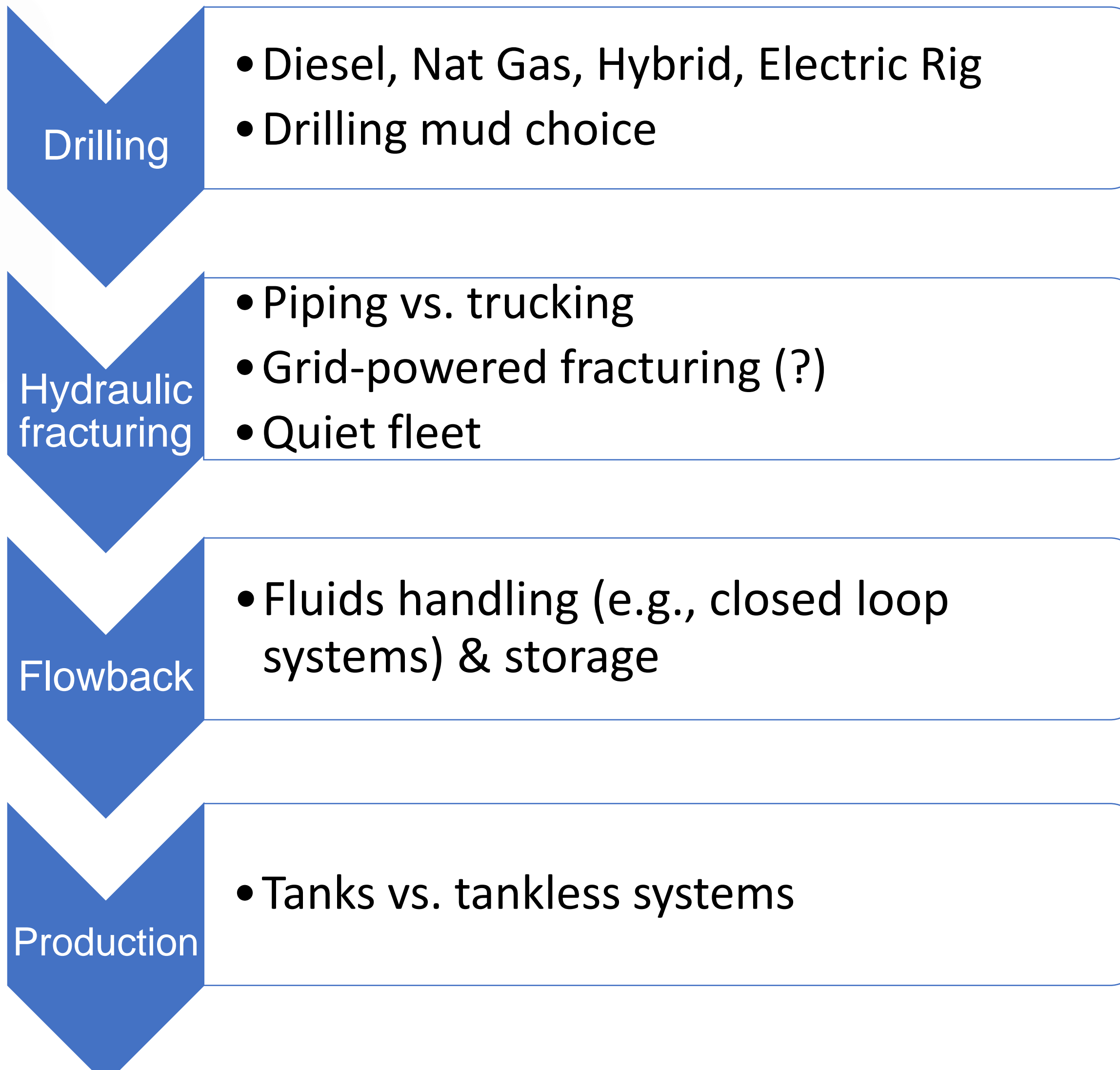
