



תשתיות נפט ואנרגיה בע"מ

מסוף אלרואי

סיכום פליטות לאוויר שנת 2021

פברואר 2022

פרויקט: 3013.18

סימוכין: 3013.18-036



www.pazeng.co.il

תוכן עניינים

1.	מבוא	4
2.	נתוני מסוף	5
2.1.	נתוני מיכלים	5
2.2.	נתונים עבור מסוף מילוי מיכליות כביש	9
3.	חישוב פליטות	10
3.1.	כללי	10
3.2.	סוגי פליטות מחושבות	10
3.3.	בחירת חומרים בתוכנת TANKS	11
3.4.	נתונים מטאורולוגיים	11
4.	סיכום פליטות לשנת 2021	12
4.1.	מיכלים	12
4.2.	מסוף מילוי מיכליות כביש	12
4.3.	מיכל איסוף תשטיפים	13
4.4.	סיכום ממצאי ניטור LDAR	13
4.5.	פליטה שנתית מכלל המתקן	13
5.	פליטות לא שגרתיים במהלך שנת 2021	13
6.	מקורות	14

טבלאות

5.....	טבלה 1: נתוני מיכלים – מידע כללי, מידות ונתוני תפעול – שנת 2021
6.....	טבלה 2: נתוני מעטפת וגגות – שנת 2021
7.....	טבלה 3: נתוני אביזרים – שנת 2021
8.....	טבלה 4: צבעים מייצגים לצורך חישובי אקסל ותוכנת TANKS
9.....	טבלה 5: נתונים עבור מסוף מילוי מיכליות כביש – שנת 2021
11.....	טבלה 6: חומרים מייצגים בתוכנת TANKS
12.....	טבלה 7: סיכום פליטות מכלים - שנת 2021
12.....	טבלה 8: סיכום פליטות מסוף מילוי מיכליות כביש - שנת 2021

נספחים

טבלה 1-5.2 (AP-42)	נספח א'
נתוני ניטור LDAR עבור מסוף אלרואי – סיכום שנת 2021	נספח ב'
דוגמת חישוב עבור מיכל גג חיצוני צף מס' 2 המאחסן קרוסין	נספח ג'
חישוב פליטות ממכל לאיסוף תשטיפים	נספח ד'

0	להערות	28.02.2022	יואב פיסטינר	מירה ליה-זיו איסקוב
גרסה	תיאור	תאריך	שם מאשר	שם עורך

1. מבוא

חברת תשתיות נפט ואנרגיה בע"מ (להלן תש"מ) מפעילה את מסוף אלרואי לאחסון ושינוע דלקים.

המסוף כולל:

- מבני משרדים
 - חוות מכלים לאחסון דלקים מסוגים שונים
 - רציפי מילוי מכליות כביש (לשימוש בעת חירום בלבד)
- המסוף ממוקם בשוליים הדרום מערביים של קריית טבעון, בצמוד לו וממערב ממוקמת שכונת אלרואי ומדרום לו שכונת קרית חרושת.
- באתר 9 מיכלים, מתוכם 7 מכלים תפעוליים ו-2 מכלים המשמשים כמכלים אסטרטגיים (מכלים מס' 1 ו-9).
- מערכת השינוע הינה באמצעות משאבות ובקרת מילוי ובנוסף קיימות מערכות תומכות כגון מערכות כיבוי אש ומערכות פיקוד ובקרה.
- כחלק מהתנאים ברישיון עסק מדצמבר 2010, בסוף כל שנה קלנדרית על תש"ן להגיש דו"ח סיכום פליטות שנתי לגבי השנה שחלפה.
- חישובי הפליטות בוצעו בעזרת תוכנת Tanks ומסמכי EPA-AP 42 על פי נתוני המתקנים הקיימים במסוף.
- סיכום הפליטות הוכן על ידי חברת "פז" הנדסה וניהול (1980) בע"מ (להלן פז הנדסה), והוא מבוסס על סקר תהליכים ופליטות לאוויר ודו"חות ניטור LDAR שהוגשו לרשויות.

2. נתוני מסוף

2.1. נתוני מיכלים

בטבלאות הבאות מפורט מידע טכני של המיכלים בחוות המיכלים אלרואי.

טבלה 1: נתוני מיכלים – מידע כללי, מידות ונתוני תפעול – שנת 2021

מספר מיכל	סוג הדלק המאוחסן	לחץ אדים בטמפ' הנוזל הממוצעת (mmHg)	כמות צריכה שנתית (מ"ק)	סוג ניקוז בתחתית מיכל	קוטר מיכל (מטר)	נפח מיכל (מ"ק)	נפח מיכל פעיל (מ"ק)	גובה / אורך מעטפת מיכל (מטר)	גובה נוזל מירבי (מטר)	גובה נוזל ממוצע (מטר)
1 ⁽¹⁾	בנזין	405 @ 28°C	0	גבעה חלקית	48.77	32,056	28,768	17.16	15.4	10.5
2	קרוסין	0.833 @ 28°C	19,692	גבעה חלקית	48.77	32,056	28,768	17.16	15.4	10
3	סולר	0.507 @ 28°C	23,194	גבעה חלקית	48.77	32,056	28,768	17.16	15.4	9.5
4	סולר	0.507 @ 28°C	56,674	גבעה חלקית	48.77	32,056	28,768	17.16	15.4	10.3
5	סולר	0.507 @ 28°C	11,986	גבעה מלאה	68.27	56,959	51,614	15.56	14.1	14.1
6 ⁽¹⁾	סולר	0.507 @ 28°C	0	גבעה מלאה	68.27	56,959	51,614	15.56	14.1	14.1
7 ⁽¹⁾	סולר	0.507 @ 28°C	0	גבעה מלאה	68.27	56,959	51,614	15.56	14.1	11.4
8 ⁽¹⁾	קרוסין	0.833 @ 28°C	0	גבעה חלקית	48.8	36,547	34,228	19.54	18.3	18.3
9 ⁽¹⁾	קרוסין	0.833 @ 28°C	0	גבעה חלקית	48.77	32,056	28,768	17.16	15.4	9.7
סה"כ			111,547			367,704	332,913			

(1) מיכלים מס' 1, 6, 7, 8 ו-9 משמשים כמיכלי מלאי, לא היו תנועות במיכלים בשנת 2021.

