Quality Assurance Project Plan

Project 14-011
Targeted Improvements in the Fire INventory from NCAR (FINN) Model for Texas Air Quality Planning

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Summary of Project

QAPP Category Number: III
Type of Project: Research or Development (Modeling)

QAPP Requirements: This QAPP includes descriptions of the project and objectives; organization and responsibilities; scientific approach; fire emissions and air quality modeling procedures; quality metrics; data analysis, interpretation, and management; reporting; and references.

QAPP Requirements:
- Audits of Data Quality: 10% Required
- Report of QA Findings: Required in final report

May 29, 2014

DISTRIBUTION LIST

David Sullivan, Project Manager, Texas Air Quality Research Program

Cyril Durrenberger, Quality Assurance Project Plan Officer, Texas Air Quality Research Program

Jim MacKay, Project Liaison, Texas Commission on Environmental Quality

Chris Owen, Quality Assurance Project Plan Officer, Texas Commission on Environmental Quality

Maria Stanzione, Program Manager, Texas Air Quality Research Program

APPROVALS

QAPP was approved electronically on 4/23/2014 by Elena McDonald-Buller (Principal Investigator, The University of Texas at Austin).

QAPP was approved electronically on 5/9/2014 by David Sullivan (Project Manager, Texas Air Quality Research Program).

QAPP was approved electronically on 5/12/2014 by Cyril Durrenberger (Quality Assurance Project Plan Officer, Texas Air Quality Research Program).

1. PROJECT DESCRIPTION AND OBJECTIVES

1.1 Problem Statement

The influence of fire emissions on ozone and particulate matter concentrations in Texas has been documented in previous observational studies by Junquera er al., 2005; Morris et al., 2006; McMillan et al., 2010; Villanueva-Fierro et al., 2009. Fire emissions are often transported over regional or longer spatial scales and can contribute to exceedances of air quality standards. Accurate characterization of these events is necessary for understanding their influences on measured ambient concentrations, providing a weight of evidence for exceptional event exclusions, conducting air quality modeling for planning and attainment demonstrations, and estimating North American Background (NAB) ozone concentrations used to inform policy decisions regarding the National Ambient Air Quality Standards (NAAQS). Most climate models suggest that droughts will become more severe in the southwestern United States as climate changes in response to increased concentrations of greenhouse gases and other radiative forcing species in the atmosphere (U.S. Global Change Research Report, 2009). An increase in future drought frequency in Texas and the southwestern United States may have complex and profound effects on the occurrence of fires.

During the 2013-2013 AQRP fiscal year, our team completed a project (#12-018) sponsored by the Texas Air Quality Research Program (AQRP), entitled *The Effects of Uncertainties in Fire Emissions Estimates on Predictions of Texas Air Quality*, that evaluated the sensitivity of emissions estimates from the Fire INventory from the National Center for Atmospheric Research (NCAR) or FINNv1; Wiedinmyer et al. 2011) to the variability in input parameters and the effects on modeled air quality using the Comprehensive Air Quality Model with Extensions (CAMx). The project included an analysis of the climatology of fires in Texas and neighboring regions, comparisons of fire emission estimates between the FINN and BlueSky/SmartFire (Larkin 2009; Chinkin et al., 2009) modeling frameworks, evaluation of the sensitivity of FINN emissions estimates to key input parameters and data sources, and assessment of the effects of FINN sensitivities on Texas air quality. Sensitivity studies conducted using different input data sources for FINN highlighted the potential variability in predictions of fire emissions; effects were season and region dependent, could exceed a factor of two, and have substantial impacts on CAMx predictions of ozone and fine particulate matter concentrations. Among the many findings of the study were the needs for targeted improvements in land cover characterization, burned area estimation, fuel loadings, and emissions factors. These needs were particularly pronounced in areas with agricultural burning.

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1.2 Project Objectives

This project will make specific improvements in FINN that will support fire emissions estimates for Texas air quality planning and the next public release of the FINN model. The project has four major objectives:

(1) Application of regionally-specific land cover data for Texas and its neighboring states;
(2) Mapping of croplands and assignment of fuel loading estimates and emissions factors;
(3) Investigation of an emerging data resource for fire detection and burned area estimation;
(4) Investigation of the partitioning of emissions of nitrogen oxides (NO_x) to NO_z, i.e., the difference between all reactive nitrogen compounds (NO_y) and NO_x, to account for rapid NO_x oxidation in hot, rising fire plumes at sub-grid scales.

