

Area Source Oil and Gas

Episodic, Baseline, and Projected Inventories

Updated 8/31/2020

OIL AND GAS AREA SOURCE OVERVIEW

This section of the Technical Support Documentation (TSD) gives information describing how the oil and gas area source inventory was back casted.

The oil and gas inventory that was back casted is composed of small sources that do not qualify as point sources under the relevant emissions cutoffs. These sources encompass more widespread sources that may be abundant, but that, individually, release small amounts of a given pollutant. These are sources for which emissions are estimated as a group rather than individually. Examples for oil and gas typically include drilling completions and workovers, engines and turbines, separators and heaters, dehydrators, tanks, truck loading, pneumatic controllers, pneumatic pumps, fugitives, produced water and injection, centrifuges, and solid waste disposal. Area sources generally are not required to submit individual emissions estimates.

The main distinction between point and area sources is the methodology used to estimate emissions. Point sources are inventoried individually, and area sources are inventoried collectively.

BACK CASTING METHODOLOGY

The basis for the back casting was that emissions are based off production and drilling activities. The main factors considered were oil production, gas production, water production, and well drilling activity. The 2017 oil and gas inventory was used as a baseline to back cast to 2013. Production increases and decreases were calculated and applied to the 2017 inventory. Uinta Basin figures were used by narrowing data down to Uintah and Duchesne counties. Data was collected from DOGM (Utah's Division of Oil Gas and Mining) to determine which factors would be applied to various processes.

Percent Change from 2017 to 2013			
	2017	2013	% Change
Oil Production (BBL)	28,264,878	27,046,938	-4.3%
Gas Production (MCF)	244,391,570	370,065,935	51.4%
Water Production (BBL)	79,588,236	92,745,079	16.5%
Wells Drilled	161	1039	545.3%

Figure 1

Once the percent change for the four categories was developed, these factors were applied to the oil and gas inventory for 2017. The 2017 oil and gas inventory came from operator submitted workbooks which were compiled into the 2017 oil and gas inventory database. The database and gap filling line items used following factors.

Application Factor Table	
Category	Factor Applied
Centrifuges	Water
Dehydrators	Gas
Fugitives	Based on Well/Facility Type
Pneumatic Controllers	Based on Well/Facility Type
Pneumatic Pumps	Based on Well/Facility Type
Produced Water and Injection	Water
RICE Turbines	Oil
Separators & Heaters	Based on Well/Facility Type
Solid Waste	Oil
Tanks	Based on Tank Type
Truck Loading	Oil
Well Completions	Drilling
Control Effectiveness Adjustment for Tank Emissions (Gap Filling)	
Control Effectiveness Adjustment (Water Tanks)	Water
Control Effectiveness Adjustment (Condensate Tanks)	Gas
Control Effectiveness Adjustment (Oil Tanks)	Oil
UDOGM Incident Reports (Gap Filling)	
Midstream Vent (maint, startup/shutdown, malfunction)	Gas
Pipeline Leaks	Gas
Greenhouse Gas Emissions Reporting Program Additions (Gap Filling)	
Gas Well Venting (Blowdowns)	Gas
Pipeline Blowdowns and Pigging	Oil
Oil and Gas Tool	
Associated Gas Venting	Gas
Mud Degassing	Drilling

Figure 2

FORECASTING METHODOLOGY

Forecasting the oil and gas production was done using U.S. Energy Information Administration (EIA) data. This data was narrowed down to the Rocky Mountain region consisting of Colorado, Idaho, Montana, Utah, and Wyoming. The 2017 historical production was compared to the 2023 forecasted numbers from the EIA AEO 2021 report.

Forecasting factors for water production and well completions were computed by averaging the previous 4 years (2017-2020). The previous 4-year data was based off of UDOGM records for the Uinta Basin (Uintah and Duchesne Counties).

The factors computed in the table below were then used in the same manner to the Application Factor Table seen in Figure 2.

Percent Change from 2017 to 2023			
	2017	2023	% Change
Oil Production (Millions of Barrels Per Day)	0.7330	0.9346	27.50%
Gas Production (Trillion Cubic Feet)	3.7948	3.8218	0.71%
Water Production	79,588,236	78,235,588	-1.70%
Well Completions	161	140	-12.89%

Figure 3

AREA SOURCE CATEGORIES

Individual reports for the area source categories are found in the category spreadsheets for the baseline year are included in the Excel calculation workbooks. These spreadsheets calculate the emissions and contain a list of assumptions, emission factors, equations and references for the specific categories and are included in this submission

Some categories that are included in the workbook were not used in the SMOKE process because emissions from these categories do not occur in the county and/or during the time period of interest.

