



# NATIONAL AIR QUALITY TRAINING PROJECT

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## PROFESSIONAL DEVELOPMENT TRAINING GUIDE

**MARCH 2012**

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The recommendations included in this report are not requirements and do not represent the official policy of the US Environmental Protection Agency or other participating agencies and organizations.

All training courses currently listed on the Air Pollution Training Institute website have been reviewed and approved by the US Environmental Protection Agency. The US Environmental Protection Agency has not reviewed and approved the California Air Resources Board training courses or other non-APTI courses.

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## LIST OF ACRONYMS

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AERMOD	American Meteorological Society and the U.S. Environmental Protection Agency Regulatory Model Improvement Committee ( <b>AERMIC</b> ) <b>Model</b>
AERSCREEN	AERMOD Screening Model
AQ	Air Quality
AQS	Air Quality System
BACT	Best Available Control Technology
CAA	Clean Air Act
CALPUFF	California Puff Air Dispersion Model
CAM	Compliance Assurance Monitoring
CAMx	Comprehensive Air Quality Modeling with extensions
CARB	California Air Resources Board
CEMS	Continuous Emission Monitoring
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2e</sub>	Carbon Dioxide Equivalent
COMS	Continuous Opacity Monitoring System
CPMS	Continuous Parameter Monitoring System
CSAPR	Cross-State Air Pollution Rule
ENERGY STAR EnMS	ENERGY STAR Energy Management System
EPA	U.S. Environmental Protection Agency
FIRE	Factor Information Retrieval Software
FHWA	Federal Highway Administration
GHG	Greenhouse Gas
HAP	Hazardous Air Pollutant
HAZWOPER	Hazardous Waste Operation and Emergency Response
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
I/M	Vehicle Inspection and Maintenance
ICE	Internal Combustion Engines
ISO	International Organization for Standardization
LADCO	Lake Michigan Air Directors Consortium
MARAMA	Mid-Atlantic Regional Air Management Association
Metro4-SESARM	Metro 4, Inc. (The Southeastern Local Air Pollution Control Agencies) and Southern States Air Resource Managers, Inc.
MM5	PSU/NCAR Mesoscale Model Version 5
MOVES	Motor Vehicle Emission Simulator
NAA	Nonattainment Areas
NAAQS	National Ambient Air Quality Standards
NACAA	National Association of Clean Air Agencies
NATA	National-Scale Air Toxics Assessment
NESCAUM	Northeast States for Coordinated Air Use Management
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSR	Nonattainment New Source Review
NSPS	New Source Performance Standards

NSR	New Source Review
OAQPS	Office of Air Quality Planning and Standards
OBD	On-Board Diagnostics
ODS	Ozone Depleting Substances
OECA	Office of Enforcement and Compliance Assurance
OSHA	Occupation Safety and Health Administration
OTAQ	Office of Transportation and Air Quality
PAQO	Primary Quality Assurance Organization
PM	Particulate Matter
PPE	Personal Protective Equipment
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance/Quality Control
RMP	Risk Management Plan
SCREEN3	Single source Gaussian plume model
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions model
SOPs	Standard Operating Procedures
TAP	Toxic Air Pollutant
UNIX/LINUX	Multitasking and multiuser computer operating systems
UNMIX	EPA receptor model
VOC	Volatile Organic Compound
WATER9	Wastewater treatment model
WESTAR	Western States Air Resources Council
WBCSD	World Business Council for Sustainable Development
WRF	Weather Research and Forecasting Model
WRI	World Resources Institute

# National Air Quality Professional Development Training Guide

## INTRODUCTION AND PURPOSE

The purpose of this guide is to identify training courses that may be appropriate for the various fields of work commonly found in federal, state, and local agency air quality programs. Each air quality agency has its own policy and procedures regarding training, and this document has been developed to complement current practices. Some of the courses identified may not be applicable for a particular agency or person. Courses may not be offered every year.

This guide identifies the courses available for each of the job functions listed below, and a recommended curriculum. There are ten (10) functions requiring air pollution training that have been identified as part of this project. These functions are listed as follows:

### Functions Requiring Air Pollution Training

1. Introduction to Air Pollution Control
2. Ambient Monitoring, QA/QC, & Data Analysis
3. Emissions Estimation & Inventory Development
4. Modeling, Forecasting, & Data Analysis
5. Planning / Regulation Development
6. Permit Writing
7. Inspection & Enforcement
8. Air Toxics / Hazardous Air Pollutants
9. Mobile Sources
10. Climate Change

In addition to the above ten key functions performed by agency personnel, we have identified three extensions or additional areas of expertise that are needed by certain individuals in the air quality functions listed above. Certain courses have been identified in this guide under these additional areas of expertise. These additional areas of expertise are listed below:

### Additional Areas of Expertise

11. Pollution Control Foundations
12. Stationary Sources
13. Source Sampling and Monitoring

This document is structured by function. Most functions include an initial training level (introductory), then a basic and an intermediate/advanced level list of suggested courses. The general assumption is made that those in Intermediate/Advanced would have about 3 years or more experience in the field. This may or may not be appropriate for any particular air pollution control agency and is used here simply to give a rough indication that experience is assumed for the Intermediate skills and training needs.

The following information is included in this report:

- ❖ A list of frequently used acronyms or abbreviations for use as a reference tool for the user of this guide,
- ❖ A flowchart and definitions for the above functions and additional areas of expertise,
- ❖ An explanation of skills necessary for each function,
- ❖ A suggested curriculum for each function with available course for each set, and
- ❖ The course catalog of all course descriptions, which includes a summary table of all courses in each functional area.

In developing this training document, it was determined that staff may have different levels of expertise and different training needs. With this in mind, this document was developed to identify initial training with the ability to choose and pick additional courses to meet individual needs, agency needs, available training time, and agency budget constraints.

The courses and curriculums available can be divided into subject areas as found on APTI's website. The three delivery formats available are: [classroom, self-instruction, and web-videos](#).

Some of the classroom and self-instructional courses contain Adobe Acrobat versions of content materials as well as online tests and certificates of mastery. Some courses provide online formats in which the course materials are within the web applications.

The course descriptions are included in Appendix A. A listing of relevant websites has been included as well in the last section of document.

### **Classroom Courses:**

Classroom courses are available to be presented by recognized professionals, including consultants and university faculty members. Courses are taught at various locations as indicated in the [APTI consolidated classroom schedule](#). In order to receive a certificate of completion for a classroom course, you must pass a test, complete class assignments, attend/participate in class sessions, and submit a course evaluation. (Other requirements may apply depending on the nature of the course.) Employees of multi-state, state, local, and tribal air pollution control agencies must register for scheduled classroom courses by contacting the course provider/host.

- Classroom course are denoted with a solid circle bullet.

### **Self-Instructional Courses:**

Self-instructional courses are available free of charge via EPA's website. Please check the [Web-based courses](#) to see if the course is available online. Courses that are not available online can be obtained by registering through APTI using the [APTI application form](#).

- ❖ Self-Instructional course are denoted with a "SI", "RE", or "OS" in the course title and with a star bullet.

## **Web Videos:**

A growing collection of video courses on selected topics are viewable from the web. These segments are available in Flash, Windows Media Player, or other popular formats and vary in length from approximately 15 minutes to 2 hours. Registration is not required for web video. See the [list of web video selections](#).

- Video courses are denoted with a “V” in the course title and an arrow bullet.

All training courses currently listed on the Air Pollution Training Institute website have been reviewed and approved by the US Environmental Protection Agency. The US Environmental Protection Agency has not reviewed and approved the California Air Resources Board training courses.

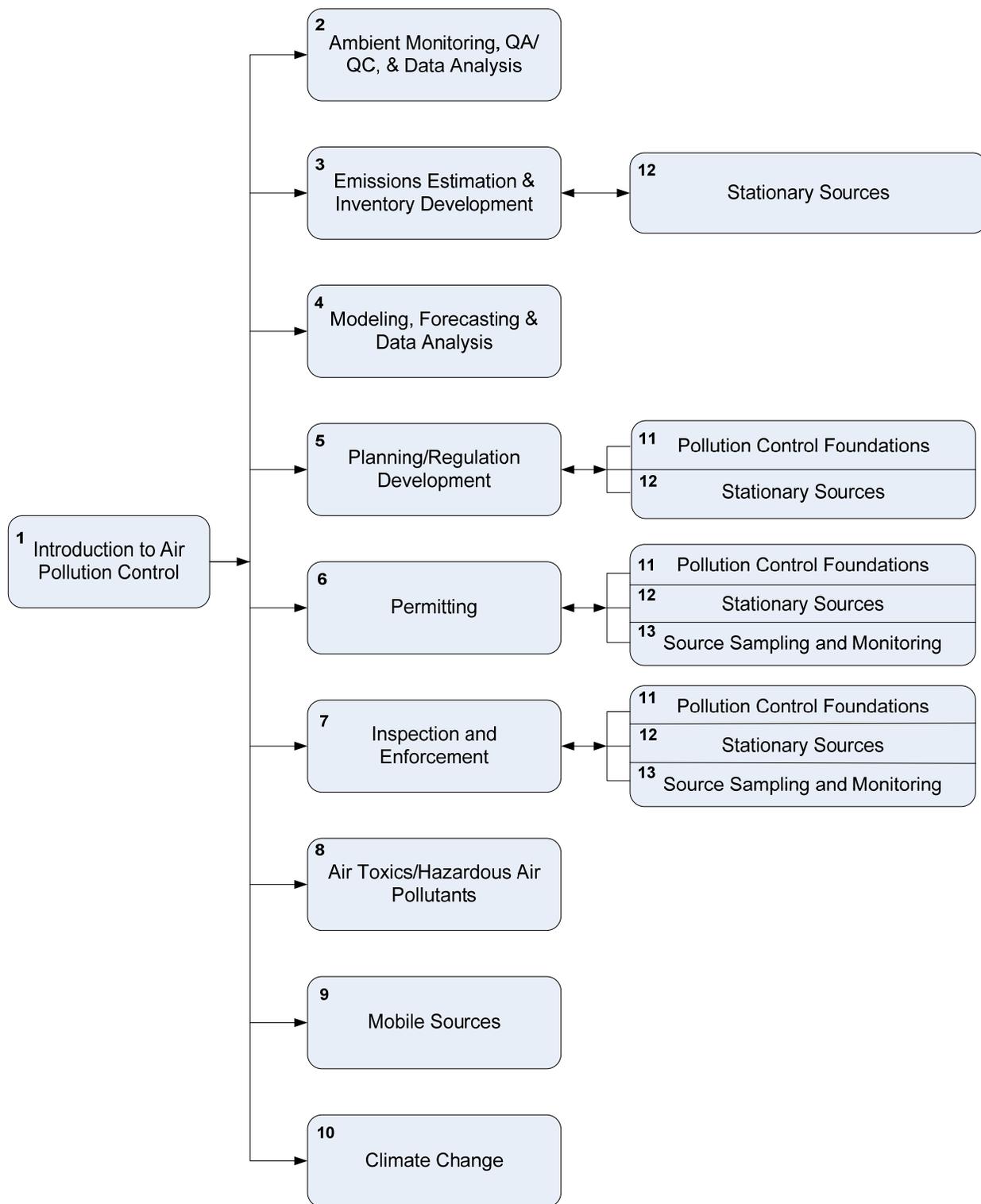
## **Curriculum Project History:**

This is the fourth document in a series of reports prepared for the National Air Quality Training Project under an assignment being managed by the Mid-Atlantic Regional Air Management Association (MARAMA). Funding for the assignment has been provided by the US Environmental Protection Agency (EPA) under Assistance Agreement XA 97390701. The first three reports are:

- Catalog of Courses (August 2011),
- Technical Training Needs Summaries (September 2011), and
- Gap Analysis Concerning Professional Competencies (February 2012).