The effects of the improvements in the FINN model on ozone and fine particulate matter concentrations will be evaluated using CAMx. Fire emission and air quality modeling will focus on 2012 to support TCEQ's air quality planning efforts.

2. ORGANIZATION AND RESPONSIBILITIES

2.1 Personnel and Responsibilities

This project is a collaborative effort between the University of Texas at Austin (UT), Dr. Christine Wiedinmyer of the National Center for Atmospheric Research (NCAR), and ENVIRON International Corporation (ENVIRON). Dr. Elena McDonald-Buller, Research Associate Professor in Civil, Architectural, and Environmental Engineering and at the Center for Energy and Environmental Resources at the University of Texas at Austin, is the Principal Investigator for the project. Dr. Christine Wiedinmyer, NCAR University Collaborator, will serve as a Co-Principal Investigator. Mr. Chris Emery, Senior Manager at ENVIRON, will also serve as a Co-Principal Investigator for the project. Project participants and their responsibilities are provided in Table 1 below. Dr. McDonald-Buller, Dr. Wiedinmyer, and Mr. Emery will have overall oversight of the quality assurance.

Table 1. Project participants and their affiliations and key responsibilities.

Participant (Organization)	Key Responsibilities
Elena McDonald-Buller (UT)	Principal Investigator with overall responsibility for guidance, integration, and supervision of the technical work, including quality control activities and project reporting.
Christine Wiedinmyer (NCAR)	Co-Principal Investigator who will provide overall assistance and support for the fire emissions modeling and quality control activities.
Chris Emery (ENVIRON)	Co-Principal Investigator with overall responsibility for the fire plume studies. Mr. Emery will assist with the interpretation of other fire emissions and CAMx sensitivity studies, quality control activities, and project reporting.
Yosuke Kimura (UT)	Research Associate who will lead the technical work associated with FINN input data processing and integration, simulation, and visualization and interpretation of fire emissions estimates. Dr. Kimura will also conduct CAMx simulations for sensitivity analyses, coordinating with Mr. Tai. He will serve under the supervision of Dr. McDonald-Buller and Dr. Wiedinmyer.
Greg Yarwood (ENVIRON)	Principal who will provide assistance to Mr. Emery.
Ed Tai (ENVIRON)	Senior Associate who will provide assistance to Mr. Emery for the fire plume studies and CAMx simulations.

2.2 Schedule

The schedule for specific tasks is listed in Table 2.

Table 2. Schedule of project activities

ID	Task	Apr-May 2014	June-July 2014	Aug-Sept. 2014	Oct.-Nov. 2014	Dec. 2014-Jan-2015	Feb.-Mar. 2015	Apr.-May 2015	June 2015
1	Regional Land Cover Characterization	X	X	X					
2	Mapping of Croplands		X	X	X	X			
3	Fire Detection and Estimation of Burned Area		X	X	X	X			
4	Sub-grid scale Partitioning of NO_x Emissions to NO_z in Fire Plumes			X	X	X			
5	CAMx Sensitivity Studies				X	X	X	X	
6	Reporting	X	X	X	X	X	X	X	X

3. SCIENTIFIC APPROACH

3.1 Fire Emissions Modeling Procedures

FINN is a global fire emissions model that estimates daily emissions of trace gases and particles from the open burning of biomass, including wildfires, agricultural fires, and prescribed burning (but not biofuel use or trash burning), at a resolution of approximately 1 km^2 (Wiedinmyer et al., 2011). FINN is especially relevant to air quality modeling because of its high spatial and temporal resolution, consistency across geopolitical boundaries, and flexible options for the chemical speciation of emissions. Fire emissions estimates in FINN are based on the following:

$$E_i = A(x,t) * B(x) * FB * ef_i \quad (1)$$

where the mass emission of species i (E_i) is equal to the area burned at time t and location x [(A(x,t)] multiplied by the biomass loading at location x [B(x)], the fraction of that biomass that is burned in the fire (FB), and the emission factor of species i (ef_i, mass of i emitted per mass of biomass burned). All biomass terms are on a dry weight basis. The default FINN methodology employs global observations from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on-board the NASA Terra and Aqua satellites for much of the input information. The MODIS Rapid Response (MRR) fire detections are used to identify burn time and location, and the MODIS Vegetation Continuous Fields (VCF) and Land Cover Type (LCT) products are used to identify the type and density of the vegetation burned at each fire point. Area burned is assigned based on the characteristics of the MODIS Fire and VCF products.

