CHEROKEE NATION

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Deputy Principal Chief

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August 11, 2008

Aunjanee Gautreaux, 6PD-Q
Air Quality Analysis Section
U. S. EPA, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

RE: CHEROKEE NATION COMMUNITY AIR TOXICS PROJECT EIGHTH QUARTER TECHNICAL REPORT

Dear Ms. Gautreaux:

Enclosed is the Eighth Quarter Technical Report (March, April, May, 2008) for the Cherokee Nation's Community Air Toxics Project (Cooperative Agreement number XA-96619701-0). The eighth quarter financial report and MBE/WBE will be provided by the Cherokee Nation Accounting Department and by our financial staff, respectively.

Also enclosed are the final reports for this project, including the final report produced by Eastern Research Group, the Supplementary Report produced by the CNEP, and all data tables. An abstract of the project and its findings is included in the Supplementary Report. The CNEP has posted the Supplementary Report to EPA's Airshare website. The CNEP is sending copies of ERG's final project report and the Supplementary Report to Mike Jones of EPA's OAQPS, to the Oklahoma Department of Environmental Quality, and to the Cherokee Nation's Health Administration.

If you have any questions regarding these matters, please call Ryan Callison at 918-453-5093 or Kent Curtis at 918-453-5095.

Sincerely,

Tom Elkins

Tom Elkins
Acting Administrator for Environmental Programs

Enclosures

cc: File

QUARTERLY TECHNICAL REPORT
for
CHEROKEE NATION ENVIRONMENTAL PROGRAMS (CNEP)
COMMUNITY AIR TOXICS PROJECT
(XA-96619701-0)

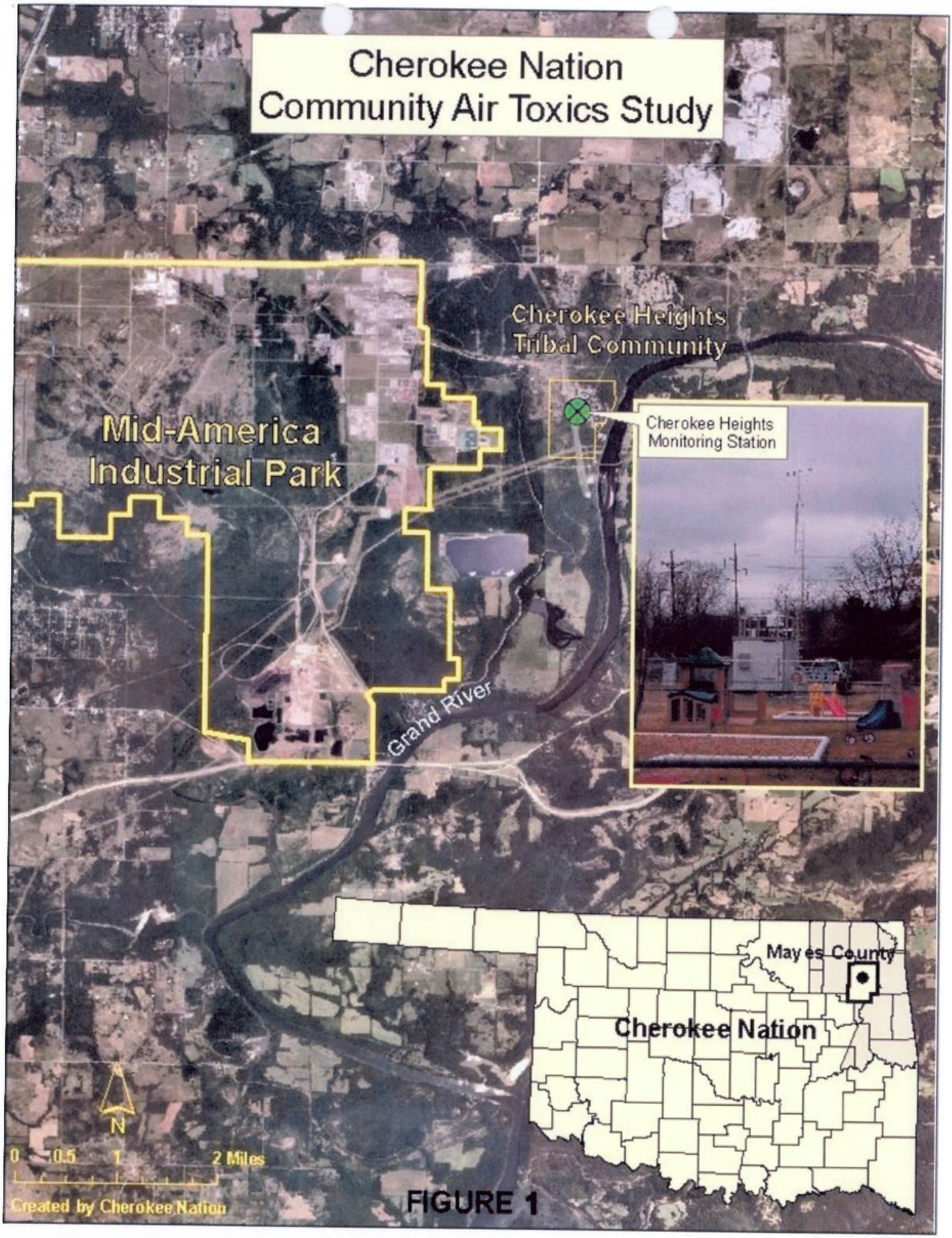
EIGHTH QUARTER FY2008
(MARCH, APRIL, MAY, 2008)