The first report provides an organized set of descriptions for air quality technical training courses offered by the EPA’s Air Pollution Training Institute (APTI) and California Air Resources Board (CARB) and is included in Appendix A of this report. The second report summarizes the technical training needs associated with designated skills and knowledge needed by air quality professionals working in state and local air quality agencies. The third report compares the training needs identified in the second report with the courses described in the first report to identify gaps and then evaluate whether courses offered by other training providers might address those needs not covered by EPA or CARB courses.





## Training and Development Flowchart



<b>Introduction to Air Pollution Control</b>	These courses are designed for regulatory personnel who are new or will be beginning their career in the air quality regulatory field.
<b>Pollution Control Foundations</b>	These courses present fundamental information on the formation and control of various air pollutants.
<b>Ambient Monitoring, QA/QC, &amp; Data Analysis</b>	These courses are designed for individuals within a regulatory agency whose role is to provide sampling and laboratory analysis of ambient air samples. Course topics also include quality assurance/quality control and analysis of ambient air quality data.
<b>Emissions Estimation &amp; Inventory Development</b>	These courses are designed for regulatory personnel who have or will have the responsibility to develop emissions inventories.
<b>Modeling, Forecasting, &amp; Data Analysis</b>	These courses are designed for individuals who will be using or interpreting the results of air quality models.
<b>Planning / Regulation Development</b>	These courses are designed for individuals who will be preparing State Implementation Plans or regulatory language.
<b>Permitting</b>	These courses are designed for personnel of state and local permitting agencies who must review and interpret permit applications and prepare permits. There are also relevant courses listed under pollution control foundations, stationary sources, and source sampling and monitoring depending on the individual assignments.
<b>Inspection &amp; Enforcement</b>	These courses are designed for inspectors who determine compliance with air pollution control requirements in permits, regulations, and orders. There are also relevant courses listed under pollution control foundations, stationary sources, and source sampling and monitoring depending on the individual assignments.
<b>Air Toxics / Hazardous Air Pollutants</b>	These courses are designed for individuals who implement programs designed to reduce emissions of toxic or hazardous air pollutants. There are also relevant courses listed under other topics depending on the individual assignments.
<b>Stationary Sources</b>	These courses provide information primarily for regulatory personnel in permits, compliance/enforcement, or planning programs.
<b>Source Sampling and Monitoring</b>	These courses are designed for regulatory personnel who have or will have the responsibility to evaluate source test methods, approve test protocols, and review source test results as required under various federal and state regulations. In addition, these courses are designed for regulatory personnel who have the responsibility to establish requirements in permits or regulatory language for continuous emissions monitoring or compliance assurance monitoring or to evaluate data provided in response to such requirements.
<b>Mobile Sources</b>	These courses are designed for individuals who implement programs designed to reduce emissions from mobile sources, both on-road and off-road.
<b>Climate Change</b>	These courses present information on greenhouse gas emissions estimation and control and fundamental scientific information about climate change.



# **1. INTRODUCTION TO AIR POLLUTION CONTROL**

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## 1.1 – INITIAL TRAINING FOR INTRODUCTION TO AIR POLLUTION CONTROL

This initial Training is for a new hire with scientific college degree, or a new hire with limited air quality work experience.

### 1.1.1 NECESSARY SKILLS

SKILLS	KNOWLEDGE AND UNDERSTANDING
S1.1.1 Ability to interpret basic air quality concepts and become familiar with the goals of the CAA and the state/local air quality programs	U1.1.1 Understanding the need for programs to implement the regulations and rules that are developed from state and federal laws to protect air quality standards and air quality related values
S1.1.2 Ability to interpret the basic science and math concepts associated with air pollution	U1.1.2 Understanding the need to interpret and calculate air quality related data (emissions data, flow data, etc.) correctly
S1.1.3 Ability to interpret how pollutants are regulated	K1.1.1 Basic knowledge of federal and state Regulated Pollutants, precursors and pollutants that may be regulated dually (for example methanol is a HAP and VOC)
S1.1.4 Ability to delineate the principles and practices associated with air pollution control	U1.1.3 Basic understanding of <ul style="list-style-type: none"> <li>• Air pollution permitting and compliance history</li> <li>• How the functions (or work) within the air quality programs are inter-related with the common goal of complying with the CAA and state and local regulations</li> </ul>
S1.1.5 Safety Skills	K1.1. 2 Knowledge of hazards that may be encountered in the performance of one’s duties in the office or in the field

## 1.2 SUGGESTED CURRICULUM FOR INTRODUCTION TO AIR POLLUTION CONTROL

Introduction to Air Pollution Control is the introductory set of courses for those individuals beginning their career in air quality. These courses do not have prerequisite courses.

**CARB and APTI** may have courses similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

These courses are designed for regulatory personnel who are new or will be beginning their career in the air quality regulatory field.

### 1.2.1 CORE OR INITIAL COURSES

Students should take three of the following courses:

- ❖ APTI SI-422 [Air Pollution Control Orientation Course] \_\_\_\_\_ or
- ❖ APTI SI-105 [Introduction to Air Pollution Control] \_\_\_\_\_ or
- APTI 452 [Principles and Practices of Air Pollution] \_\_\_\_\_ or
- CARB 101 [Uniform Air Quality Training Program (UAQTP)] \_\_\_\_\_ or
- ❖ APTI SI-100 [Mathematics Review for Air Pollution Control] \_\_\_\_\_ or
- ❖ APTI RE-100-1 [Basic Concepts in Environmental Sciences - Module 1: Basic Concepts] \_\_\_\_\_ or
- APTI V-102 [Clean Air Act Training Modules 1-11]
- APTI 446 [Inspection Procedures and Safety] \_\_\_\_\_ or
- ❖ APTI SI-446 [Air Pollution Source Inspection] \_\_\_\_\_ or

### 1.2.2 SUPPLEMENTAL INTRODUCTORY COURSES

The following introductory courses may be taken as time permits:

- ❖ APTI RE-100-2 [Basic Concepts in Environmental Sciences - Module 2: Characteristics of Gases]
- ❖ APTI RE-100-3 [Basic Concepts in Environmental Sciences - Module 3: Characteristics of Particles]
- ❖ APTI RE-100-4 [Basic Concepts in Environmental Sciences - Module 4: Liquid Characteristics]
- ❖ APTI RE-100-5 [Basic Concepts in Environmental Sciences - Module 5: Flowcharts and Ventilation Systems]
- ❖ APTI RE-100-6 [Basic Concepts in Environmental Sciences - Module 6: Air Pollution and Control Techniques]
- ❖ APTI RE-100-7 [Basic Concepts in Environmental Sciences - Module 7: Regulatory Requirements]
- ❖ APTI SI-473A [Beginning Environmental Statistical Techniques]
- APTI V-101 [Understanding Air Toxics]

## **2. AMBIENT MONITORING, QA/QC, & DATA ANALYSIS**

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## 2.1 BASIC SKILLS FOR AMBIENT MONITORING, QA/QC, & DATA ANALYSIS

These are the basic skills for a new hire with technical school or college degree or a new hire with limited work experience.

ET = Environmental Technician

ES = Environmental Scientist

SKILLS	ES OR ET	KNOWLEDGE AND UNDERSTANDING
S2.1.1 Ability to interpret general information about the reference methods, continuous air quality monitors, sampling design and statistical techniques applicable to ambient air monitoring	ES & ET	U2.1.1 Understanding of the math and scientific concepts associated with ambient monitoring
S2.1.2 Ability to determine the appropriate analytical methods for analysis of each pollutant	ES	K2.1.1 Knowledge of the appropriate methods available for collection and analysis of ambient air
S2.1.3 Ability to apply appropriate QA/QC procedures for ambient air monitoring	ES & ET	K2.1.2 Knowledge of QA/QC procedures that apply to ambient air monitoring, sampling, and analysis U2.1.2 Understand the principles of monitoring and sampling methods and QC requirements
S2.1.4 Ability to provide general maintenance and upkeep of the ambient air monitors used in the agency's network	ES & ET	K2.1.3 Knowledge to ensure monitors are operated properly and are kept in good operating order
S2.1.5 Ability to install and maintain sites to meet project requirements	ES	K2.1.4 Knowledge of relevant regulation and written protocols for monitor and probe siting
S2.1.6 Ability to handle and document ambient samples in accordance with project requirements and regulations and to conduct data analysis	ES & ET	K2.1.5 Knowledge of proper handling of ambient samples and appropriate data analysis to evaluate sample results
S2.1.7 Ability to review field and QC data to evaluate performance of instruments and diagnose and address potential deficiencies.	ET	K2.1.6 Knowledge of appropriate data analysis to apply to evaluate monitoring results
S2.1.8 Ability to identify and document exceptional events that require flagging	ES	K2.1.7 Knowledge of how to identify and flag exceptional events and how to prepare official documentation to obtain EPA approval for flagging
S2.1.9 Ability to validate and analyze air quality monitoring data for regulatory determinations	ES	K2.1.8 Knowledge of data validation and data analysis methods U2.1.3 Understanding of how to analyze monitoring data in the context of regulatory and technical uncertainties

## 2.2 INTERMEDIATE/ADVANCED SKILLS FOR AMBIENT MONITORING, QA/QC, & DATA ANALYSIS

These are the intermediate/advanced skills for staff with 3 or more years of ambient air monitoring experience for ET, data analysis, QA/QC analysis and regulatory interpretation and assessment

SKILLS	ES OR ET	KNOWLEDGE AND UNDERSTANDING
S2.2.1 Ability to site monitors following federal/state/local protocols to meet project goals	ES	K2.2.1 Knowledge of relevant regulations and protocols for monitoring siting K2.2.2 Knowledge of local conditions and constraints applicable to monitoring siting
S2.2.2 Ability to troubleshoot operational and network design problems, provide input to senior management on long-term equipment and network upgrades/design changes	ES& ET	K2.2.3 Knowledge of relevant regulatory changes and technical advances Understand the goals of the agency
S2.2.3 Ability to develop Standard Operating Procedures for methods, instruments and sampling methods for air sampling	ES	K2.2.4 Knowledge of current criteria pollutant monitoring methods and instruments K2.2.5 Knowledge of air toxics sampling and analytical methods K2.2.6 Knowledge of state of the art monitoring technology U2.2.1 Understanding of staff capabilities and constraints on operations
S2.2.4 Ability to interpret new federal and/or state regulation impact on monitoring network methods and design	ES &ET	K2.2.7 Knowledge of relevant regulatory changes and technical advances
S2.2.5 Ability to evaluate and assess ambient monitoring data for quality, trends, source impacts, attainment status  S2.2.6 Ability to apply appropriate methods to validate and verify ambient monitoring data	ES	K2.2.8 Advanced knowledge of ambient air pollution chemistry, transport, and statistical analysis methods U2.2.2 Understand agency goals and regulatory issues U2.2.3 Familiarity with analysis methods, QC requirements, modes of failure, statistical tools, and use of external data for validation
S2.2.7 Ability to design and carry out programmatic and analytical QA/QC methods, protocols, and plans	ES	K2.2.9 Advanced knowledge of QA/QC principles and procedures, federal and state regulations, and statistical analysis methods
S2.2.8 Ability to design, implement, and report on special monitoring studies	ET& ET	K2.2.10 ET – Knowledge of special monitoring methods and procedures K2.2.11 ES – Advanced knowledge of study design and data analyses K2.2.12 ES – Advanced knowledge of current scientific ambient air pollution issues, including new criteria air pollutants and air toxics
S2.2.9 Ability to develop presentations and present data analyses, monitoring network updates and changes to internal agency management, state regulatory entities, scientific community, and the general public at any public hearings	ES	K2.2.13 Advanced knowledge and understanding of ambient air pollution and related state and federal regulations

## 2.3 SUGGESTED AMBIENT MONITORING, QA/QC, & DATA ANALYSIS TRAINING CURRICULUM

### 2.3.1 CORE COURSES

Ambient Monitoring including QA/QC and data analysis has four levels of core courses. Some courses in this function have prerequisite courses. Courses with a prerequisite have the required prerequisite course identified underneath the course.

