



April 6, 2015

Mr. Chris Hines  
Environmental Specialist  
Encana Oil and Gas, Inc.  
143 Diamond Avenue  
Parachute, Colorado 81635

**RE: Remediation Update  
D19 Pad  
Garfield County, Colorado  
North Parachute Ranch**

Dear Mr. Hines:

LT Environmental, Inc. (LTE), under the direction of Encana Oil and Gas, Inc. (Encana), has been conducting remedial action activities at the D19 Pad (Site) located within the North Parachute Ranch in Garfield County, Colorado. This correspondence is a summary of the remediation activities completed to date.

### **Remediation System Description, Operations and Maintenance**

From May 7, 2014 through May 19, 2014, LTE installed 14 passive soil vapor extraction (SVE) wells at depths ranging from 25 to 40 feet below ground surface associated within a historical production pit. Vent turbines were secured to the top of 11 SVE wells for the purpose of remediating residual hydrocarbon concentrations.

Monthly measurements of flow, temperature, and gas concentrations are collected at each SVE well. Measurements are not collected during winter months under the assumption that microbial activity is dormant in cold conditions. A Site Diagram (Attachment A) has been included along with a summary of these measurements presented as Table 1. Attachment B graphically illustrates the gas concentrations of each SVE well.

### **Summary and Conclusions**

LTE, under the direction of Encana, will resume monthly site visits April, 2015 to collect measurements from the SVE wells. As gas concentrations stabilize, LTE will evaluate conditions with the goal of obtaining analytical results in compliance with applicable COGCC Table 910-1 allowable concentrations standards.



LTE appreciates the opportunity to provide environmental services to Encana. Please call us at 970-285-9985 if you have any questions or comments regarding this report.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink, appearing to read 'Chris McKisson'.

Chris McKisson  
Project Manager

A handwritten signature in blue ink, appearing to read 'Gavin Casson'.

Gavin Casson, E.I.T.  
Staff Engineer

#### Attachments

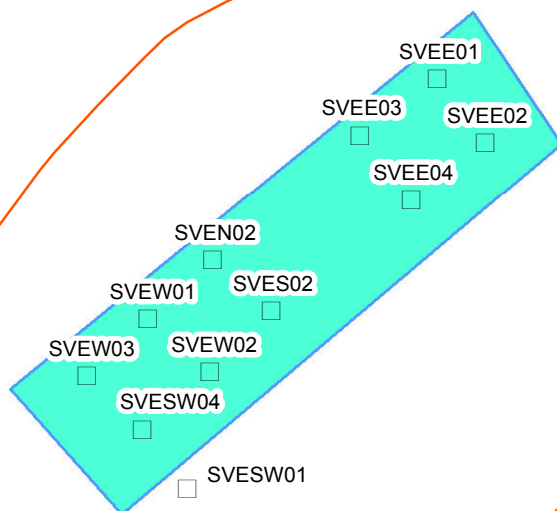
Attachment A:	Site Diagram
Attachment B:	Gas Concentration Graphs
Table 1:	SVE Operation and Maintenance Field Parameters

**ATTACHMENT A**  
**SITE DIAGRAM**



ACCESS ROAD

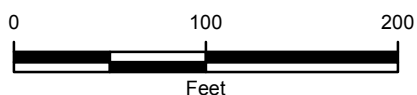
EDGE OF WORKING SURFACE



# LEGEND

□ PASSIVE SOIL VAPOR EXTRACTION WELL

■ PIT BOUNDARY



SITE DIAGRAM  
D19  
GARFIELD COUNTY, COLORADO

ENCANA OIL & GAS (USA) INC.