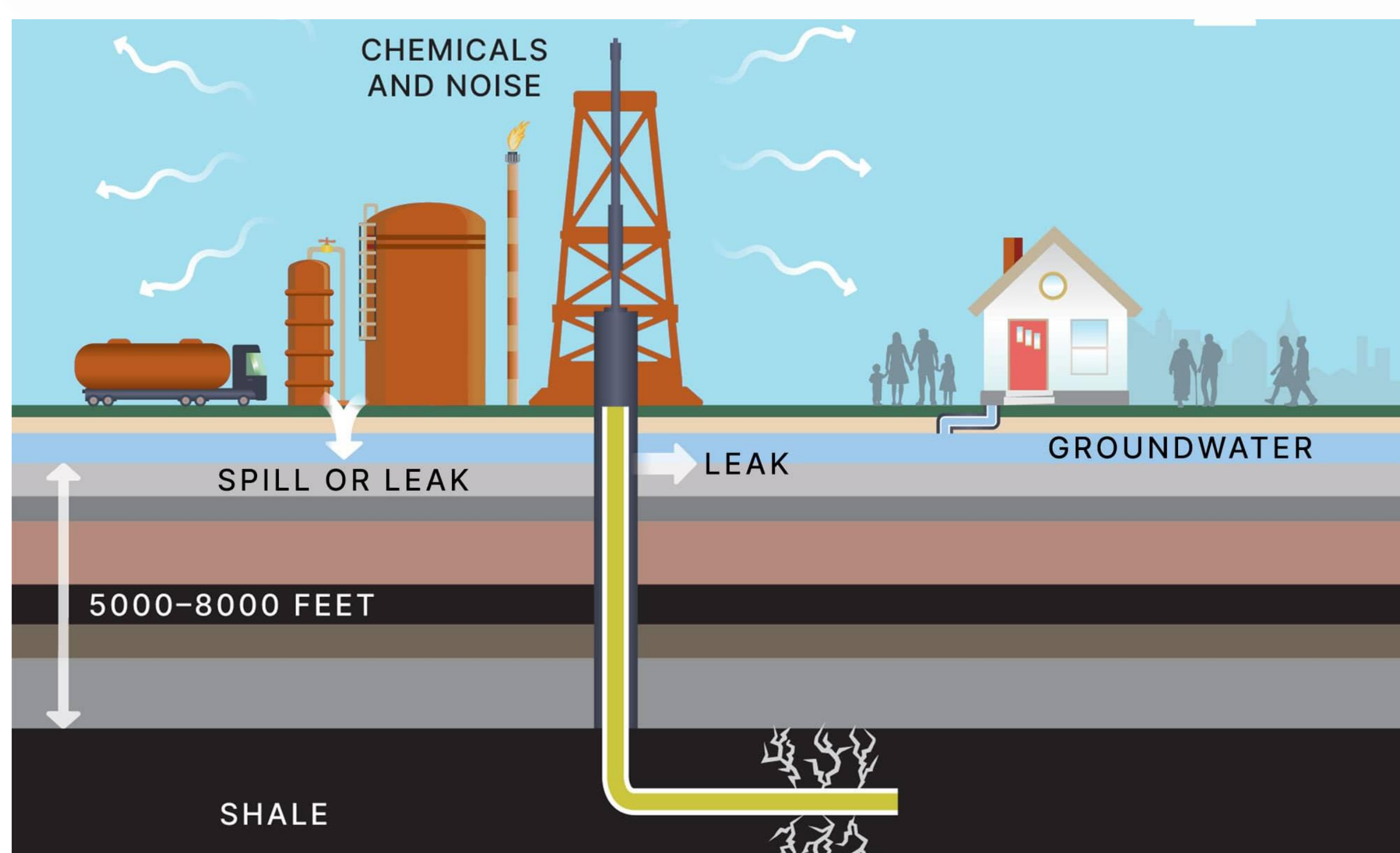