**CARB and APTI** may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

#### 2.3.1.1 INTRODUCTORY COURSES

General introductory courses are listed previously in Section 1.

#### 2.3.1.2 BASIC COURSES

Students should take the following courses first:

- CARB 222 [Principles of Ambient Air Monitoring]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- ❖ APTI SI-434 [Introduction to Ambient Air Monitoring]
- ❖ APTI SI-474 [Introduction to Environmental Statistics]
- ❖ APTI SI-446 [Air Pollution Source Inspection] \_\_\_\_\_  
*Prerequisite:* APTI SI-445 [Introduction to Baseline Source Inspection Techniques] \_\_\_\_\_ or
- APTI 446 [Inspection Procedures & Safety] \_\_\_\_\_

#### 2.3.1.3 INTERMEDIATE/ADVANCED COURSES – LEVEL 1

These courses can be taken after the initial courses based on students need.

- APTI 435 [Atmospheric Sampling PM 2.5 Monitoring Update - 1998]
- ❖ APTI SI-471 [General Quality Assurance Consideration for Ambient Air Monitoring]

#### 2.3.1.4 INTERMEDIATE/ADVANCED COURSE – LEVEL 2

- APTI 464 [Analytical Methods for Air Quality Standards]  
*Prerequisite:* APTI 435 [Atmospheric Sampling PM 2.5 Monitoring Update - 1998]

- APTI 470 [Quality Assurance for Air Pollution Measurement Systems]
  - Prerequisites:* APTI SI-100 [Mathematics Review for Air Pollution Control]
    - APTI SI-471 [General Quality Assurance Consideration for Ambient Air Monitoring]
    - APTI SI 473A [Beginning Environmental Statistical Techniques]
- ❖ APTI SI-433 [Network Design and Site Selection for Monitoring PM<sub>2.5</sub> and PM 10 in Ambient Air]
  - Prerequisites:* APTI SI-422 [Air Pollution Control Orientation Course] or APTI 452 [Principles and Practices of Air Pollution]
    - APTI 435 [Atmospheric Sampling PM 2.5 Monitoring Update – 1998] or APTI SI-434 [Introduction to Ambient Air Monitoring]
- ❖ APTI SI-436 [Site Selection for Monitoring SO<sub>2</sub> and PM 10]
  - Prerequisites:* APTI SI-422 [Air Pollution Control Orientation Course] or APTI 452 [Principles and Practices of Air Pollution]
    - APTI 435 [Atmospheric Sampling PM 2.5 Monitoring Update – 1998] or APTI SI-434 [Introduction to Ambient Air Monitoring]
- APTI V 202 [ How to Create a Successful Air Toxics Monitoring Program]
- APTI V-109 [Air Quality Data & Tools for Ozone Season & Beyond (2 modules)]

### **3. EMISSIONS ESTIMATION & INVENTORY DEVELOPMENT**

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### 3.1 BASIC SKILLS FOR EMISSIONS ESTIMATION & INVENTORY DEVELOPMENT

These are the basic skills for a new hire with scientific college degree or a new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S3.1.1 Ability to determine types of emission sources that must submit emission inventories and the intervals for submittal	<ul style="list-style-type: none"> <li>• U3.1.1 Understanding of which permits require the submittal of an emission inventory and the regulatory authority for the inventory submittal</li> </ul>
S3.1.2 Ability to determine how pollutants are regulated and how fees should be assessed	<ul style="list-style-type: none"> <li>• K3.1.1 Knowledge of federal and state Regulated Pollutants, precursors and pollutants that may be regulated dually (for example methanol is a HAP and VOC)</li> <li>• K3.1.2 Knowledge to ensure that dually regulated pollutants are not double counted for fee purposes</li> </ul>
S3.1.3 Ability to interpret agency guidelines regarding the use of emission factors for different purposes (annual inventories, permitting, compliance assessment, etc.)	<ul style="list-style-type: none"> <li>• K3.1.3 Basis knowledge of agency guidelines for the use of emission factors for different purposes (annual inventories, permitting, compliance assessment, etc.)</li> </ul>
S3.1.4 Ability to (1) review and find credible emission factors for various emission sources; and (2) evaluate the use of emission factors by simple industrial sources (i.e., boilers, ICE, etc.)	<ul style="list-style-type: none"> <li>• K3.1.4 Basic knowledge and understanding of the limitations of emission factors (such as those found in AP-42 or FIRE)</li> </ul>
S3.1.5 Ability to review emissions calculations for accuracy and validity of technical basis for simple emission sources	<ul style="list-style-type: none"> <li>• U3.1.2 Understanding of emissions calculations concepts and the ability to use data for development of actual and potential emission calculations. For example:               <ul style="list-style-type: none"> <li>❖ AP-42</li> <li>❖ EPA's Tanks Program</li> <li>❖ EPA's WATER9 Program</li> <li>❖ Material Balance</li> <li>❖ CEMS</li> <li>❖ Source Testing Emissions Factors</li> </ul> </li> </ul>

### 3.2 INTERMEDIATE/ADVANCED SKILLS FOR EMISSIONS ESTIMATION & INVENTORY DEVELOPMENT

These are the Intermediate/Advanced skills for staff with 3 or more years of emissions inventory experience; equivalent experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S3.2.1 Ability to be a resource for junior staff on emissions inventory issues	U3.2.1 Understand the limitations for the use of emission factors K3.2.1 Knowledge of EI's in order to perform the following: <ul style="list-style-type: none"> <li>o Mentor junior staff on the use of emission factors</li> <li>o Challenge junior staff to validate the use of emission factors when there is uncertainty</li> </ul>
S3.2.2 Ability to review and interpret more complex inventory submittals (complex Title V sources)	U3.2.2 Understanding of emissions calculations concepts and the ability to use data for development of actual and potential emission calculations K3.2.2 Knowledge to perform more advanced and complex calculations associated with approaches that are used to calculate dually regulated pollutants but excludes double counting
S3.2.3 Ability to review source test results and interpret or determine the methods for developing source specific emission factors from such data	K3.2.3 Knowledge to understand and perform more advanced and complex calculations associated with source test results
S3.2.4 Ability to gather site-specific or area-specific (i.e., county level) activity data and accurately use the data to develop a credible approach to estimating emissions	U3.2.3 Understand how to use activity data in conjunction with existing emission factors and other inputs to accurately estimate emissions.
S3.2.5 Ability to prepare estimates of mobile source emissions using models such as MOVES and NONROAD	U3.2.4 Understanding how to use approved models U3.2.5 Understanding where to obtain up to date input information to use with models U3.2.5 Understanding of the relative importance of various factors in terms of their influence on model performance
S3.2.6 Ability to comply with federal, state, and/or local requirements for developing and maintaining data bases of emissions data	K3.2.4 Knowledge of federal/state/local requirements and guidance

### 3.3 SUGGESTED EMISSIONS ESTIMATION & INVENTORY DEVELOPMENT TRAINING CURRICULUM

#### 3.3.1 CORE COURSES

Emission Estimation and Inventory Development has two levels of courses. Some courses in this function have prerequisite courses. Courses with a prerequisite have the required prerequisite course identified underneath the course

**CARB and APTI** may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

##### 3.3.1.1 INTRODUCTORY COURSES

General introductory courses are listed previously in Section 1.

##### 3.3.1.2 BASIC COURSES

- ❖ APTI SI-419A [ Introduction to Emission Inventories]
- APTI 419B [Preparation of Fine Particulate Emissions Inventories]  
*Prerequisite:* APTI SI-419A [Introduction to Emission Inventories]
- APTI V 204 [Preparation of Fine Particulate Emissions Inventories]

*NOTE: this is a summary of APTI 419B*

##### 3.3.1.3 INTERMEDIATE/ADVANCED COURSES

- Motor Vehicle Emission Simulator (MOVES)  
<http://www.epa.gov/otaq/models/moves/index.htm>

#### 3.3.2 OTHER RELATED COURSES

The following courses provide additional experience in areas that may benefit individuals that are tasked with developing emission estimates for industrial sources.

- APTI 450 [ Source Sampling for Pollutants]  
*Prerequisite:* APTI RE 100 [Basic Concepts in Environmental Sciences – Modules 1 – 7]
- ❖ APTI SI-431 Air Pollution Control Systems for Selected Industries

#### 3.3.3 ADDITIONAL AREAS OF EXPERTISE

The following courses provide industry specific training that may benefit individuals that are tasked with developing emission estimates for the following list of industrial facilities.

### 3.3.3.1 STATIONARY SOURCES

- ❖ **APTI SI 428A Introduction to Boiler Operation**  
*Prerequisites:* APTI SI-431 Air Pollution Control Systems for Selected Industries, and APTI SI-422 [Air Pollution Control Orientation Course]
- **CARB 271 Stationary Reciprocating Engines**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 272 Stationary Gas Turbines**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 230 Surface Coating: Metal Parts & Products**
- **CARB 230.4 Graphic Arts**  
*Prerequisite:* CARB 230 Surface Coating: Metal Parts & Products
- **CARB 233 Solvent Cleaning: Degreasing Operations**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 242 Hot Mix Asphalt Facilities**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 243 Aggregate Plants**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 244 Concrete Batch Plants**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 245 Cement Plants**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 246 Aggregate, Asphalt, & Concrete Batching Operations**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 261 Polyester Resin and Fiberglass**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 270 Incinerators**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 273 Industrial Boilers**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 285 Landfill Gas Control Facilities**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 287 Dry Cleaning**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 288 Petroleum Refining**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]

## **4. MODELING, FORECASTING, & DATA ANALYSIS**

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#### 4.1 BASIC SKILLS FOR MODELING, FORECASTING, AND DATA ANALYSIS

These are the basic skills for a new hire with scientific college degree or new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S4.1.1 Ability to interpret the introductory basic sciences found in the study of atmospheric science, meteorology, air quality science and modeling of emission sources	K4.1.1 Basic understanding of the math and scientific concepts associated with dispersion modeling
S4.1.2 Ability to determine how to use air pollution meteorology, chemistry to include tropospheric chemistry, and the use of computer modeling tools and their limitations	K4.1.2 Basic knowledge of the tools that are needed to conduct dispersion modeling
S4.1.3 Ability to utilize the model for selected simple applications	K4.1.3 Basic knowledge of how to setup and run the model for selected simple applications
S4.1.4 Ability to analyze simple dispersion modeling analyses that are submitted with air permit applications	K4.1.4 Basic knowledge to ensure modeling protocols are followed, proper meteorological data was used, setup of facility data was accurate, and that input and output files are correct K4.1.5 Basic understanding to run model to QA/QC application results
S4.1.5 Ability to assist senior staff with modeling simple sources for SIP and state-only air planning purposes	K4.1.6 Basic knowledge of how to setup and run the model to assist in air quality planning purposes
S4.1.6 Ability to assist senior modeling staff in forecasting air pollution events, such as daily ozone forecasting	K4.1.7 Basic knowledge of how to setup and run the model to assist with air pollution forecasting as needed by the agency