Fuel loadings are assigned for six generic land cover classifications (tropical forest, temperate forest, boreal forest, woody savanna/shrublands, savanna and grasslands, and croplands) within 12 global regions, one of which is North America. Emission factors, which are specific to the six land cover classifications in FINN, were updated in AQRP Project #12-018, based on the findings of Akagi et al. (2013), from the original values used in the default configuration. Speciation profiles are currently provided for multiple chemical mechanisms including SAPRC99, MOZART, and GEOS-Chem. This work will continue to use revisions in the emissions factors as well as the mapping of MOZART-4 species to CAMx Carbon Bond (CB05) chemical mechanism species developed in project #12-018.

This work will apply a land cover database specific to Texas from Popescu et al. (2011), and, to the extent possible, regional land cover data for neighboring states, as an alternative to global scale land cover mappings from the MODIS LCT product. The team will work in collaboration with the Texas Commission on Environmental Quality (TCEQ) to ensure that the most recent land cover data development efforts in Texas are considered and to establish potential land cover data resources and contact information for appropriate agencies in other states. The current representations of croplands in FINN and other global fire models lack specificity in distinguishing crop types and assignment of parameters important for fire emissions estimates. A mapping of crop types will be developed for incorporation in the FINN land cover database for the United States and, to the extent possible neighboring countries. A literature search along with direct contact of individuals in the research community will be used to identify relevant data resources for cropland characterization and assignment of crop-specific emissions factors and fuel loadings in FINN.

FINN currently assumes an upper limit of 1 km^2 for area burned in its default configuration, except for fires located in grasslands and savannas, which are assigned a burned area of 0.75 km^2 (Wiedinmyer et al., 2006; Al-Saadi et al., 2008). This burned area is scaled in accordance with the percent bare cover in the MODIS Vegetation Continuous Fields (VCF). This work will consider two alternative resources. A potential source of fire activity data may be available from the Western Regional Air Partnership (WRAP) Fire Emissions Tracking System (FETS; http://deasco3.wraptools.org/), a web-enabled database tool for planned and unplanned fire events, which is intended for daily smoke management coordination and retrospective analyses such as emission inventories and regional haze air quality planning tasks. The team will investigate the availability of fire activity data from FETS for the 2012 year. An emerging data resource is the Visible Infrared Imaging Radiometer Suite (VIIRS) sensor onboard the National Aeronautics and Space Administrations (NASA's) National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP) platform that launched on October 28, 2011. The VIIRS active fire product will be explored as a resource for fire detections (http://npp.gsfc.nasa.gov/viirs.html). The VIIRS product is currently available for September through December of 2012; this resource may become useful should TCEQ wish to expand the time period of its current CAMx modeling in 2012 and for future air quality modeling efforts.

Daily estimates of key fire emissions, including NO_x, carbon monoxide (CO), volatile organic compounds (VOCs), and fine particulate matter ($PM_{2.5}$) will be generated for each scenario. Comparisons will be conducted between a baseline FINN configuration (likely a hybrid of the default FINN configuration with updated emission factors and fuel loadings from project #12-018) and alternative configurations based on improvements described above that will be investigated in this work. In order to support TCEQ's air quality planning efforts, fire emission estimates will be developed for the entire year of 2012. Fire climatology based on CO emissions estimates for the baseline FINN configuration will provide a perspective on fire activity in 2012 relative to the time period of 2002-2012. The project will support the development of the next generation of FINN.

3.2 Air Quality Modeling Procedures

CAMx v6.10 (ENVIRON, 2014) will be used for all air quality modeling simulations in this project to be consistent with TCEQ's current development of the June 2012 modeling database. CAMx is an Eulerian grid model that has been approved by the EPA for regulatory applications (http://www.epa.gov/ttn/scram/photochemicalindex.htm) and is the model used by the State of Texas for ozone attainment demonstrations and air quality planning. The model has been applied extensively for both regulatory and research applications in the United States and internationally. The model and supporting documentation have been developed by ENVIRON International Corporation (http://www.camx.com/).

CAMx sensitivity studies will be conducted using the June 2012 episode currently under development by the TCEQ. The success of the CAMx simulations will be contingent on communication with and assistance from the TCEQ, as well as transfer of all necessary data files and scripts for predictions of ozone and fine particulate matter concentrations from the TCEQ to the project team. Model performance evaluation is beyond the scope and will not be considered in this effort.

