



# UAS Pipeline Monitoring Burnt Lake Gas COOP Findings Report - TAP 50

April 26, 2019

Prepared by:

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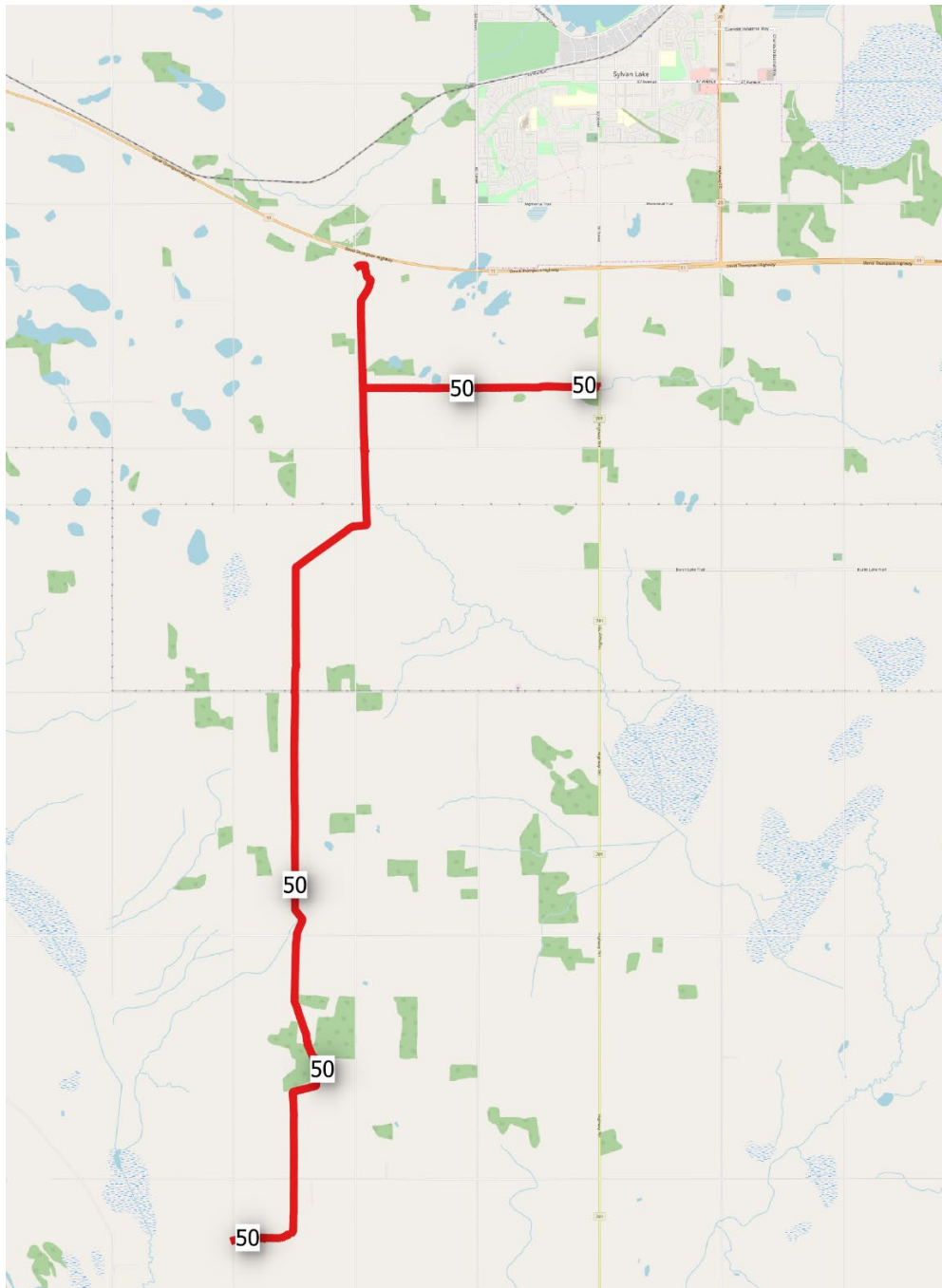
# Contents