## 4.2 INTERMEDIATE ADVANCED SKILLS FOR MODELING, FORECASTING, AND DATA ANALYSIS

These are the Intermediate/Advanced skills for staff with 3 or more years of modeling experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S4.2.1 Ability to utilize the model for selected complex applications as requested by agency management	K4.2.1 Advanced knowledge of how to setup and run the model for complex applications
S4.2.2 Ability to analyze complex dispersion modeling analyses that are submitted with air permit applications (e.g., PSD modeling, which may include multisource modeling; complex air toxics modeling; residual risk modeling)	K4.2.2 Advanced knowledge to ensure modeling protocols are followed, proper meteorological data was used, setup of facility data was accurate, and that input and output files are correct K4.2.3 Advanced understanding to run complex models to QA/QC application results
S4.2.3 Ability to model complex sources and situations for SIP and state-only air planning purposes	K4.2.4 Advanced knowledge of how to setup and run the model to provide results for air quality planning purposes
S4.2.4 Ability to analyze air pollution/ambient situations to forecast air pollution events, such as daily ozone forecasting	K4.2.5 Advanced knowledge of how to setup and run the model to provide air pollution forecasting as needed by the agency
S4.2.5 Ability (1) to mentor junior staff and (2) provide oversight and be a resource for complex modeling issues	K4.2.6 Knowledge to perform more advanced and complex oversight of the dispersion modeling process
S4.2.6 Ability to implement receptor modeling as a part of some air quality management	U4.2.1 Background and application of receptor models for the source identification and quantitative mass apportionment of airborne pollutants
S4.2.7 Ability to apply models in complex situations where there is a need to make assumptions about how to set up the modeling platform in order to best represent specific complex situations S4.2.8 Ability to explain the rationale for these decisions to decision makers	U4.2.2 Thorough understanding of model assumptions and options for input data. K4.2.7 Knowledge of prior decisions by regulatory agencies to approve specific applications of models Knowledge of applicable regulations and guidance. K4.2.8 Knowledge of scientific basis for model assumptions and data for particular situations that would determine the best application of the model

### 4.3 SUGGESTED MODELING, FORECASTING, AND DATA ANALYSIS TRAINING CURRICULUM

#### 4.3.1 CORE COURSES

Modeling, Forecasting and Data Analysis has three levels of courses. Some courses in this function have prerequisite courses. Courses with a prerequisite have the required prerequisite course identified underneath the course

**CARB and APTI** may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

#### 4.3.1.1 INTRODUCTORY COURSES

General introductory courses are listed previously in Section 1.

#### 4.3.1.2 BASIC COURSES

- ❖ APTI SI-409 [Basic Air Pollution Meteorology]
- ❖ APTI SI-410 [Introduction to Dispersion Modeling]
- ❖ APTI OS-411A [Series 411 – Computational Atmospheric Sciences for Air Quality Monitoring]
- ❖ APTI OS-411B [Series 411 - Computational Atmospheric Sciences: Essential Atmospheric Sciences]  
*Prerequisite:* APTI OS-411A [Series 411 – Computational Atmospheric Sciences for Air Quality Monitoring]
- ❖ APTI OS-411C [Series 411 - Computational Atmospheric Sciences: Meteorology for Air Quality Monitoring]  
*Prerequisite:* APTI OS-411A [Series 411 – Computational Atmospheric Sciences for Air Quality Monitoring]  
APTI OS-411B [Series 411 - Computational Atmospheric Sciences: Essential Atmospheric Sciences]
- ❖ APTI OS-411D [Series 411 - Computational Atmospheric Sciences: Tropospheric Chemistry for Air Quality Modeling]  
*Prerequisite:* APTI OS-411A [Series 411 – Computational Atmospheric Sciences for Air Quality Monitoring]  
APTI OS-411B [Series 411 - Computational Atmospheric Sciences: Essential Atmospheric Sciences]  
APTI OS-411C [Series 411 - Computational Atmospheric Sciences: Meteorology for Air Quality Monitoring]
- ❖ APTI OS-411E [Series 411 - Computational Atmospheric Sciences: Computational Science]  
*Prerequisite:* APTI OS-411A [Series 411 – Computational Atmospheric Sciences for Air Quality Monitoring]  
APTI OS-411B [Series 411 - Computational Atmospheric Sciences: Essential Atmospheric Sciences]  
APTI OS-411C [Series 411 - Computational Atmospheric Sciences: Meteorology for Air Quality Monitoring]  
APTI OS-411D [Series 411 - Computational Atmospheric Sciences: Tropospheric Chemistry for Air Quality Modeling]
- ❖ APTI OS-411F [Series 411 - Computational Atmospheric Sciences: Atmospheric Science Models]  
*Prerequisite:* APTI OS-411A [Series 411 – Computational Atmospheric Sciences for Air Quality Monitoring]  
APTI OS-411B [Series 411 - Computational Atmospheric Sciences: Essential Atmospheric Sciences]  
APTI OS-411C [Series 411 - Computational Atmospheric Sciences: Meteorology for Air Quality Monitoring]

APTI OS-411D [Series 411 - Computational Atmospheric Sciences: Tropospheric Chemistry for Air Quality Modeling]

APTI OS-411E [Series 411 - Computational Atmospheric Sciences: Computational Science]

### 4.3.1.3 INTERMEDIATE/ADVANCED

- APTI 423 [Air Pollution Dispersion Models - Applications]  
*Prerequisite:* APTI SI-409 [Basic Air Pollution Meteorology] and APTI SI-410 [Introduction to Dispersion Modeling ]
- APTI 424 [Introduction to Receptor Modeling]  
*Prerequisites:* APTI SI-410 [Introduction to Dispersion Modeling ] **or**  
APTI 435 [Atmospheric Sampling PM 2.5 Monitoring Update - 1998] **or**  
APTI SI-434 [Introduction to Ambient Air Monitoring]  
APTI SI-473A [Beginning Environmental Statistical Techniques]
- APTI V-109 [[Air Quality Data & Tools for Ozone Season & Beyond](#) (2 modules)]
- APTI V-210 [Revisions to the Primary NAAQS for Sulfur Dioxide]
- APTI V-211 [Lead National Ambient Air Quality Standards Update (5 segments)]
- APTI V-212 [PM2.5 Implementation (5 modules)]
- APTI V-213 [2008 Ozone National Ambient Air Quality Standards & Air Quality Index Update (6 segments)]

## **5. PLANNING/ REGULATION DEVELOPMENT**

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## 5.1 BASIC SKILLS FOR PLANNING/REGULATION DEVELOPMENT

These are the basic skills for a new hire with scientific college degree or a new hire with limited work experience.

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S5.1.1 Ability to identify types of emission sources that affect air quality and the underlying reasons they must be addressed in air quality planning and regulation development	U5.1.1 Understanding of which emission sources affect air quality in the region of interest and what regulatory requirements already exist to limit emissions from those sources
S5.1.2 Ability to determine and differentiate the compliance concepts of the federal, state and local general statutes, laws, rules and regulations	U5.1.2 Understand the goals of the agency and the underlying laws, rules and regulations from which regulations must be developed
S5.1.3 Ability to differentiate between the requirements for ambient standards and the requirements for emission standards	U5.1.3 Understand the reasons for the need to have both ambient standards as well as specific emission standards for various emission sources
S5.1.4 Ability to identify goals for state implementation plans and state and federal regulations	K5.1.1 Basic knowledge of underlying state laws or regulations that allow the development of state standards K5.1.2 Basic knowledge of regulatory requirements that allow and require the adoption of federal standards
S5.1.5 Ability to identify which federal regulations must be adopted into the SIP	K5.1.3 Basic knowledge of the rule adoption procedures for incorporating federal regulations and requirements into state requirements
S5.1.6 Ability to review new simple federal regulations (e.g., new NSPS and NESHAP) and determine the need to incorporate the federal regulations into the state and local regulations	K5.1.4 Basic knowledge of which rules must be included in the state and local regulations and the state procedures for rule development
S5.1.7 Ability to draft simple regulations and supporting documentation for incorporation of new state or federal rules into the state regulations	K5.1.5 Knowledge of regulation development and procedures for developing new regulations

## 5.2 INTERMEDIATE ADVANCED FOR PLANNING/REGULATION DEVELOPMENT

These are the Intermediate/Advanced skills for staff with 3 or more years of planning and regulation experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S5.2.1 Ability to recognize the need for a state or local regulation or ordinance based on air quality needs or Clean Air Act requirements	U5.2.1 Understand up to date information about new developments in federal and state laws, regulations, and guidance pertaining to air quality management K5.2.1 Knowledge of emissions inventory information and control cost/benefit information pertinent to rule development K5.2.2 Knowledge of health effects and exposure to pollutants in the area of interest
S5.2.2 Ability to determine the permitting and compliance concepts of the federal, state and local general statutes, laws, rules and regulations	U5.2.2 Understand and implement the planning goals of the agency U5.2.3 Understand the underlying laws, rules and regulations from which regulations must be developed
S5.2.3 Ability to determine whether new regulations must be developed as state-only regulations or federal SIP and other federal regulations	K5.2.3 Knowledge of underlying state laws or regulations that allow the development of state standards K5.2.4 Knowledge of regulatory requirements that allow and required the adoption of federal standards
S5.2.4 Ability to determine which federal regulations must be adopted into the SIP	K5.2.5 Knowledge of the rule adoption procedures for incorporating federal regulations K5.2.6 Knowledge of the guidance for demonstrating that state/local rules are equivalent to federal rules
S5.2.5 Ability to review new complex federal regulations (e.g., nonattainment regulation updates, CSAPR, etc.) and determine the need and approach to incorporate the federal regulations into the state and local regulations	K5.2.7 Basic knowledge of which rules must be included in the state and local regulations and the state procedures for rule development
S5.2.6 Ability to draft complex regulations and supporting documentation for incorporation of new state or federal rules into the state regulations	K5.2.8 Knowledge of regulation development and procedures for developing new regulations
S5.2.7 Ability to develop presentations and present regulatory updates and changes to internal agency management, state regulatory approval commissions, and the general public at any public hearings	K5.2.9 Advanced knowledge of the regulatory development process
S5.2.8 Ability (1) to instruct junior staff and (2) review regulatory data for accuracy and validity for development of updated regulations	K5.2.10 Knowledge to perform more advanced and complex oversight of the rule development process

## 5.3 SUGGESTED PLANNING/REGULATION DEVELOPMENT TRAINING CURRICULUM

### 5.3.1 CORE COURSES

Planning & Regulatory Development has three levels of courses. Some courses in this function have prerequisite courses. Courses with a prerequisite have the required prerequisite course identified underneath the course CARB and APTI may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

#### 5.3.1.1 INTRODUCTORY COURSES

General introductory courses are listed previously in Section 1.

#### 5.3.1.2 BASIC COURSES

- APTI V-107 [ Air Quality Planning for New Non-Attainment Areas]
- APTI V-206 [ SIP Law & Rulemaking on State Implementation Plans]
- APTI V-207 [Sanctions, FIPS, & SIP Calls under the Clean Air Act ]

#### 5.3.1.3 INTERMEDIATE/ADVANCED

- APTI V-103 [Black Carbon Training Modules]
- APTI V-104 [ PM Health Effects from Wood Smoke]
- APTI V-105 [Residential Wood Smoke]
- APTI V-106 [Working Together for a Better Quality of Life and Clean Environment]
- APTI V-109 [[Air Quality Data & Tools for Ozone Season & Beyond](#) (2 modules)]
- APTI V-210 [Revisions to the Primary NAAQS for Sulfur Dioxide]
- APTI V-211 [Lead National Ambient Air Quality Standards Update (5 segments)]
- APTI V-212 [PM2.5 Implementation (5 modules)]
- APTI V-213 [2008 Ozone National Ambient Air Quality Standards & Air Quality Index Update (6 segments)]

### 5.3.2 OTHER RELATED COURSES

The following courses provide additional experience in areas that may benefit individuals that are tasked with planning and regulatory development associated with the following air quality activities.

- APTI SI 460 [Introduction to Permitting]
- APTI 461 [Intermediate Permitting]  
Prerequisites: APTI SI 460 [Introduction to Permitting] and APTI 454 [ Effective Permit Writing ]  
APTI RE-100-7 [Basic Concepts in Environmental Sciences - Module 7: Regulatory Requirements]
- ❖ APTI SI-300 [Introduction to Air Pollution Toxicology]
- CARB 290 [MACT General Background Information]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]

### 5.3.3 ADDITIONAL AREAS OF EXPERTISE

The following courses provide industry specific training that may benefit individuals that are tasked with planning and regulatory development for the following list of industrial facilities.