טבלה 2: נתוני מעטפת וגגות – שנת 2021

מספר מיכל	סוג גג	אטם ראשי	אטם משני	צורת גג	סוג חיבורי גג	צבע גג	מצב צבע גג	צבע מעטפת חיצונית	מצב צבע מעטפת חיצונית	סוג חיבורי מעטפת	מצב מעטפת פנימית	מיכל מחומם
1	גג צף חיצוני	Mechanical Shoe	Rim mounted	Pontoon	מרותך	לבן	טוב	לבן	טוב	מרותך	חלוד הרבה	לא
2	גג צף חיצוני	Mechanical Shoe	Shoe mounted	Pontoon	מרותך	לבן	טוב	חום	טוב	מרותך	חלוד הרבה	לא
3	גג צף חיצוני	Mechanical Shoe	Shoe mounted	Pontoon	מרותך	לבן	טוב	לבן	טוב	מרותך	חלוד הרבה	לא
4	גג צף חיצוני	Mechanical Shoe	Shoe mounted	Pontoon	מרותך	לבן	טוב	חום	ישן	מרותך	חלוד הרבה	לא
5	גג צף חיצוני	Mechanical Shoe	Shoe mounted	Pontoon	מרותך	לבן	טוב	צהוב קרם	טוב	מרותך	חלוד הרבה	לא
6	גג צף חיצוני	Mechanical Shoe	Shoe mounted	Pontoon	מרותך	לבן	טוב	צהוב קרם	טוב	מרותך	חלוד הרבה	לא
7	גג צף חיצוני	Mechanical Shoe	Shoe mounted	Pontoon	מרותך	לבן	טוב	צהוב קרם	טוב	מרותך	חלוד הרבה	לא
8	גג צף חיצוני	Liquid mounted	Rim mounted	Pontoon	מרותך	לבן	טוב	כחול בהיר	טוב	מרותך	חלוד הרבה	לא
9	גג צף חיצוני	Mechanical Shoe	Rim mounted	Pontoon	מרותך	לבן	טוב	צהוב קרם	טוב	מרותך	חלוד הרבה	לא

טבלה 3: נתוני אביזרים – שנת 2021

מספר מיכל	שובר ואקום			רגליים מתכווננות התומכות בגג צף ⁽¹⁾			Rim Vent	כמות מדי מפלס	כמות בוצה בנקיון (מ"ק)	"גרביים" לבאר הדיגום המחורצת ולרגלי הגג הצף ⁽¹⁾
	כמות	Vacuum set. [psi]	Pressure set. [psi]	גובה (ft)	כמות באזור pontoon	כמות במרכז				
1	2	0	0.5	11	43	29	1	1	70	יש
2	2	0	0.5	11	43	29	1	1	70	יש
3	2	0	0.5	11	43	29	1	1	70	יש
4	2	0	0.5	11	43	29	1	1	70	יש
5	2	0	0.5	11	107	72	1	1	150	יש
6	2	0	0.5	11	107	72	1	1	150	יש
7	2	0	0.5	11	107	72	1	1	150	יש
8	6	0	0.5	9	54	36	1	1	70	יש
9	2	0	0.5	11	43	29	6	1	70	יש
סה"כ									870	

⁽¹⁾ הני"ל לא נלקחו בחשבון בחישוב הפליטות מתוכנת ה-TANKS מפני שנדגמו במסגרת ניטורי ה-LDAR.

הנחות שנלקחו לצורך החישובים

1. עבור חישוב Degassing במיכל עם גג צף – הונח:
 - גג צף נח על רגליים בגובה 9-11 ft (בהתאם לטבלה לעיל) וזהו גם הגובה המרבי של הנוזל במיכל.
 - גובה ממוצע של הנוזל במיכל הינו 50% מגובה הנוזל המרבי.
2. הונח כי ניקיון כללי וריקון של המיכלים מתבצע אחת ל-15 שנים. הניקיון יארך יום אחד.
3. הונח כי אירוע של נחיתת גגות צפים מתבצע אחת ל-15 שנים. זמן נחיתת הגג במקרה זה לא יעלה על 4 ימים.
4. יחס הנוזל בבוצה הונח כ- 0.8 [2]
5. בהתאם לטבלה 6-7.1 על פי [1], נבחרו הצבעים הבאים כמייצגים את צבע מעטפת המיכלים, לצורך חישובי פליטות לאוויר:

טבלה 4: צבעים מייצגים לצורך חישובי אקסל ותוכנת Tanks

צבע מעטפת מיכל	צבע לצורך חישובי אקסל בהתאם למסמך EPA AP-42	צבע לצורך חישובים בתוכנת Tanks (*)
כחול בהיר	Gray Medium	Gray Medium
חום	Brown	Aluminium/Diffuse
צהוב קרם	Beige/Cream	Aluminium/Specular
לבן	White	White

(*) בתוכנת Tanks מבחר הצבעים מצומצם יותר מאשר בטבלה 6-7.1 אשר במסמך EPA AP-42 [1].