- Mission Summary.....2
  - Flight Map.....2
  - Flight Parameters .....3
  - Survey Data .....3
- Results .....4
  - Summary of Findings.....4
- Appendix .....6
  - Area of Concern Parameters .....6

# Mission Summary

Silver Spring Energy Consulting Ltd. was contracted by Burnt Lake Gas COOP to fly a UAV surveillance mission over the Tap 50 high pressure gas line south of Sylvan Lake Alberta. The purpose of this flight was to inspect for signs of undetected leaks or possible ground activities that could threaten the integrity of the pipeline.

## Flight Map



## Flight Parameters

<b>Flight Date / Time</b>	April 23, 2019 09:30hrs - 14:00hrs
<b>Weather Conditions</b>	Mostly Sunny Wind 10km/h gusting to 30km/h + at end of mission ENE 5 to 9 degrees C
<b>Sensors Used</b>	Laser Methane Detector
<b>Time In Air</b>	88 minutes.
<b>Flight Segments</b>	11
<b>Planned Flight Altitude</b>	25m AGL
<b>Executed Flight Altitude</b>	25m AGL (Average)
<b>Comments</b>	Wind blowing toward west and south. Flights offset down wind of pipeline.

## Survey Data

<b>Number Of Images</b>	N/A
<b>Flying Altitude</b>	25m
<b>Ground Resolution</b>	N/A
<b>Coverage Area</b>	13.5 linear km
<b>Camera Stations</b>	N/A
<b>Tie Points</b>	N/A
<b>Projections</b>	N/A
<b>Methane detection lower threshold</b>	200ppm/m
<b>Geographic Location Accuracy</b>	3.50m
<b>Geographic Coordinate System</b>	WGS84 (EPSG::4326)

## Results

Flight operations were completed successfully. Methane readings collected for entire length of pipeline.

Results were interpreted from direct atmospheric methane readings of entire air column from UAV to ground level.

### BREAKDOWN OF AREAS OF CONCERN

Concern Level	Number of Locations
Immediate Action	0
Moderate Concern	1
Minor Concern	2