OVERVIEW OF PROJECT ORIGIN, PURPOSE, AND COMPLETION

The origin and purpose of this project are described in the first quarterly technical report for this project. This project has now been completed. In summary, the Cherokee Nation conducted this 18-month VOC sampling project at its Cherokee Heights (aka, Pryor) site (**Figure 1**), collecting samples in vacuum canisters for analyses via EPA Test Method TO-15. Ninety-three valid samples were collected using a 1-in-6 day sampling interval. The 18-month project documented an absence of seasonal variations in VOC concentrations and focused on hazardous air pollutants (VOC HAPs) identified as "drivers" in the 1999 NATA, as well as on VOC HAPs detected in the Cherokee Nation's screening project from the winter of 2005. Analysis of sample data by Eastern Research Group (ERG) revealed that acrolein, benzene, carbon tetrachloride, and acrylonitrile are the only VOCs posing an elevated risk to the health of tribal members at Cherokee Heights. ERG completed the final project report in July, 2008. The CNEP wrote a Supplementary Report to accompany ERG's final report. The final report, supplementary report, and project data will be shared with the EPA, the state of Oklahoma (ODEQ), the Cherokee Nation, and the general public via AQS, XML flat file, and other means, as appropriate.

EIGHTH QUARTER GOALS, OBJECTIVES, AND ACCOMPLISHMENTS

1. Complete sample collection in accordance with the Proposed Sampling Schedule for this project. Sample collection began as scheduled on September 26, 2006 and was completed on March 31, 2008. Ninety-three valid samples (including nine duplicates) were collected during the project. Summary information for these 93 samples is shown in the Sampling Schedule for this project, which is included as **Appendix A** of the Supplementary Report that accompanies this quarterly technical report. Eleven samples – collected on December 1st, December 25th, April 18th, June 29th, October 3rd, December 26th, and February 24th – were invalid (unusable) because the sample canisters had internal pressures of zero at the end of sample collection or because a leak from the canisters was suspected or because the sample period was too long. Duplicate samples scheduled for October 9th could not be collected because no sample canisters were available on that date. A further explanation of problems encountered with sample collection and analysis is included in the "Problems Encountered" section of this quarterly technical report.