#### 5.3.3.1 STATIONARY SOURCES

- ❖ **APTI SI 428A Introduction to Boiler Operation**  
*Prerequisites:* APTI SI-431 Air Pollution Control Systems for Selected Industries, and  
APTI SI-422 [Air Pollution Control Orientation Course]
- **CARB 271 Stationary Reciprocating Engines**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 272 Stationary Gas Turbines**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 230 Surface Coating: Metal Parts & Products**
- **CARB 230.4 Graphic Arts**  
*Prerequisite:* CARB 230 Surface Coating: Metal Parts & Products
- **CARB 233 Solvent Cleaning: Degreasing Operations**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 242 Hot Mix Asphalt Facilities**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 243 Aggregate Plants**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 244 Concrete Batch Plants**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 245 Cement Plants**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 246 Aggregate, Asphalt, & Concrete Batching Operations**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 261 Polyester Resin and Fiberglass**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 270 Incinerators**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 273 Industrial Boilers**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 285 Landfill Gas Control Facilities**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 287 Dry Cleaning**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- **CARB 288 Petroleum Refining]**  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]

### 5.3.3.2 POLLUTION CONTROL FOUNDATION

- CARB 299 [ Theory & Application of Air Pollution Control Devices]
- ❖ APTI SI 437 [ Air Pollution Control Technology Series]
- ❖ APTI SI-412A [Fabric Filter Operation Overview]
- ❖ APTI SI-412B [Electrostatic Precipitator Plan Overview]
- ❖ APTI SI-412C [Wet Scrubber Plan Overview]
- APTI-413 [Control of Particulate]  
*Prerequisites* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI 415 [Control of Gaseous Emissions]  
*Prerequisites* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI-418 [Control of Nitrogen Oxide Emissions]  
*Prerequisites* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI 482 [ Sources and Control of Volatile Organic Air Pollutants ]  
*Prerequisites* APTI SI-422 [Air Pollution Control Orientation Course]
- ❖ APTI SI-417 [Controlling VOC Emissions from Leaking Process Equipment]
- APTI 445 [ Inspection of Particle Control Devices (2003)]
- APTI 455 [ Inspection of Gas Control devices and Selected Industries (2003)  
*Prerequisites* APTI SI-422 [Air Pollution Control Orientation Course]
- CARB 281 [ESP]  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 282 [Baghouses]  
*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 284 [VOC Control Devices]



## 6. PERMITTING

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## 6.1 BASIC SKILLS FOR PERMITTING

These are the basic skills for is a new hire with scientific college degree or a new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S6.1.1 Ability to determine types of emission sources that must be included in an air permit	U6.1.1 Understanding of which emission sources require a permit and which are exempt from permitting or are considered insignificant sources
S6.1.2 Ability to determine how pollutants are regulated	K6.1.1 Knowledge of federal and state Regulated Pollutants, precursors and pollutants that may be regulated dually (for example methanol is a HAP and VOC)
S6.1.3 Ability to determine the type of permit required by an applicant	U6.1.2 Understand differences in permits <ul style="list-style-type: none"> <li>○ PSD</li> <li>○ NNSR</li> <li>○ Minor NSR</li> <li>○ State Construction (Minor NSR</li> <li>○ Small or Area / Non-Title V</li> <li>○ Synthetic Minor / Non-Title V</li> <li>○ Title V</li> </ul>
S6.1.4 Ability to utilize the CAA, state and local laws to review and interpret regulations for source applicability purposes	K6.1.2 Knowledge of underlying laws that implement federal, state and local permitting K6.1.3 Knowledge of regulatory requirements derived from various air quality rule: <ul style="list-style-type: none"> <li>○ SIP</li> <li>○ NSPS</li> <li>○ NESHAP</li> <li>○ PSD (basic applicability)</li> <li>○ NNSR (basic applicability)</li> <li>○ Title V/CAM</li> <li>○ State only (air toxics, odor)</li> </ul>
S6.1.5 Ability to review emissions calculations for accuracy and validity of technical basis	U6.1.3 Understanding of emissions calculations concepts and the ability to use data for development of potential emission calculations. For example: <ul style="list-style-type: none"> <li>○ AP-42</li> <li>○ EPA's Tanks Program</li> <li>○ EPA's WATER9 Program</li> <li>○ Material Balance</li> <li>○ Source Testing Emissions Factors</li> </ul>

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S6.1.6 Ability to draft minor source construction permits, non -Title V operating permits and simple Title V permits from applicable rules	K6.1.4 Knowledge to draft enforceable permit conditions which incorporate <ul style="list-style-type: none"> <li>○ Applicable federal and state regulations</li> <li>○ Applicable emission limits/standards</li> <li>○ Applicable operating limits/standards</li> <li>○ Applicable testing requirements</li> <li>○ Applicable monitoring</li> <li>○ Applicable recordkeeping</li> <li>○ Applicable state or local specific general conditions reporting</li> </ul>
S6.1.7 Ability to review control technology performance relative to regulatory specifications	U6.1.4 Understand gaseous air control device operations and key elements affecting performance U6.1.5 Understand particulate control device operations and key elements affecting performance U6.1.6 Understand work practice standards for air emissions control and key elements affecting effectiveness
S6.1.8 Ability to review AQ dispersion modeling input data for accuracy and interpret AQ modeling results	U6.1.7 Understand the need for accurate input data and apply the results for permitting actions
S6.1.9 Ability to develop technical memoranda documenting permit application review and communicate with public, facilities, etc.	U6.1.8 Understand how to identify key assumptions underlying permit conditions, write a concise memo

## 6.2 INTERMEDIATE / ADVANCED SKILLS FOR PERMITTING

These are the Intermediate/Advanced skills for staff with 3 or more years of permit writing or inspection experience; equivalent experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S6.2.1 Ability to determine the type of permit	U6.2.1 Understand differences in permits <ul style="list-style-type: none"> <li>❖ PSD</li> <li>❖ NNSR</li> <li>❖ Minor NSR</li> <li>❖ State Construction (Minor NSR)</li> <li>❖ Small or Area / Non-Title V</li> <li>❖ Synthetic Minor / Non-Title V</li> <li>❖ Title V</li> </ul>
S6.2.2 Ability to review and interpret more complex regulations for source applicability purposes	U6.2.2 Detailed understanding of the following regulations <ul style="list-style-type: none"> <li>○ SIP</li> <li>○ NSPS</li> <li>○ NESHAP</li> <li>○ CAM</li> <li>○ PSD</li> <li>○ NNSR</li> <li>○ Tailoring Rule</li> </ul>
S6.2.3 Ability (1) to instruct junior staff and (2) review emissions calculations for accuracy and validity of technical basis for more complex emission calculations	K6.2.1 Knowledge to perform more advanced and complex calculations associated with PSD, NSR NAA, NESHAP and NSPS
S6.2.4 Ability to conduct advanced technical analyses as required in the PSD regulations and NSR NAA regulations	U6.2.3 Understand and conduct top-down BACT analysis U6.2.4 Understand and conduct a PSD netting analysis U6.2.5 Understand and conduct an emissions offset analysis
S6.2.5 Ability to draft major source (PSD, NSR/NAA) construction permits and complex Title V permits from applicable rules	K6.2.2 Knowledge to draft enforceable permit conditions which incorporate <ul style="list-style-type: none"> <li>○ Applicable federal and state regulations.</li> <li>○ Applicable emission limits/standards</li> <li>○ Applicable operating limits/standards</li> <li>○ Applicable testing requirements</li> <li>○ Applicable monitoring</li> <li>○ Applicable recordkeeping</li> <li>○ Applicable state or local specific general conditions reporting</li> </ul>
S6.2.6 Ability to review control technology performance relative to regulatory specifications	U6.2.6 Detailed understanding of specific gaseous air control device operations and key elements affecting performance U6.2.7 Detailed understanding of specific particulate control device operations and key elements affecting performance

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S6.2.7 Ability to interpret AQ modeling results	U6.2.8 Detailed understanding of the modeling results and use for permitting actions
S6.2.8 Ability to evaluate and interpret other air quality rules	U6.2.9 Basic understanding of Risk Management Program requirements U6.2.10 Basic understanding of Ozone Depleting Substance requirements U6.2.11 Basic understanding of Regional Haze Program requirements

## 6.3 SUGGESTED PERMITTING TRAINING CURRICULUM

### 6.3.1 CORE COURSES

Permitting has four levels of courses. Some courses in this function have prerequisite courses. Courses with a prerequisite have the required prerequisite course identified underneath the course

**CARB and APTI** may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

#### 6.3.1.1 INTRODUCTORY COURSES

General introductory courses are listed previously in Section 1.

#### 6.3.1.2 BASIC COURSES

- ❖ APTI SI-460 [Introduction to Permitting] \_\_\_\_\_ or
- CARB 333 [Permit Practices and Procedures I] \_\_\_\_\_

#### 6.3.1.3 INTERMEDIATE/ADVANCED -LEVEL 1

- APTI 454 [Effective Permit Writing] \_\_\_\_\_  
*Prerequisite:* APTI RE-100-7 [Basic Concepts in Environmental Sciences - Module 7: Regulatory Requirements]
- CARB 334 [Permit Writing II] \_\_\_\_\_  
*Prerequisite:* CARB 333 [Permit Practices and Procedures I]

#### 6.3.1.4 INTERMEDIATE/ADVANCED-LEVEL 2

- APTI 461 [Intermediate Permitting]  
*Prerequisite:* APTI SI-460 [Introduction to Permitting]  
APTI 454 [Effective Permit Writing]  
*Prerequisite (to APTI 454)* APTI RE-100-7 [Basic Concepts in Environmental Sciences - Module 7: Regulatory Requirements]

### 6.3.2 OTHER RELATED COURSES

The following courses provide additional experience in areas that may benefit individuals that are tasked with permitting associated with the following air quality activities.

- APTI 345 [Emission Capture and Gas Handling System Inspection (1995)]
- APTI 427 [Combustion Evaluation]
- APTI 423 [Air Pollution Dispersion Models - Applications]  
*Prerequisites:* APTI SI-409 [Basic Air Pollution Meteorology]  
APTI SI-410 [Introduction to Dispersion Modeling]
- ❖ APTI SI-419A [Introduction to Emission Inventories]
- CARB 290 [ MACT General Background Information ]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- APTI V-205 [Greenhouse Gas Permit Training – December 2010]

### 6.3.3 ADDITIONAL AREAS OF EXPERTISE

The following courses provide industry specific training that may benefit individuals that are tasked with permitting for the following list of industrial facilities.

