

Standard Operating Procedure for Training for Staff Working on the PM_{2.5} Chemical Speciation Program

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* RTI International is a trade name of Research Triangle Institute.

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1.0 Staff Training

1.1 Special Training Requirements/Certification

Each task area under the PM_{2.5} Chemical Speciation Program (whether analytical or database management) has specific standard operating procedures (SOPs) and/or quality assurance (QA) procedures that must be followed.

It is important that the analytical results produced by each analyst be able to produce data that meets measurement quality objectives (MQOs) for the analysis. Attainment of MQOs will be documented by attainment of acceptable recovery and precision from analysis of identified reference samples, blind test samples, and previously analyzed field samples.

Analysts new to the PM_{2.5} Chemical Speciation program will be required to be experienced with the basic measurement techniques relevant to the analyses that they will perform. These techniques include operation of an analytical microbalance, X-ray fluorescence (XRF), ion chromatography, gas chromatography/mass spectrometry, electron and optical microscopy, and organic and elemental carbon. Each technique requires an analyst who has been trained to use the apparatus and trained to use good laboratory practices to avoid contamination of filters and standards.

With experience in the basic methodology, the analyst to be trained will read and understand the appropriate SOP. Under the direction of an analyst experienced in the method, the analyst will follow the SOP and use the method to analyze reference samples and, if available, samples that have been previously analyzed by an experienced analyst. These samples might include split filters, filter extracts, and whole filters for XRF. This effort will be continued until the analyst achieves MQOs for recovery (or bias) and precision. The Task Leader or mentor will also audit the performance of the analyst, checking such operations as calibration, data treatment, system maintenance, and record keeping. With both acceptable analytical results and a successful systems audit, the analyst will be considered ready to perform program samples. Even then, the analyst will work under the direction of the mentor until the mentor determines that the analyst is ready to work independently. Ongoing performance will be monitored by the program QA Manager through the review of analytical data, which are identified by analysis.

RTI will require gravimetric analysts to pass a written test similar to the certification test administered to analysts working on the EPA's PM_{2.5} Federal Reference Method Performance Evaluation Program (FRM PEP), which RTI helped to develop under another contract.

Permanent RTI employees, including high-level personnel and Task Leaders are eligible to attend training courses relevant to the project areas. Both in-house and extramural training opportunities are provided at RTI's expense to its employees. Most employees attend one or more such courses each year. Project staff will be encouraged to attend courses such as manufacturer's training sessions or method-specific courses that are relevant to this program.

Training and acceptable performance will be documented in each analyst's training folder as described below. Documentation will include a record of reading and using the SOP and a verification by the Task Leader and/or mentor that acceptable method performance has been demonstrated. Training folders will include records of performance standard analyses, formal training, and in-house training and testing, as applicable to each task area.

1.2 Experience and Training of Current Personnel

The qualifications of all analysts currently producing data for the PM_{2.5} Chemical Speciation Program have been documented in the training folders maintained by the program office. Courses taken, special in-house training, and results of performance audits are included in the employees' training files to document their proficiency. Highlights of the present status of experience and training of RTI personnel include the following:

- Gravimetric Laboratory staff have been given instructional workshops and prepared SOPs to train analysts for the PM_{2.5} Performance Evaluation Program.
- Gravimetric Laboratory staff members have performed analysis for the FRM network for five states, two U.S. territories, and one Tribal nation since the inception of the FRM network in 1998.
- The RTI Ion Chromatographic Team has performed air filter analysis for the National Park Service for the past 15 years. PM_{2.5} ion analysis has been performed in support of EPA's evaluation of PM_{2.5} samplers and for the California Air Resources Board.
- Three staff members have trained other personnel in the use of single channel PM_{2.5} samplers and in the handling and shipment of filters for the FRM PEP.
- At least five members of the RTI staff have been actively involved in evaluating commercially available speciation samplers and have participated in operating them at sites across the country.
- At least three staff members have served as sample custodians or sample managers to send and receive filters, prepare denuder surfaces, and send and retrieve chain-of-custody forms and field data sheets for each of the available speciation samplers.
- RTI XRF Operator, Andrea McWilliams, has successfully completed training courses in the operation and application of the ThermoNoran energy dispersive XRF unit and understands the problems associated with the analysis.
- CHESTER LabNet has successfully completed training courses in the operation of XRF units, has participated in numerous audits, and understands the problems associated with the analysis.
- RTI operators of the thermal-optical analysis method for carbon species have shown good agreement with other laboratories through sample analysis intercomparisons and analysis of standards. For more details on training for this method, see RTI's Standard Operating Procedure for the Determination of Organic, Elemental, and Total Carbon in Particulate Matter Using a Thermal/Optical-Transmittance Carbon Analyzer.

1.3 Training and Qualification of New Personnel

RTI will hire new personnel as needed to meet the needs of this program and to maintain data delivery schedules. The majority of new personnel are hired to perform activities such as assembling sample packages in the Sample Handling and Archiving Laboratory (SHAL), receiving exposed samples, and performing data entry. It is critically important that errors in these areas be held to an absolute minimum. Therefore, as with new hires for the analytical laboratories, an in-house training program has been implemented to ensure that all new personnel (or personnel learning a different function) are fully proficient in these activities and can successfully perform their responsibilities.

Current personnel (either the Task Leader or a designated experienced worker) will serve as mentors during the training process. The mentor will be responsible for the training activities listed below and for determining that the trainee has successfully met training requirements before being allowed to perform work on the PM_{2.5} Chemical Speciation Program.

RTI's approach to assessing and training new hires (and cross-training of existing employees) will be as follows:

- New personnel will be interviewed and their credentials will be carefully assessed with regard to prior experience and aptitude for the assigned task. Candidates will be interviewed by the Task Leader and by at least one other senior-level project participant, such as the Services Program Manager, QA Manager, or a Task Leader in a different specialty /laboratory.
- RTI regular and temporary personnel to be hired for sample shipping and receiving in the SHAL must have excellent work habits and must be careful and attentive to detail. These individuals must also be comfortable with working under tight deadlines imposed by contractual turn-around times.
- New hires in the analytical laboratories must have experience or aptitude that is equivalent to 2 years of experience, but individuals will be assessed on a case-by-case basis by the Task Leader. References will be contacted to verify that the applicant possesses the required laboratory skills and aptitude.
- For individuals hired as permanent RTI employees, a 6-month probationary period is provided during which time the employee may be terminated for failing to meet required job standards; temporary employees may be dismissed at any time. The majority of training will be on the job and will be provided by the Task Leader or by a mentor who has already mastered the task area. Mentors will be assigned by the Task Leader for each program area. The specific SOPs will be the main training materials used.
- All SOPs will be written in sufficient detail to allow a new staff member with the requisite training and experience to perform the task. Any departures from the written SOPs will require consultation with the Task Leader for that area. Departures from SOPs necessitated by systematic or recurring problems will result in corrective actions, which may include revising the SOP.

- All new hires will work under close supervision of the Task Leader or mentor until they have demonstrated proficiency with analyzing standards and duplicates of previously analyzed samples. The Task Leader will be responsible for providing the test samples and assessing the results. These results will be included in the employee's training file.