2.2. נתונים עבור מסוף מילוי מיכליות כביש

טבלה 5: נתונים עבור מסוף מילוי מיכליות כביש – שנת 2021

מס' זרוע	מוצר	מילוי עילי/ תחת	נפח מילוי שנתי (מ"ק)	נפח ממוצע של מיכלית (מ"ק)
1	קרוסין	עילי טבול	12	30
2	קרוסין	עילי טבול	0	30
3	קרוסין	עילי טבול	0	30
4	קרוסין	עילי טבול	0	30
5	קרוסין	עילי טבול	0	30
6	קרוסין	עילי טבול	0	30
7	קרוסין	עילי טבול	0	30
8	קרוסין	עילי טבול	0	30
	סה"כ		12	

הנחות שנלקחו צורך החישובים

1. מקדם α (Tank paint solar absorptance) ממוצע עבור קרוסין חושב כדלקמן:

א. בשלב ראשון חושב המקדם α עבור כל אחד ממיכלי הקרוסין:

דוגמת חישוב עבור מיכל מס' 2:

$$\alpha_{\text{tank2}} = \frac{\alpha_{\text{roof}(2)} + \alpha_{\text{shell}(2)}}{2} = \frac{0.17 + 0.58}{2} = 0.38$$

ב. בשלב השני חושב מקדם α ממוצע עבור הקרוסין:

$$\alpha_{\text{Kerosene}} = \frac{\alpha_{\text{tank}(2)} + \alpha_{\text{tank}(8)} + \alpha_{\text{tank}(9)}}{\text{number of kerosene tanks}} = \frac{0.38 + 0.43 + 0.26}{3} = 0.35$$

2. זמן מילוי מיכלית חושב על פי נפח ממוצע של מיכלית וקצב מילוי שעתי מרבי של 1000 ליטר/דקה.

3. Vapor collection efficiency - 70%

4. Vapor recovery efficiency - 0%

5. Saturation factor הונח כ-0.6 (Submerged loading, dedicated normal service) על פי [1]. טבלה רלוונטית מצורפת בנספח א'.

3. חישוב פליטות

3.1. כללי

חישובי הפליטות עבור מיכלי האחסון בוצעו בתוכנת Tanks ובעזרת EPA-AP 42 [1].
הערכת פליטות כתוצאה מדליפות ציוד ואביזרים (LDAR) מצורפת בנספח ב'.
דוגמת חישוב עבור מיכל גג חיצוני צף (מיכל מס' 2) המאחסן קרוסין, מצורפת כנספח ג' למסמך זה.
בדוגמאות אלה ניתן לראות את נתוני הקלט (כולל הנחות) עליהם התבססו החישובים.

3.2. סוגי פליטות מחושבות

הערכת הפליטות ממיכלי אחסון כוללת [3]:

- פליטות בזמן אחסון (Breathing Losses)
- פליטות משינויי מפלס (Working Losses)
- פליטות כתוצאה מניקוי וריקון מיכלים (Degassing Losses)
- פליטות כתוצאה מנחיתת גגות צפים (Roof Landing Losses)
- פליטות כתוצאה מהפרשי לחץ (Flash Losses)
- פליטות בזמן מילוי מיכלים ומיכליות

בסקר הפליטות חושבו כל הפליטות המפורטות לעיל, למעט פליטות כתוצאה מהפרשי לחץ (Flash Losses).

פליטות אלה רלוונטיות לשינויי פתאומיים בלחץ הנוזל, נתון הגורם להפרת שיווי המשקל הקיים במיכל (בין גז לנוזל) וכתוצאה מכך נוצר תהליך הבזקה, בו מרכיבים קלים מפאזה הנוזל עוברים לפאזה הגזית. תופעות אלה מתרחשות, בדרך כלל, כאשר נוזל המאוחסן בלחץ נשלח לאחסון במיכל בעל לחץ נמוך יותר [3].

פליטות אלו הוזנחו כיוון שכל החומרים מוחזקים בתנאים אטמוספריים בכל אחד מהשלבים הנוגעים להובלתם ואחסונם, ולפיכך לא צפויה פליטת אדים כתוצאה מתהליך זה.

3.3. בחירת חומרים בתוכנת Tanks

על פי נתוני MSDS של הדלקים במסוף, נבחרו החומרים הבאים הקיימים בתוכנת Tanks כמייצגים של חומרים אלו:

טבלה 6: חומרים מייצגים בתוכנת Tanks

חומר מייצג בתוכנת Tanks	דלק קיים במסוף
Distillate fuel oil no 2	סולר (תחבורה והסקה)
Jet kerosene	נפט (קרוסין)
Gasoline RVP 10	בנזין

3.4. נתונים מטאורולוגיים

לצורך חישוב הנתונים בתוכנת Tanks הוגדרו נתונים מטאורולוגיים המתאימים למפרץ חיפה על פי מקורות [4].

4. סיכום פליטות לשנת 2021

4.1. מיכלים

סיכום חישובי פליטה עבור כל אחד ממכלי האחסון מפורט בטבלה להלן:

טבלה 7: סיכום פליטות מכלים - שנת 2021

מיכל	חומר	פליטות לאוויר (ק"ג/שנה)
1	בנזין	3,603
2	קרוסין	785
3	סולר	31
4	סולר	848
5	סולר	1,701
6	סולר	1,693
7	סולר	1,693
8	קרוסין	756
9	קרוסין	758
	סה"כ	11,867

4.2. מסוף מילוי מיכליות כביש

להלן טבלת סיכום חישובי פליטות עבור זרועות המילוי.

טבלה 8: סיכום פליטות מסוף מילוי מיכליות כביש - שנת 2021

מס' זרוע	מוצר	מילוי עילי / תחתית	פליטה שנתית (ק"ג/שנה)
1	קרוסין	עילי טבול	0.04
2	קרוסין	עילי טבול	0
3	קרוסין	עילי טבול	0
4	קרוסין	עילי טבול	0
5	קרוסין	עילי טבול	0
6	קרוסין	עילי טבול	0
7	קרוסין	עילי טבול	0
8	קרוסין	עילי טבול	0
סה"כ			0.04

4.3. מיכל איסוף תשטיפים

סך הפליטה ממיכל לאיסוף תשטיפים הינה כ- 1 ק"ג/שנה.