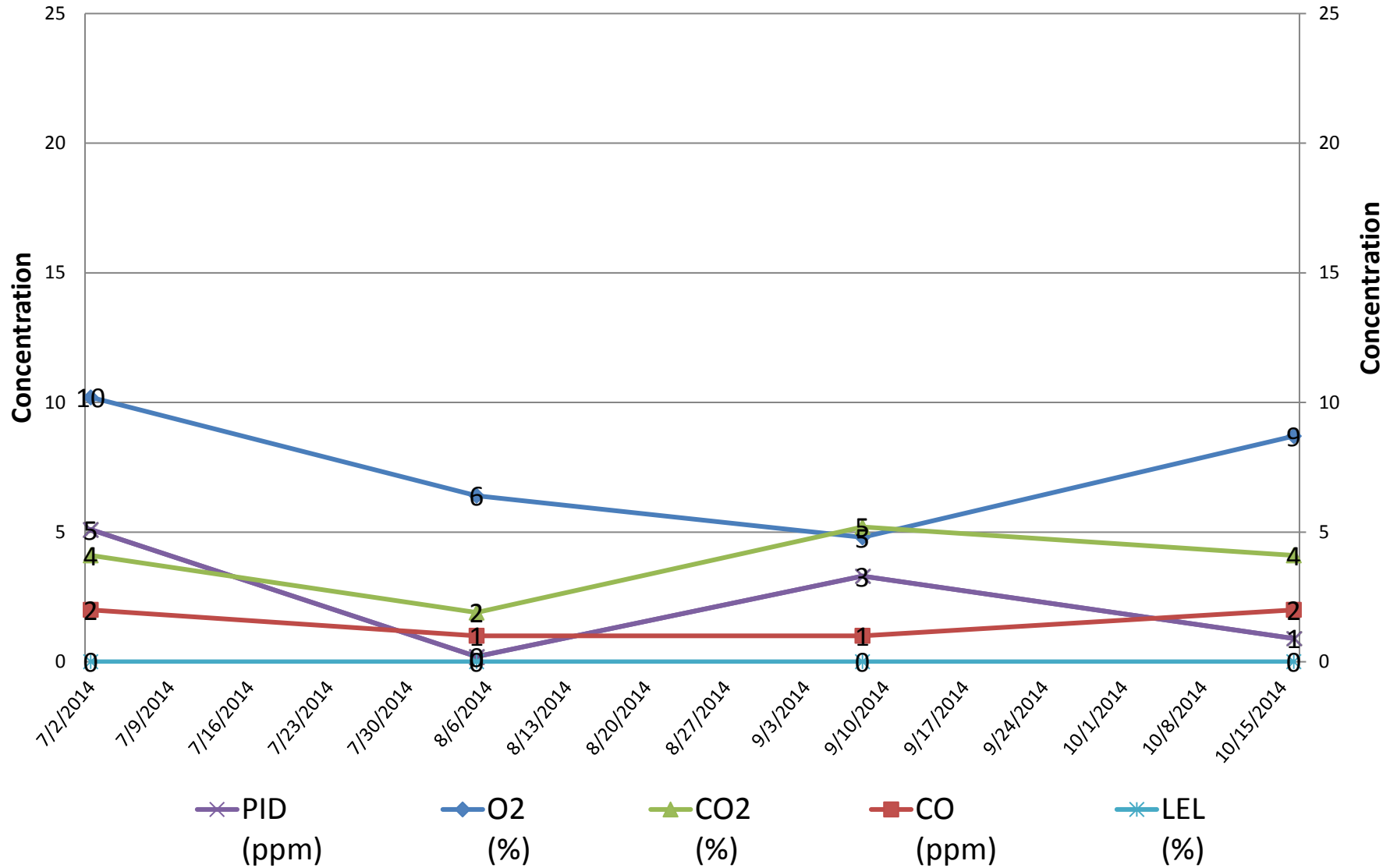


**ATTACHMENT B**  
**GAS CONCENTRATION GRAPHS**



**ENCANA D19 PAD  
SVEE01**

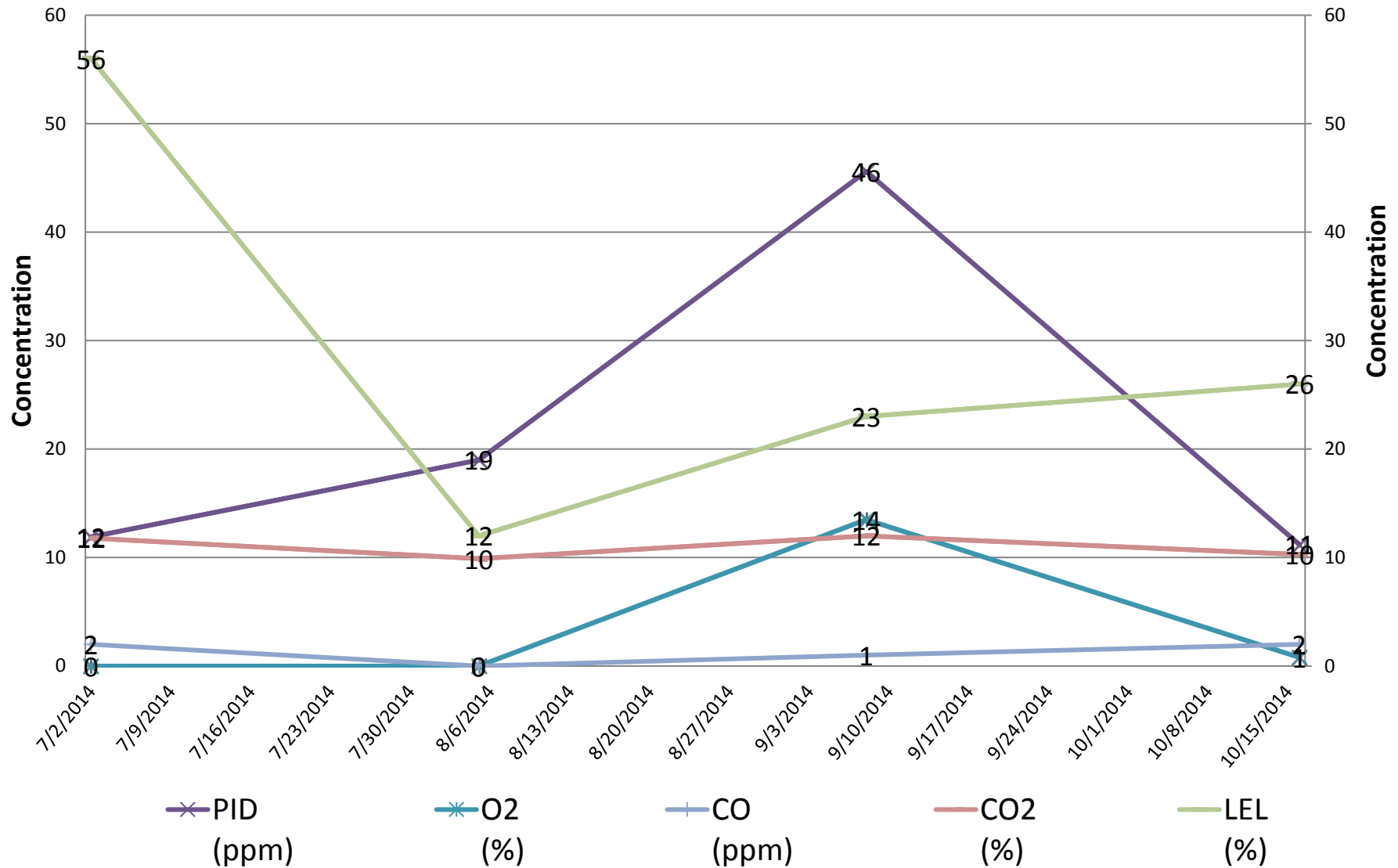
Assessed TPH: 40 mg/kg



# ENCANA D19 PAD

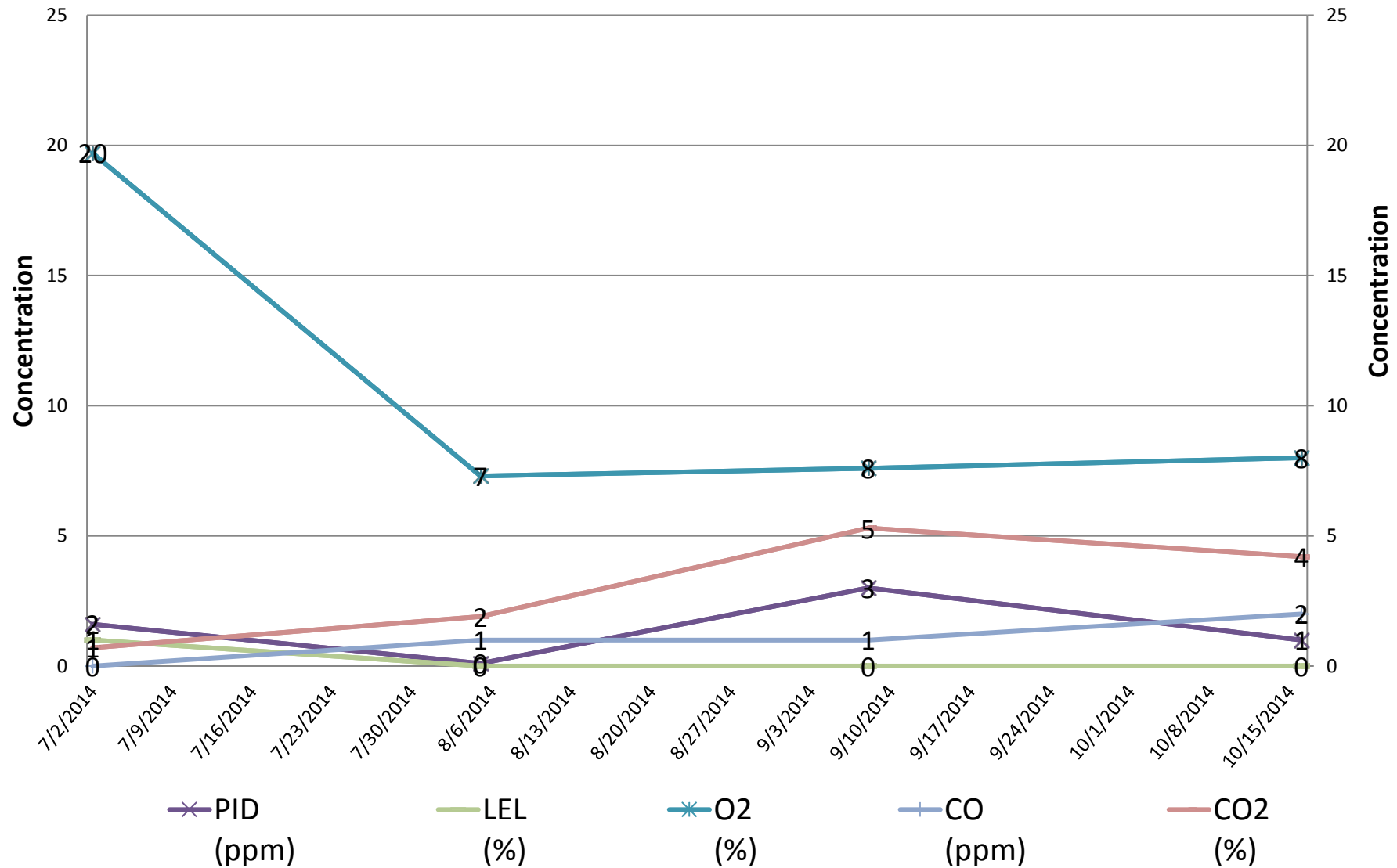
SVEE02

Assessed TPH: 3,747 mg/kg



ENCANA D19 PAD  
SVEE03

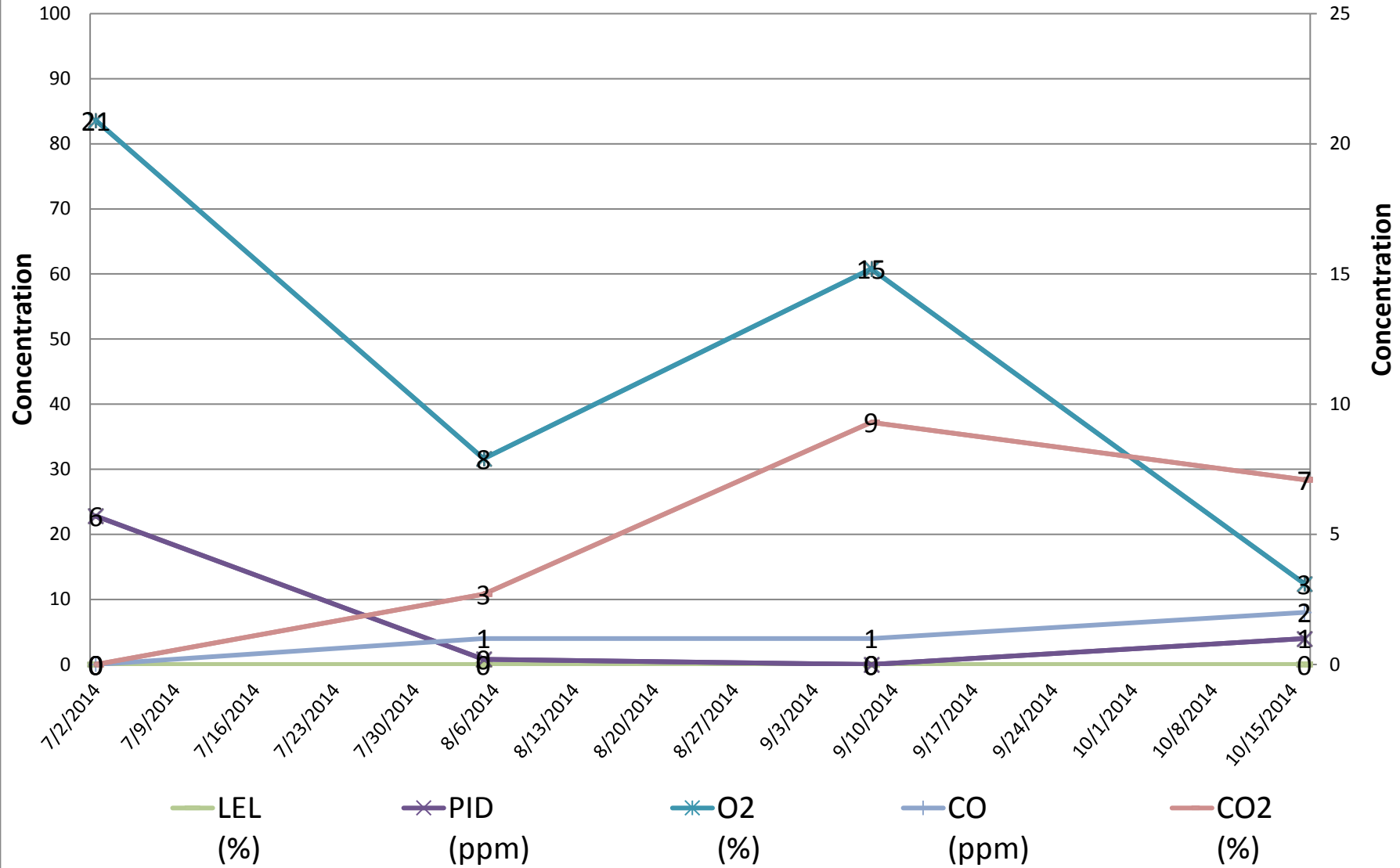
Assessed TPH: 70 mg/kg





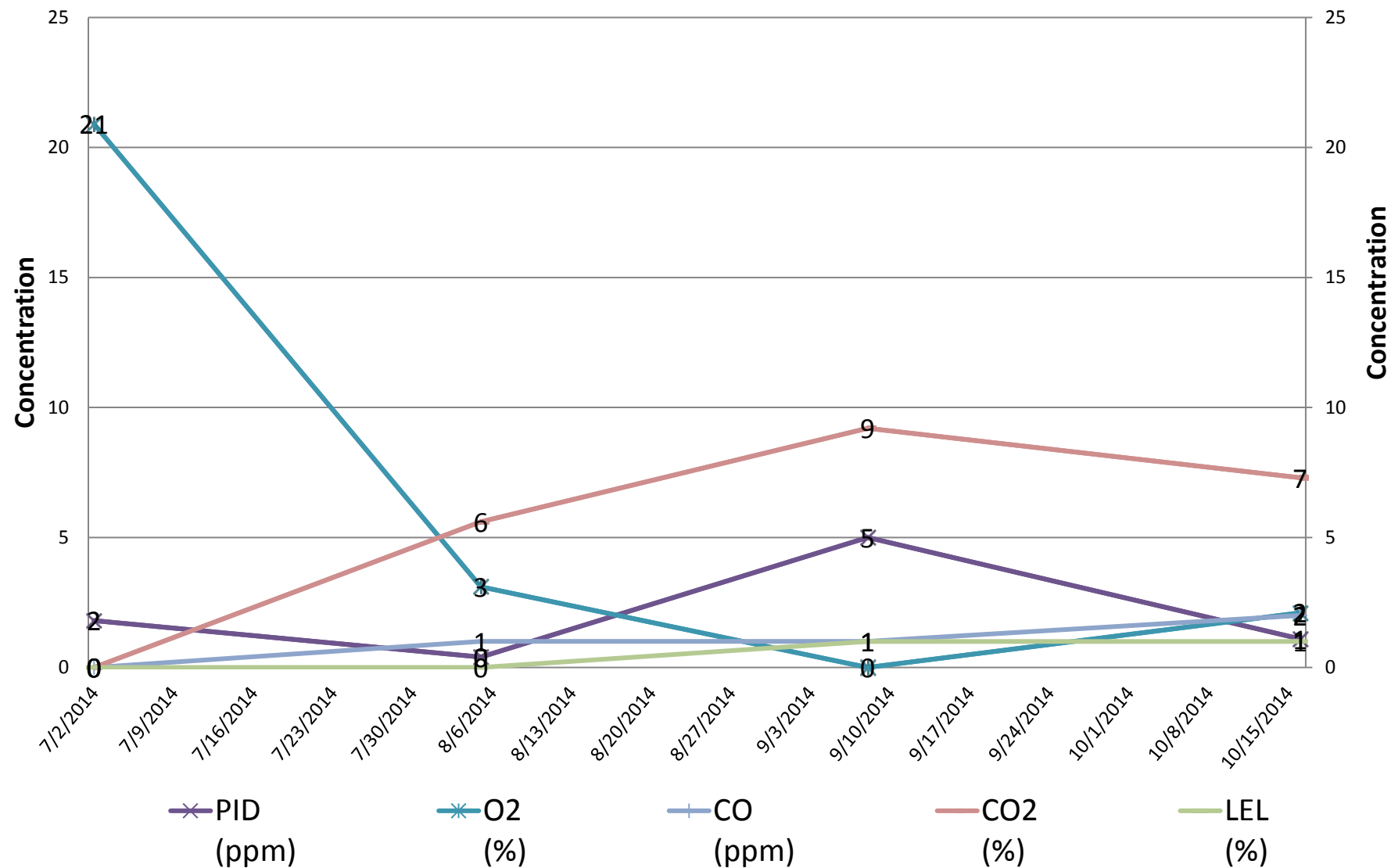
**ENCANA D19 PAD  
SVEE04**

Assessed TPH: 11 mg/kg



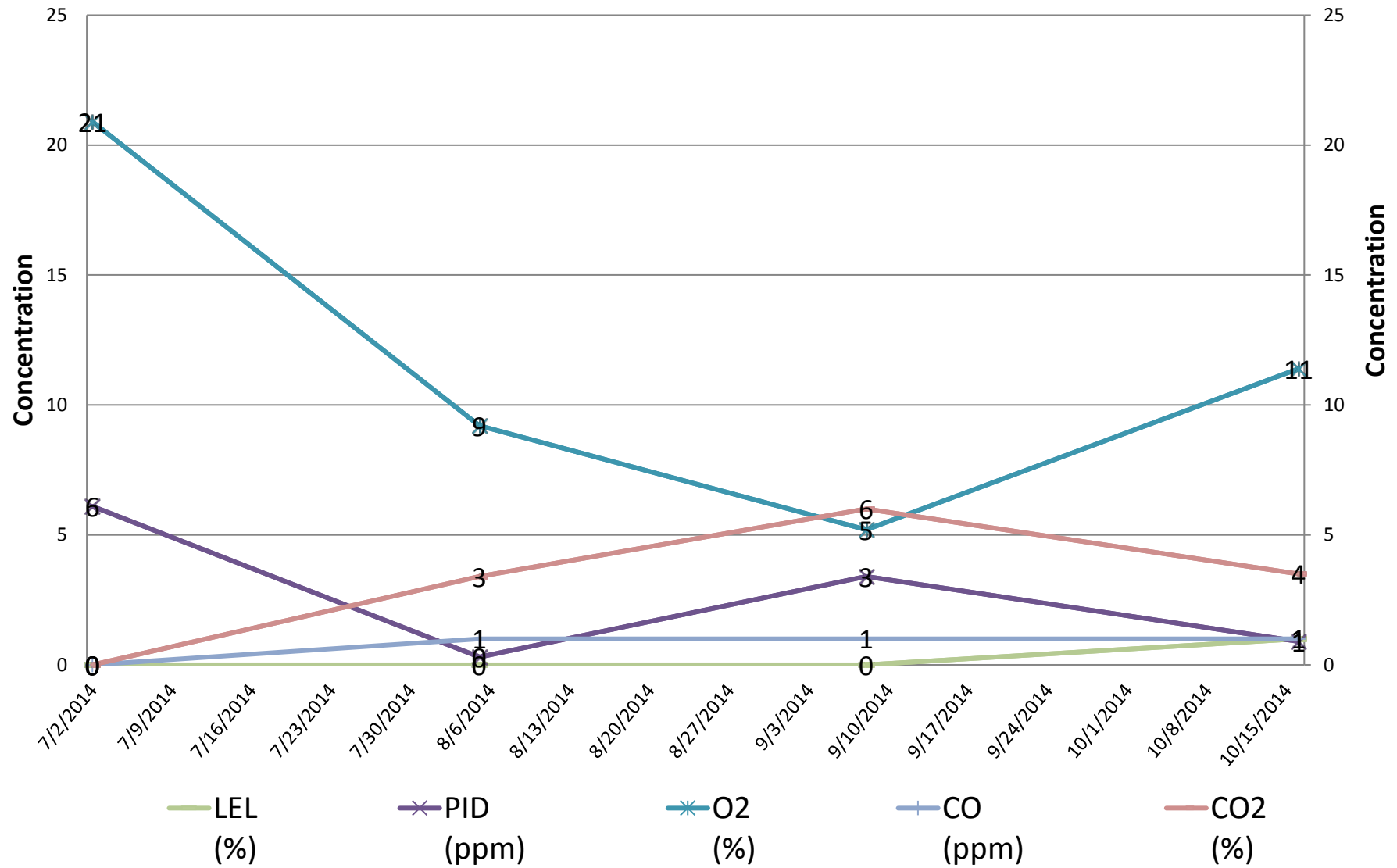
**ENCANA D19 PAD  
SVES02**

Assessed TPH: 170 mg/kg