Cherokee Nation
Community Air Toxics Study
Cherokee Heights
Tribal Community
Mid-America
Industrial Park
Cherokee Heights
Monitoring Station
Grand River
Mayes County
Cherokee Nation
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Created by Cherokee Nation

FIGURE 1

2. Perform NATTS Certification and flow verification check on primary RM910A sampler. The CNEP performed a flow verification check on its primary RM910A sampler after sample collection for this project was completed on March 31, 2008. The flow verification check was performed on April 9, 2008, and the RM910A passed the check. The CNEP sent the primary sampler to ERG for an EPA Compendium Method TO-15 "canister sampling system certification" (aka, NATTS Certification) in May, 2008. ERG performed this certification on May 11-13, 2008 and the sampler passed the certification. ERG returned the sampler to the CNEP in May, 2008.

3. ERG will begin reporting sample data to the CNEP within 45 days after the completion of the first month of sample collection. The CNEP received lab data for its first seven samples – collected from September 26th through October 26th – from ERG in December, 2006. Subsequently, the CNEP received data for samples collected from November, 2006 through March, 2008. The CNEP has analyzed this data. CNEP tables of all project data are included in **Appendix B** of the Supplementary Report that accompanies this quarterly technical report. The data tables were compiled to facilitate the discovery and analysis of any seasonal trends in the data. The data in **Appendix B** of the Supplementary Report serves as a supplement to the final project report produced by ERG. ERG posted the data for October 15th through December 20th, 2007 to the AQS website in March, 2008. ERG posted the data for January 1st through March 31st, 2008 to the AQS website in June, 2008. Thus all eighteen months of sample data for this project have now been entered in the AQS website.

4. ERG will provide the CNEP with a statistical analysis of the project data for calendar year 2007. ERG's final project report, which was submitted to the CNEP at the end of July, 2008, includes statistical analyses of the project data, identification of pollutants of interest, and estimates of the risk posed by those pollutants of interest to the health of tribal members living in Cherokee Heights.

5. ERG will produce draft and final reports for this VOC monitoring project. ERG submitted a draft final project report to the CNEP on June 30th, 2008. The CNEP reviewed and edited this draft report and sent it back to ERG on July 2nd, 2008. ERG submitted the final report to the CNEP at the end of July, 2008. The CNEP will distribute copies of the final project report to the EPA Region 6 office in Dallas, to the Oklahoma Department of Environmental Quality, and to interested parties within the Cherokee Nation, such as the Cherokee Nation's Health Administration, in August, 2008.

Summary of Eighth Quarter Goals, Objectives, and Accomplishments. The goals and objectives of this project, including overall goals, have not changed from the original CNEP application for funding. Eighth quarter goals and objectives for this project were to complete sample collection, analyze sample data, obtain NATTS certification for the CNEP's primary RM910A sampler, reach agreement with ERG on the content and format of the final project report, review and edit the draft final project report, and distribute the final project report to the EPA and other interested parties. These goals and objectives have been met. No significant difficulties or delays were encountered in

meeting these eighth quarter goals and objectives. In summary, work for this project has been completed on schedule.

Summary of Project Completion. Work for this two-year project has been completed. Ninety-three valid VOC canister samples were collected during an eighteen-month period from September 26, 2006 to March 31, 2008, and all of the sample data have been entered in AQS by ERG. All sample collection, sample analysis, and data analysis was performed in accordance with a EPA-approved QAPPs, and the sample collection equipment passed flow verification checks and EPA Compendium Method TO-15 "canister sampling system certifications" (aka, NATTS Certifications) before and after the eighteen-month sample collection period. The CNEP paid all contractors and closed the account for this project by the end of the grant period on May 31, 2008. The CNEP reviewed and edited the draft final project report produced by ERG, and ERG submitted the final project report to the CNEP in late July, 2008.

