AIR QUALITY RESEARCH PROGRAM

Texas Commission on Environmental Quality
Contract Number 582-22-20017
Awarded to The University of Texas at Austin

Quarterly Report
March 1, 2024-August 31, 2024

Submitted to

Jocelyn Mellberg
Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, TX 78753

Prepared by

David T. Allen, Principal Investigator
The University of Texas at Austin
10100 Burnet Rd. MC R7100
Austin, TX 78758

November 1, 2024

The preparation of this report was financed through a grant from the Texas Commission on Environmental Quality (TCEQ), administered by The University of Texas at Austin (UT) through the Air Quality Research Program (AQRP). The contents, findings, opinions, and conclusions are the work of the author(s) and do not necessarily represent findings, opinions, or conclusions of the TCEQ.

TABLE OF CONTENTS

Texas Air Quality Research Program

Quarterly Report

March 1, 2024 – August 31, 2024

OVERVIEW

The goals of the State of Texas Air Quality Research Program (AQRP) are:

(i) to support scientific research related to Texas air quality, in the areas of emissions inventory development, atmospheric chemistry, meteorology, and air quality modeling,

(ii) to integrate AQRP research with the work of other organizations, and

(iii) to communicate the results of AQRP research to air quality decision-makers and stakeholders.

PROGRAM ACTIVITIES FOR THE QUARTER

Between March 1, 2024 and August 31, 2024, the AQRP program efforts were focused primarily on Request for Proposal (RFP) correspondence with applicants, coordinating Independent Technical Advisory Committee (ITAC) proposal assignments and rankings, corresponding with RFP Principal Investigators (PI) to address questions and concerns from the ITAC and Advisory Council, hosting the Advisory Council Meeting to finalize funding options, and grant management tasks required for UT-internal contracting processes.

The ITAC members met remotely in February 2024 to discuss the preliminary technical rankings of all twenty-seven (27) proposals received in response to the request for proposals. In April 2024, the ITAC finalized the proposal ratings and rankings and proposals were sent the TCEQ for their review. The ITAC ranked projects in three categories: (1) Highly Recommended, (2) Recommended, and (3) Not Recommended. In May 2024, the TCEQ proposal reviews were completed.

Highly Recommended projects included 24-007, 24-024, and 24-021. Recommended projects included 24-003, 24-004, 24-011, 24-012, 24-019, 24-020 and 24-027. Not Recommended projects included 24-017, 24-001, 24-002, 24-005, 24-006, 24-008, 24-009, 24-010, 24-013, 24-014, 24-015, 24-016, 24-018, 24-022, 24-023, 24-025 and 24-026. The finalized ITAC rankings are available in Appendix A.

The Advisory Council met remotely in July 2024 to discuss funding options. The Advisory Council members voted unanimously to approve projects 24-003, 24-004, 24-007, 24-021, and 24-024 for funding. The Advisory Council's approval utilized $1,249,230 of the $1,255,125 budget available, leaving $5,895 available for a contingency budget for research purposes. The TCEQ was notified of the Advisory Council decision shortly after the Advisory Council meeting concluded. PIs of proposals approved for funding were notified on August 8th and given a deadline of August 23rd at 5:00 PM CT to submit Workplans, which consist of a Scope of Work, Budget, Budget Justification, and Quality Assurance Protection Plan documents (QAPP). The AQRP Director assigned AQRP Project Managers and an AQRP QAPP Officer to all projects. The TCEQ assigned Project Liaisons and a QAPP Officer to projects. Appendix B lists all Projects approved for funding, Advisory

Council approved budgets, AQRP Project Managers, and TCEQ Liaisons. All projects are pending Subaward Agreement execution.

Due to changes and expansions in research scope to better support the AQRP Research priorities, PIs on projects 24-003, 24-004, and 24-021 were requested to modify their scope of work to include modified or additional efforts. Modified project budgets are reflected in the total approved budget for each project in Appendix B. Once Subaward Agreements are fully executed, all projects will be listed on the AQRP website (https://aqrp.ceer.utexas.edu/research/projects). Below is a summary of the technical modifications that were requested by the TCEQ and AQRP, as well as the budget adjustments required to accommodate the modifications:

Project 24-003: *Improving Emission Rates Estimates of Commercial Marine Vessels (PI: Flynn, University of Houston)*

Reason for TCEQ Request: In addition to the NO_X and CO_2, the TCEQ is also interested in better understanding of VOC emissions from commercial marine vessels.