New fire emissions inventories developed in this work will reflect the FINN baseline configuration and alternative configurations based on improvements to the land cover characterization and alternative burned area/fire detection algorithm described above. Emissions estimates from FINN will be processed using the Emission Processing System (EPS3) and exported in a format suitable for input to CAMx. For Project #12-018, EPS3 processing methodologies were developed for the spatial and temporal allocation and chemical speciation of fire emission estimates for the CB05 mechanism employed in CAMx. CAMx simulations for June 2012 will be conducted with the FINN fire emissions inventories from the sensitivity studies and compared with results from the FINN baseline configuration. This work will only result in changes to the emissions inputs for fires; no other changes in anthropogenic or biogenic emissions inputs are expected.

CAMx will also be used in this work to investigate ozone sensitivity to various approaches to partition NO_x emissions to NO_z compounds. Approaches will include simple proportions of NO_x to various forms of NO_z across all fire types and sizes, stratifying NO_x partitioning by fire type to account for different relative levels of NO_x and VOC emissions, and stratifying NO_x partitioning by fire size to account for different time scales for plume rise prior to injection into the grid system. On the basis of these results, recommendations will be developed for future fire plume speciation techniques and/or explicit chemistry modeling, such as those necessary for plume-in-grid techniques currently in use for large anthropogenic NO_x point sources.

4. QUALITY METRICS

The U.S. Environmental Protection Agency (EPA) has not specified specific data quality requirements for this work, nor is it expected that the EPA will evaluate this specific application. The FINNv1 emissions have been used successfully as part of many chemical transport model applications and studies (e.g., Kumar et al, 2012; Lin et al. 2012; Pfister et al. 2011; de Foy et al. 2011). The uncertainties of the emission estimation technique have been constrained with comparisons with other emission estimates and with the comparison of chemical transport models with satellite observations (e.g., Al-Saadi et al., 2006; Wiedinmyer et al., 2011; Paton-Walsh et al., 2012). Although limitations have been identified, the model performs within reason for the U.S. and is assumed to be within the uncertainties of other models.

The default FINN methodology employs global observations from the MODIS instrument. MODIS and VIIRS product quality is assessed by calibration, quality assurance (QA) and validation efforts (e.g., http://landval.gsfc.nasa.gov/). To the extent possible, the version and validation levels of products derived from satellite observations for the sensitivity studies will be documented in the project final report. The sources of all satellite data, as well as the timing of retrievals of these data, will be documented. Other data products used for the characterization of land cover and burned area/fire detections will be documented to the extent possible, focusing on data development and validation methodologies. Spatial mapping and descriptive summaries will be created for this project to facilitate the detection of anomalies and evaluation of reasonableness. The team anticipates that maps will be created using ArcGIS, PAVE, or alternative visualization software available through the Texas Advanced Computing Center (TACC).

This work will result in the generation of new fire emissions inventories that will be processed for input to the June 2012 CAMx episode. Emissions estimates from FINN will be processed using EPS3 and exported in a format suitable for input to CAMx. Mapping of the magnitude and spatial distribution of fire emissions estimates from FINN with CAMx-ready emissions will be an important step to assure pre- and post-processing consistency and reasonableness. Discrepancies that warrant further investigation will be identified, and reconciliation approaches will be pursued as appropriate. A minimum of 10% of the data input to the models will be audited and reviewed in detail by a project team member that did not perform the analyses for quality assurance purposes. A minimum of 10% of the results of all analyses performed during this project will be audited and reviewed in detail by a project team member that did not perform the analyses for quality assurance purposes. The results of these reviews and any quality assurance findings will be included in the final report.

5. DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT

AQRP project #12-018 examined the sensitivity of FINN model estimates to several sources of uncertainty in the fire emissions estimation technique including characterization of land cover, burned area, fuel loading, assumed biomass burned, and emission factors. This work specifically focuses on improvements to the land cover characterization in eastern Texas, neighboring states, and croplands in the U.S. and bordering countries, as well as consideration of alternative approaches for fire detection and burned area estimation in the FINN model configuration. State and/or regional summaries of CO, NOx, VOC, and $PM_{2.5}$ emissions estimates will be generated by season and as episode totals for 2012. Spatial mapping using visualization software identified above will compare emissions estimates for the sensitivity scenarios with the FINN baseline configuration.