חישוב מצורף בנספח ד'.

יצוין כי החישוב מתבסס על הנחה מחמירה שהמכל מכיל קרוסין בלבד. מעשית, המיכל מכיל בעיקר ניקוז מים מהמכלים.

4.4. סיכום ממצאי ניטור LDAR

טבלה 9: סיכום פליטות חומרים אורגנים נדיפים עבור רכיבים בשנת 2021

סה"כ פליטות (ק"ג/שנה)	
פליטה שנתית (ק"ג/שנה)	סיכום פליטות LDAR
6	סה"כ

4.5. פליטה שנתית מכלל המתקן

טבלה 10: סיכום פליטות שנתי מכלל מסוף אלרואי – שנת 2021

סה"כ פליטות (ק"ג/שנה)				
סה"כ	סיכום פליטות רכיבים (LDAR)	מיכל לאיסוף תשטיפים	מסוף מילוי מיכליות כביש	חוות מיכלים
11,874	6	1	0.04	11,867

5. פליטות לא שגרתיות במהלך שנת 2021

במהלך שנת 2021 לא התרחשו פליטות לא שגרתיות כתוצאה מפעילות הטרימינג.

6. מקורות

[1] EPA-AP42

[2] USER'S GUIDE to TANKS - Storage Tank Emissions Calculation Software Version
4.0 - APPENDIX D

[3] הנחיות להגשת בקשה להיתר פליטה ושינוי הפעלה משמעותי הנחיות הממונה לטיפול בבקשה
להיתר פליטה לפי סעיף 9(א) לתקנות אוויר נקי (היתרי פליטה), התשי"ע – 2010, מהדורה 5,
נובמבר 2020

[4] האטלס האקלימי לתכנון פיסי וסביבתי בישראל, מהדורה שנייה, 1994



נספח א'

טבלה 5.2-1

AP-42

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00
Marine vessels ^a	Submerged loading: ships	0.2
	Submerged loading: barges	0.5

^a For products other than gasoline and crude oil. For marine loading of gasoline, use factors from Table 5.2-2. For marine loading of crude oil, use Equations 2 and 3 and Table 5.2-3.

נספח ב'

נתוני ניטור LDAR עבור אלרואי – סיכום שנת 2021

(מתוך דיווח שהתקבל ממעבדות אקולוגיה מתאריך 17.02.2022)

3013.18-004A

**LDAR
Fugitive Emission Monitoring
Report No.
RL-EI-R1-6-21**

Plant: **Energy Infrastructures LTD**

City: **Haifa**

District: **Haifa**

Production Unit: **Alroy**

Report printing date: **17-Feb-2022**

Report editor: **Michael Ourievsky**

Approved by: **Alexey Ratner**

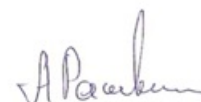


Table of Content

1. Executive Summary	5
2. Project introduction	6
2.1 Scope of work	6
2.2 Project phases	6
3. Monitoring Results	7
Table 3.1 – Overview by component class	7
Table 3.2 – Overview by reading range	7
Table 3.3 – Overview per Unit	8
Table 3.4 – Monitoring results, last known situation	8
Graph 3.5 – Total overview by chemicals	10
4. Historical overview	10
Table 4.1 – Historical overview by component class	10
Table 4.2 – Historical Overview by Unit	10
5. Detailed monitoring summary	11
Table 5.1 - Cumulative summary, Fugitive emission component classification and emission estimation for production facilities	12
Table 5.2 – Chemical Summary by Component Class	13
Table 5.3 - LDAR report for production facilities	15
Table 5.4 - Components with more than 5 significant leaks detected during last 12 months	16
Graph 5.6 - Comparison between count of components & kg/year, by components	17
Graph 5.7 - Comparison between total annual emissions (kg/year), by class & year	18
6. Summary by monitoring period, Round 1	19
Table 6.1 - First measurements, overview by component class	20
Table 6.2 - First measurement, overview by reading range	21
Table 6.3 - Measurement after repair attempt, overview by component class	21
Table 6.4 - Measurement after repair attempt, Overview by reading range	21
Table 6.5 - Form 07: First measurement and measurement after repair	21
Table 6.6 - Chemical Summary by Component Class, First Measurement	22
Table 6.7 - Chemical Summary by Component Class, After Repair	23
Table 6.8 - LDAR report for production facilities	24
Graph 6.10 - Count of components & kg/year	25
Graph 6.11 - Overview by reading range	26
Graph 6.12 - Overview by chemicals	27
6. Summary by monitoring period, Round 2	28
Table 6.1 - First measurements, overview by component class	29
Table 6.2 - First measurement, overview by reading range	30
Table 6.3 - Measurement after repair attempt, overview by component class	30
Table 6.4 - Measurement after repair attempt, Overview by reading range	30
Table 6.5 - Form 07: First measurement and measurement after repair	30
Table 6.6 - Chemical Summary by Component Class, First Measurement	31
Table 6.7 - Chemical Summary by Component Class, After Repair	32
Table 6.8 - LDAR report for production facilities	33
Graph 6.10 - Count of components & kg/year	34
Graph 6.11 - Overview by reading range	35
Graph 6.12 - Overview by chemicals	36
6. Summary by monitoring period, Round 3	37
Table 6.1 - First measurements, overview by component class	38
Table 6.2 - First measurement, overview by reading range	39
Table 6.3 - Measurement after repair attempt, overview by component class	39
Table 6.4 - Measurement after repair attempt, Overview by reading range	39
Table 6.5 - Form 07: First measurement and measurement after repair	39
Table 6.6 - Chemical Summary by Component Class, First Measurement	40
Table 6.7 - Chemical Summary by Component Class, After Repair	42
Table 6.8 - LDAR report for production facilities	44
Graph 6.10 - Count of components & kg/year	45
Graph 6.11 - Overview by reading range	46
Graph 6.12 - Overview by chemicals	47
6. Summary by monitoring period, Round 4	48
Table 6.1 - First measurements, overview by component class	49
Table 6.2 - First measurement, overview by reading range	50
Table 6.3 - Measurement after repair attempt, overview by component class	50
Table 6.4 - Measurement after repair attempt, Overview by reading range	50
Table 6.5 - Form 07: First measurement and measurement after repair	50
Table 6.6 - Chemical Summary by Component Class, First Measurement	51