TCEQ Request: Utilize an instrument packages which had a cost of deployment in the ~$40k range.

PI Response: $35k for MeDOAS and MeFTIR instruments; FluxSens measurements would need to rely on UH team personnel for the day-to-day operation, which necessitate training costs. If instrument repair/maintenance is needed, there may be additional costs.

Budget Modification Increase: +$42,858

Project 24-007: *Texarkana Intensive Campaign (PI: Flynn, University of Houston)*

Reason for TCEQ Request: The TCEQ is in the midst of planning and responding to the new PM standard. Understanding of PM and sources impacting in the Texarkana area is of particular importance to the TCEQ.

TCEQ Request: 1. With the recent changes to the fine PM standard, other areas of Texas are of interest in addition to El Paso, which was the region originally proposed for measurements. Of particular interest is the Texarkana New Boston monitor and surrounding area. TCEQ requested moving the monitoring to this region, including possible sources in Louisianna. For this campaign, TCEQ would be focused on PM rather than ozone.

PI Response: The PI offered a proposed payload and a $PM_{2.5}$ focus in Texarkana that would potentially fill some of the knowledge gaps. The main modified science objectives would be to:

1. Characterize selected $PM_{2.5}$ point sources in the Texarkana area.
2. Evaluate background $PM_{2.5}$ conditions in the vicinity, including upwind of C1031, which may include portions of LA or AR. However, this would not necessarily identify specific sources outside of TX.
3. If high $PM_{2.5}$ is forecast for C1031, the team would work upwind and try to identify potential sources that may be impacting the monitor.

Budget Modification Increase: +$11,525

Project 24-021: *Improving WRF representation of coastal, marine, and residual boundary layers and quantifying the effects on ozone prediction (PI: Wang, University of Houston)*

Reason for TCEQ Request: The TCEQ would like to leverage the PBL data obtained during the SCOAPE-19 campaign to improve meteorological modeling.

TCEQ Request: The TCEQ requested tuned WRF parameters at other over-water locations, utilizing SCOAPE-19 campaign data.

PI Response: SCOAPE-19 had PBL measurements. However, the campaign domain was over the Louisiana coast, not the proposed modeling domain of the project which covers Galveston Bay and the Gulf of Mexico close to Galveston. Therefore, new WRF simulation were required to compare to the SCOAPE-19 data. Additional personnel effort were also needed.

Budget Modification Increase: +$14,400

Other awarded projects did not have requested modifications to report.

The AQRP Grant Manager began the process of drafting Subaward Agreements for all project institutions in preparation for partial execution to be delivered when Workplans are approved by the AQRP and TCEQ. AQRP Project Manager and QAPP Officer salary allocation costings have been calculated for the 2024-2025 budget period.

The Financial Status Report (FSR) section of this report includes accounting through August 2024.

Throughout the reporting period, the AQRP Program Manager communicated regularly with the TCEQ Project Manager regarding program deadlines, deliverables, program updates, submission of monthly FSRs, and provided any additional information as requested by the TCEQ.

BACKGROUND

Section 387.010 of House Bill (HB) 1796 (81st Legislative Session), directs the Texas Commission on Environmental Quality (TCEQ) to establish the Texas Air Quality Research Program (AQRP). The University of Texas at Austin (UT) was selected by the TCEQ to administer the program. A contract for the administration of the AQRP was established between the TCEQ and UT. Consistent with the provisions in HB 1796, up to 10% of the available funding is to be used for program administration; the remainder (90%) of the available funding is to be used for research projects, individual project management activities, and meeting expenses associated with an Independent Technical Advisory Committee (ITAC).

A new AQRP contract was executed for the 2024-2025 biennium and funding of $750,000 per year was awarded.

RESEARCH PROJECT CYCLE

The Research Program is implemented through a nine-step cycle each biennium. The steps in the cycle are described from project concept generation to final project evaluation for a single project cycle.