#### 6.3.3.1 STATIONARY SOURCES

- ❖ APTI SI 428A Introduction to Boiler Operation  
*Prerequisites:* APTI SI-431 Air Pollution Control Systems for Selected Industries, and  
APTI SI-422 [Air Pollution Control Orientation Course]
- CARB 271 Stationary Reciprocating Engines  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 272 Stationary Gas Turbines  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 230 Surface Coating: Metal Parts & Products
- CARB 230.4 Graphic Arts  
*Prerequisite:* CARB 230 Surface Coating: Metal Parts & Products
- CARB 233 Solvent Cleaning: Degreasing Operations  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 242 Hot Mix Asphalt Facilities  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 243 Aggregate Plants  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 244 Concrete Batch Plants  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 245 Cement Plants  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 246 Aggregate, Asphalt, & Concrete Batching Operations  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 261 Polyester Resin and Fiberglass  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 270 Incinerators  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 273 Industrial Boilers  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 285 Landfill Gas Control Facilities  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 287 Dry Cleaning  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 288 Petroleum Refining  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]

#### 6.3.3.2 POLLUTION CONTROL FOUNDATION

- CARB 299 [ Theory & Application of Air Pollution Control Devices]

- ❖ APTI SI 437 [ Air Pollution Control Technology Series]
- ❖ APTI SI-412A [Fabric Filter Operation Overview]
- ❖ APTI SI-412B [Electrostatic Precipitator Plan Overview]
- ❖ APTI SI-412C [Wet Scrubber Plan Overview]
- APTI-413 [Control of Particulate]
 

*Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI 415 [Control of Gaseous Emissions]
 

*Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI-418 [Control of Nitrogen Oxide Emissions]
 

*Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI 482 [ Sources and Control of Volatile Organic Air Pollutants ]
 

*Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]
- ❖ APTI SI-417 [Controlling VOC Emissions from Leaking Process Equipment]
- APTI 445 [ Inspection of Particle Control Devices (2003)]
- APTI 455 [ Inspection of Gas Control devices and Selected Industries (2003)]
 

*Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]
- CARB 281 [ESP]
 

*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 282 [Baghouses]
 

*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 284 [VOC Control Devices]

### 6.3.3.3 SOURCE SAMPLING AND MONITORING

- APTI 450 [ Source Sampling for Pollutants ]
- APTI 468 [ Monitoring Compliance Test and Source Test Observations]
 

*Prerequisite:* APTI 450 [Source Sampling for Pollutants]
- CARB 224 [ Observing Source Tests]
 

*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- APTI 476B Continuous Emissions Monitoring Systems – Operations and Maintenance of Gas Monitors]
- APTI 474 [ Continuous Emissions Monitoring]
 

<p><i>Prerequisites:</i> APTI SI-100 [Mathematics Review for Air Pollution Control]            APTI 476B Continuous Emissions Monitoring Systems – Operations and Maintenance of Gas Monitors]</p>	OR
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- CARB 221 [ Continuous Emissions Monitoring]
 

*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 220 [ Compliance Assurance Monitoring (CAM)]
 

*Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]  
 CARB 299 [ Theory & Application of Air Pollution Control Devices]
- CARB 262 [Fugitive VOC Emissions Inspections]
 

*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- APTI 380 [Fugitive Source Inspection]
 

*Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]



## 7. INSPECTION & ENFORCEMENT

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## 7.1 BASIC SKILLS FOR INSPECTION AND ENFORCEMENT

These are basic skills for a new hire with scientific college degree or a new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S7.1.1 Ability to determine types of emission sources that must be included in an air permit and those that can be excluded from permitting	U7.1.1 Understanding of which emission sources require a permit and which are exempt from permitting or are considered insignificant source
S7.1.2 Ability to determine the types of permits needed for emission sources at a manufacturing site	U7.1.2 Understand differences in permits <ul style="list-style-type: none"> <li>❖ PSD</li> <li>❖ NSR NAA</li> <li>❖ Minor NSR</li> <li>❖ State Construction (Minor NSR)</li> <li>❖ Small or Area / Non-Title V</li> <li>❖ Synthetic Minor / Non-Title V</li> <li>❖ Title V</li> </ul>
S7.1.3 Ability to implement safety procedures while conducting an inspection	U7.1.3 Understand important safety items: <ul style="list-style-type: none"> <li>○ need for wearing safety equipment (hat, glasses, shoes, etc.)</li> <li>○ requirement to follow plant safety procedures</li> <li>○ hazards associated with industrial process operations</li> </ul>
S7.1.4 Ability to inspect simple air emission sources and control devices at non-Title V facilities and simple Title V facilities for proper operation	U7.1.4 Understand and be knowledgeable of the operation of emission sources and control devices
S7.1.5 Ability to interpret permit conditions while performing a plant inspection and be able to review plant operating data to determine compliance	U7.1.5 Understanding the underlying permit conditions and the information required for compliance
S7.1.6 Ability to review compliance reports, test reports, emission inventories, monitoring data, notifications, etc.	U7.1.6 Understanding the required information that is expected in the submittal of any report, including have knowledge of the required information and be able to determine completeness and accuracy of each report
S7.1.7 Ability to review plant operating data and plant submitted data to determine permit compliance  S7.1.8 Ability to develop inspection and compliance assessment reports	K7.1.1 Knowledge to draft agency inspection reports which document <ul style="list-style-type: none"> <li>○ Nature of operations of inspected facility</li> <li>○ Emission sources observed</li> <li>○ Assessment of inspected emission sources (compliance/non-compliance)</li> </ul> K7.1.2 Knowledge to draft agency reports which document <ul style="list-style-type: none"> <li>○ Compliance assessment of each submitted report in regards to the permit and any other agency requirements</li> </ul>

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S7.1.9 Ability to determine non-complying facilities and communicate such findings to their supervisors	K7.1.3 Basic knowledge of permit and underlying regulations that must be evaluated to determine facility compliance K7.1.4 Basic knowledge of enforcement procedures for non-complying emission sources K7.1.5 Knowledge to document in agency format non-complying issues in accordance with agency procedures
S7.1.10 Ability to review test protocols and observe compliance test procedures for simple processes	K7.1.6 Knowledge of agency procedures and source test methods for compliance testing
S7.1.11 Ability to meet federal/state/local requirements for maintaining databases concerning inspections and compliance status	K7.1.7 Knowledge of federal/state/local requirements for data reporting and maintenance

## 7.2 INTERMEDIATE ADVANCED SKILLS FOR INSPECTION AND ENFORCEMENT

These are Intermediate/Advanced skills for staff with 3 or more years of inspection or permitting experience; equivalent experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S7.2.1 Ability to determine types of emission sources that must be included in an air permit and those that can be excluded from permitting at a complex manufacturing facility (Title V and Major PSD or NSR-NAA site)	U7.2.1 Understanding of which emission sources require a permit and which are exempt from permitting or are considered insignificant sources
S7.2.2 Ability to determine the types of permits needed for emission sources at a complex manufacturing complex (Title V and Major PSD or NSR-NAA site)	U7.2.2 Understand differences in permits <ul style="list-style-type: none"> <li>❖ PSD</li> <li>❖ NNSR</li> <li>❖ Minor NSR</li> <li>❖ State Construction (Minor NSR)</li> <li>❖ Small or Area / Non-Title V</li> <li>❖ Synthetic Minor / Non-Title V</li> <li>❖ Title V</li> </ul>
S7.2.3 Ability to implement safety procedures while conducting an inspection	U7.2.3 Understand: <ul style="list-style-type: none"> <li>○ the need for wearing safety equipment (hat, glasses, shoes, etc.)</li> <li>○ the need for following plant safety procedures</li> <li>○ the hazards associated with industrial process operations</li> </ul>
S7.2.4 Ability to inspect complex air emission sources and control devices at Title V facilities for proper operation	U7.2.4 Understand and be knowledgeable of the operation of emission sources and control devices
S7.2.5 Ability to interpret complex permit conditions while performing a plant inspection and be able to review plant operating data to determine compliance	U7.2.5 Understanding the underlying permit conditions and the information required for compliance U7.2.6 Understanding of complex federal regulations – NESHAP, NSPS, CAM , PSD, NSR-NAA
S7.2.6 Ability to review compliance reports, test reports, emission inventories, monitoring data, notifications, etc.	U7.2.7 Understanding the required information that is expected in the submittal of any report. Be knowledgeable of the required information and be able to determine completeness and accuracy of each report
S7.2.7 Ability to review plant operating data and plant submitted data and determine permit compliance	K7.2.1 Knowledge to draft agency inspection reports which document <ul style="list-style-type: none"> <li>○ Nature of operations of inspected facility</li> <li>○ Emission sources observed</li> <li>○ Assessment of an inspected emission sources (compliance/non-compliance)</li> </ul> K7.2.2 Knowledge to draft agency reports which document <ul style="list-style-type: none"> <li>○ Compliance assessment of each submitted report in regards to the permit and any other agency requirements</li> </ul>
S7.2.8 Ability to develop inspection and compliance assessment reports for complex facilities (Title V sources)	

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S7.2.9 Ability to determine non-complying facilities and develop enforcement reports following agency procedures for complex industrial operations (Title V sources)	K7.2.3 Knowledge of permit and underlying regulations that must be evaluated to determine facility compliance K7.2.4 Knowledge of enforcement procedures for non-complying emission sources K7.2.5 Knowledge to document in agency format non-complying issues in accordance with agency procedures
S7.2.10 Ability to evaluate complex sources for applicability to complex regulations in order to determine applicability to and compliance with such regulations	K7.2.6 Knowledge to perform more advanced and complex compliance regulatory assessment and calculations associated with PSD, NSR NAA, NESHAP and NSPS
S7.2.11 Ability to review test protocols and observe compliance test procedures for complex processes	K7.2.7 Knowledge of agency procedures and understanding of source test methods for compliance testing
S7.2.12 Ability to review CEMS/COMS/CPMS data and determine compliance	K7.2.8 Knowledge of regulations and understanding of the CEMS/COMS/CPMS units to assess compliance with regulations
S7.2.13 Ability to evaluate and interpret other air quality rules for site inspection purposes	U7.2.8 Basic understanding of Risk Management Program requirements U7.2.9 Basic understanding of Ozone Depleting Substance requirements U7.2.10 Basic understanding of Regional Haze Program requirements
S7.2.14 Ability to instruct junior staff on inspection and enforcement expectations and review junior staff compliance and enforcement reports	K7.2.9 Knowledge to provide guidance for staff instruction and to perform overview of compliance and enforcement reports

## 7.3 SUGGESTED INSPECTION AND ENFORCEMENT TRAINING CURRICULUM

### 7.3.1 CORE COURSES

Inspections and Enforcement has four levels of courses. Some courses in this function have prerequisites courses.

**CARB and APTI** may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

#### 7.3.1.1 INTRODUCTORY COURSES

General introductory courses are listed previously in Section 1.

#### 7.3.1.2 BASIC COURSES

- ❖ APTI SI 445 [Introduction to Baseline Source Inspection Techniques]
- CARB 350 [Basic Inspector Training]

#### 7.3.1.3 INTERMEDIATE/ADVANCED COURSES-LEVEL 1

- ❖ APTI SI 446[Air Pollution Source Inspection]  
*Prerequisite:* APTI SI 445 [Introduction to Baseline Source Inspection Techniques]
- APTI 446 [Inspection Procedures and Safety]  
*Prerequisite:* APTI SI 445 [Introduction to Baseline Source Inspection Techniques]
- CARB 335 [Principles of Environmental Compliance & Enforcement]

#### 7.3.1.4 INTERMEDIATE /ADVANCED COURSES-LEVEL 2

- APTI 380 [ Fugitive Source Inspection]
- APTI 345 [Emission Capture and Gas Handling System Inspection ]
- APTI 444 [ Air Pollution Field Enforcement]  
*Prerequisites:* APTI 452 [Principles and Practices of Air Pollution]  
APTI SI-422 [Air Pollution Control Orientation Course]
- APTI 445 [ Inspection of Particle Control Devices ]  
*Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]
- APTI 455 [ Inspection of Gas Control Devices and Selected Industries]  
*Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]

- CARB 262 [Fugitive VOC Emissions Inspections]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 345 [Enforcement Case Development and Resolution]
- CARB 355 [Advanced Inspector Training]
- APTI 427 [Combustion Evaluation]
- APTI 350 [Asbestos NESHAP Inspection and Safety Procedures Workshop]
- APTI V-100 [Auto Body Area Source Rule Update & Collision Repair Campaign]
- APTI V-104 [PM Health Effects from Wood Smoke]
- APTI V-105 [Residential Wood Smoke]

### 7.3.2 OTHER RELATED COURSES

The following courses provide additional experience in areas that may benefit individuals that are tasked with inspection and enforcement associated with the following air quality activities.

