

Bottom-up Oil & Gas Emissions Inventory plans for the greater San Juan Basin of New Mexico and Colorado

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WESTAR Council

Four Corners Public Science Forum on Methane

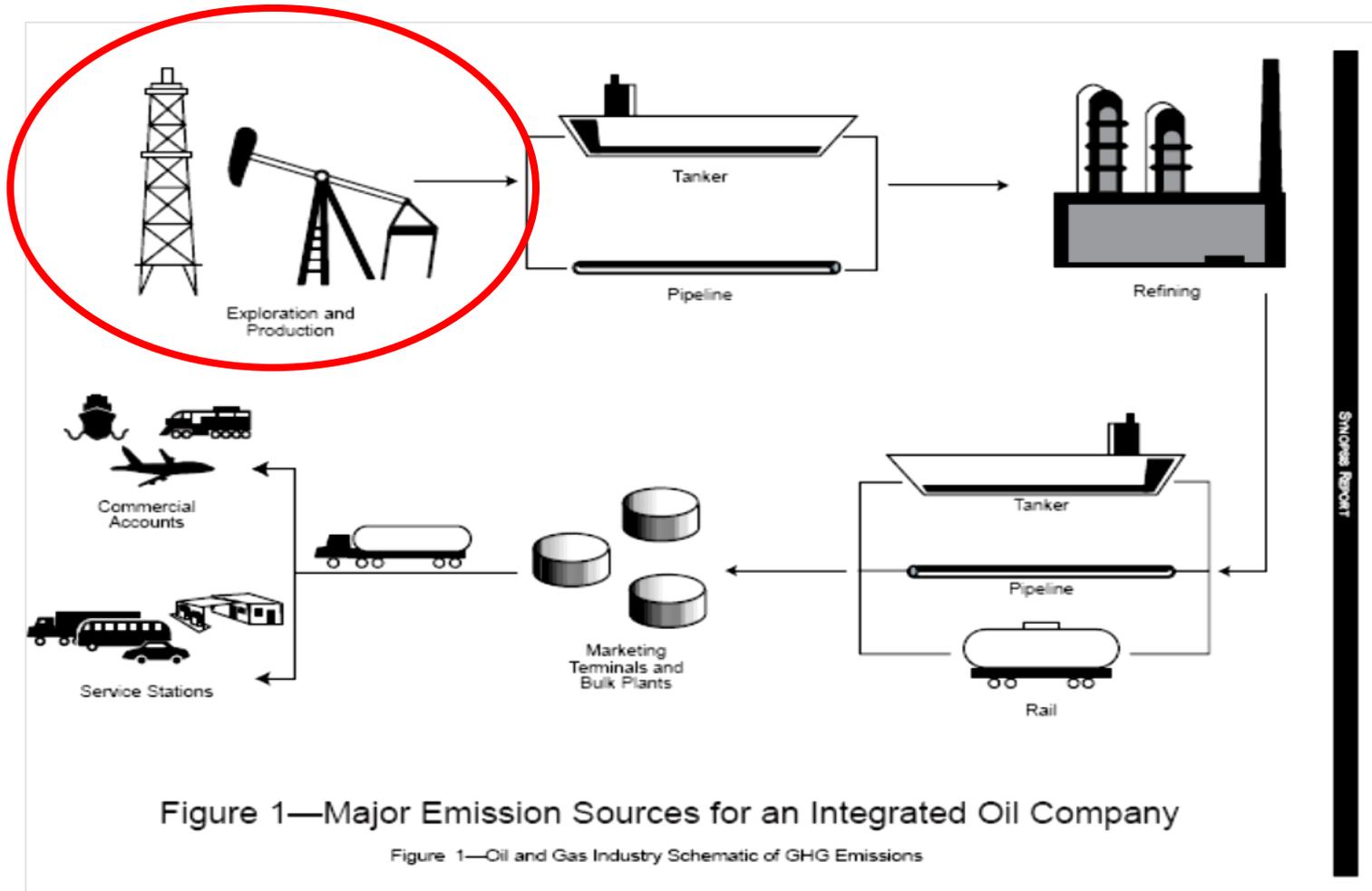
Farmington, NM



Bottom-up Emission Inventories

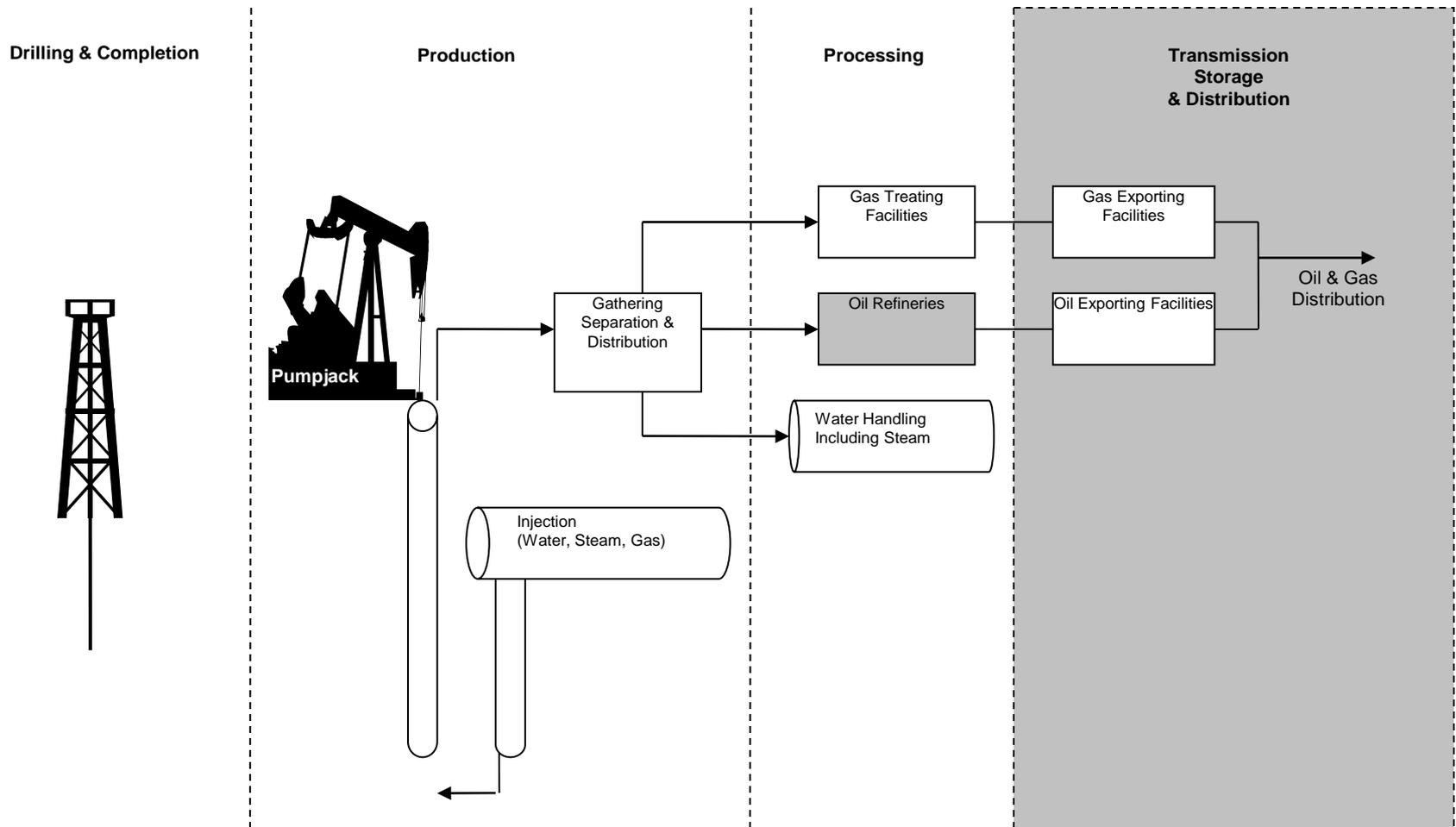
- Provide regulatory-grade inventories of upstream oil & gas (exploration and production) emissions, including methane
 - Well-documented and comprehensive
 - Develop current data by building a 2014 “base year” with projections to future years
 - Multiple data sources studied through an integrated analysis
 - 1) permitted emissions from state, tribal, and federal databases
 - 2) well-drilling and production information from a high-quality commercial dataset, and
 - 3) operator and producer activity surveys