Table 6.7 - Chemical Summary by Component Class, After Repair	52
Table 6.8 - LDAR report for production facilities	53
Graph 6.10 - Count of components & kg/year	54
Graph 6.11 - Overview by reading range	55
Graph 6.12 - Overview by chemicals	56
6. Summary by monitoring period, Round 5	57
Table 6.1 - First measurements, overview by component class	58
Table 6.2 - First measurement, overview by reading range	59
Table 6.3 - Measurement after repair attempt, overview by component class	59
Table 6.4 - Measurement after repair attempt, Overview by reading range	59
Table 6.5 - Form 07: First measurement and measurement after repair	59
Table 6.6 - Chemical Summary by Component Class, First Measurement	60
Table 6.7 - Chemical Summary by Component Class, After Repair	62
Table 6.8 - LDAR report for production facilities	64
Graph 6.10 - Count of components & kg/year	65
Graph 6.11 - Overview by reading range	66
Graph 6.12 - Overview by chemicals	67
6. Summary by monitoring period, Round 6	68
Table 6.1 - First measurements, overview by component class	69
Table 6.2 - First measurement, overview by reading range	70
Table 6.3 - Measurement after repair attempt, overview by component class	70
Table 6.4 - Measurement after repair attempt, Overview by reading range	70
Table 6.5 - Form 07: First measurement and measurement after repair	70
Table 6.6 - Chemical Summary by Component Class, First Measurement	71
Table 6.7 - Chemical Summary by Component Class, After Repair	72
Table 6.8 - LDAR report for production facilities	73
Graph 6.10 - Count of components & kg/year	74
Graph 6.11 - Overview by reading range	75
Graph 6.12 - Overview by chemicals	76
7. Attachments	78
7.1 General Remarks	78
Table 7.1.1 Monitored components	78
Table 7.1.2 Unmonitored P&IDs	78
Table 7.2 Project schedule	78
7.3 Methodology	79
7.4 Calibration loglist	80
7.5 Calibration gas certificates	81
7.6 Stream Composition Summary	87
7.7 Quarterly Validation of LDAR Devices, Quater 1	88
7.8 Quarterly Validation of LDAR Devices, Quater 2	89
7.9 Quarterly Validation of LDAR Devices, Quater 3	90
7.10 Quarterly Validation of LDAR Devices, Quater 4	91
7.11 Cumulative production hours template	92

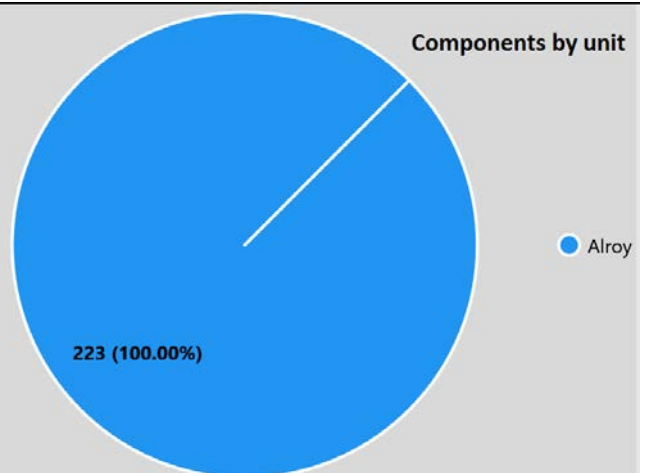
1. Executive Summary

- The total number of active components at Energy Infrastructures LTD is 223.
- Six rounds of measurements have been performed in 2021.
- The total calculated emission from 01/01/2021 to 31/12/2021 is 6.08 kg.
- The number of components above leak definition found from the beginning of the year – 0
- The number of pegged readings (above 100,000 ppm) found from the beginning of the year - 0
- The last known situation of Energy Infrastructures LTD indicates there are no leaks