Project Timeline and Milestones. The following list shows the timeline and milestones for the entire two-year duration of this project. *Milestones that have been met are shown in italics.*

(1) Cherokee Nation will receive EPA approval of its QAPP for this project by June 1, 2006, or by the end of the second month of the project. *The original QAPP/Work Plan for this project was approved by the EPA in February, 2006. The CNEP revised this original QAPP in September, 2006, and the revised QAPP was approved by EPA on October 26, 2006. A second revision of the QAPP was submitted to EPA for approval in December, 2007, and it was approved on January 17, 2008.*

(2) Cherokee Nation will solicit bids from labs for sample analysis during the first month of the project and will select the winning bid and award the contract by the beginning of the third month of the project. *ERG was selected (August, 2006) to analyze project samples and perform data reporting for the project.*

(3) Cherokee Nation will begin sample collection by the beginning of the third month (September, 2006) of the project, or by the date of project QAPP approval by EPA, whichever is later. *Sample collection for this project began on September 26, 2006. Ninety-three valid samples (including nine duplicate samples) were collected for this project from September 26, 2006 to March 31, 2008.*

(4) Cherokee Nation will begin data analysis as soon as the first data is received from lab. Data analysis will continue to the end of the project on May 31, 2008. *The CNEP began receiving lab data from ERG in December, 2006. The CNEP completed analysis of all project data by May, 2008.*

(5) Cherokee Nation will complete sample collection by the end of 18 months of sampling (March, 2008). *The CNEP completed eighteen months of sample collection on March 31, 2008.*

(6) ERG will submit sample data to CNEP within 45 days after the end of each month of sample collection. ERG will submit statistical analyses of data and quality assurance reports to CNEP at the end of each year of the project. *ERG began submitting sample data to the CNEP in December, 2006 (see Project Timeline and Milestone item 4 above). Data submission to the CNEP was completed in May, 2008.*

(7) ERG, under the terms of its contract with CNEP, will post project data to AQS within 90 days of the end of each calendar quarter. Posting of project data to AQS will begin as early as the 9th month (March, 2007) of the project. ERG will complete final posting of project data to AQS within 90 days after the conclusion of the project on May 31, 2008. *ERG posted project data for September, 2006 through September, 2007 to the AQS website in March, June, and September, 2007, and in January, 2008. ERG posted project data for October, 2007 through December, 2007 to the AQS website in March, 2008. ERG posted project data for January, 2008 through March, 2008 to the AQS website in June, 2008. All eighteen months of project sample data have now been entered in AQS.*

(8) Cherokee Nation will host public meeting to present results of project to residents of Cherokee Heights no later than the final month of the project (May, 2008). *Analysis of sample data for this project revealed that the pollutants of interest – acrolein, benzene, carbon tetrachloride, and acrylonitrile – pose a low risk to the health of tribal members living in Cherokee Heights. The risks are comparable to the risks posed by the same VOCs in the urban environment of Tulsa. Thus the CNEP decided not to host a public meeting at the end of this project. Instead, the CNEP will distribute copies of the final project report to interested parties within the Cherokee Nation, such as the Cherokee Nation's Health Administration.*

(9) Cherokee Nation will submit final project report to EPA within 90 days after the conclusion of the project on May 31, 2008. Quarterly technical reports will be submitted to EPA within 30 days after the end of each three-month quarter of each fiscal year. *This is the final quarterly technical report for this project. This report is being submitted to EPA in August, 2008.*

CHANGES IN KEY PERSONNEL INVOLVED IN PROJECT

The following seven persons in the CNEP air quality monitoring program worked on this project:

Ryan Callison, Project Manager
Kent Curtis, Project QA/QC Manager
April Hathcoat, Environmental Specialist II
Jacque Adam, Environmental Specialist I
Jeremy Freise, Environmental Specialist I
Danielle Keese, Environmental Specialist I
Larry Scrapper, Environmental Specialist I

Ryan had overall responsibility for the project. Kent was responsible for project planning, project oversight, and QA/QC management. Kent and April were responsible for project data management. April, Jacque, Jeremy, Danielle, and Larry had primary responsibility for sample collection and equipment maintenance, while Kent and Ryan assisted with such tasks.

ERG was the laboratory responsible for sample analyses and data reporting for the project. Key contacts at ERG were Julie Swift (project oversight), Ray Merrill (QA oversight), Dave Dayton (Method TO-15 canister sampling system certification), and Rodney Williams (canister sample shipping and receiving).

