

# Request for Information on Optical Remote Sensing Instruments to Evaluate Flaring Emissions

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STATIONARY SOURCE COMMITTEE

JUNE 16, 2017



## Background

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- Flaring emissions estimates rely on monitoring data from vent gases before combustion at flare tip & default emission factors
  - Emerging ORS technologies may be able to directly observe plume emitted from flare stack
  - Optical Remote Sensing (ORS) instruments detect how different wavelengths of light are affected by gas composition
  - ORS has potential to:
    - Improve emissions estimates
    - Provide real-time feedback to operators about flaring with the possibility to make changes and reduce emissions
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## Proposed Request for Information (RFI)

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- Targeted to commercial vendors and technology developers of ORS instruments – focused on single stack monitoring
  - RFI is seeking from each submittal:
    - Abilities of instrument and scientific basis of technology
    - Validation studies and previous uses of technology
    - Logistical considerations and range of costs
  - Information from RFI will be used to develop a Request for Proposals
    - Field study in partnership with local facilities
    - Additional validation study, if needed
  - RFI has no fiscal impact
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BOARD MEETING DATE: July 7, 2017

AGENDA NO. XXXX

**PROPOSAL:** Issue Request for Information to Evaluate Optical Remote Sensing Instruments to Evaluate Emissions from Refinery Flares

**SYNOPSIS:** Emerging optical remote sensing technologies show promise in evaluating emissions from refinery flares in real time, thus providing better quantification of emissions and the potential opportunity for facilities to make adjustments to reduce flaring emissions. The submittals received from this Request for Information will be used to develop a subsequent Request for Proposals for a field demonstration pilot study of optical remote sensing technologies and/or if it is found that available technologies have not been sufficiently validated for a field demonstration, for a validation study. This action is to issue a Request for Information to evaluate the state of available optical remote sensing instruments that can evaluate emissions from refinery flares.

**COMMITTEE:** Stationary Source, June 16, 2017; Recommended for Approval

**RECOMMENDED ACTION:**

Approve Issuance of Request for Information RFI2017-XXXX to evaluate available Optical Remote Sensing instruments that can evaluate refinery flaring emissions.

Wayne Nastri  
Executive Officer

PF:SN:IM

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**Background**

Rule 1118 requires refineries, hydrogen plants, and sulfur recovery plants to report their flaring emissions every quarter to the District. The emissions estimates are based either on approved calculation methods or on monitoring data collected from vent gases before they are emitted into the atmosphere. Default emission factors are used to convert the calculations or monitoring data into emissions estimates. As demonstrated by U.S. EPA's recent update to its Refinery Sector Rule, a key factor that can affect flaring emissions is the destruction efficiency of the combustion occurring at the flare tip. As an example, U.S. EPA's emission factors assume a 98 percent destruction efficiency for VOCs for all flaring events, however US EPA's studies have found that many factors can affect the flaring destruction efficiency, such as the heating value of gases being flared, the amount of steam added to the flare tip, the velocity of the flared gas, local winds, etc. Some studies have found that the destruction efficiency can drop substantially below 98 percent, and while

actual emissions would increase in these cases, there are no methods currently available to quantify these emissions.

In recent years, many new optical remote sensing technologies have emerged to evaluate emissions in a variety of applications. These technologies use several techniques to detect how different wavelengths of light are affected by the gas composition that the light passes through. The advantage of some of these technologies is that they have the potential to provide near real-time feedback on emission characteristics of individual emission sources (e.g., individual flare stacks), such as the destruction efficiency, emission rate, and chemical composition. These technologies may offer a feasible method to evaluate actual flaring emissions in real world conditions. It is generally infeasible to place traditional monitoring instruments on a flare stack given the height of the flare emission release points and the very high temperatures at the flare tip. In addition to potentially providing better quantification of flaring emissions, the real-time feedback on actual emissions could provide refinery operators valuable real-time information and feedback that could be used to more efficiently operate the flare and reduce emissions.

### **Proposal**

This action is to issue Request for Information (RFI) RFI2017-XXXX to solicit information from vendors about potential instruments that could be used to evaluate flaring emissions. The information submitted must include a description of the technology underlying the instruments, where these instruments have been utilized in the past, and any validation studies that have been conducted to verify the accuracy of the instrument.

The information provided under this RFI would be used to develop a subsequent Request for Proposals to conduct a Pilot Study to test these instruments in partnership with local facilities to determine the feasibility of using this technology in a real world setting and what data could be provided. If the RFI reveals that these technologies would benefit from further validation studies before testing in real world conditions, a Request for Proposals could be developed to conduct a validation study in controlled conditions at a flare testing facility before moving to the Pilot Study stage at local facilities. Before any RFP is developed, staff will return to the Board with the results of the RFI.