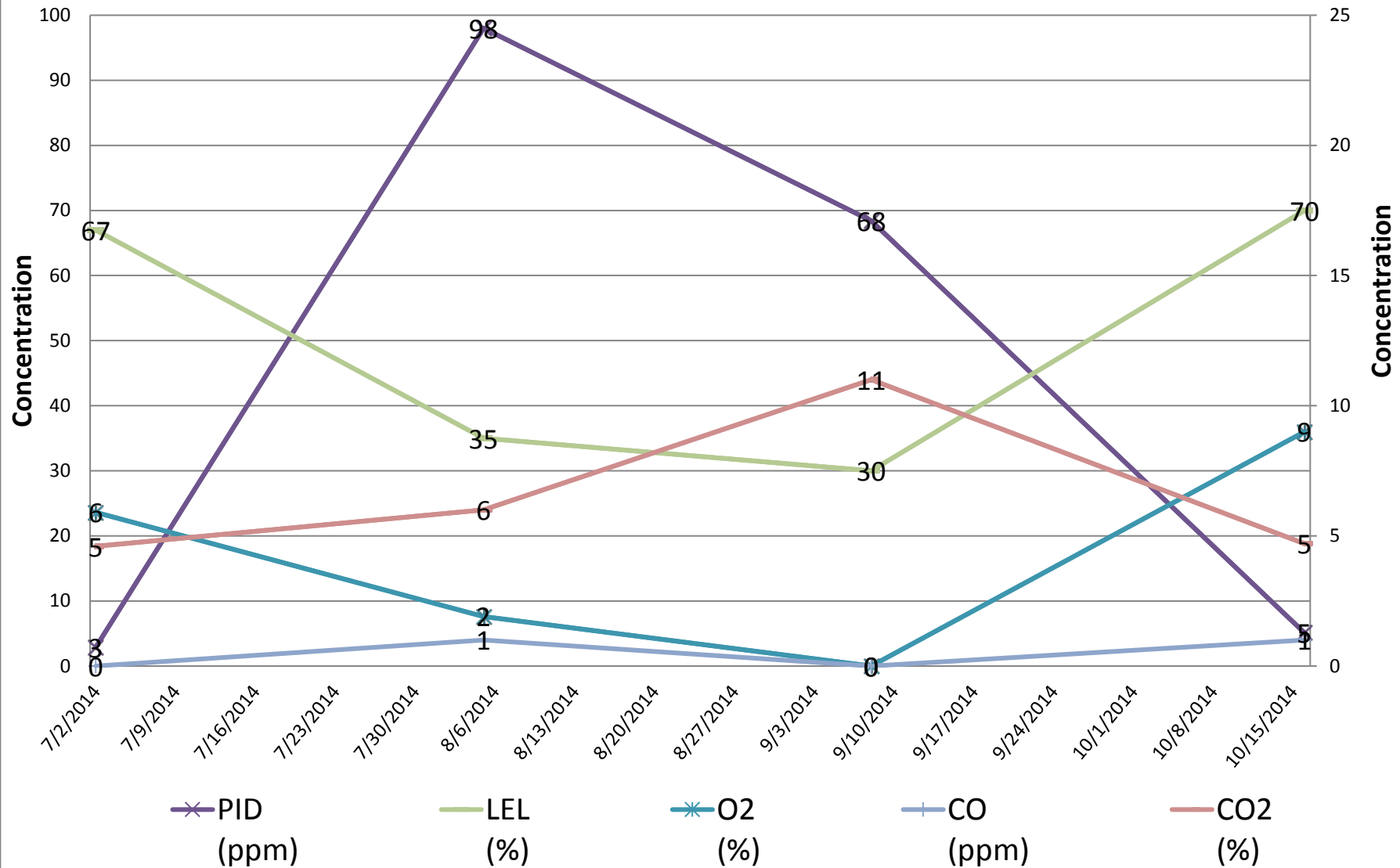
**ENCANA D19 PAD  
SVEN02**

Assessed TPH: 37 mg/kg



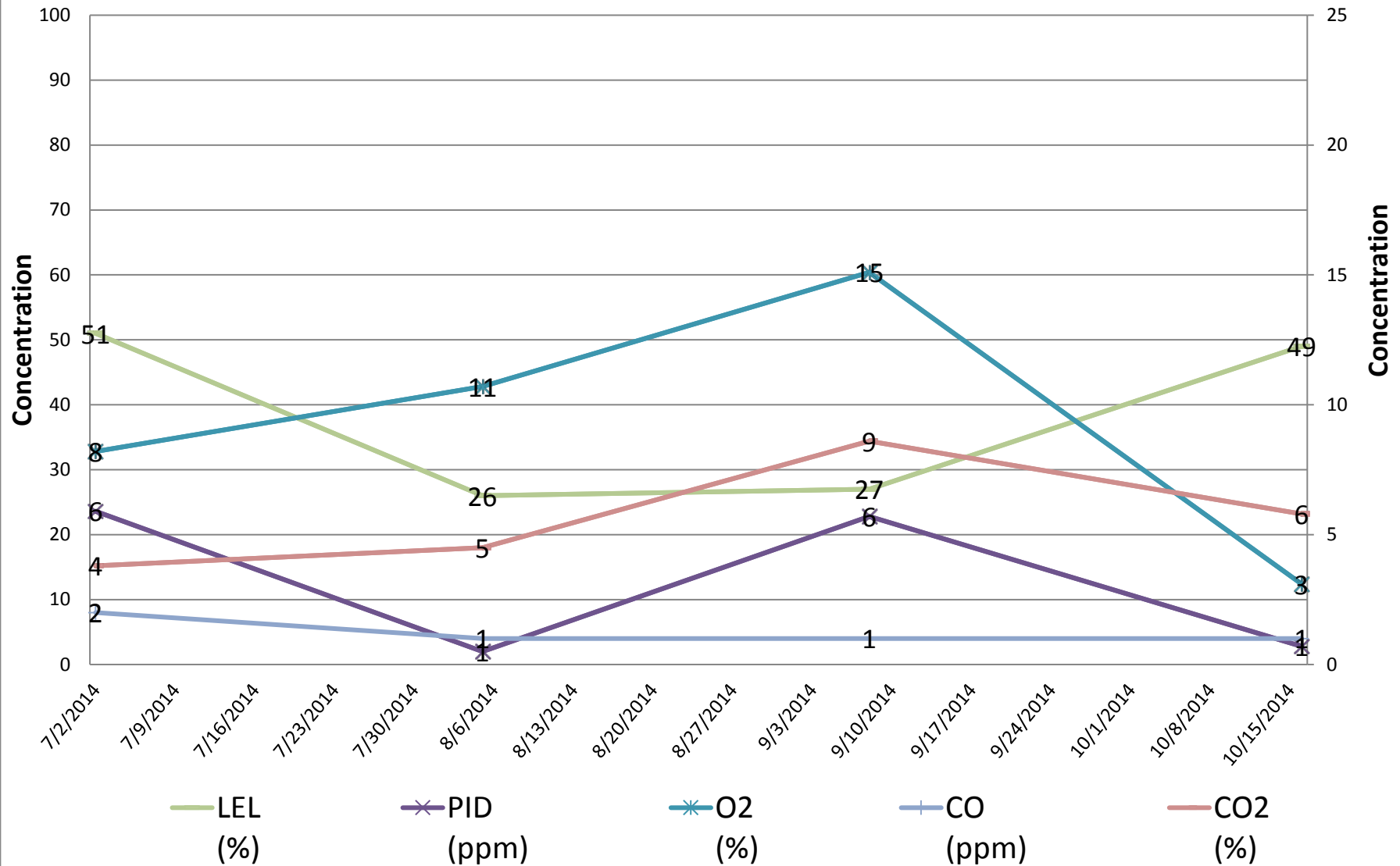
ENCANA D19 PAD  
SVEW01

Assessed TPH: 1,018 mg/kg



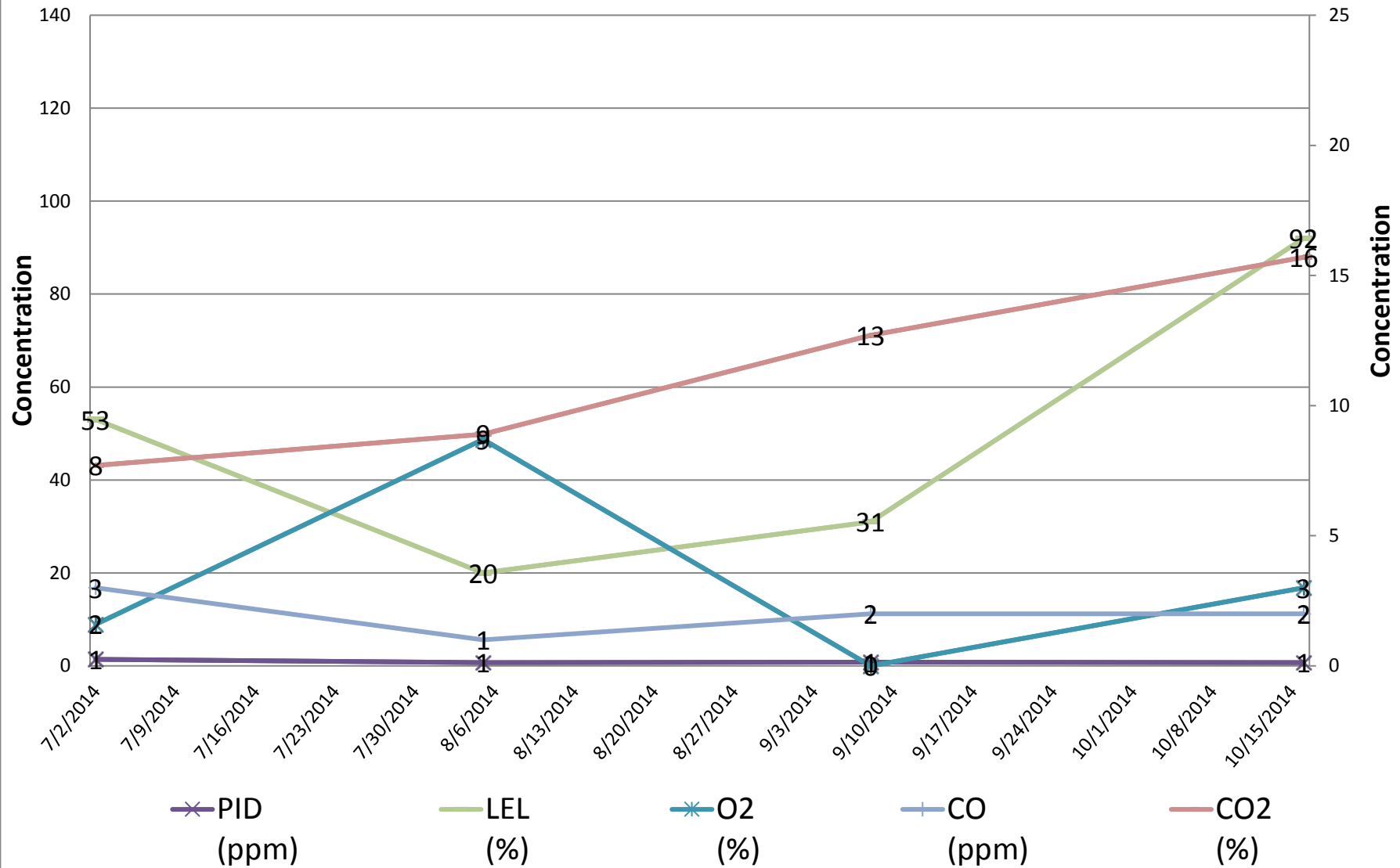
ENCANA D19 PAD  
SVEW02

Assessed TPH: 646 mg/kg



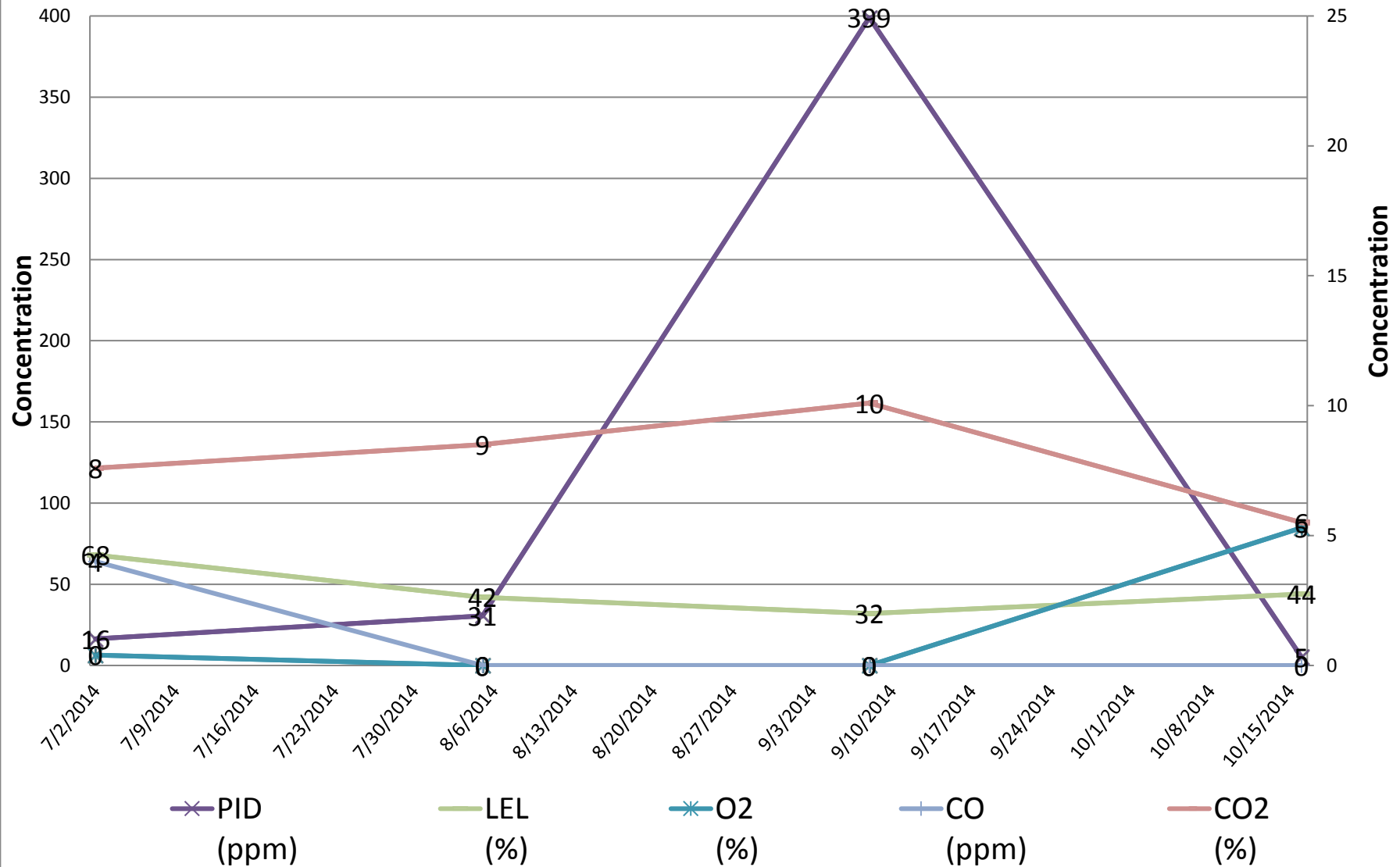
**ENCANA D19 PAD  
SVEW03**

Assessed TPH: 220 mg/kg



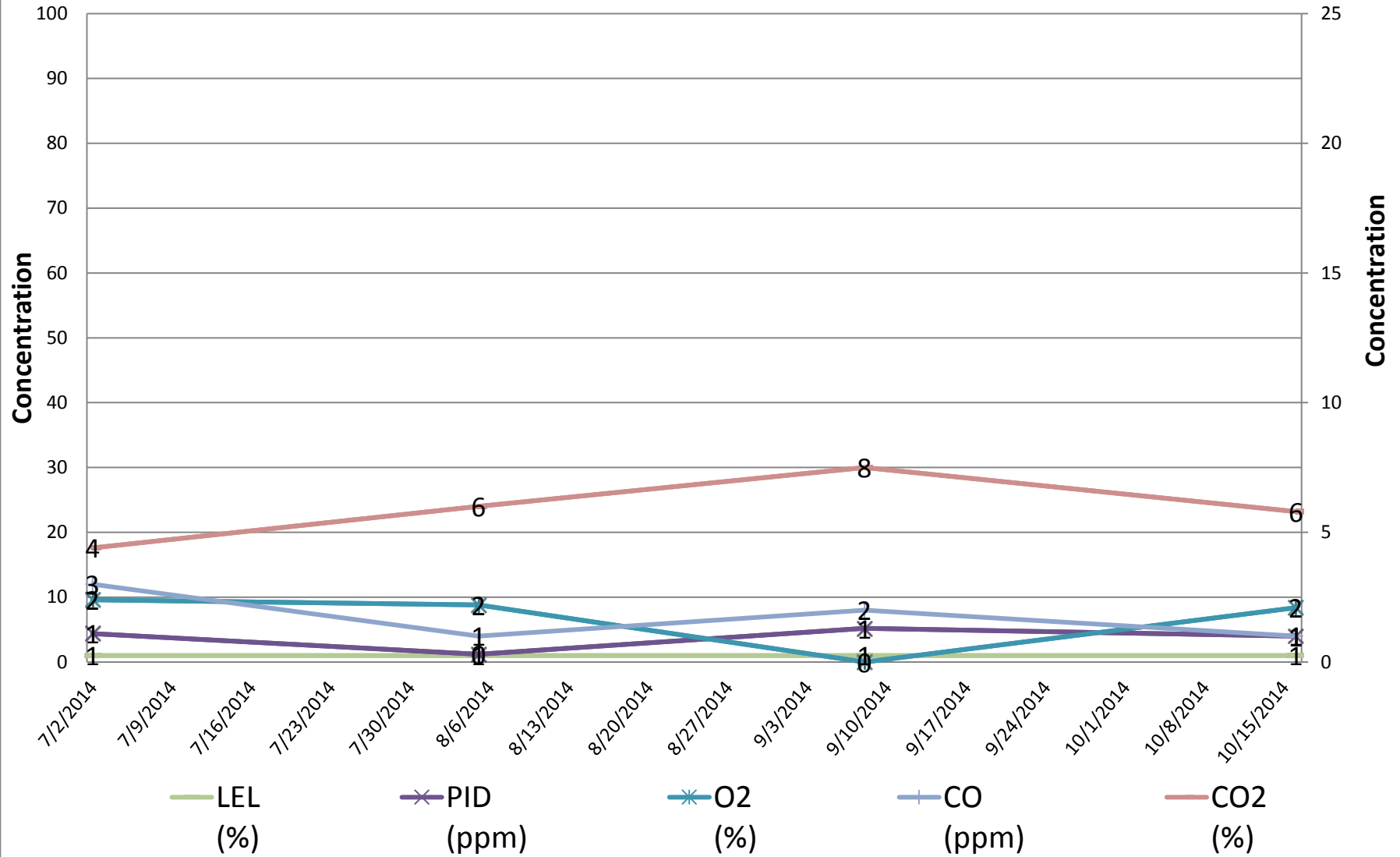
**ENCANA D19 PAD  
SVEW04**

Assessed TPH: 7,260 mg/kg



**ENCANA D19 PAD  
SVESW01**

Assessed TPH: 79mg/kg