1) The project cycle is initiated by developing (in year 1) or updating (in subsequent years) the research priorities. The Air Quality Research Program (AQRP) Director, in consultation with the Independent Technical Advisory Committee (ITAC), the Advisory Council (the Council) and the Texas Commission on Environmental Quality (TCEQ), develop research priorities; the research priorities are released along with a Request for Proposals (RFP).
2) Project proposals relevant to the research priorities are solicited. The RFP will be found at http://aqrp.ceer.utexas.edu/ once released.
3) The ITAC performs a scientific and technical evaluation of the proposals.
4) The project proposals and ITAC recommendations are forwarded to the TCEQ. The TCEQ evaluates the project recommendations from the ITAC and comments on the relevancy of the projects to the State of Texas's air quality research needs.
5) The recommendations from the ITAC and the TCEQ are presented to the Council and the Council selects the proposals to be funded.
6) All Investigators are notified of the status of their proposals, either intent to fund, not funded, or contingent (not funded at this time, but being held for possible reconsideration if funding becomes available).
7) Intent to fund projects are assigned an AQRP Project Manager at UT Austin and a Project Liaison at TCEQ. The AQRP Project Manager is responsible for ensuring that project objectives are achieved in a timely manner and that effective communication is maintained among investigators involved in multi-institution projects. The AQRP Project Manager has responsibility for documenting progress toward project measures of success for each project. The AQRP Project Manager works with the researchers, and the TCEQ, to create an approved work plan for the project.

   The AQRP Project Manager also works with the researchers, TCEQ, and the Program's Quality Assurance officer to develop an approved Quality Assurance Project Plan (QAPP) and Work Plan for each project. Subaward Agreements are issued. The AQRP Project Manager reviews monthly, annual, and final reports from the researchers and works with the researchers to address deficiencies.
8) The AQRP Director and the AQRP Project Manager for each project describe progress on the project in the ITAC and Council meetings dedicated to on-going project review.
9) The project findings are communicated through multiple mechanisms. Final reports are posted to the AQRP web site (http://aqrp.ceer.utexas.edu/); research briefings are developed for the public and air quality decision makers; and a bi-annual research conference/data workshop is held.

During this period, the AQRP performed step 3, 4, 5, 6, and 7.

Independent Technical Advisory Committee

The Air Quality Research Program (AQRP) funding is to be used primarily for research projects, and one of three groups responsible for selecting the projects is the Independent Technical Advisory Committee (ITAC). The ITAC is composed of between 9 and 15 individuals with scientific expertise relevant to the AQRP. The ITAC is charged with recommending technical approaches, establishing research priorities, and reviewing, commenting, and advising on all projects to ensure that the projects facilitate air quality improvement in Texas. Members of the ITAC consist of the Texas Commission on Environmental Quality (TCEQ) Air Quality Deputy Director (or designee), and representatives with air quality expertise from research institutions with extensive expertise in air quality research in Texas. The members of the ITAC are listed in Table 1. The members of the ITAC are drawn from Texas universities active in air quality research, national laboratories that have participated in air quality studies in Texas, and institutions that have expertise not available in Texas and that have participated in air quality studies in Texas.

The ITAC membership is intentionally drawn from air quality researchers who have experience in Texas. These researchers and their colleagues will likely have interest in responding to the requests for research proposals issued by the AQRP. This raises potential confidentiality and conflict of interest issues, and the contract between TCEQ and the University of Texas at Austin requires that the AQRP maintain and implement an appropriate written policy on conflict of interest. Specifically, for the ITAC, all members are required to certify:

> *Confidentiality:* As a member of Independent Technical Advisory Committee (ITAC), I understand that I will have access to proposals submitted to the Air Quality Research Program (AQRP). Subject to any legal requirements, I agree to keep the information in these proposals confidential until the selection process is completed and it is appropriate to release information to the public. I understand that there may be certain information that comes to me in my role as a member of ITAC that retains its confidential nature even after the process is concluded. I also understand that I will review said proposals and may have access to the reviews made by other ITAC members. I agree to keep these reviews and the identity of the reviewers confidential until such time as this information is released to the public. (NOTE: For the reviews and reviewers, this information may never be released.)
>
> *Conflict of Interest:* As a member of ITAC, I agree that I will not evaluate, comment on, or vote on proposals in which I or my home institution is involved, including but not limited to, any financial interest, or in which I have another form of conflict of interest. I understand that ITAC members with conflicts of interest must leave the meeting room or the conference line when a proposal with which they have a conflict is discussed, voted on or otherwise being considered. I understand that I must recuse myself from participating in or attempting to influence at any time the ITAC's or the AQRP Council's consideration or decision concerning such proposals. I agree to bring any issues concerning a possible conflict of interest to the attention of the Director of the AQRP or the TCEQ Air Quality Deputy Director. If there is a question of interpretation regarding whether a conflict of interest exists, I agree that the decision regarding whether a conflict of interest exists will be made by the Director of the Air Quality Research Program or the TCEQ Air Quality Deputy Director.