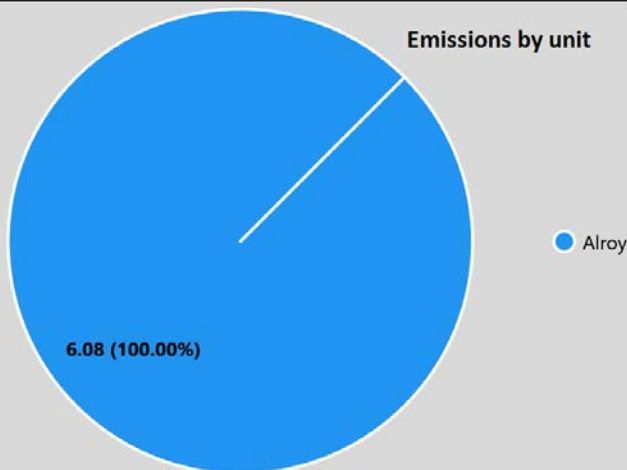
Total active components

223

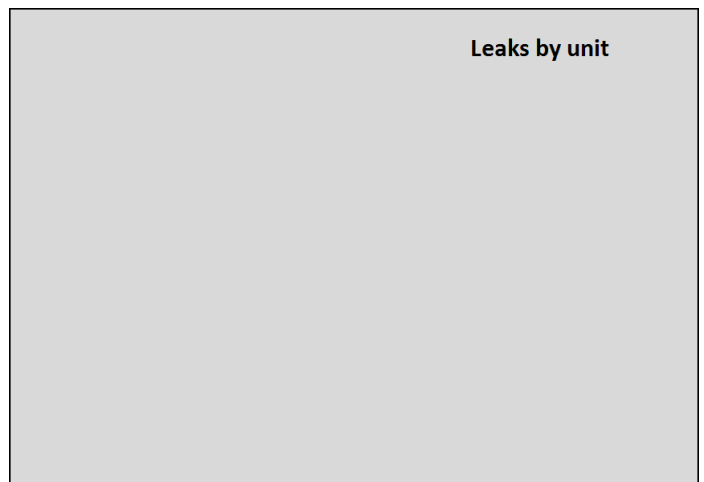
Components by unit



Emissions by unit



Leaks by unit



2 Project introduction

2.1 Scope of work

Following measurements been performed in 2021:

Round	Unit	Monitored group		
		G1	G2	G3
Round 1	Alroy	✓		
Round 2	Alroy	✓		
Round 3	Alroy	✓	✓	✓
Round 4	Alroy	✓		
Round 5	Alroy	✓	✓	
Round 6	Alroy	✓		

2.2 Project phases

- Monitoring
- Re-measurement after repair
- Revision of equipment and production processes
- Inventorisation: adding or deleting components

General

1. LDAR tests were performed under ISO-17025 accreditation of ISRAC (Israel Laboratory Accreditation Authority).
2. ISRAC is not responsible for the test results.
3. The following data is provided by the customer: production hours, P&IDs, and stream information.

3. Monitoring results

The table "Overview by component class" below shows the number of active components, number of leaks above leak definitions and number of components that are still leaking in each class (according to the monitoring round), and total calculated emissions in the specified period.

Table 3.1 Overview by component class, 01/01/2021-31/12/2021

Component Class	Total Components	Total Components above leak definition						% of components above leak definition							Unrepaired Components						Total Emissions
		count						%							count						kg
	count	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Average	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	01/01/2021-31/12/2021
PRD	4	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	0.14
Sampling Point	4	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	0.14
Total Group 1:	8	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	0.28
Stem Valve	20			0		0				0.0%		0.0%		0.0%			0		0		1.367
Open End	102			0		0				0.0%		0.0%		0.0%			0		0		1.787
Total Group 2:	122			0		0				0.0%		0.0%		0.0%			0		0		3.154
Flange	55			0						0.0%				0.0%			0				0.149
Connection	38			0						0.0%				0.0%			0				2.497
Total Group 3:	93			0						0.0%				0.0%			0				2.646
Total:	223	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	6.080

In table "Overview by reading range" all the components divided by their reading range at first measurement according to the monitoring round.

Table 3.2 Overview by reading range

Reading Range	Total Components											
	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6	
	#	%	#	%	#	%	#	%	#	%	#	%
0 ppm	8	100.0%	8	100.0%	223	100.0%	8	100.0%	130	100.0%	8	100.0%
1-499 ppm	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
500-749 ppm	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
750-999 ppm	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
1,000-100,000 ppm	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Above 100,000 ppm	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total above leak definition	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Difficult to Monitor	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total:	8	100.0%	8	100.0%	223	100.0%	8	100.0%	130	100.0%	8	100.0%

Table 3.3 Overview per Unit, 01/01/2021-31/12/2021

Unit	Total components count	Components above leak definition						Total emission kg 01/01/2021-31/12/2021
		R1	R2	R3	R4	R5	R6	
Alroy	223	0	0	0	0	0	0	6.08
Total:	223	0	0	0	0	0	0	6.08

Table 3.4 – Monitoring results, 01/01/2021-31/12/2021, last known situation.

The last known situation of Energy Infrastructures LTD indicates there are no leaks.

0 "difficult to monitor" sources.