Focus on Upstream Oil and Gas sector – sources and activities



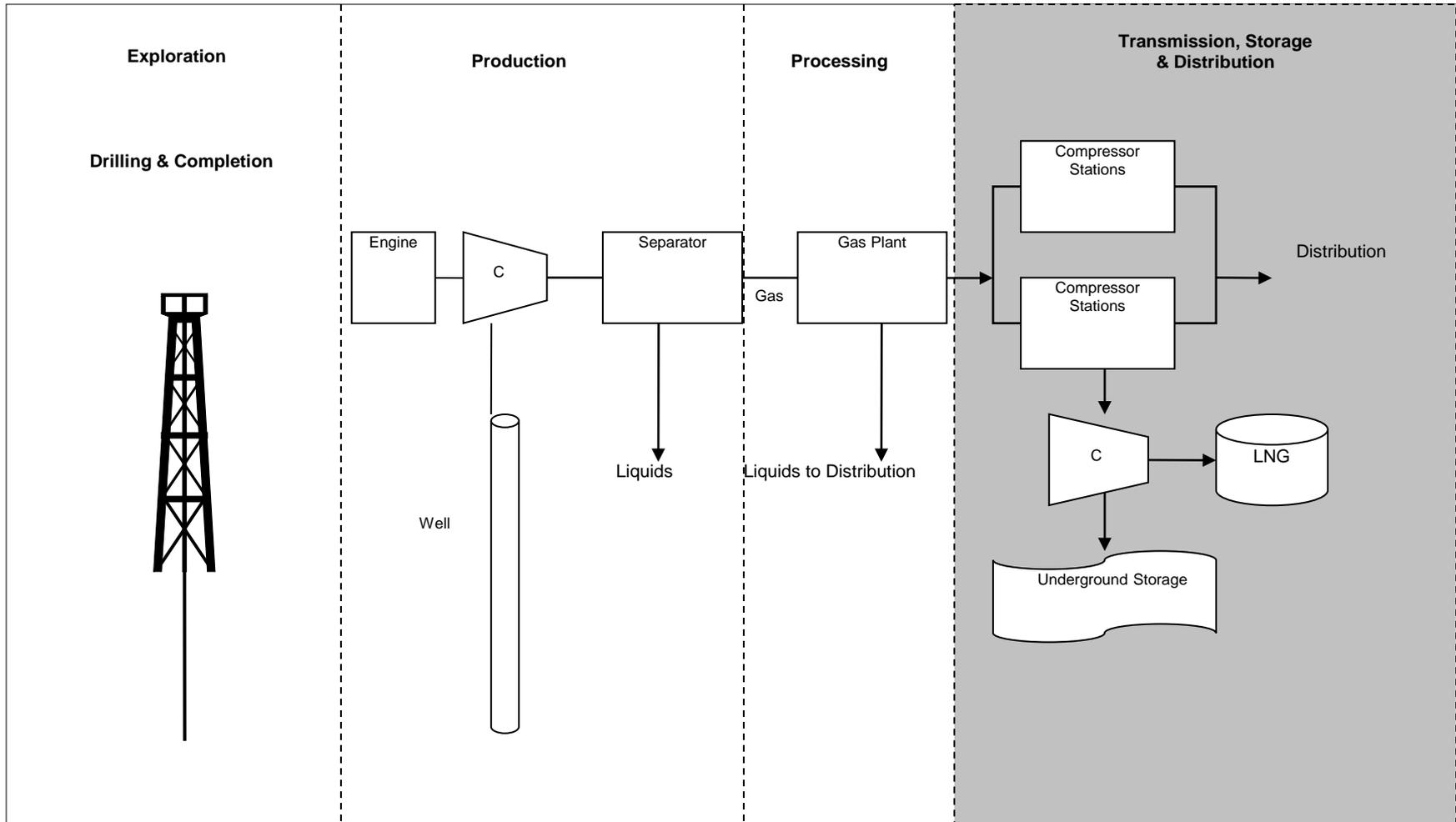
Source: American Petroleum Institute: Toward a Consistent Methodology for Estimating Greenhouse Gas Emissions from Oil and Natural Gas Industry Operations. Page 4.

Example of Upstream Sector where the wells are primarily intended to produce Oil (Liquid Hydrocarbons)



Natural Gas can also be captured and processed efficiently, or could be a by-product that is flared due to operational needs, lack of pipelines, and/or current prices

Example of Upstream Sector where the wells are primarily intended to produce Natural Gas



Oil (Liquid Hydrocarbons) occurs with gas production, sometimes oil is a minimal part of a gas field, example is North San Juan Basin on the Southern Ute Indian Reservation