## TABLES

**TABLE 1**  
**OPERATION AND MAINTENANCE FIELD PARAMETERS**  
**D19 WELL PAD**  
**ENCANA OIL AND GAS (USA) INC.**  
**GARFIELD COUNTY, COLORADO**

Well ID	Date	Velocity (fpm)	Flow (cfm)	Temperature (°F)	PID (ppm)	O <sub>2</sub> (%)	H <sub>2</sub> S (ppm)	CO (ppm)	CO <sub>2</sub> (%)	LEL (%)
SVEE01	7/2/2014	38	0.545	105.0	5.1	10.2	0	2	4.1	0
	8/5/2014	37	0.850	86.1	0.2	6.4	0	1	1.9	0
	9/8/2014	17	0.500	83.2	3.3	4.8	0	1	5.2	0
	10/16/2014	34	0.700	86.1	0.9	8.7	0	2	4.1	0
SVEE02	7/2/2014	34	1.10	104.3	11.9	0.0	0	2	11.8	56
	8/5/2014	2	0.0436	83.5	19.0	0.0	0	0	9.9	12
	9/8/2014	30	0.565	80.5	45.6	13.5	0	1	12	23
	10/16/2014	29	0.565	85.9	11.2	0.8	0	2	10.3	26
SVEE03	7/2/2014	58	0.710	104.0	1.6	19.7	0	0	0.7	1
	8/5/2014	2	0.0436	80.0	0.1	7.3	0	1	1.9	0
	9/8/2014	3	0.0436	81.1	3.0	7.6	0	1	5.3	0
	10/16/2014	30	0.565	84.1	1.0	8.0	0	2	4.2	0
SVEE04	7/2/2014	30	0.525	103.0	5.7	20.9	0	0	0.0	0
	8/5/2014	4	0.0436	84.2	0.2	7.9	0	1	2.7	0
	9/8/2014	1	0.0218	83.4	0.0	15.2	0	1	9.3	0
	10/16/2014	37	0.850	88.0	1.0	3.1	0	2	7.1	0
SVES02	7/2/2014	30	0.635	105.6	1.8	20.9	0	0	0.0	0
	8/5/2014	34	0.700	79.0	0.4	3.1	0	1	5.6	0
	9/8/2014	6	0.196	85.5	5.0	0.0	0	1	9.2	1
	10/16/2014	34	0.700	82.3	1.1	2.1	0	2	7.3	1
