**Draft Statement of Work**

**For BLM Task Add-on to WESTAR Regional Haze SIP Modeling Project**

Please see Attachment A for a definition of all acronyms used in this Statement of Work. The BLM is seeking technical assistance with air resource impacts analysis within its jurisdiction within the Rocky Mountain West region. In order to streamline NEPA analyses, minimize costs, and utilize best available science, the BLM seeks to leverage ongoing regional air quality modeling being conducted by WESTAR for the purposes of regional haze and ozone, to provide quantitative air impacts results to support analyses of future oil and gas development on federal lands and other BLM authorized activities. Tasks 1, 2, and 3 shall be completed within the scope and schedule for the ongoing WESTAR regional haze SIP modeling. Tasks 4 through 7 involve additional analysis specific to BLM and in addition to the goals and objectives of state agencies for the WESTAR regional haze SIP modeling. These tasks (4-6) shall be completed within 6 months of obtaining results for the initial regional haze SIP modeling.

**Task 1. Apportion Oil and Gas Emissions by “Federal” and “Non-federal”**

The contractor will segregate the estimated emissions from federal O&G development vs. non-federal (at 12 km resolution) for the “2014” and “Historical Trends” emissions inventory scenarios already completed for the WESTAR regional haze SIP modeling based on a percentage of production for each county within each oil and gas basin. In addition, where applicable (i.e Uintah basin, Williston basin) the contractor will segregate emissions from the Tribal mineral estate. The apportioned emissions should include PM10, PM2.5, NO2, SO2, CO, VOCs, and GHGs (CO2, CH4, and N2O). The contractor will provide a draft version of the apportioned emissions inventories to BLM for review. BLM will review the draft apportioned emissions inventories within two weeks of receipt from the contractor and contractor will respond to one iteration of comments from BLM.

**Task 2. Spatial allocation of O&G development within the federal mineral estate**

The contractor will spatially allocate the federal emissions over the federal mineral estate in each basin by county within the western U.S. for those basins where emissions have already been allocated for the WESTAR regional haze SIP modeling. The contractor will obtain data for existing federal development from ONRR, IHS Markit LTD, oil and gas commissions, and other relevant sources and use this to geographically locate future federal oil and gas development. If available, BLM will provide GIS layers of the federal mineral estate within the modeling domain. BLM will work with the contractor on selecting geographic areas to “grow” future emissions for the federal mineral estate in addition to areas of existing federal development. BLM will provide available data and review by a mutually agreed upon date to ensure minimal impact to the schedule for the WESTAR regional haze SIP modeling.

**Task 3. Source Apportionment of Federal Mineral Development Impacts using PSAT and OSAT**

The contractor will conduct source apportionment modeling using PSAT and OSAT tools to determine the contribution to impacts from federal and non-federal oil and gas sector emissions by basin and county. The contractor will provide impact results for ozone, PM10, PM2.5, NO2, CO, SO2, nitrate and sulfate deposition, and visibility for the base year (2014) and the “historical trends” emissions scenarios. The contractor will report results and analysis of impacts from federal and non-federal oil and gas development in a technical support document that includes tables and plots similar to Attachment B. These results and analysis may be included in a technical support document being developed for the WESTAR regional haze SIP modeling instead of a discrete document for this task.

**Task 4. Develop an additional future year (BLM-RFD) emissions scenario**

The contractor will work closely with BLM to construct an emissions inventory for future oil and gas development within the same geographic domain as the WESTAR regional haze SIP modeling. This emissions scenario may represent “reasonably foreseeable development” (RFD) scenarios in each BLM field office or other methodology for growing and declining future oil and gas emissions from the federal mineral estate. This task will leverage, and may be based on, emissions inventory work for future oil and gas scenarios completed under the WESTAR regional haze SIP modeling. The contractor will process this emissions inventory scenario through SMOKE to produce model ready emissions inputs. The purpose of this emissions inventory scenario is to support future BLM analysis under NEPA and will not be used in the WESTAR regional haze SIP modeling.

**Task 5. Run CAMx for an additional future year (BLM-RFD) scenario**

The contractor will re-run the CAMx model (as set up for the regional haze SIP project) for the “BLM-RFD” future year emissions scenario. The contractor will report results and analysis of impacts from federal and non-federal oil and gas development in a technical support document that includes tables and plots similar to Attachment B.

**Task 6. Run CAMx for specified 4 km grid domain (FLEXINESTING)**

The contractor will advise BLM on the selection of optimal 4 km nested modeling domains within the Rocky Mountain region to obtain relevant results to support future BLM planning and air resource management efforts including the advantages of one-way vs two-way nesting. The contractor will assist BLM in determining where it would be beneficial to develop meteorological modeling and emissions modeling at 4 km resolution (in addition to the 12 km resolution already completed for the WESTAR regional haze SIP modeling). For the modeling runs specified in 6a and 6b, the contractor will include up to 5 additional sensitive receptor locations within the 4 km domain. BLM will provide the location of these receptors. The contractor will report results and analysis of impacts from federal and non-federal oil and gas development from the model runs specified in 6a and 6b in a technical support document that includes tables and plots similar to Attachment B.

6a. The contractor will run CAMx for one selected geographic area using emissions at a 4 km resolution and using the WRF meteorological modeling results at 12 km resolution completed for the WESTAR regional haze SIP project. This run will likely be completed over an area where terrain may not be a significant influencing factor and a 12km WRF resolution is sufficient.

6b. The contractor will run CAMx for one selected geographic area using emissions at a 4 km resolution and using WRF meteorological modeling a 4 km resolution. The contractor will specifically address vertical meteorological conditions to improve the modeled inversions and will perform WRF meteorological modeling at a 4 km resolution within this domain. This run will likely be completed over a different geographic area from task 6a, where a more refined resolution for meteorological modeling would be beneficial.

**Task 7 Additional speciation of VOCs**

Recent work in the Uintah basin has shown that although total estimated VOCs are valid, the speciation of those VOCs has a significant impact on ozone formation. The contractor will use data from recent available basin specific organic compound composition studies to improve the VOC emissions speciation in each basin and use this improved speciation in the Regional Haze SIP modeling and the additional model runs under Task 6.

**ATTACHMENT A**

BLM Bureau of Land Management

CAMx Comprehensive Air Quality Model with Extensions

CH4 Methane

CO Carbon monoxide

CO2 Carbon dioxide

GHGs Greenhouse gases

NEPA National Environmental Policy Act

N2O Nitrous oxide

NO2 Nitrogen dioxide

ONRR Office of Natural Resources Revenue

OSAT Ozone Source Apportionment Technology

PM10 Particulate matter that is 10 microns or less in diameter

PM2.5 Particulate matter that is 2.5 microns or less in diameter

PSAT Particulate Source Apportionment Technology

RFD Reasonably Foreseeable Development

SIP State Implementation Plan

SMOKE Sparse Matrix Operator Kernel Emissions model

SO2 Sulfur dioxide

VOCs Volatile organic compounds

WESTAR Western States Air Resources Council

WRF Weather Research and Forecasting model

ATTACHMENT B

Source: Technical Support Document for EPA’s Updated 2028 Regional Haze Modeling, EPA, Sept. 2019