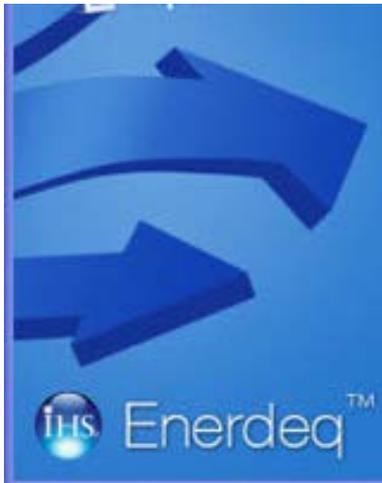
Oil & Gas Emissions Data Sources

Clipboard | Font | Alignment | Number | Styles

G12 | Engine(s) make(s) & model(s)

A	B	C	D	E	F	G	H
2. 2006 SOUTH SAN JUAN BASIN TYPICAL WELL DRILLING CHARACTERISTICS							
For all drilling operations in 2006, we request that you provide average well drilling characteristics. These well drilling characteristics, along with drill rig engine and engine operational characteristics requested below will be used to identify drill rig emissions for an average well. Please provide any notes or comments in the yellow highlighted cells							
Drilling Depth of Typical Well Drilling Event							feet
Time of Drill Rig Operation for a Typical Well Drilling Event (spud to end of drilling)							hours
Diesel Fuel Consumed During a Typical Drilling Event							gallons
Number of Wells Drilled in 2006							
3. 2006 SOUTH SAN JUAN BASIN DRILL RIG UTILIZATION DATA							
For a drill rig, we request that you provide information regarding engine and engine operational characteristics for all engines on each drill rig that operated in the South San Juan basin in 2006. The emissions rates provided for each engine should incorporate both the load factor and the emissions factor of the engine at a particular load. Example records for a drill rig is provided for guidance. If the number of drill rigs operated by your company in the South San Juan Basin is greater than the number of drill rig entries below, please add further data fields to the sheet and incorporate all drill rigs that operate in the South San Juan Basin. Please provide any notes or comments in the yellow							
ENVIRON: For Example: Diesel Particulate Filter (DPF) Diesel Oxidation Catalyst (DOC) Selective Catalyst Reduction Exhaust Gas Recirculation (EGR)							

Industry Surveys



Production Statistics



State, Tribal, and EPA Permit Data

Point source data from State, Tribal, and EPA permit databases

+

Equipment/process data from industry surveys

+

High-quality production statistics from commercially available tools

Regulatory-grade emissions inventories - permits

Permitted “point” sources

- Point sources – what are they?
- States, Tribes and EPA issue permits with emission limits
- Regulation of point sources varies by jurisdiction
 - Permitting thresholds
 - Actual emissions are less
 - Inventories tally up tons of emissions from source types
- Periodic testing and inspections are also done to verify compliance with permit conditions
- *Best-understood emissions are from permitted sources*

