gas operations.

Areas of Expertise

We offer a comprehensive range of environmental services, including the following:

- Developing emissions inventories (for toxics, criteria pollutants, and greenhouse gases)
- Identifying and characterizing emission sources and waste streams
- Performing risk assessments for emission sources and waste streams
- Evaluating costs and environmental impacts for current and alternative control strategies and pollution prevention measures

RTI helps federal, state, and local governments as well as private organizations identify cost-effective strategies for reducing air pollution emissions and other environmental issues from petroleum refineries, petrochemical complexes, and oil and gas production and transmission/distribution facilities. Our industry knowledge provides the technical foundation necessary to successfully perform studies, assessments, audits, and inspections of these facilities around the world.

Recent Project Highlights

Petroleum Refinery Risk and Technology Review (RTR).

RTI developed an extensive industry survey to gather process equipment, control, and emissions information from U.S. petroleum refineries. We identified technological advances and evaluated the cost-effectiveness of emissions reductions measures for a variety of emission sources, including equipment leaks, storage vessels, wastewater collection and treatment, fluid catalytic cracking units, catalytic reforming units, delayed coking units, sulfur recovery plants, flares, and miscellaneous process vents. We reviewed advancements in ambient “fence line” monitoring techniques to improve compliance assurance around petroleum refinery or petrochemical complexes, and prepared monitor placement and sampling guidelines for diffusive tube monitoring. We assisted with preparing proposed and final amendments to 40 CFR 63 subparts CC and UUU, and prepared supporting documentation.

Emission Estimation Protocol for Petroleum Refineries.

RTI developed the Emission Estimation Protocol for Petroleum Refineries document to provide guidance to refineries as well as state and local agencies in developing more comprehensive and more accurate emissions inventories, particularly for emissions of specific hazardous air pollutants that do not have emission factors in the U.S. EPA's AP-42 *Compilation of Air Pollutant Emission Factors*. We used emissions test data collected for the RTR (previously mentioned) to revise the refinery protocol document and update default emission factors in AP-42. Both documents were finalized following public review.

Greenhouse Gas Reporting Program (GHGRP).

RTI provides support to the U.S. EPA for implementation of the GHGRP. This program collects annual greenhouse gas (GHG) emissions data from stationary combustion at refinery complexes as well as GHG emissions data from a variety of petroleum refinery, hydrogen production, petrochemical, and oil and natural gas processing, transmission, distribution, and storage activities. We assisted with developing GHGRP requirements. We review and verify the annual GHG data submissions and assist in preparation of GHG data summaries to inform various programs.

Peer Review of Oil and Gas Sector Technical Papers.

To support the U.S. EPA in developing GHG emission reduction strategies, RTI coordinated an external peer review for five technical white papers on mitigation techniques for methane and volatile organic compound (VOC) emissions from the oil and gas sector.

Review of Petroleum Refinery Regulations and New Source Performance Standards for Refineries and for Synthetic Organic Chemical Manufacturing Industry Equipment Leaks.

RTI supported the U.S. EPA's review of the New Source Performance Standards for petroleum refineries, synthetic organic chemical manufacturing industry equipment leaks, and refinery equipment leaks (40 CFR 60 subparts J/Ja, VV/VVa, and GGG/GGGa). We summarized information on state and local standards, reviewed consent decree (enforcement) requirements, and analyzed emissions test data to identify applicable control techniques to reduce emissions of sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO), and VOC. We evaluated control techniques in terms of costs and effectiveness in reducing emissions. We supported regulatory development efforts by developing technical background documents, proposal packages, response to comments, and promulgation packages for each of the regulations reviewed.

Past Projects

- Petroleum Gases Risk Assessment (CONservation of Clean Air and Water in Europe [CONCAWE])
- Development of Industrial Profile for the Petroleum Refining Industry (U.S. EPA Office of Atmospheric Programs)
- Multipollutant Strategies for Petroleum Refineries (U.S. EPA Office of Air Quality Planning and Standards)
- Human and Ecological Risk Assessment Support for the Petroleum Refining Waste Listings Determination (U.S. EPA Office of Solid Waste)

More Information

Jeff Coburn
Sr. Research Chemical Engineer and Program Manager, Air Quality Engineering
+1.919.316.3407
E-mail: cob@rti.org
RTI International
3040 E. Cornwallis Road, PO Box 12194
Research Triangle Park, NC 27709-2194 USA

RTI 9883 0316



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