

Alt-FEMP Executive Summary

| Company | Program start | Program end | # of sites |
|------------------------------------|-----------------|-------------------|------------|
| Canadian Natural Resources Limited | January 1, 2021 | December 31, 2023 | 600 |

Once an alternative fugitive emissions management program is approved, AER staff draft this executive summary. This is a summary only, published to help interested stakeholders understand what has been approved. These summaries are found on our website, www.aer.ca > Protecting What Matters > Holding Industry Accountable > Industry Performance > Methane Performance > [Alternative Fugitive Emission Management Program Approvals](#). For additional information on these approvals, contact methane.reduction@aer.ca.

Summary

Canadian Natural will use a combination of technologies to execute the approved alternative fugitive emissions management program (alt-FEMP) in the NW Alberta region (including Grande Prairie, Fairview, and Edson fields). Aerial methane detection technology will be coupled with ground-based, vehicle-mounted methane detection technology to achieve the planned outcomes under the pilot proposal. Canadian Natural intends to run its proposed pilot program in the NW Alberta region for two years. Furthermore, these technologies will be using Alberta-based service providers.

Based on table 4 of *Directive 060*, section 8.10.2, in the NW Alberta region, there are 494 facilities that are subject to annual surveys and 140 facilities that are subject to triannual surveys for the baseline *Directive 060* FEMP. Canadian Natural's pilot alt-FEMP proposes screening all 634 facilities twice yearly using ground-based, vehicle-mounted methane detection technology and a third survey at the 140 triannual facilities using aerial methane detection technology. Pad sites that do not fall under table 4 of *Directive 060* are not included in the pilot alt-FEMP and will receive annual screenings.

Canadian Natural will contract an aerial methane detection service provider early in each program year to complete the aerial surveys. The data will be provided back to Canadian Natural and analyzed for prioritization of ground-based surveys. Any location that is emitting over 500 m³/day will be scheduled for further investigation.

The ground-based, vehicle-mounted methane detection technology will be installed on equipment owned by Canadian Natural and will be operated by Canadian Natural employees. These employees will be field operations staff who are familiar with the sites, layouts, and venting equipment because of their experience in the industry and the area. The operator will navigate the site in accordance with the equipment provider's recommendations and obtain live indications and quantifications of emissions during the survey. Emission detections can then be investigated on site, immediately following vehicle-mounted detection, using the optical gas imaging (OGI) camera in the event additional information is

required. Any fugitive emissions measured over 60 m³/d and any higher-than-expected continuous vent volumes will be investigated. The operator can then immediately conduct repairs or prepare an action plan to address the methane emission sources in the event that the repair cannot be completed during the initial site visit. Any total site emissions found to be larger than 500 m³/d will be investigated (continuous vents combined with fugitives), as will any continuous vent under this threshold that seems uncharacteristic based on the operator's experience in the area.

Canadian Natural contracted an independent gas emissions research and analysis service provider to model the baseline fugitive emissions, the default OGI fugitive emissions, and the alt-FEMP fugitive emissions based on the survey frequency of the pilot program. The results in the following table show that the pilot alt-FEMP that Canadian Natural is proposing has the potential to result in lower annual fugitive emissions than the baseline *Directive 060* FEMP requirements.

| Program | Estimated Annual Fugitive Emission Reductions (m³/year) |
|----------------------------------|---|
| Baseline D060 FEMP (Default OGI) | 1 254 430 |
| Alt-FEMP pilot program | 1 297 353 |

The results of the alt-FEMP will be reviewed annually by the alt-FEMP management team to analyze for emerging patterns and incorporate any regulatory changes. The alt-FEMP is a dynamic tool that will continue to evolve as knowledge is gained, shared, and incorporated into application of the program.

The more understanding Canadian Natural gains on its fugitive emission profile, the more efficient the application of FEMPs and alt-FEMPs will become. The FEMP management team has set the following key performance indicators to evaluate the performance of the FEMP over time:

- Quantified emissions reduction over time, corporate-wide and by operating area
- Cost of detection (\$/t methane detected)
- Volume of gas conserved by managing fugitive emissions
- Number of leaking components over time, corporate-wide and by operating area
- Specific component within facilities that are more prone to leaks
- Time between leak detection and repair

The continuous improvement indicators will be reviewed annually, and the FEMP management team will use the data to inform the annual update of the FEMP.