Measuring and Modelling Air Pollution and Noise Exposure Near Unconventional Oil and Gas Development (UOGD) in Colorado: Study Overview

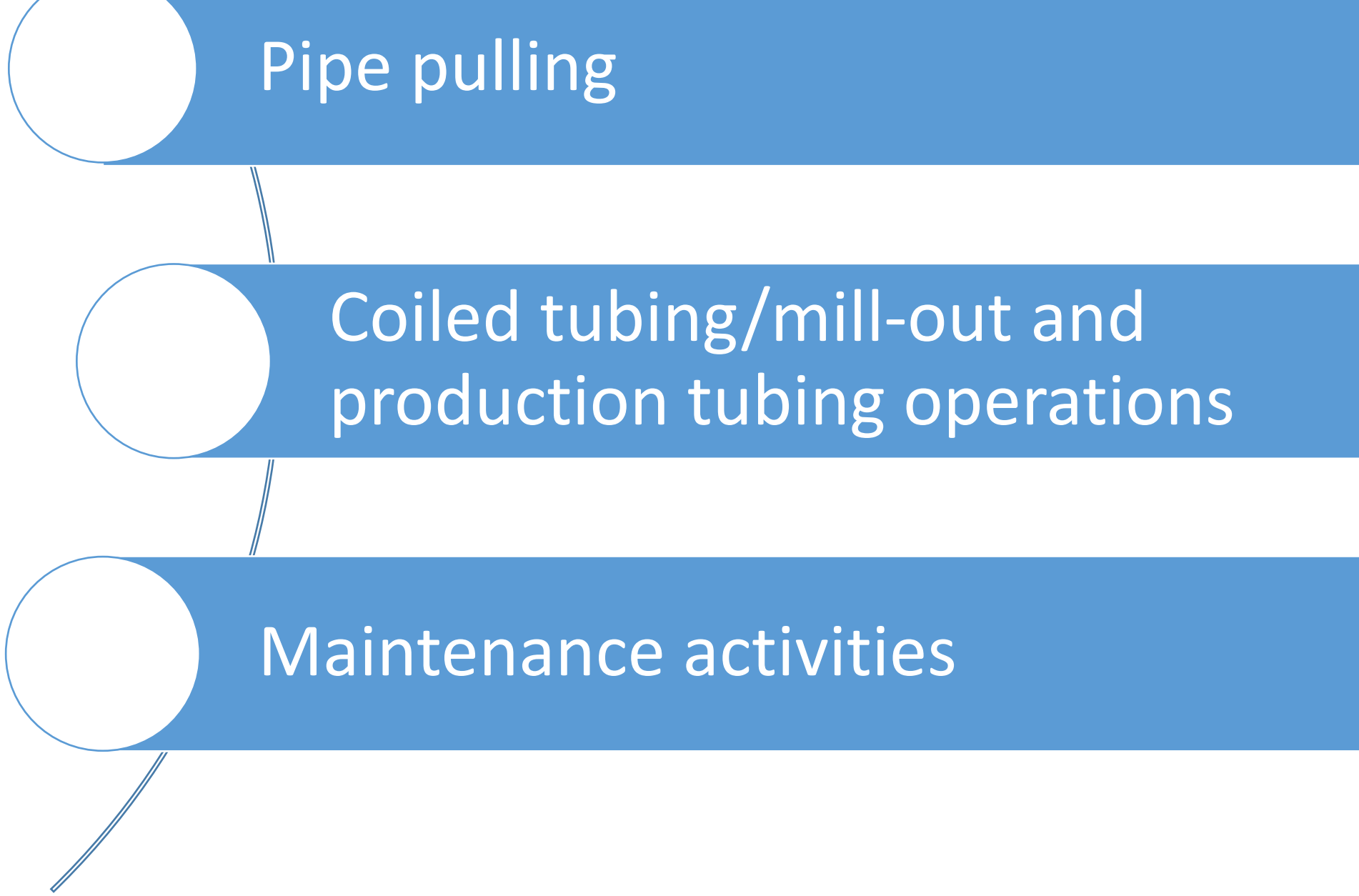
Air pollutants from UOGD

Benzene, toluene, ethylbenzene, xylenes (BTEX) and other nonmethane hydrocarbons (NMHCs); fine particles (PM_{2.5}), and nitrogen oxides (NO_x) → Both long- and short-term health effects.