Figure 2 is an organizational chart showing all parties involved in this project. Those personnel named in the preceding paragraphs were directly involved in this project while other parties shown in **Figure 2** played supporting roles in the project. Tom Elkins replaced Jeannine Hale as Acting Administrator of CNEP in January, 2008, and Melanie Knight replaced Diane Hammons as Group Leader of Cherokee Nation Environmental Programs at that time.

EXPENDITURES TO DATE

A total of $164,658.77 of the $165,000 awarded for this grant was spent by the CNEP by the end of the eighth quarter of this project. Thus expenditures through the end of the eighth quarter were within the overall budget for the project. $341.23 of the total grant money was unspent during the project and was returned to the EPA in July, 2008.

COMPLIANCE WITH QUALITY ASSURANCE REQUIREMENTS

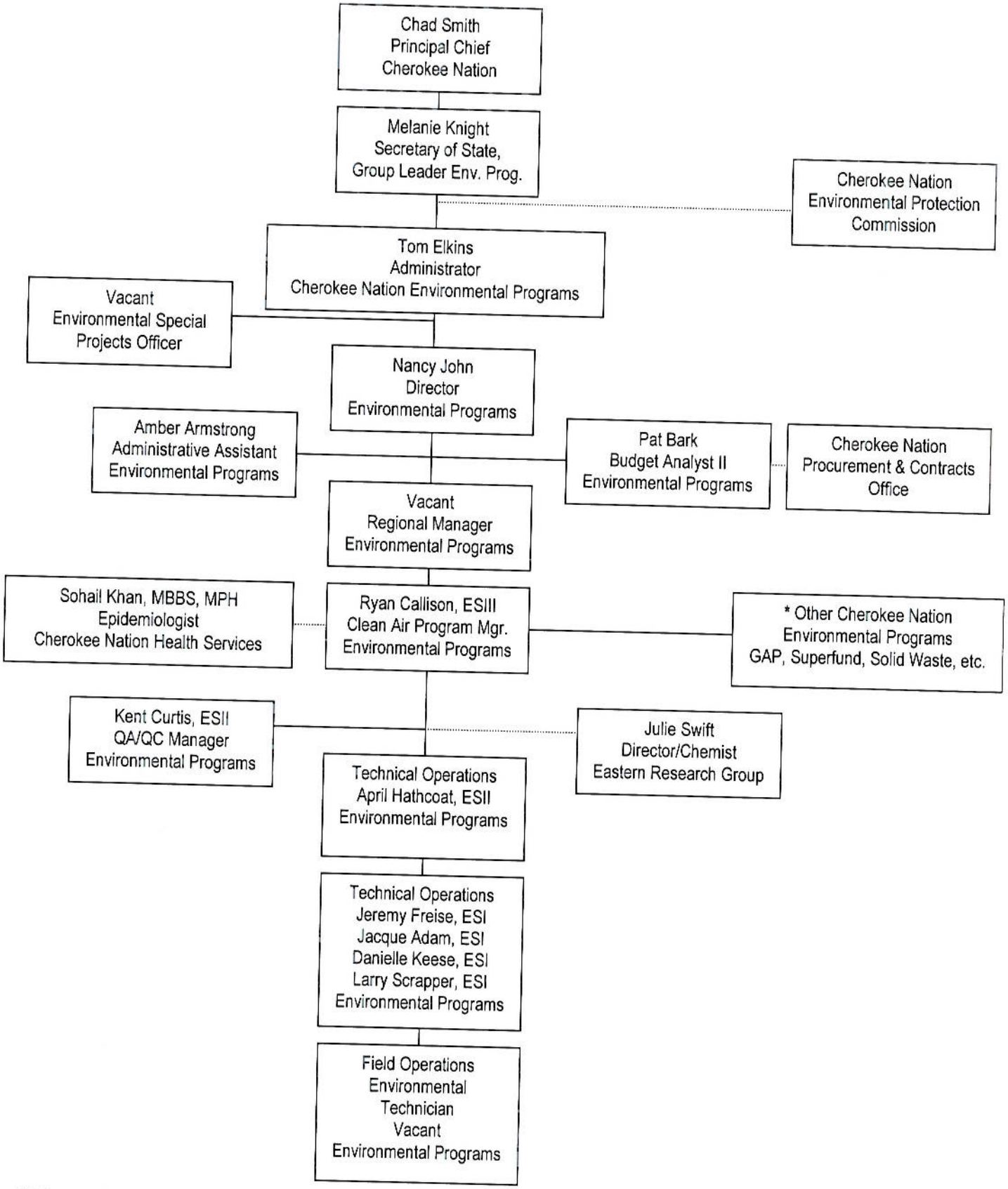
The CNEP's original QAPP/Work Plan for this project was approved by the EPA in February, 2006. A revision of this QAPP was completed by the CNEP on September 21, 2006 and was approved by the EPA on October 26, 2006. EPA approval of this QAPP was extended to January 26, 2008. The CNEP completed a revision of this QAPP and submitted it to EPA for approval on December 12, 2007. This revision was approved by the EPA on January 17, 2008.