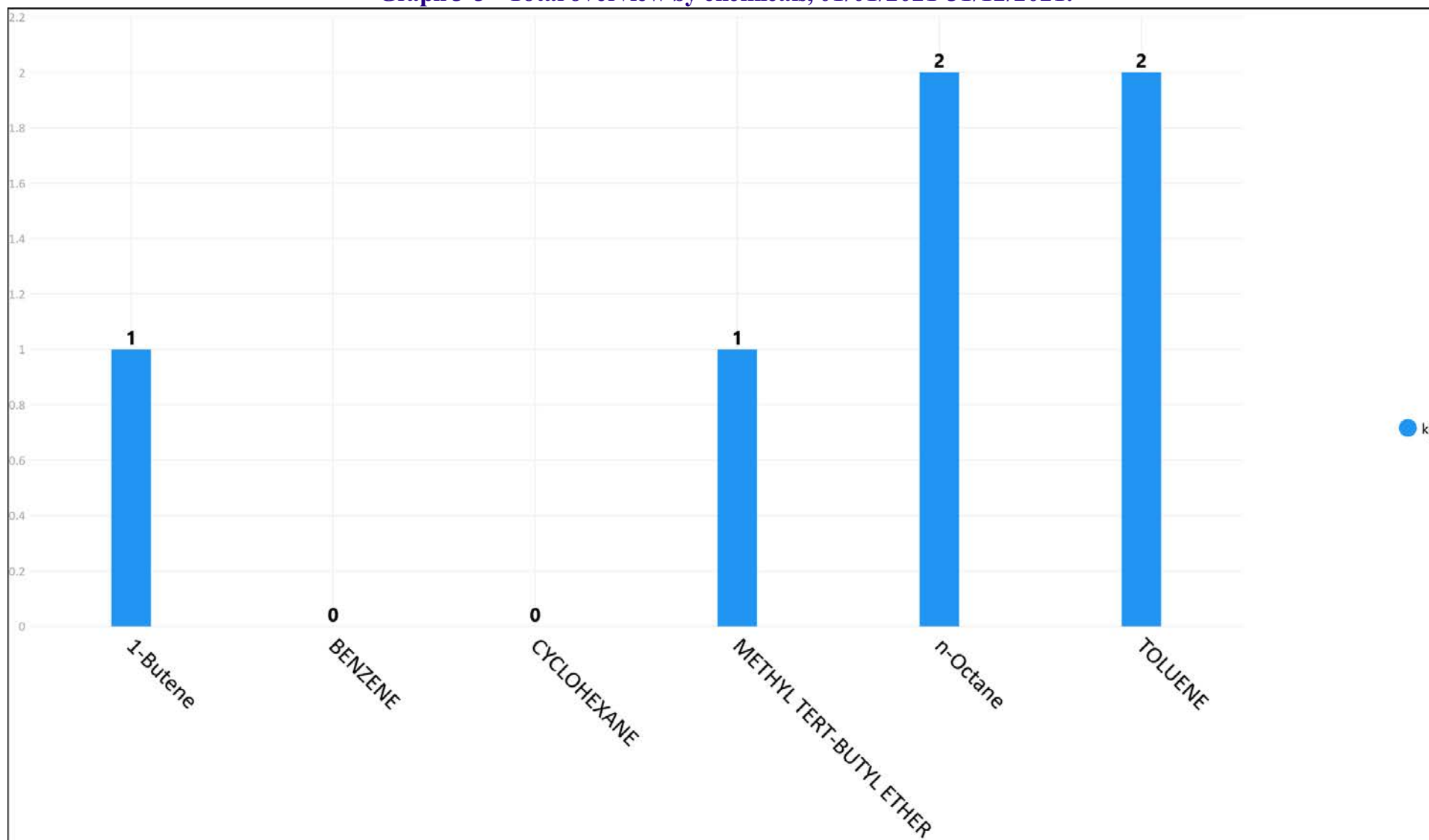
223 default-zero sources (0ppm).

0 registered sources (1-999ppm).

0 components above leak definition

Component Class	Total components count	Components 1-499ppm count	Components 500-749ppm count	Components 750-999ppm count	Components above leak definition (1,000 ppm) count	% of components 1-999ppm %	% of components above leak definition %
PRD	4	0	0	0	0	0.00%	0.00%
Sampling Point	4	0	0	0	0	0.00%	0.00%
Stem Valve	20	0	0	0	0	0.00%	0.00%
Open End	102	0	0	0	0	0.00%	0.00%
Flange	55	0	0	0	0	0.00%	0.00%
Connection	38	0	0	0	0	0.00%	0.00%
Total:	223	0	0	0	0	0.00%	0.00%

Graph 3-5 - Total overview by chemicals, 01/01/2021-31/12/2021.



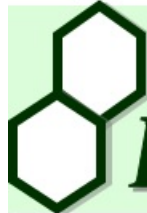
4 . Historical overview

Table 4.1 – Historical overview by component class, 2019-2021 .

Component Class	Total Components above leak definition count, summary of all rounds			% of components above leak definition, average of all rounds) %			Total Emissions kg		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
PRD	0	0	0	0.00%	0.00%	0.00%	0.14	0.14	0.14
Sampling Point	0	0	0	0.00%	0.00%	0.00%	1.35	0.3	0.14
Total Group 1	0	0	0	0.00%	0.00%	0.00%	1.49	0.44	0.28
Stem Valve	0	0	0	0.00%	0.00%	0.00%	1.37	1.37	1.37
Open End	0	0	0	0.00%	0.00%	0.00%	2.25	1.79	1.79
Total Group 2	0	0	0	0.00%	0.00%	0.00%	3.61	3.16	3.15
Flange	0	0	0	0.00%	0.00%	0.00%	0.15	0.15	0.15
Connection	0	0	0	0.00%	0.00%	0.00%	2.5	2.5	2.5
Total Group 3	0	0	0	0.00%	0.00%	0.00%	2.65	2.65	2.65
Total:	0	0	0	0.00%	0.00%	0.00%	7.75	6.26	6.08

Table 4.1 – Historical Overview by Unit, 2019-2021

Unit	Total Components above leak definition, summary of all rounds			Total emission kg		
	2019	2020	2021	2019	2020	2021
Alroy	0	0	0	7.75	6.26	6.08
Total:	0	0	0	7.75	6.26	6.08



5. Detailed monitoring summary

01/01/2021-31/12/2021

12/92

Table 5.2 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary Cumulative

Equation Set: Refinery

Units of Measurement: KG

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.014
	BENZENE	71-43-2	0.0014
	CYCLOHEXANE	110-82-7	0.007
	METHYL TERT-BUTYL ETHER	1634-04-4	0.014
	n-Octane	111-65-9	0.0561
	TOLUENE	108-88-3	0.0477
			0.1402
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.014
	BENZENE	71-43-2	0.0014
	CYCLOHEXANE	110-82-7	0.007
	METHYL TERT-BUTYL ETHER	1634-04-4	0.014
	n-Octane	111-65-9	0.0561
	TOLUENE	108-88-3	0.0477
			0.1402
<u>Component Class:</u> Stem Valve	1-Butene	106-98-9	0.1367
	BENZENE	71-43-2	0.0137
	CYCLOHEXANE	110-82-7	0.0683
	METHYL TERT-BUTYL ETHER	1634-04-4	0.1367
	n-Octane	111-65-9	0.5466
	TOLUENE	108-88-3	0.4646
			1.3666
<u>Component Class:</u> Open End	1-Butene	106-98-9	0.1787
	BENZENE	71-43-2	0.0179
	CYCLOHEXANE	110-82-7	0.0894
	METHYL TERT-BUTYL ETHER	1634-04-4	0.1787
	n-Octane	111-65-9	0.7148
	TOLUENE	108-88-3	0.6076
			1.7871