- ❖ APTI SI-460 [Introduction to Permitting] \_\_\_\_\_ or
- CARB 333 [Permit Practices and Procedures I] \_\_\_\_\_  
*Prerequisites:* APTI 454 [Effective Permit Writing] \_\_\_\_\_  
*Prerequisite to APTI 454:* APTI RE-100-7 [Basic Concepts in Environmental Sciences - Module 7: Regulatory Requirements] \_\_\_\_\_ or  
CARB 334 [Permit Writing II] \_\_\_\_\_  
*Prerequisite (to CARB 334):* CARB 333 [Permit Practices and Procedures I]
- CARB 224 [Observing a Source Test]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- APTI 450 [Source Sampling for Pollutants]  
*Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences series]
- APTI 468 [Source Test Observation]  
*Prerequisite:* APTI 450 [Source Sampling for Pollutants]
- ❖ APTI SI-303 [Chain of Custody]
- APTI 470 [Quality Assurance for Air Pollution Measurement Systems]  
*Prerequisites:* APTI SI-100 [Mathematics Review for Air Pollution Control]  
APTI SI-473A [Beginning Environmental Statistical Techniques]  
APTI SI-471 [General Quality Assurance Consideration for Ambient Air Monitoring]
- APTI 476B Continuous Emissions Monitoring Systems – Operations and Maintenance of Gas Monitors]
- APTI 474 [Continuous Emissions Monitoring] \_\_\_\_\_ or  
*Prerequisites:* APTI SI-100 [Mathematics Review for Air Pollution Control]  
APTI 476B Continuous Emissions Monitoring Systems –  
Operations and Maintenance of Gas Monitors]
- CARB 221 [Continuous Emissions Monitoring]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)] \_\_\_\_\_

### 7.3.3 ADDITIONAL AREAS OF EXPERTISE

The following courses provide industry specific training that may benefit individuals that are tasked with inspection and enforcement for the following list of industrial facilities.

### 7.3.3.1 STATIONARY SOURCES

- ❖ APTI SI 428A Introduction to Boiler Operation  
*Prerequisite:* APTI SI-431 Air Pollution Control Systems for Selected Industries, and APTI SI-422 [Air Pollution Control Orientation Course]
- CARB 271 Stationary Reciprocating Engineers  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 272 Stationary Gas Turbines  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 230 Surface Coating: Metal Parts & Products
- CARB 230.4 Graphic Arts  
*Prerequisite:* CARB 230 Surface Coating: Metal Parts & Products
- CARB 233 Solvent Cleaning: Degreasing Operations  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 242 Hot Mix Asphalt Facilities  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 243 Aggregate Plants  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 244 Concrete Batch Plants  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 245 Cement Plants  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 246 Aggregate, Asphalt, & Concrete Batching Operations  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 261 Polyester Resin and Fiberglass  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 270 Incinerators  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 273 Industrial Boilers  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 285 Landfill Gas Control Facilities  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 287 Dry Cleaning  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 288 Petroleum Refining  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]

### 7.3.3.2 POLLUTION CONTROL FOUNDATION

- CARB 299 [ Theory & Application of Air Pollution Control Devices]
- ❖ APTI SI 437 [ Air Pollution Control Technology Series]
- ❖ APTI SI-412A [Fabric Filter Operation Overview]
- ❖ APTI SI-412B [Electrostatic Precipitator Plan Overview]

- ❖ APTI SI-412C [Wet Scrubber Plan Overview]
- APTI-413 [Control of Particulate]
  - Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI 415 [Control of Gaseous Emissions]
  - Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI-418 [Control of Nitrogen Oxide Emissions]
  - Prerequisite:* APTI RE-100-17 [Basic Concepts in Environmental Sciences]
- APTI 482 [ Sources and Control of Volatile Organic Air Pollutants ]
  - Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]
- ❖ APTI SI-417 [Controlling VOC Emissions from Leaking Process Equipment]
- APTI 445 [ Inspection of Particle Control Devices (2003)]
- APTI 455 [ Inspection of Gas Control devices and Selected Industries (2003)]
  - Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]
- CARB 281 [ESP]
  - Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 282 [Baghouses]
  - Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 284 [VOC Control Devices]

### 7.3.3.3 SOURCE SAMPLING AND MONITORING

- APTI 450 [ Source Sampling for Pollutants ]
- APTI 468 [ Monitoring Compliance Test and Source Test Observations]
  - Prerequisite:* APTI 450 [Source Sampling for Pollutants]
- CARB 224 [ Observing Source Tests]
  - Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- APTI 476B Continuous Emissions Monitoring Systems – Operations and Maintenance of Gas Monitors]
- APTI 474 [ Continuous Emissions Monitoring]
 

<i>Prerequisites:</i> APTI SI-100 [Mathematics Review for Air Pollution Control] APTI 476B Continuous Emissions Monitoring Systems – Operations and Maintenance of Gas Monitors]
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- CARB 221 [ Continuous Emissions Monitoring]
 

<i>Prerequisite:</i> CARB 101 [Uniform Air Quality Training Program (UAQTP)]
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- CARB 220 [ Compliance Assurance Monitoring (CAM)]
  - Prerequisites:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]  
 CARB 299 [ Theory & Application of Air Pollution Control Devices]
- CARB 262 [Fugitive VOC Emissions Inspections]
  - Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- APTI 380 [Fugitive Source Inspection]
  - Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]

or

## **8. AIR TOXICS / HAZARDOUS AIR POLLUTANTS**

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## 8.1 BASIC SKILLS FOR AIR TOXICS / HAZARD AIR POLLUTANTS

These are basic skills for a new hires with scientific college degree or a new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S8.1.1 Ability to interpret state-only air toxic rules (if applicable in your state)	U8.1.1 Understanding of: <ul style="list-style-type: none"> <li>❖ rule applicability requirements</li> <li>❖ which emission sources require a permit</li> <li>❖ which emission sources are exempt from permitting or from the air toxics requirements</li> <li>❖ process equipment</li> <li>❖ control technologies</li> </ul>
S8.1.2 Ability to understand the basic concepts underlying risk assessment, risk management, and risk communication	U8.1.2 General understanding of environmental health, information used in developing health benchmarks, and general assumptions and limitations with those
S8.1.3 Ability to determine how and which pollutants are regulated	K8.1.1 Knowledge of the differences in the state-only air toxics pollutants versus the federal HAP pollutants
S8.1.4 Ability to determine how state-only air toxics are regulated vs. the federal HAPs	K8.1.2 Knowledge of the differences in the state-only air toxics requirements versus any federal HAP requirements, such as 112(d), (g) and (j) and 122 (f) and (k)
S8.1.5 Ability to determine the applicable rules for various sources of HAPs	U8.1.3 Understand the federal NESHAP requirements to be knowledgeable of: <ul style="list-style-type: none"> <li>❖ the categorical standards that have been developed for major and area sources</li> <li>❖ the categorical standards that are under development for major and area sources</li> </ul>
S8.1.6 Ability to review HAP and TAP emissions calculations for accuracy and validity of technical basis	U8.1.4 Understanding of emissions calculations concepts and the ability to use data for development of potential and actual emission calculations.: For example: <ul style="list-style-type: none"> <li>❖ AP-42</li> <li>❖ EPA's Tanks Program</li> <li>❖ Material Balance</li> <li>❖ Source Testing Emissions Factors</li> </ul>
S8.1.7 Ability to review control technology performance relative to HAP regulatory specifications	K8.1.3 Knowledge of the following: <ul style="list-style-type: none"> <li>○ Gaseous air control device operations and key elements affecting performance</li> <li>○ Particulate control device operations and key elements affecting performance</li> <li>○ Work practice standards for air emissions control and key elements affecting effectiveness</li> </ul>
S8.1.8 Ability to review simple state-only TAP AQ dispersion modeling input data for accuracy and interpret AQ modeling results	U8.1.5 Understand the need for accurate input data and apply the results for permitting actions U8.1.6 Understanding of state-only risk determinations based on dispersion modeling when no state or national emission standards are applicable

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S8.1.9 Ability to interpret basic information for HAP risk data	U8.1.7 Understand how risk data is utilized under the current regulatory framework U8.1.8 Understand how risk data is utilized for unregulated HAPs
S8.1.10 Ability to develop technical memoranda documenting HAP regulatory information and communicate with public, facilities, etc.  S8.1.11 Ability to communicate technical information to a wide variety of audiences in a wide variety of situations	K8.1.4 Knowledge to write a concise memo K8.1.5 Knowledge to prepare presentation materials K8.1.6 Knowledge to present information to internal and external audiences
S8.1.12 Ability to understand national reports on risks from toxic air pollutants, such as EPA's National Air Toxics Assessment (NATA)	K8.1.7 Knowledge of EPA's past and current NATA reports and how they pertain to the area of interest (state/locality) K8.1.8 Knowledge of other information that the state or locality may have concerning toxics risks in the community K8.1.9 Knowledge of local interest groups and their concerns regarding the reports K8.1.10 Knowledge of the state or local agency's position on the reports

## 8.2 INTERMEDIATE/ADVANCED SKILLS FOR AIR TOXICS / HAZARDOUS AIR POLLUTANTS

These are the Intermediate/Advanced skills for staff with 3 or more years of toxics experience; equivalent experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S8.2.1 Ability to provide senior regulatory background guidance on state-only air toxic rules (if applicable in your state)	U8.2.1 Thorough understanding of: <ul style="list-style-type: none"> <li>❖ rule applicability requirements</li> <li>❖ which emission sources require a permit</li> <li>❖ which emission sources are exempt from permitting or from the air toxics requirements</li> <li>❖ process equipment used in industrial process like condensers, reactors, fans, pumps, process heaters, boilers, evaporators, spray nozzles, etc</li> <li>❖ Control technology</li> </ul>
S8.2.2 Ability to understand the concepts underlying risk assessment, risk management, and risk communication	U8.2.2 Understanding the application of risk assessment principles to specific situations, assumptions, etc.
S8.2.3 Ability to determine the applicable rules for complex sources of HAPs	U8.2.3 Understand the federal NESHAP requirements to be knowledgeable of and be a regulatory resource for: <ul style="list-style-type: none"> <li>❖ the categorical standards that have been developed for major and area sources</li> <li>❖ the categorical standards that are under development for major and area sources</li> </ul>
S8.2.4 Ability (1) to instruct junior staff and (2) review regulatory determinations for accuracy and validity of technical basis for more complex emission sources	K8.2.1 Knowledge to mentor junior staff K8.2.2 Knowledge to perform more advanced and regulatory determinations associated with complex NESHAP regulations
S8.2.5 Ability to review complex HAP and TAP emissions calculations for accuracy and validity of technical basis	U8.2.4 Understanding of emissions calculations concepts and the ability to use data for development of potential and actual emission calculations.: For example: <ul style="list-style-type: none"> <li>❖ AP-42</li> <li>❖ EPA's Tanks Program</li> <li>❖ Material Balance</li> <li>❖ Source Testing Emissions Factors</li> </ul>
S8.2.6 Ability to review control technology performance relative to HAP regulatory specifications	K8.2.3 Knowledge of the following: <ul style="list-style-type: none"> <li>○ Gaseous air control device operations and key elements affecting performance</li> <li>○ Particulate control device operations and key elements affecting performance</li> <li>○ Work practice standards for air emissions control and key elements affecting effectiveness</li> </ul>
S8.2.7 Ability to review complex state-only TAP AQ dispersion modeling input data for accuracy and interpret AQ modeling results	U8.2.5 Understand the need for accurate input data and apply the results for permitting actions

<b>SKILLS</b>	<b>KNOWLEDGE AND UNDERSTANDING</b>
S8.2.8 Ability to interpret HAP risk data and understand that basis and data used for conducting a residual risk analysis	U8.2.6 Understand how risk data is utilized under the current regulatory framework U8.2.7 Understand the residual risk regulatory review procedures and interpret results
S8.2.9 Ability to develop technical memoranda documenting HAP regulatory information and communicate with public, facilities, etc.	K8.2.4 Knowledge to identify key assumptions within a rule and write a concise memo
S8.2.10 Ability to evaluate and interpret other air quality rules that may have an effect on TAPs and HAPs	U8.2.8 Basic understanding of Risk Management Program requirements U8.2.9 Basic understanding of Ozone Depleting Substance requirements U8.2.10 Basic understanding of Regional Haze Program requirements

## **8.3 SUGGESTED AIR TOXICS / HAZARDOUS AIR POLLUTANTS TRAINING CURRICULUM**

### **8.3.1 CORE COURSES**

Air Toxics and HAPs has three levels of courses. Some courses in this function have prerequisite courses. Courses with a prerequisite have the required prerequisite course identified underneath the course

**CARB and APTI** may have courses with similar in content. These are denoted with an adjoining bar. Students could take either course to gain the required knowledge.