All members of the ITAC agree to abide by these conflicts of interest and confidentiality provisions prior to participating in the review of proposals. Table 1 contains the 2024-2025 Biennium ITAC members.

Table 1. Independent Technical Advisory Committee Members

Name	Title	Institution
David Allen	Professor and Director, AQRP	The University of Texas at Austin
Doug Boyer	Technical Specialist	TCEQ, Office of Air Director
Brad Pierce	Director, Space Science and Engineering Center	Univ. of Wisconsin-Madison
Don Collins	Professor	University of California, Riverside
Joost de Gouw	Research Physicist, Cooperative Institute for Research in Environmental Sciences (CIRES) Senior Scientist and Fellow	National Oceanic and Atmospheric Administration (NOAA), University of Colorado Boulder
James Nolan	Technical Specialist	TCEQ, Office of Air Director
Lea Hildebrandt Ruiz	Associate Professor	The University of Texas at Austin
Rebecca Sheesley	Associate Professor	Baylor University
William Vizuete	Professor	University of North Carolina
Yuxuan Wang	Associate Professor of Atmospheric Chemistry	University of Houston
Greg Yarwood	Principal	Ramboll
Renyi Zhang	Distinguished Professor of Atmospheric Sciences, Harold J. Haynes Chair in Geosciences	Texas A&M University

TCEQ Relevancy Review

The Texas Commission on Environmental Quality (TCEQ) reviews proposals for relevancy to the State's air quality research needs. TCEQ approval is required for a project to receive funding from the Program.

Advisory Council

The final group responsible for selecting Air Quality Research Program (AQRP) research projects is the Advisory Council (the Council). The Council consists of between 7 and 11 members. Two Council members with relevant scientific expertise are nominated by the Texas Commission on Environmental Quality (TCEQ). As defined in the AQRP contract, up to four members of the Council can be county judges from the Houston-Galveston-Brazoria (HGB) and Dallas-Fort Worth (DFW) non-attainment counties. Additional members should have a general background in air quality and business practices, and can include elected officials, business community representatives, environmental group representatives, and members of the general public. The Council's responsibilities are to attend meetings with TCEQ Management and the AQRP to understand the statewide project goals for the funding period, to select for funding the projects reviewed by the Independent Technical Advisory Committee (ITAC) and ranked by the TCEQ, and to assist with the presentation of project final results at locations throughout the state. Table 2 contains the 2024-2025 Biennium Advisory Council Members.

Table 2. Advisory Council Members

NAME	TITLE	INSTITUTION
Dan Baker	Senior Partner	Environmental Reaction Engineering Experts (E REX)
Beata Czader	Air Modeling Team Leader	TCEQ
Andrew De Candis	Clean Cities & Clean Vehicles and H-GAC Cities Co-Director	Houston-Galveston Area Council (H-GAC)
Lyle Hufstetler	Clean Cities Coordinator	Alamo Area Council of Governments (AACOG)
Chris Klaus	Senior Program Manager	North Central Texas Council of Governments (NCTCOG)
Chris Owen	Senior Technical Specialist	TCEQ
Chris Rabideau	Senior Technical Specialist	Chevron
Cyrus Reed	Conservation Director	Sierra Club

FINANCIAL STATUS REPORT

The Air Quality Research Program (AQRP) contract was awarded for FY 24-25 for $750,000 per year. Funds were distributed across several different reporting categories as required under the contract with TCEQ. The reporting categories are listed below in detail.

Program Administration: Limited to 10% of the overall funding per fiscal year. This category includes all staffing, materials and supplies, and equipment needed to administer the overall AQRP. It also includes the costs for the Council meetings.

ITAC: These funds are to cover the costs, largely travel expenses, for the Independent Technical Advisory Committee (ITAC) meetings.