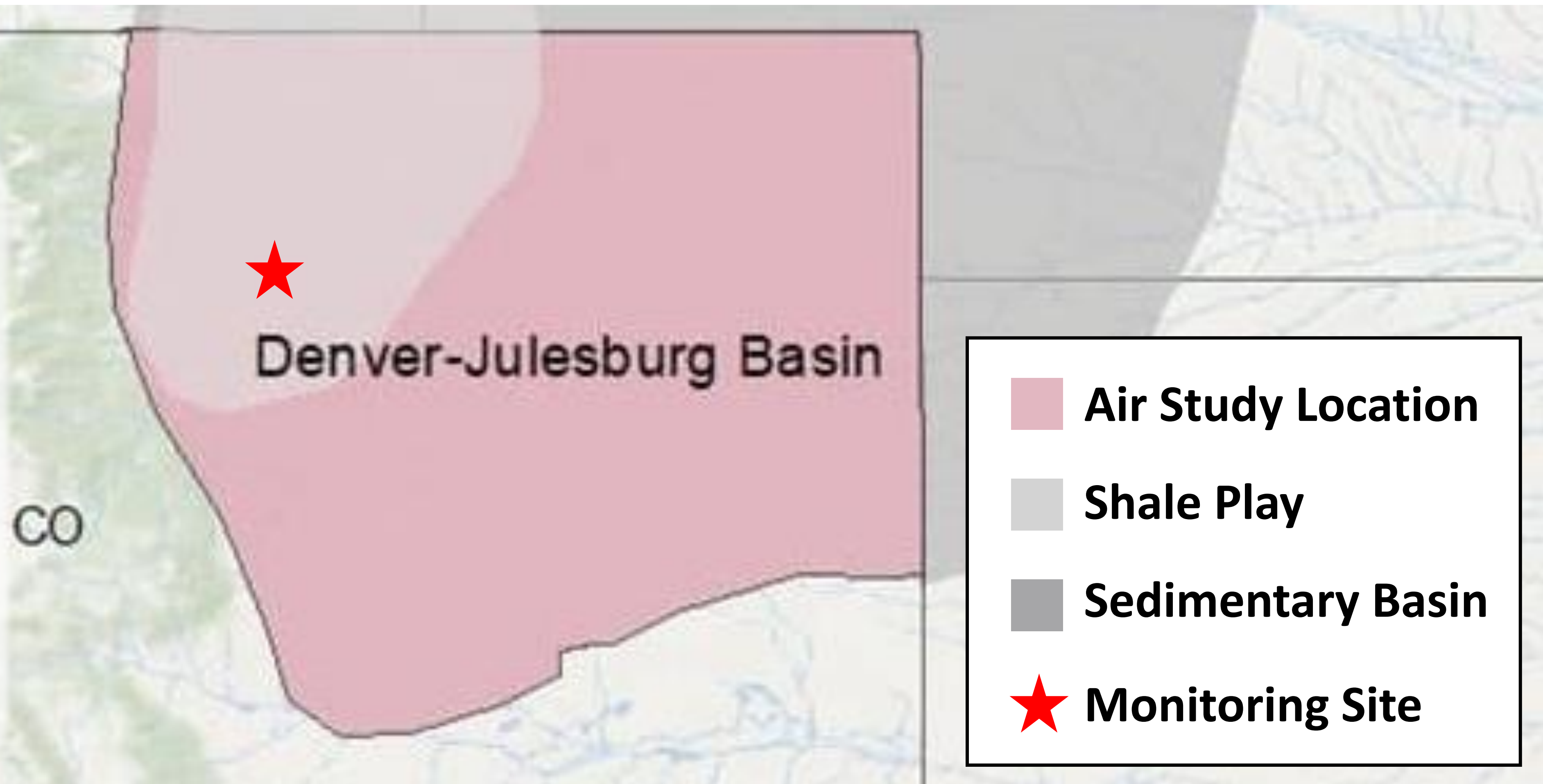
Pre-production activities and early production

Emissions and their health impacts are relatively uncertain.



Study objectives

1. Develop community exposure profiles over the UOGD lifecycle
 - Air pollutant measurements and dispersion modeling;
 - Focus on pre-production activities and early production at large, multi-well pads in populated areas.
2. Collect noise measurements from UOGD operations to quantify potential exposures.
3. Contextualize results to yield new information concerning community impacts by operation phase → Emission prediction model, publicly available data and tools, and stakeholder engagement



Measurement approach

- Deployments target specific activities
- Long-term exposure monitoring : CAMML, integrated canister, noise sensors
- Short-term exposure detection and characterization: PID and mobile monitoring
- Check equipment poster for more details

Weekly integrated canister Photon Ionization Detector (PID) Noise measurements:

- 1-second intervals
- 1/3 Octave bands for noise character
- Triggered recording for review of sources



Weekly integrated canister
Methane and 50 NMHCs, including BTEX
Photon Ionization Detector (PID)
Fast measurements of total volatile organic compound (VOC); Trigger a short-duration canister when a plume is detected



CDPHE Colorado Air Monitoring Mobile Lab (CAMML)

- Hourly Speciated VOCs
- 1 min CH₄, NO_x, PM_{2.5}

Mobile monitoring

Fast measurements (sec)
Move around to capture transient plumes



Monitoring timeline:

- Started in June 2023
- Continue through 2024