The spatial and temporal effects on predicted ozone and particulate matter concentrations by CAMx will be examined through maps and statistical metrics that describe the range of differences between the sensitivity analyses and the FINN baseline configuration. Metrics that will be considered based on the analyses completed in AQRP Project #12-018, are expected to include the following for ozone:

8-Hour Ozone Concentration Percentile: *(2)*

$$\underset{i\in R,h\in P}{\mathrm{P}(percentile)}\left(A8_{i,h}\right)$$

Mean Difference in 8-Hour Ozone Concentration: *(3)*

$$\underset{i\in R,h\in P}{\mathrm{mean}}\left(A8_{i,h,sensitivity} - A8_{i,h,default}\right)$$

Maximum Difference in 8-Hour Ozone Concentration- From either below that has a greater absolute value: *(4)*

$$\begin{cases} \underset{i\in R,h\in P}{\max}\left(A8_{i,h,sensitivity} - A8_{i,h,default}\right) \\ \underset{i\in R,h\in P}{\min}\left(A8_{i,h,sensitivity} - A8_{i,h,default}\right) \end{cases}$$

Mean MDA8 Ozone Concentration: *(5)*

$$\underset{i\in R,d\in P}{\mathrm{mean}}\left(MDA8_{i,d}\right)$$

Mean Difference in MDA8 Ozone Concentration: *(6)*

$$\underset{i\in R,d\in P}{\mathrm{mean}}\left(MDA8_{i,d,sensitivity} - MDA8_{i,d,default}\right)$$

where R: Spatial region of interest; P: Temporal period of interest; i: A model grid cell index within region of interest, R; h: An hour within analysis period, P; d: A day within analysis period, P; *sensitivity* refers to sensitivity study; *default*: refers to FINN model configuration; $C_{i,h}$: Hourly concentration at cell i, hour h; $A8_{i,h}$: Eight hour moving average concentration at cell i, hour h; $MDA8_{i,d}$: Daily maximum eight hour concentration at cell i, day d.

and for $PM_{2.5}$:

24-Hour PM2.5 Concentration Percentile *(7)*

$$\underset{i\in R,h\in P}{\mathrm{P}percentile}\left(A24_{i,d}\right)$$

Mean Difference in 24-Hour $PM_{2.5}$ Concentration *(8)*

$$\underset{i\in R,d\in P}{\mathrm{mean}}\left(A24_{i,d,sensitivity}-A24_{i,d,default}\right)$$

Maximum Difference in 24-Hour $PM_{2.5}$ Concentrations- From either below that has a greater absolute value: *(9)*

$$\begin{cases}\underset{i\in R,h\in P}{\max}\left(A24_{i,d,sensitivity}-A24_{i,d,default}\right)\\ \underset{i\in R,h\in P}{\min}\left(A24_{i,d,sensitivity}-A24_{i,d,default}\right)\end{cases}$$

where $A24_{i,d}$: 24 hour average concentration at cell i, day d.

Spatial maps of ozone and fine particulate matter concentrations and difference maps will be developed using PAVE or ArcGIS. Rigorous comparisons between model predictions and observations at episode-specific background sites are beyond the scope of the project.

Archiving of fire emissions and air quality modeling data, including input and output files and scripts, post-processed analyses, and reports will be done at the TACC (https://www.tacc.utexas.edu). Dr. McDonald-Buller's research team utilizes the TACC computational resources (e.g., the Lonestar Dell Linux Cluster: https://www.tacc.utexas.edu/user-services/user-guides/lonestar-user-guide) extensively for air quality simulations and has migrated all data resources to dedicated disk space on its storage system, which is accessible both from the Center for Energy and Environmental Resources computation nodes and via TACC.

6. DELIVERABLES

AQRP requires certain reports to be submitted on a timely basis and at regular intervals. A description of the specific reports to be submitted and their due dates are outlined below. One report per project will be submitted (collaborators will not submit separate reports), with the exception of the Financial Status Reports (FSRs). The lead PI will submit the reports, unless that responsibility is otherwise delegated with the approval of the Project Manager. All reports will be written in third person and will follow the State of Texas accessibility requirements as set forth by the Texas State Department of Information Resources. Report templates and accessibility guidelines found on the AQRP website at http://aqrp.ceer.utexas.edu/ will be followed.