Regulatory-grade emissions inventories - Non-Point (Area) Sources

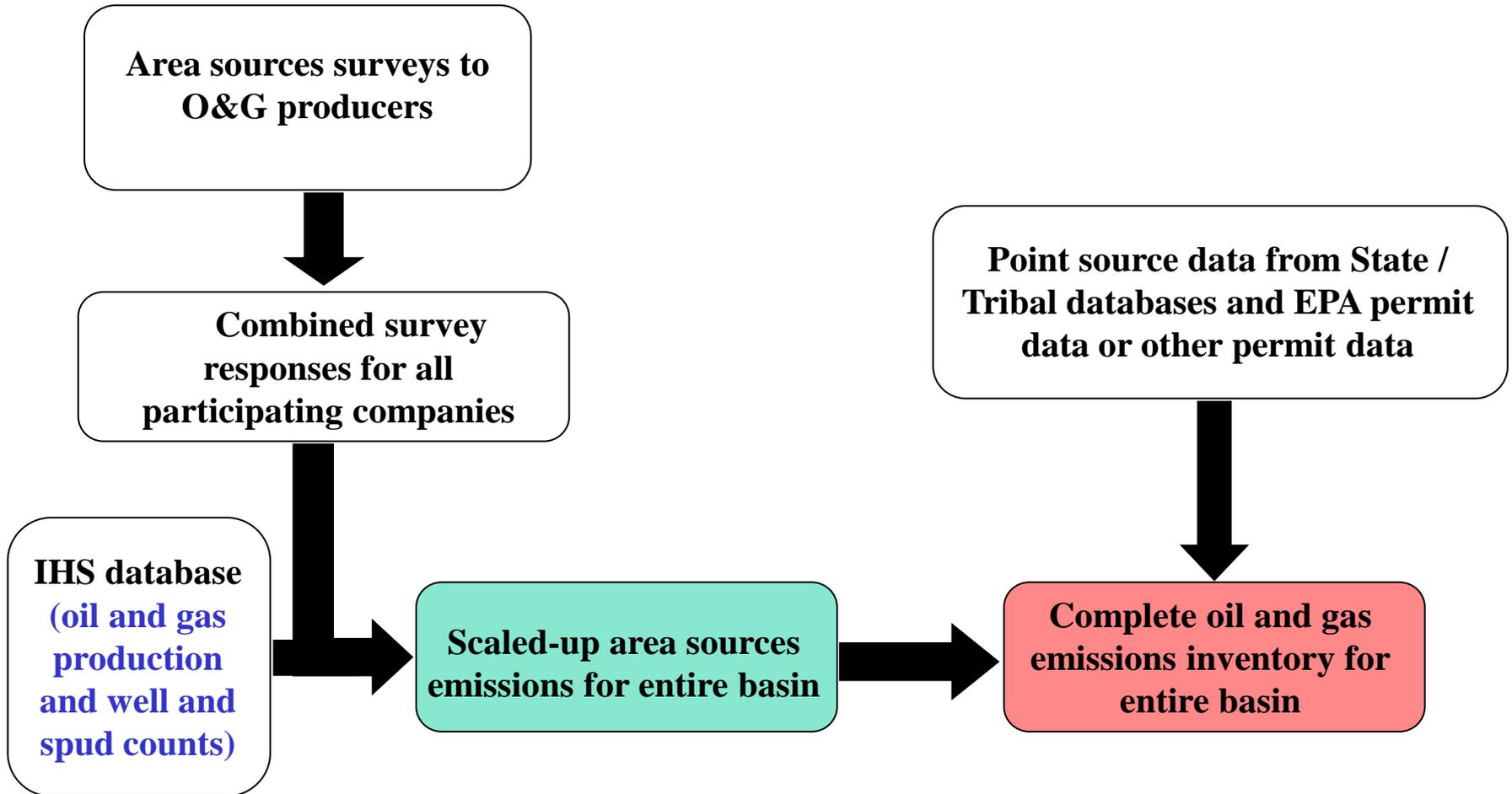
Area sources

- What are they?
- Sources too small and numerous to have individual permits with emission limits
- Determination of “which are area sources” varies by jurisdiction
 - Related to permitting thresholds
 - Counted and then emissions are estimated at the county and tribal reservation levels
 - Inventories tally up tons of emissions from source types
- *Less well-understood emissions are from area sources*

Source Categories

- **Large Point Sources**
(Gas plants, compressor stations)
- **Drill Rigs**
- **Wellhead Compressor Engines**
- **CBM Pump Engines**
- **Heaters**
- **Pneumatic Devices**
- **Condensate and Oil Tanks**
- **Dehydrators**
- **Completion Venting**
- **Fracking Engines**
- **Lateral compressor engines**
- **Workover Rigs**
- **Salt-Water Disposal Engines**
- **Artificial Lift Engines**
(Pumpjacks)
- **Vapor Recovery Units (VRUs)**
- **Miscellaneous or Exempt Engines**
- **Flaring**
- **Fugitive Emissions**
- **Well Blowdowns**
- **Truck Loading**
- **Amine Units (acid gas removal)**
- **Water Tanks**

Inventory Methodology Diagram



Oil & Gas Activity and Equipment Survey for 2014

- Survey O&G Operators in the San Juan Basin
 - Last major survey effort was for 2006 data - now out-of-date
 - Significant changes in industry practices since then
- Perform outreach to Operators to make sure of high survey response
- Address routine and episodic source activities

Area Source Methodology

- Area source data derived from surveys
 - Past inventories use survey data by production type basin-wide
- Will consider applying survey data by field and formation
 - Finer geographic resolution
 - Allows for variations in practices by field or formation to be captured
 - Need to define boundaries of fields/formations
 - More extensive data responses required

Mineral Estate

- Basin-level inventories reported at various levels
 - By production type (gas, oil, coal bed methane)
 - By county
 - By tribal vs. non-tribal
- Might consider reporting at mineral estate ownership level
 - Bureau of Land Management, US Forest Service, National Park Service
 - Tribal
 - State/fee

Project Timeline

- Data gathering – May to August 2015
- Complete analysis and report preparation – September 2015
- Publish updated inventories and projected future emissions – Fall 2015

Thanks –

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Western Regional Air Partnership | www.wrapair2.org