In addition, the CNEP is operating under a Quality Management Plan (QMP) approved by the EPA on May 7, 2008. The CNEP air quality monitoring program is also operating under several other EPA-approved QAPPs, including QAPPs for criteria pollutant monitoring (including meteorological instruments) and for PM2.5 monitoring.

The contracted laboratory, ERG, is operating under the following EPA-approved QAPP: *Support for the EPA National Monitoring Programs (NMOC, UATMP, PAMS, HAPs, and NATTS)* for 2007/2008.

Cherokee Nation Environmental Programs
Organizational Chart

Figure 2



Note: *Chart shows only those CNEP staff directly involved in the Community Air Toxics Project

AWARD CATEGORY /	BUDGET	Expenditures	Encumbrance	Commitment	Total	Balance
Personnel	31,769.00	38,609.95	0.00	0.00	38,609.95	(6,840.95)
Fringe	11,078.00	41,859.14	0.00	0.00	41,859.14	(30,781.14)
Travel	9,011.00	9,960.04	0.00	0.00	9,960.04	(949.04)
Contractual	77,000.00	37,620.00	0.00	0.00	37,620.00	**39,380.00**
Supplies	3,400.00	4,658.53	0.00	0.00	4,658.53	(1,258.53)
Equipment	6,995.00	4,522.00	0.00	0.00	4,522.00	**2,473.00**
Other	13,600.00	9,729.28	0.00	0.00	9,729.28	**3,870.72**
IDC	12,147.00	17,699.83	0.00	0.00	17,699.83	(5,552.83)
	165,000.00	**164,658.77**	**0.00**	**0.00**	**164,658.77**	**341.23**

PROJECT RESULTS

Ninety-three valid samples (including nine valid duplicates) were collected from September 26, 2006 through March 31, 2008 (see Sample Dates in **Appendix A** of the Supplementary Report that accompanies this quarterly technical report). Thirteen additional samples (including four duplicates) were declared invalid by the CNEP due to problems that affected data quality. ERG submitted data for 93 valid samples – collected from September 26, 2006 through March 31, 2008 – to the CNEP and the CNEP has analyzed this data. The CNEP tables of all project data are included in **Appendix B** of the Supplementary Report that accompanies this quarterly technical report. The data tables were compiled to facilitate the discovery and analysis of any seasonal trends in the data. **Appendix B** of the Supplementary Report serves as a supplement to the final project report that was produced by ERG. ERG has posted all sample data for this project to the AQS website as of June, 2008.

The number of VOCs detected in each of the 93 valid samples ranged from 14 to 30. The concentrations of the detected VOCs were compared to the following benchmarks: EPA Region 6 Human Health Medium-Specific Screening Levels, including chronic inhalation toxicity values (non-cancer and cancer values), and including screening values for ambient air; Oklahoma Department of Environmental Quality (ODEQ) MAACs; and ATSDR Minimal Risk Levels (MRLs) for inhalation. The concentrations of 3 to 7 of the detected VOCs equaled or exceeded one or more of these benchmarks in each sample. The VOCs exceeding these benchmarks were as follows: acrolein; chloromethane; 1,3-butadiene; chloroform; benzene; carbon tetrachloride; trichloroethylene; and 1,2-dichloroethane. A more detailed analysis of these results is included in the Supplementary Report that accompanies this quarterly technical report.