Project Management: Limited to 8.5% of the funds allocated for Contractual budget category. Each research project is assigned a Project Manager to ensure that project objectives are achieved in a timely manner and that effective communication is maintained among investigators in multi-institution projects. These funds are to support the staffing and performance of project management.

Research Projects / Contractual: These are the funds available to support the research projects that are selected for funding.

Program Administration

Program Administration includes salaries and fringe benefits for those overseeing the program, as well as materials and supplies, travel, equipment, and other expenses. This category allows indirect costs in the amount of 10% of salaries and wages.

Dr. David Allen, Principal Investigator and AQRP Director, is responsible for the overall administration of the AQRP. RoseAnna Goewey, AQRP Program Manager, performs program and grant management. Mr. Vincent Torres, AQRP QAPP Manager, reviews and oversees AQRP approval of all project QAPPs.

The University of Texas at Austin's federally negotiated fringe rates for full-time/benefits eligible employees is 26.1%. Rates are estimated to have a 0.5% increase for full/part-time benefits eligible employees in subsequent years.

Table 3: Administration Budget (2024-2025 Biennium)

Admin Budget

Budget Category	FY24 Budget	FY25 Budget	Total Budget	Expenses	Remaining Balance
Personnel/Salary	$53,244.17	$53,144.51	$106,388.68	$54,517.10	$51,871.58
Fringe Benefits	$14,482.42	$14,721.03	$29,203.45	$14,228.95	$14,974.50
Supplies	$24,706.19	$1,820.00	$26,526.19	$2,453.96	$24,072.23
Total Direct Costs	$92,432.78	$69,685.54	$162,118.32	$71,200.01	$90,918.31
Authorized Indirect Costs *(10% of Salaries and Wages)*	$5,324.42	$5,314.45	$10,638.87	$5,451.72	$5,187.15
Total Costs	**$97,757.20**	**$75,000.00**	**$172,757.19**	**$76,651.73**	**$96,105.46**

ITAC

Table 4 details the 2024-2025 Biennium ITAC budget. Through August 2024, ITAC travel for members to attend meetings is accrued.

Table 4: ITAC Budget (2024-2025 Biennium)

ITAC Budget

Budget Category	FY24 Budget	FY25 Budget	Total Budget	Expenses	Remaining Balance
Travel	$5,000.00	$5,000.00	$10,000.00	$945.97	$9,054.03
Supplies	$625.00	$625.00	$1,250.00	$0.00	$1,250.00
Total Direct Costs	$5,625.00	$5,625.00	$11,250.00	$945.97	$10,304.03
Total Costs	**$5,625.00**	**$5,625.00**	**$11,250.00**	**$945.97**	**$10,304.03**

Project Management

Table 5 details the 2024-2025 Biennium Project Management Budget. Expenses include Project Manager salaries, fringes, required supplies, and associated Indirect Costs.

Table 5: Project Management Budget (2024-2025 Biennium)

Project Management Budget

Budget Category	FY24 Budget	FY25 Budget	Total Budget	Expenses	Remaining Balance
Personnel/Salary	$38,000.00	$38,000.00	$76,000.00	$37,165.96	$38,834.04
Fringe Benefits	$10,336.00	$10,526.00	$20,862.00	$9,700.31	$11,161.69
Supplies	$4,114.00	$3,924.00	$8,038.00	$5,409.60	$2,628.40
Other	$1,875.00	$1,875.00	$3,750.00	$0.00	$3,750.00
Total Direct Costs	$54,325.00	$54,325.00	$108,650.00	$52,275.87	$56,374.13
Authorized Indirect Costs *(10% of Salaries and Wages)*	$3,800.00	$3,800.00	$7,600.00	$3,716.59	$3,883.41
Total Costs	**$58,125.00**	**$58,125.00**	**$116,250.00**	**$55,992.46**	**$60,257.54**

RESEARCH PROJECTS

Research projects have been selected in this reporting period. However, contracting has not been finalized. Therefore, there are no research expenses to report. Table 6 shows the 2024-2025 Biennium Research Project budget. The budget allocates $1,255,125.09 for research projects. The budget includes carry forward from the prior biennium. At the time of this report submission, subaward contracts have not been fully executed with awardees.