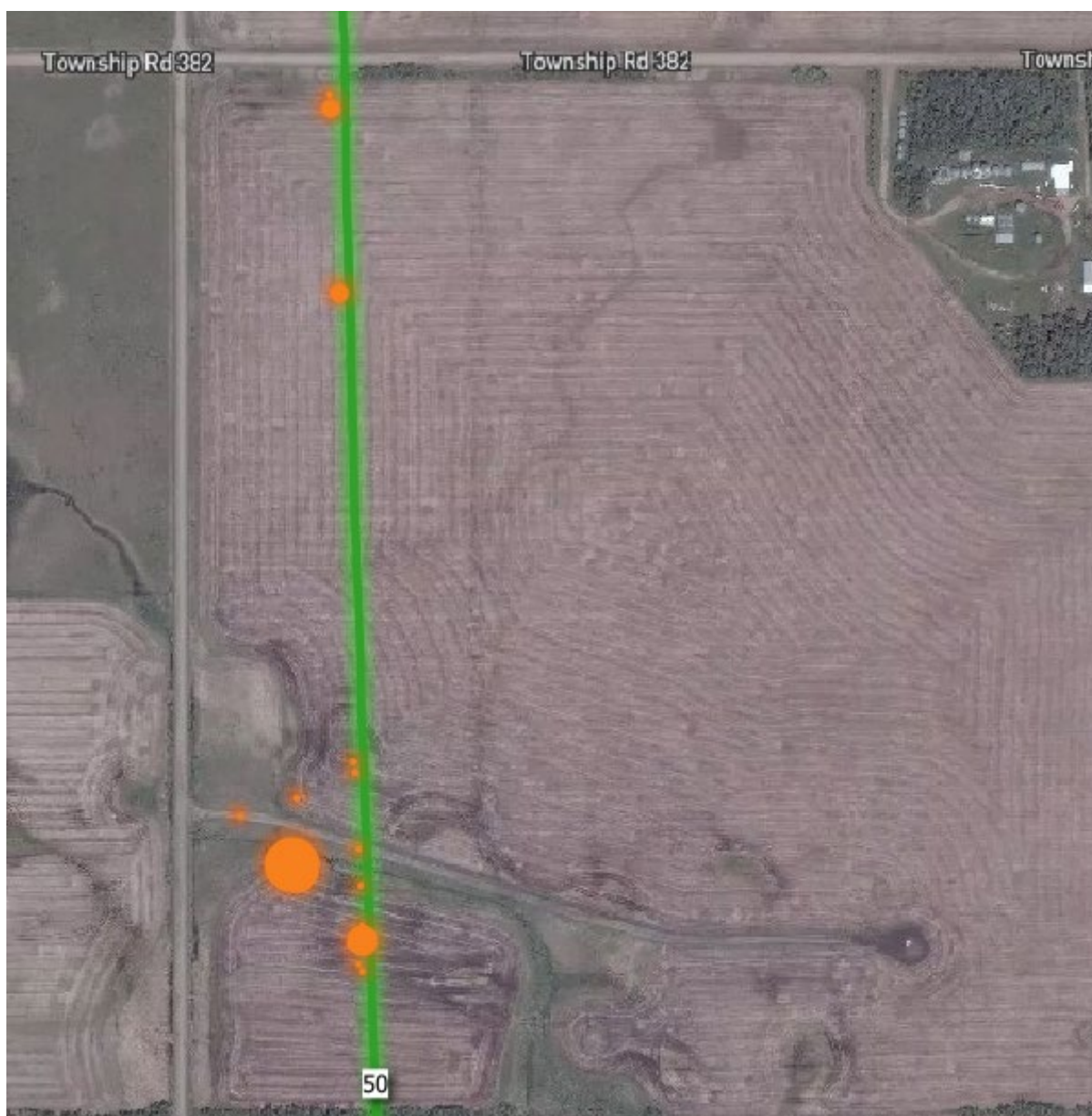
### LOCATIONS OF CONCERN

	Concern Level	Coordinates (WGS84 Lat/Long)	Description
1	Moderate	52.2548667 -114.1426183	High gas readings with no visible reason (no standing water, no vegetation decay and no livestock)
2	Minor concern	52.2352767 -114.1569500	Elevated readings down wind of pipeline. Windbreak trees become more dense, deadfall in tree line could account for elevated readings.
3	Minor concern	52.2496317 -114.1496467	Elevated readings in middle of field. Drainage channel runs through field and could account for higher readings.

### Summary of Findings

This report finds moderate evidence of possible leakage at the locations indicated above. Only one location merits follow-up unless gas balance readings indicate significant losses that cannot be accounted for.





*1 Area of moderate concern clustered orange dots at 52.2553533 -114.1433650*

# Appendix

## Area of Concern Parameters

The following key indicates how each area of concern is categorized:

### Immediate Action Required

- Visible gas plume or oily sheen on surface water
- Defined and definite irregular snow melt along gas pipeline path
- Pronounced and defined vegetation stress along pipeline
- New unauthorized building construction directly over pipeline
- Extreme gas readings (multiple readings above 800 ppm/m down wind of pipeline)

### Moderate Concern

- Slightly anomalous snow melt along pipeline
- Possible anomalous vegetation stress along pipeline
- Slight oil sheen on surface water in vicinity of pipeline
- High gas readings (multiple readings above 500 ppm/m down wind of pipeline or single reading above 1000).

### Minor Concern

- Patchy vegetation stress
- Farm operations or minor construction (fencing, sheds, drilling rig set-up) near pipeline
- New tree growth directly on pipeline
- Elevated gas readings above between 200 and 300ppm/m clustered along pipeline.