Executive Summary

At the beginning of the project, an Executive Summary will be submitted to the Project Manager for use on the AQRP website. The Executive Summary will provide a brief description of the planned project activities, and will be written for a non-technical audience.
Due Date: Friday, May 30, 2014

Quarterly Reports

The Quarterly Report will provide a summary of the project status for each reporting period. It will be submitted to the Project Manager as a Word doc file. It will not exceed 2 pages and will be text only. No cover page is required. This document will be inserted into an AQRP compiled report to the TCEQ.

Due Dates:

Report	Period Covered	Due Date
Quarterly Report #1	June, July, August 2014	Friday, August 30, 2014
Quarterly Report #2	September, October, November 2014	Monday, December 1, 2014
Quarterly Report #3	December 2015, January & February 2015	Friday, February 27, 2015
Quarterly Report #4	March, April, May 2015	Friday, May 29, 2015
Quarterly Report #5	June, July, August 2015	Monday, August 31, 2015
Quarterly Report #6	September, October, November 2015	Monday, November 30, 2015

Technical Reports

Technical Reports will be submitted monthly to the Project Manager and TCEQ Liaison as a Word doc using the AQRP FY14-15 MTR Template found on the AQRP website.

Due Dates:

Report	Period Covered	Due Date
Technical Report #1	Project Start – July 31, 2014	Friday, August 8, 2014
Technical Report #2	August 1 - 31, 2014	Monday, September 8, 2014
Technical Report #3	September 1 - 30, 2014	Wednesday, October 8, 2014
Technical Report #4	October 1 - 31, 2014	Monday, November 10, 2014
Technical Report #5	November 1 - 30 2014	Monday, December 8, 2014
Technical Report #6	December 1 - 31, 2014	Thursday, January 8, 2015
Technical Report #7	January 1 - 31, 2015	Monday, February 9, 2015
Technical Report #8	February 1 - 28, 2015	Monday, March 9, 2015
Technical Report #9	March 1 - 31, 2015	Wednesday, April 8, 2015
Technical Report #10	April 1 - 28, 2015	Friday, May 8, 2015
Technical Report #11	May 1 - 31, 2015	Monday, June 8, 2015

Financial Status Reports
Financial Status Reports will be submitted monthly to the AQRP Grant Manager (Maria Stanzione) by each institution on the project using the AQRP FY14-15 FSR Template found on the AQRP website.
Due Dates:

Report	Period Covered	Due Date
FSR #1	Project Start – July 31, 2014	Friday, August 15, 2014
FSR #2	August 1 - 31, 2014	Monday, September 15, 2014
FSR #3	September 1 - 30, 2014	Wednesday, October 15, 2014
FSR #4	October 1 - 31, 2014	Monday, November 17, 2014
FSR #5	November 1 - 30 2014	Monday, December 15, 2014
FSR #6	December 1 - 31, 2014	Thursday, January 15, 2015
FSR #7	January 1 - 31, 2015	Monday, February 16, 2015
FSR #8	February 1 - 28, 2015	Monday, March 16, 2015
FSR #9	March 1 - 31, 2015	Wednesday, April 15, 2015
FSR #10	April 1 - 28, 2015	Friday, May 15, 2015
FSR #11	May 1 - 31, 2015	Monday, June 15, 2015
FSR #12	June 1 - 30, 2015	Wednesday, July 15, 2015
FSR #13	Final FSR	Wednesday, August 15, 2015

Draft Final Report
A Draft Final Report will be submitted to the Project Manager and the TCEQ Liaison. It will include an Executive Summary. It will be written in third person and will follow the State of Texas accessibility requirements as set forth by the Texas State Department of Information Resources.
Due Date: Monday, May 18, 2015

Final Report
A Final Report incorporating comments from the AQRP and TCEQ review of the Draft Final Report will be submitted to the Project Manager and the TCEQ Liaison. It will be written in third person and will follow the State of Texas accessibility requirements as set forth by the Texas State Department of Information Resources.
Due Date: Tuesday, June 30, 2015

Project Data
All project data will be submitted to the AQRP Project Manager within 30 days of project completion. This archive for the project will include all land cover data, fire detection/burned area data, input/job scripts/output for fire emissions modeling with FINN, input/job scripts/output for air quality modeling with CAMx, and software files associated with the analysis and presentation of results in the final report. The data will be submitted in a format that will allow AQRP or TCEQ or other outside parties to utilize the information. All data will be submitted for inclusion in the AQRP archive at the Texas Advanced Computing Center (TACC) and retained for seven years.

AQRP Workshop
A representative from the project will present at the AQRP Workshop in June 2015.

7. REFERENCES

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