#### **8.3.1.1 INTRODUCTORY COURSES**

General introductory courses are listed previously in Section 1.

#### **8.3.1.2 BASIC COURSES**

- APTI 400 [Introduction to Hazardous Air Pollutants (2009)]  
*Prerequisite:* APTI SI-422 [Air Pollution Control Orientation Course]
- ❖ APTI SI-401 [Risk-Based Air Toxics]

#### **8.3.1.3 INTERMEDIATE/ADVANCED COURSES**

- ❖ APTI SI-400 [Introduction to Risk Assessment/Risk Management]
- APTI V-104 [ PM Health Effects from Wood Smoke]
- APTI V-105 [Residential Wood Smoke]

### **8.3.2 OTHER RELATED COURSES**

The following courses provide additional experience in areas that may benefit individuals that that are tasked with understanding air toxics and hazardous air pollutants associated with the following air quality activities.

- ❖ APTI SI-300 [Introduction to Air Pollution Technology]
- CARB 335 [Principles of Environmental Compliance & Enforcement]
- ❖ APTI SI-419A [Introduction to Emission Inventories]
- APTI 419B [Preparation of Fine Particulate Emission Inventories]
- APTI 345 [Emission Capture and Gas Handling System Inspection (1995)]
- CARB 290 [ MACT General Background]  
*Prerequisite:* CARB 101 [Uniform Air Quality Training Program (UAQTP)]
- CARB 251[ Asbestos Demolition and Renovation – Regulator Training]



## 9. MOBILE SOURCES

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## 9.1 BASIC SKILLS FOR MOBILE SOURCES

These are the basic skills for a new hire with scientific college degree or a new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S9.1.1 Ability to write and review competitive grant applications for low emitting mobile source engines	U9.1.1 Understand and have knowledge of the low emitting mobile source process U9.1.2 Understand and knowledge of mobile sources to recommend grant approval
S9.1.2 Ability to determine the compliance requirements for mobile sources with regard to federal and state requirements	U9.1.3 Understand the regulations and work with the state planning and compliance sections on developing and implementing any required regulations
S9.1.3 Ability to review, determine and implement the state air quality requirements for the I/M and OBD programs	U9.1.4 Understand the regulatory requirements and implement these required programs within the required areas of the state
S9.1.4 Ability to develop and implement calculation procedures for estimating mobile source emission within a given area	K9.1.1 Knowledge of references and procedures for developing mobile source emissions
S9.1.5 Ability to interpret the transportation conformity requirements from the CAA as required in each state	K9.1.2 Knowledge of the requirements so as to implement address the conformity requirements

## **9.2 SUGGESTED MOBILE SOURCES TRAINING CURRICULUM**

### **9.2.1 CORE COURSES**

Mobile Sources has three levels of courses.

#### **9.2.1.1 INTRODUCTORY OR PERQUISITE COURSES**

Since there are no courses listed below, there are no specific courses from Introduction to Air Pollution Control curriculum included in this section. Introductory information describing air pollutants from vehicles, engines, and other mobile sources may be found EPA's website "[Mobile Source Emissions-Past, Present, and Future](http://www.epa.gov/otaq/inventory/overview/)" - <http://www.epa.gov/otaq/inventory/overview/>

#### **9.2.1.2 BASIC COURSES**

- ❖ OTAQ – Transportation Conformity 101
- EPA-Using MOVES for SIPs and Regional Conformity
- NTI – Introduction to Transportation Conformity

#### **9.2.1.3 INTERMEDIATE/ADVANCED COURSES**

- ❖ Motor Vehicle Emission Simulator (MOVES)  
<http://www.epa.gov/otaq/models/moves/index.htm>
- OTAQ Project Level Training for Quantitative PM Hot Spot Analysis for Transportation Conformity
- ❖ OTAQ – Overview of the PM Hot spot Requirements and Guidance for Transportation Conformity

### **9.2.2 OTHER RELATED COURSES**

There are no APTI courses currently developed for mobile sources.



## 10. CLIMATE CHANGE

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## 10.1 BASIC SKILLS FOR CLIMATE CHANGE

These are basic skills for a new hire with scientific college degree or a new hire with limited work experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S10.1.1 Ability to concisely summarize key concepts of climate change science and their connection to voluntary and regulatory GHG mitigation programs	U10.1.1 Understanding of the following topics: <ul style="list-style-type: none"> <li>○ Carbon cycle and potential relationship between increased atmospheric CO<sub>2</sub> concentration and temperature, as well as the relationship between climate change and air quality and public health</li> <li>○ Main greenhouse gases and primary emission sources</li> <li>○ Global warming potential of main greenhouse gases</li> <li>○ Key features of the Kyoto Protocol</li> <li>○ Key features of carbon emissions trading</li> <li>○ Key climate change impacts on the U.S. and the state/local/regional area of concern</li> </ul>
S10.1.2 Ability to review GHG emissions calculations for validity and accuracy of technical basis	U10.1.1 Understanding of the following topics: <ul style="list-style-type: none"> <li>○ GHG Protocol established by WRI/WBCSD</li> <li>○ Sector protocols and data monitoring requirements specified under Mandatory Reporting Rule</li> <li>○ GHG inventory protocols and procedures specified under The Climate Registry</li> <li>○ GHG Inventory verification (ISO 14064 Part 3)</li> <li>○ WebFIRE and AP-42 and other emissions factors</li> </ul>

## 10.2 INTERMEDIATE/ADVANCED SKILLS FOR CLIMATE CHANGE

These are the intermediate/advanced skills for staff with 3 or more years of climate change experience; equivalent experience within regulatory agency; equivalent environmental consulting or industry experience.

SKILLS	KNOWLEDGE AND UNDERSTANDING
S10.2.1 Ability to review and interpret PSD regulations for applicability to GHG emissions	U10.2.1 Understanding of regulatory requirements derived from the EPA Tailoring Rule- including GHG applicability analysis, NSR impact on non-GHG pollutants, GHG BACT requirements, and PSD requirements for Biomass
S10.2.2 Ability to review and interpret Title V regulations for applicability to GHG emissions	U10.2.2 Understanding of regulatory requirements derived from the EPA Tailoring Rule – including GHG applicability and requirements for inclusion in Title V permit
S10.2.3 Ability to review a top-down BACT analysis for GHG	U10.2.2 Understanding of the following: <ul style="list-style-type: none"> <li>○ Energy efficiency measures for GHG reduction and factors affecting performance</li> <li>○ Fuel switching options for GHG reduction and factors affecting performance</li> <li>○ Carbon capture/storage technology and factors affecting performance</li> <li>○ Potential use of Energy Management Systems (Energy Star EnMS, ISO 50001) as BACT work practice requirement</li> </ul>
S10.2.4 Ability to understand proposed and final EPA New Source Performance Standards (NSPS) intended to reduce GHG emissions	K10.2.1 Knowledge of proposed and final NSPS regulations, including background information found in preambles to the proposed and final rules
S10.2.5 Ability to identify GHG emissions potential associated with various types of fuel combustion	K10.2.2 Knowledge of combustion course operations and factors impacting GHG emissions K10.2.3 Knowledge of Carbon potential of various petroleum fuels K10.2.4 Knowledge of Carbon potential of biomass emissions

## 10.3 SUGGESTED CLIMATE CHANGE TRAINING CURRICULUM

### 10.3.1 CORE COURSES

Climate Change has three course levels.

#### 10.3.1.1 INTRODUCTORY OR PREREQUISITE COURSES

There are no specific APTI courses from Introduction to Air Pollution Control curriculum included in this section. An introduction to the topic may be found on the following websites:

- [Learn the Issues: Climate Change](#) (EPA)
- [NOAA Climate Program Office, Education Website](#)
  - Climate Literacy: The Essential Principles of Climate Sciences (NOAA Booklet)

#### 10.3.1.2 BASIC COURSES

- APTI V -103 [Black Carbon Training Modules]
- APTI V -203 [Climate and Air Quality: Applications for Air Quality Professionals]
- APTI V -205 [Greenhouse Gas Permit Training 7-Modules]

#### 10.3.1.3 INTERMEDIATE/ADVANCED COURSES

There are no specific APTI intermediate/advanced course courses currently developed for climate change. Information about requirements under the

- [New Source Review and Prevention of Significant Deterioration programs website](#)
- [EPA Greenhouse Gas Reporting Tool – Training Presentations](#)

### 10.3.2 OTHER RELATED COURSES

The following courses provide additional experience in areas that may benefit individuals that are tasked with climate change associated with the following air quality activities.

- ❖ APTI SI-428A [Introduction to Boiler Operations]
- CARB 270 [Incinerators]
- CARB 271 [Stationary Reciprocating Engines]
- CARB 272 [Stationary Gas Turbines]
- CARB 273 [Industrial Boilers]



The following list includes the websites where many of the courses can be found.

<b>AGENCY</b>	<b>WEBSITE(S)</b>
Air & Waste Management Association (A&WMA)	<a href="http://www.awma.org">http://www.awma.org</a>
California Air Resources Board (CARB)	<a href="http://www.arb.ca.gov/training/courselist.php">http://www.arb.ca.gov/training/courselist.php</a>
CenSARA	<a href="http://www.censara.org/">http://www.censara.org/</a>
FHWA Resource Center – Air Quality	<a href="http://www.fhwa.dot.gov/resourcecenter/teams/airquality/courses.cfm">http://www.fhwa.dot.gov/resourcecenter/teams/airquality/courses.cfm</a>
GHG Management Institute	<a href="http://ghginstitute.org/education">http://ghginstitute.org/education</a>
LADCO	<a href="http://www.ladco.org">http://www.ladco.org</a>
MARAMA	<a href="http://www.marama.org/">http://www.marama.org/</a>
Metro 4/SESARM	<a href="http://www.metro4-sesarm.org">http://www.metro4-sesarm.org</a>
NACAA	<a href="http://www.4cleanair.org">http://www.4cleanair.org</a>
National Highway Institute	<a href="http://www.nhi.fhwa.dot.gov/default.aspx">http://www.nhi.fhwa.dot.gov/default.aspx</a>
NESCAUM	<a href="http://www.nescaum.org">http://www.nescaum.org</a>
US EPA – Air Pollution Training Institute (APTI)	<a href="http://epa.gov/apti/index.html">http://epa.gov/apti/index.html</a>
US EPA – National Enforcement Training Institute (NETI)	<a href="http://www.netionline.com">www.netionline.com</a>
US EPA Learn the Issues	<a href="http://www.epa.gov/gateway/learn">http://www.epa.gov/gateway/learn</a>
US EPA – OAQPS	<a href="http://www.epa.gov/airquality/genconform/training/index.html">http://www.epa.gov/airquality/genconform/training/index.html</a>
US DOT Federal Highway Administration – Air Quality Website	<a href="http://www.fhwa.dot.gov/environment/airqual">http://www.fhwa.dot.gov/environment/airqual</a>
WESTAR	<a href="http://www.westart.org">http://www.westart.org</a>

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# APPENDIX A – COURSE CATALOG

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