### **Outreach**

In accordance with SCAQMD's Procurement Policy and Procedure, a public notice advertising the RFI will be published in the Los Angeles Times, the Orange County Register, the San Bernardino Sun, and the Riverside County's Press Enterprises newspapers to leverage the most cost-effective method of outreach to the South Coast Basin. Additionally, potential technology providers may be notified utilizing SCAQMD's own electronic listing of certified minority vendors. Notice of the RFI will be emailed to the Black and Latino Legislative Caucuses and various minority chambers of commerce and business associations, and placed on the Internet at SCAQMD's website (<http://www.aqmd.gov>) where it can be viewed by making the selection "Grants & Bids."

**Benefits to SCAQMD**

The RFI will provide valuable information regarding rapidly developing commercial optical remote sensing technology. Ultimately, if this technology is sufficiently mature, there may be opportunities to apply this technology at local facilities to reduce flaring emissions and improve emission inventories.

**Resource Impacts**

This action will not create any financial commitment since the RFI only seeks information about the state of available optical remote sensing instruments.

**Attachment**

RFI 2017-XXXX Develop and Demonstrate Remote Sensing Technologies to Qualify Emissions from Refinery Flares.

# **SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT**

## **REQUEST FOR INFORMATION**

### **DEVELOP AND DEMONSTRATE REMOTE SENSING TECHNOLOGIES TO QUANTIFY EMISSIONS FROM REFINERY FLARES**

**RFI2017-XX**

The South Coast Air Quality Management District (SCAQMD) requests information for the following purpose according to the terms and conditions attached. In the preparation of this Request for Information (RFI), the words “Respondent”, Qualified Entity, and “Qualified Entities” are used interchangeably.

#### **PURPOSE/INTRODUCTION**

The purpose of this RFI is to obtain information from qualified entities regarding the availability and feasibility of using optical remote sensing technologies for evaluating emissions from refinery flares. Flaring from refineries typically occurs from elevated stacks that do not allow placement of monitoring instruments in the combustion zone. Emissions are currently estimated by measuring the inputs into the flare stack prior to combustion and using default emission factors to calculate criteria and toxic pollutants from flaring. Emerging optical remote sensing technologies show promise in estimating the post combustion emissions from flares in real time, thus providing better quantification of emissions and a potential opportunity for facilities to make adjustments to reduce flaring emissions. This Request for Information will be used to develop a Request for Proposals for a field demonstration pilot study of optical remote sensing technologies, or potentially a prior validation study in a controlled setting (e.g., at a flare testing facility) if necessary.

#### **SECTION I: BACKGROUND**

In recent years many new optical remote sensing technologies have emerged to evaluate emissions in a variety of applications. These technologies use several different techniques to detect how light wavelengths are affected when passing through a plume of gas with a certain molecular composition. The advantage of some of these technologies is that they have the potential to provide more accurate emission characteristics of individual emission sources (e.g., individual flare stacks), such as the destruction efficiency, emission rate and chemical composition. These technologies may be the only feasible method to evaluate actual flaring emissions in real world conditions because it is generally not feasible to physically place traditional monitoring instruments on a flare stack given its emissions release point at 100 plus feet above the ground and the very high temperatures of the combustion zone at the flare tip. In addition to potentially providing better quantification of flaring emissions, the real-time feedback on actual emissions could provide refinery operators a valuable new piece of information that may be used to more efficiently operate the flare and reduce emissions.

## **SECTION II: INFORMATION REQUESTED**

This action is to issue Request for Information RFI2017-XXXX to solicit information from commercial vendors and technology developers about potential instruments that could be used to evaluate flaring emissions. The information provided under this RFI would be used to develop a subsequent Request for Proposals to conduct a Pilot Study to test these instruments in partnership with local facilities to determine the feasibility of using these technologies in a real world setting and what data could be obtained. If the RFI reveals that these technologies would benefit from further validation studies before testing in real world conditions, a Request for Proposals could be developed to conduct a validation study in controlled conditions at a flare testing facility before moving to the Pilot Study stage at local facilities.

This RFI is divided into three areas of interest including instrument operating technology, applications the instrument has previously been used for, and costs. Respondents must address concisely the information requested in each area of interest (Tasks and sub-Tasks) in the format specified in V – Response Format and Requirements. The information provided must be specific enough to facilitate the determination of the state of the optical remote sensing technology, and to select the most viable of these technologies for development and demonstration on elevated flares.

