

Task 4.1 Emission Inventory Improvements

Inventory Preparation Plan (IPP) for Developing an Oil and Gas Emissions Inventory for Development of the Haynesville Shale

Task 4.1 of the NETAC FY 0809 is for emission inventory improvements related to oil and gas production. The work proposed is to estimate future emissions from exploration & production and gathering/transmission operations associated with natural gas development of the Haynesville Shale in Northwest Louisiana and Northeast Texas. The work will be performed by ENVIRON and the proposed budget is \$60,000. The budget is less than the \$65,000 allocated for Task 4.1 so \$5,000 will be moved to contingency. The work will be completed and a draft report prepared by July 31, 2009. This document is the Inventory Preparation Plan (IPP) for the proposed work. A Quality Assurance Project Plan (QAPP) is not needed because no primary data collection activities (e.g., surveys) are proposed; the project will gather existing data.

Background

The Haynesville Shale is similar to the Barnett Shale near DFW, but potentially much larger. Development has just begun and is expected to grow rapidly in the next few years¹ (Nossiter, 2008). According to some estimates, the Haynesville Shale formation may contain up to 250 trillion cubic feet of recoverable gas, and already two major energy companies – Cheseapeake Energy and Petrohawk – have begun activities to develop this formation. The formation straddles the border between Northwestern Louisiana and Northeastern Texas, centered on the Shreveport Louisiana area. This formation lies both in the Louisiana-Mississippi Salt Basins and the East Texas Basin, in an area that already has significant oil and gas development.

The development of the Haynesville Shale will require both significant exploration activities and, as the field develops, production and gathering/transmission infrastructure to be constructed. Each of these activities will result in a significant population of equipment operating in the region, potentially contributing to NOx, VOC and sulfur emissions. Because the field is deep (13,000 feet at some points) and requires significant rock fracturing to stimulate production, NOx emissions from drilling and well completion activities are expected to be high relative to development of shallow wells. In addition, VOC emissions from completion activities, and emissions from other initial activities such as fracturing and well pad construction will be relatively high. As the field develops, production and gathering/transmission infrastructure will be built, and related emissions will grow. Given the potential level of activity in the Haynesville Shale, the development of the formation could result in significant emissions and impacts to local air quality. This project will evaluate the potential future emissions so that they can be incorporated into ozone modeling studies.

¹ Nossiter, A., 2008. "Gas Rush Is On and Louisianans Cash In," New York Times, August 2008. Internet address: http://www.nytimes.com/2008/07/29/us/29boom.html?_r=1&oref=slogin

An approach is presented to estimate future levels of exploration and production activity from the Haynesville Shale and the associated emissions. The approach is broken down into two tasks: (1) development of production growth estimates for the Haynesville Shale; and (2) development of emissions inventories.

Task 1 -Production Growth Estimates for the Haynesville Shale

Develop several scenarios of growth in development of the Haynesville Shale with a range of possible growth rates.

- Potential approaches to developing growth scenarios include examination of the potential recoverable gas reserves of the Haynesville Shale by conducting a review of existing information and documentation on the formation, such as financial information and prospectuses of the major oil and gas companies involved in development of the Haynesville Shale, geological reports and other published articles. In addition, the Texas Railroad Commission (RRC) and Louisiana Department of Natural Resources (LADNR) would be contacted to determine if either of these agencies has conducted quantitative analyses on the recoverable gas reserves of the Haynesville Shale.
- Three scenarios would be developed of the annual gas production, annual drilling event count, and annual active well count in the Haynesville Shale for each calendar year between 2009 and 2020. The 3 scenarios would represent a range of the production parameters: (1) a limited development scenario; (2) a moderate development scenario; and (3) an aggressive development scenario. For each scenario, estimates of gas production, drilling counts and well counts would be developed by reviewing available documentation and literature.
- The analysis would be for the Haynesville Shale as defined by geological analyses available from the U.S. Geological Survey (USGS), RRC or LADNR.

Task 2 -Estimates of criteria pollutant emissions

Using the production growth scenarios developed in Task 1, emissions of criteria pollutants from the Haynesville Shale gas formation would be developed.

- Emissions from exploration and production activities would be developed based on data available from other studies, such as the WRAP Phase II and Phase III inventory efforts and the recent CENRAP oil and gas area source inventory improvement project, and from production-based estimates developed by the TCEQ and Louisiana Department of Environmental Quality (LA DEQ). In addition emissions for gathering, processing and transmission activities would be developed based on data available from other studies and permit data for typical compressor stations and gas processing facilities operating in the East Texas Basin and Louisiana-Mississippi Salt Basins. The literature data would be combined with activity projections to develop inventories for the entire formation for all 3 scenarios for each calendar year from 2009 to 2020.

- Finally, the emissions estimates for each calendar year would be adjusted to account for the impacts of future emissions controls by reviewing “on-the-books” controls at the federal and state level that may affect individual gas production source categories.

Task 3-Final Report

The methodologies and results of the growth scenario (Task 1) and emissions (Task 2) calculations would be documented in a draft final report. The draft report would be finalized based on NETAC comments.