Table 6: 2024-2025 Biennium Research Project Budget

2024-2025 Biennium Total Contractual Funding		**$1,222,500.00**		
FY 22-23 Contractual Carry Forward		**$32,625.09**		
TOTAL CONTRACTUAL BUDGET		**$1,255,125.09**		
Project Number	**Institution**	**Amount Awarded**	**Cumulative Expenditures**	**Remaining Balance**
24-003	*University of Houston (Flynn)*	$159,221.00	$0.00	$159,221.00
24-003	*Ramboll (Lindhjem)*	$47,827.00	$0.00	$47,827.00
24-003	*FluxSens (Samuelsson)*	$35,000.00	$0.00	$35,000.00
24-004	*Ramboll (Johnson)*	$229,691.00	$0.00	$229,691.00
24-007	*University of Houston (Flynn)*	$144,233.00	$0.00	$144,233.00
24-007	*Baylor University (Usenko)*	$88,951.00	$0.00	$88,951.00
24-007	*Aerodyne (Fortner)*	$76,519.00	$0.00	$76,519.00
24-021	*University of Houston (Wang)*	$186,978.00	$0.00	$186,978.00
24-024	*The University of Texas at Austin (Misztal)*	$280,810.00	$0.00	$280,810.00
FY 24 Total Contractual Funding Awarded		$1,249,230.00		
FY 24 Contractual Funds Expended			$0.00	
FY Contractual Funds Remaining to be Spent				$1,255,125.09
Total Contractual Funding		**$1,255,125.09**		
Total Contractual Funding Awarded		**$1,249,230.00**		
Total Contractual Funding Contingency		**$5,895.09**		
Total Contractual Funds Expended to Date			**$0.00**	
Total Contractual Funds Remaining to be Spent				**$1,255,125.09**

APPENDIX A. ITAC PROPOSAL RANKING (BIENNIUM 2024-2025)

Project titles are displayed to reflect the original proposal. Awarded titles may vary.

Proposal #	Project Title	Primary Institution: PI	Rank in Tier	ITAC Recommendation
24-021	Improving WRF representation of coastal, marine, and residual boundary layers and quantifying the effects on ozone prediction	University of Houston: Yuxuan Wang	1	Highly Recommended
24-007	El Paso Intensive Campaign	University of Houston: James Flynn	2	Highly Recommended
24-024	Novel Observations and Quantified Source Apportionment of Ozone, Particulate Matter and Contributing Precursors in the El Paso Area	The University of Texas at Austin: Pawel Misztal	3	Highly Recommended
24-004	Evaluating Updates to CAMx and NOx Emission Inventories using TEMPO Measurements over Texas	Ramboll: Jeremiah Johnson	1	Recommended
24-003	Improving Emission Rates Estimates of Commercial Marine Vessels	University of Houston: James Flynn	2	Recommended
24-011	Updating NOx emissions using inverse modeling, new geostationary satellite data, and deep learning methods in Texas.	University of Houston: Yunsoo Choi	4	Recommended
24-019	Maximizing the Value of Satellite Data to Characterize Ozone Precursor Sensitivity in Texas	University of Wisconsin-Madison: Tracey Holloway	3	Recommended
24-012	Source categories contributing to high ozone formation in San Antonio using SAFS 2017 and 2021 Data	Aerodyne Research, Inc.: Tara Yacovitch	7	Recommended
24-027	Integrated Analysis Combining TEMPO Satellite and Ground Measurements to Better Quantify Key Species Impacting Ozone Formation in the Greater Houston Area	Texas A&M University: Miska Olin	5	Recommended
24-020	Quantifying the Temporal Distribution, Emission Intensities, and Impact of Ozone of Key VCP Species	Texas A&M University: Yue Zhang	6	Recommended