Kent Curtis (CNEP) and Julie Swift (ERG) reached an agreement on January 31st, 2008 about the format and content of the final project report that ERG submitted to the CNEP in July, 2008. The final project report includes statistical analyses of the project data, identification of pollutants of interest, and estimates of the risk posed by those pollutants of interest to the health of tribal members living in Cherokee Heights. The CNEP wrote a Supplementary Report that supplements ERG's final project report. Both ERG's final project report and the CNEP's Supplementary Report have been submitted to the EPA, along with this final quarterly technical report.

PROBLEMS ENCOUNTERED

No serious problems were encountered during the eighth quarter of this project. The ongoing problem of MDLs for particular VOCs of concern being higher than EPA Region 6 Human Health Screening Levels continued into 2008, although there was improvement in this area. This problem (MDLs) is discussed in the following paragraph.

ERG recalculated its Method Detection Limits (MDLs) for VOCs at the beginning of 2008, achieving the lowest MDLs of the entire eighteen-month project. Only five VOCs, including acrolein and trichloroethylene, had MDLs that were higher than EPA Region 6

Human Health Screening Levels in 2008. In 2007, twelve to fifteen VOCs (including 1,3-butadiene, acrolein, acrylonitrile, chloroform, 1,2-dichloroethane, carbon tetrachloride, and trichloroethylene) had MDLs higher than EPA screening levels, while eight VOCs (including acrolein, acrylonitrile, and trichloroethylene) had MDLs higher than EPA screening levels in 2006. Thus it is possible that false negatives were reported for VOCs of particular concern in this project. That is, data may falsely show that a particular VOC was not present at a concentration higher than a Screening Level when, in fact, that VOC may actually have been present at a concentration higher than the Screening Level but lower than the MDL achieved by the lab. This limits the usefulness of some project data and forces the CNEP to accept the possibility of false negatives for some VOCs of concern, including 1,3-butadiene, acrolein, acrylonitrile, chloroform, 1,2-dichloroethane, carbon tetrachloride, and trichloroethylene.

Of the 106 samples collected (including thirteen duplicates) from September 26, 2006 through March 31, 2008, 93 samples yielded valid (useable) data. Thus the data completion rate for the eighteen months of sample collection (106 collected samples) is 87.7%. This meets the desired data completion rate of 85%, which is specified in Section 2.5 of the Revised QAPP/Work Plan for this project.

Nine valid duplicate samples were collected for this project. This meets the QA/QC requirement (described in Section 2.1 of the Quality Assurance Project Plan/Work Plan for this project) that ten percent of all project samples must be duplicate samples.

ACTIVITIES PLANNED FOR JULY AND AUGUST, 2008

1. ERG will provide the CNEP with a final project report in July, 2008. The CNEP received the final project report from ERG in late July, 2008.

2. Copies of ERG's final project report, and of the Supplementary Report written by the CNEP, are being distributed to the U. S. EPA Region 6 office in Dallas, to Mike Jones of the EPA OAQPS in Research Triangle Park, to the Oklahoma Department of Environmental Quality, to the Cherokee Nation Health Administration, and to other interested parties in August, 2008.

PUBLICATIONS ARISING FROM THIS PROJECT

Kent Curtis attended the Air and Waste Management Association's Symposium on Air Quality Measurement Methods and Technology in San Francisco on April 30-May 2, 2007. He gave a brief presentation on the CNEP's Community Air Toxics Project, including a summary of sample data collected as of February, 2007. This presentation was published in the proceedings of the symposium.

The Supplementary Report written for this project by the CNEP was posted to the EPA's Airshare website in August, 2008.

There are no plans to publish ERG's final report for this project.