The objective of this RFI is for a qualified entity to provide detailed information on feasible technologies capable of being tested a field demonstration pilot study of optical remote sensing technologies, or potentially a prior validation study in a controlled setting (e.g., at a flare testing facility) if necessary. To meet this objective, respondents must provide:

- Commercial availability of the instrument/technology, or the level of pre-commercial product development
- Previous uses
- Scientific foundation for the technology/operating principle
- The ability of the instrument/technology to:
  - measure destruction/combustion efficiency of a flare,
  - quantify and speciate criteria pollutants and/or toxics emissions (e.g., HCN, benzene, etc.),
  - operate during daytime/night/all weather,
  - provide real-time or near real-time data,
  - operate continuously and permanently at a site,
  - evaluate more than one emission source at a time (e.g., two flares in close proximity)
- An evaluation of how an understanding of flaring emissions would be enhanced when combining data provided by the instrument/technology with data collected in pre-combustion monitoring of flare gases required by SCAQMD Rule 1118, and the EPA Refinery Sector Rule (40 CFR Part 63, Subpart CC)
- Calibration/ maintenance schedule/needs of instrument
- Previous validation studies comparing the proposed technology to other methods
- Range of costs to install and operate the technology/instrument to monitor a flare
- Logistical needs: power, space, set-up requirements, etc.

**SECTION III: SCHEDULE of EVENTS**

July 7, 2017      Release of RFI  
September 29, 2017      RFI responses due by 5 p.m.

**SECTION IV: RESPONSE FORMAT and REQUIREMENTS**

Respondents must submit a technology concept paper(s) (Concept Paper) in electronic format (e.g., pdf) and follow an environmentally friendly format as outlined below: recycled paper; stapled, not bound; double-sided, black and white print; no three-ring, spiral, or plastic binders; and no card stock or colored paper.

**Cover Letter**

The Concept Paper must be submitted with a cover letter specifying the RFI2017-XXXX and containing the name, address, telephone number, fax number and e-mail address of the respondent. The letter must also include contact person(s) and be signed by person(s) authorized to represent the firm.

**Table of Contents**

A table of contents shall identify materials contained in the Concept Paper by section and page numbers.

**Executive Summary**

Limited to 3 pages, an overview of the optical remote sensing technology for estimating emissions from elevated flares must be provided in the executive summary along with a description of the instrumentation including costs. The summary shall also describe the instrument features and capabilities, including emissions speciation and quantification, combustion efficiency, ability to provide real time data, etc. A brief background on the experience and qualifications of the respondent and its associates related to the technology shall also be included in this section.

**Technology Description and Application**

Respondents must provide a comprehensive discussion of the optical remote sensing technology proposed, including information requested in Section II – Information Requested, of this RFI.

**Costs**

Respondents must provide a range of costs, including different scenarios if applicable for different applications of technology (e.g., one cost for just combustion efficiency, another cost for detecting specific compounds, another cost to include quantification of emissions, etc.)

**Respondent Qualifications and Background**

This section shall describe the history, organization, and background of the Respondent including relevant qualifications of all key personnel necessary for the development, demonstration and commercialization of the proposed optical remote sensing technology. To the extent possible, the Respondent should provide its individual member and collective design and construction experience, including experience in prior applications of the proposed technology or any related technologies.

## **Submittal Requirements**

Three (3) complete copies of the Concept Paper must be submitted in a sealed envelope, plainly marked in the upper, left-hand corner with the name and address of the Respondent with the words, "Request for Information RFI2017-XX." It should be addressed to:

Procurement Unit  
South Coast Air Quality Management District  
21865 Copley Drive  
Diamond Bar, CA 91765

***Concept Papers are due no later than 5:00 p.m. on September 29, 2017.***

Concept Papers must be received, not post marked, by the submittal deadline and SCAQMD may refuse to accept any Concept Papers submitted after the deadline. The delivery of Concept Papers to the SCAQMD by the submittal deadline is the sole responsibility of the Respondent.

All responses shall become the property of the SCAQMD. One copy of the responses shall be retained for SCAQMD files. Additional copies and materials will be returned only if requested and at the Respondent's expense. SCAQMD considers information submitted in response to this RFI in the public domain, in conformance with the California Public Records Act. Any trade secret information may be submitted to the SCAQMD in a separate document in which the trade secret information is specifically identified. SCAQMD agrees to treat such trade secret information in accordance with its Public Records Act guidelines relating to trade secret information.

## **SCAQMD CONTACT**

Questions regarding this RFI should be addressed to:

Dairo Moody  
Air Quality Specialist  
South Coast Air Quality Management District  
21865 Copley Drive  
Diamond Bar, CA 91765  
909-396-2333; Fax: 909-396-3324  
E-mail: [dmoody@aqmd.gov](mailto:dmoody@aqmd.gov)