24-017	Assessing the Impacts of Wildfire on Texas Air Quality in Near-Real Time	Texas A&M University: Qi Ying	1	Not Recommended
24-002	Offshore Aerosol Radiation Study (OARS)	University of Houston: James Flynn	2	Not Recommended
24-013	Validation and Analysis of TEMPO Data across Texas	Stony Brook University: Guanyu Huang	3	Not Recommended
24-022	Accelerating the Use of TEMPO Data Products in Air Quality Management Applications	NASA Marshall Space Flight Center: Aaron Naeger	4	Not Recommended
24-018	Estimating Ozone Impacts in Texas from Foreign and Domestic Fire Sources	Ramboll: Chris Emery	5	Not Recommended
24-001	Improving the Temporal Variability of VOC and NO2 Emissions from the Houston Ship Channel using a Machine-Learning Inverse Model with Observations	George Mason University: Bok Haeng Baek	6	Not Recommended
24-005	Analysis of toluene measurement in El Paso (TOL-El Paso)	University of Houston: Bernhard Rappenglueck	7	Not Recommended
24-014	Assessing Ozone Formation During Heatwaves in the Texas Triangle Region	Texas A&M University: Zheng Lu	8	Not Recommended
24-006	Rapid Top-Down Updates of NOx Emission Inventory Using TEMPO Satellite Data and the Digital Twin of CMAQ DDM-3D	University of Houston: Yunsoo Choi	9	Not Recommended
24-008	Investigating the Role of Stable Boundary Layer Parameterization in Delineating Sea/Land Breeze Circulation during TRACER-AQ	University of Alabama Huntsville: Arastoo Pour-Biazar	10	Not Recommended
24-009	Quantifying the contribution of domestic wildfire smoke to O3 and PM2.5 concentrations in multiple Texas urban areas from 2012-2022	Atmospheric and Environmental Research, Inc.: Archana Dayalu	11	Not Recommended
24-010	TEMPO Observations for Diurnal O3-NOx-VOCs Sensitivity Diagnosis: An Assessment of O3 Response in Texas	University of Maryland, Baltimore County: Lok Lamsal	12	Not Recommended

24-015	Combining Muti-Angle Spaceborne Observations and Global Cloud-Resolving Models in Characterizing PM2.5 Constituents in Texas	The University of Texas Health Science Center at Houston: Yun Hang	13	Not Recommended
24-016	Numerical simulations of the impacts from domestic fire emission on air quality in Texas using CMAQ	University of Maryland, Baltimore County: Hao He	14	Not Recommended
24-023	Leveraging Satellite Remote Sensing and Ground-Based Sensors to Improve Methane Emissions Inventories from Oil and Gas Infrastructure	The University of Texas at Austin: Erin Tullos	15	Not Recommended
24-025	Machine Learning assessment of Wildfire smoke impact on air quality in Texas	Georgia Institute of Technology: Yuhang Wang	16	Not Recommended
24-026	Quantifying hourly sectoral emissions of NOx, SO2, CO, and VOCs in Texas using TEMPO and MOPITT satellite observations	North Carolina State University: Zhen Qu	17	Not Recommended

APPENDIX B. CONTRACTUAL RESEARCH PROJECTS APPROVED FOR FUNDING (BIENNIUM 2024-2025)

Project #	Project Title	Research Priority	Primary Institution: PI	Collab. Institution: Co-PI(s)	Total Budget	AQRP Project Manager	TCEQ Liaison
24-003	Improving Emission Rates Estimates of Commercial Marine Vessels	Improve emission inventories	*University of Houston*: Flynn	*Ramboll*: Lindhjem, *FluxSens*: Samuelsson	$242,048	Vincent Torres	Cody McClain
24-004	Evaluating Updates to CAMx and NOx Emission Inventories using TEMPO Measurements over Texas	Photochemical air quality models	*Ramboll*: Jeremiah Johnson	n/a	$229,691	Elena McDonald-Buller	Robert Kierstead
24-007	Texarkana Intensive Campaign	Development of an ozone and PM2.5 field study in El Paso	*University of Houston*: James Flynn	*Baylor University*: Usenko; *Aerodyne Research, Inc.*: Fortner	$309,703	Vincent Torres	Chola Regmi
24-021	Improving WRF representation of coastal, marine, and residual boundary layers and quantifying the effects on ozone prediction	Photochemical air quality models	*University of Houston*: Yuxuan Wang	n/a	$186,978	Elena McDonald-Buller	Gabriel Lee
24-024	Novel Observations and Quantified Source Apportionment of Ozone, Particulate Matter and Contributing Precursors in the El Paso Area	Development of an ozone and PM2.5 field study in El Paso	*The University of Texas at Austin*: Pawel Misztal	n/a	$280,810	Vincent Torres	Celinda Vallejo-Rodriguez