SVEN02	7/2/2014	26	0.485	107.7	6.1	20.9	0	0	0.0	0
	8/5/2014	1	0.0218	81.8	0.3	9.2	0	1	3.4	0
	9/8/2014	13	0.371	81.1	3.4	5.2	0	1	6.0	0
	10/16/2014	30	0.700	85.7	0.9	11.4	0	1	3.5	1
SVEW01	7/2/2014	52	0.500	105.8	2.9	5.9	0	2	4.6	67
	8/5/2014	28	0.565	80.0	98.0	1.9	0	1	6.0	35
	9/8/2014	26	0.480	85.6	68.4	0.0	0	0	11.0	30
	10/16/2014	28	0.567	81.1	5.1	9.0	0	1	4.7	70
SVEW02	7/2/2014	24	0.0218	106.2	5.9	8.2	0	2	3.8	51
	8/5/2014	49	1.05	83.2	0.5	10.7	0	1	4.5	26
	9/8/2014	30	0.700	83.7	5.7	15.1	0	1	8.6	27
	10/16/2014	26	0.567	86.2	0.7	3.1	0	1	5.8	49
SVEW03	7/2/2014	25	0.610	106.9	1.4	1.6	0	3	7.7	53
	8/5/2014	38	0.700	83.3	0.7	8.7	0	1	8.9	20
	9/8/2014	30	0.740	87.1	0.8	0.0	0	2	12.7	31
	10/16/2014	34	0.700	84.7	0.7	3.0	0	2	15.7	92
SVEW04	7/2/2014	28	0.0435	107.1	16.4	0.4	0	4	7.6	68
	8/5/2014	4	0.0218	81.2	30.5	0.0	0	0	8.5	42
	9/8/2014	9	0.0875	84.5	399	0.0	0	0	10.1	32
	10/16/2014	30	0.565	84.7	5.1	5.3	0	0	5.5	44



**TABLE 1**  
**OPERATION AND MAINTENANCE FIELD PARAMETERS**  
**D19 WELL PAD**  
**ENCANA OIL AND GAS (USA) INC.**  
**GARFIELD COUNTY, COLORADO**

Well ID	Date	Velocity (fpm)	Flow (cfm)	Temperature (°F)	PID (ppm)	O <sub>2</sub> (%)	H <sub>2</sub> S (ppm)	CO (ppm)	CO <sub>2</sub> (%)	LEL (%)
SVESW01	7/2/2014	26	1.24	106.8	1.1	2.4	0	3	4.4	1
	8/5/2014	23.0	0.271	80.3	0.3	2.2	0	1	6.0	1
	9/8/2014	6	0.0655	85.7	1.3	0.0	0	2	7.5	1
	10/16/2014	37	0.850	89.0	1.0	2.1	0	1	5.8	1

Notes:

fpm - feet per minute

cfm - cubic feet per minute

PID - photoionization detector

ppm - parts per million

O<sub>2</sub> - oxygen

H<sub>2</sub>S - hydrogen sulfide

CO - carbon monoxide

CO<sub>2</sub> - carbon dioxide

CH<sub>4</sub> - methane

°F - degrees fahrenheit

> - greater than

mg/kg - milligrams per kilogram

TPH - total petroleum hydrocarbons