Table 5.2 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary Cumulative

Equation Set: Refinery

Units of Measurement: KG

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> Flange	1-Butene	106-98-9	0.0149
	BENZENE	71-43-2	0.0015
	CYCLOHEXANE	110-82-7	0.0075
	METHYL TERT-BUTYL ETHER	1634-04-4	0.0149
	n-Octane	111-65-9	0.0597
	TOLUENE	108-88-3	0.0508
			0.1493
<u>Component Class:</u> Connection	1-Butene	106-98-9	0.2497
	BENZENE	71-43-2	0.025
	CYCLOHEXANE	110-82-7	0.1248
	METHYL TERT-BUTYL ETHER	1634-04-4	0.2497
	n-Octane	111-65-9	0.9986
	TOLUENE	108-88-3	0.8488
			2.4966
<u>Component Class:</u> All	1-Butene	106-98-9	0.608
	BENZENE	71-43-2	0.0609
	CYCLOHEXANE	110-82-7	0.304
	METHYL TERT-BUTYL ETHER	1634-04-4	0.608
	n-Octane	111-65-9	2.4319
	TOLUENE	108-88-3	2.0672
			6.08
<u>Grand Total</u>			6.08

Table 5.3-LDAR report for production facilities

Plant								Unit											
Energy Infrastructures LTD								Alroy											
Round	Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt

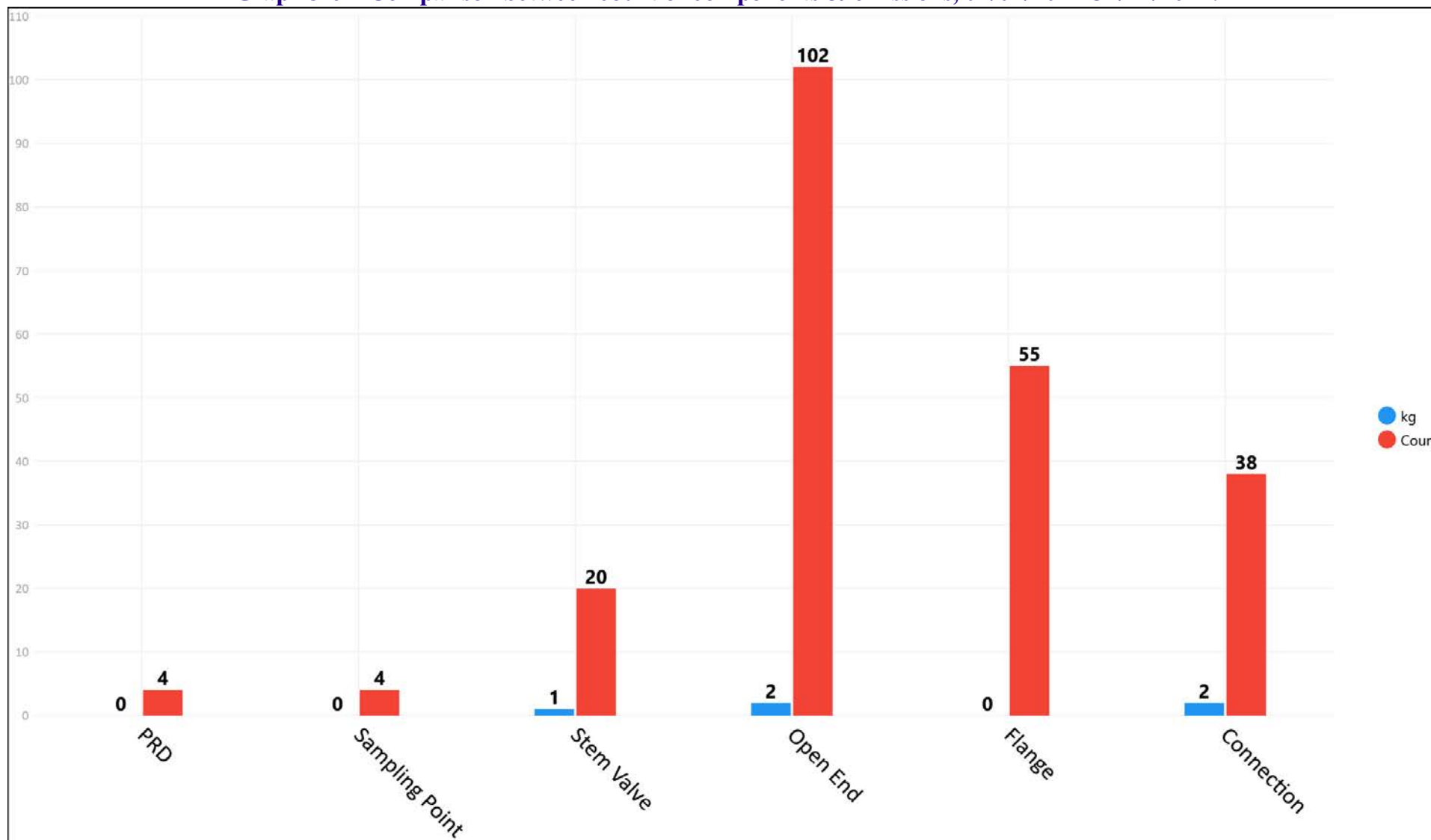
Table 5.4-LDAR report for production facilities

In the table below we provided a list of components with more than 5 Leaks during the last 12 months as follows: $\geq 10,000$ ppm, or more than 3 drops per minute or $\geq 1,000$ ppm for PRDs

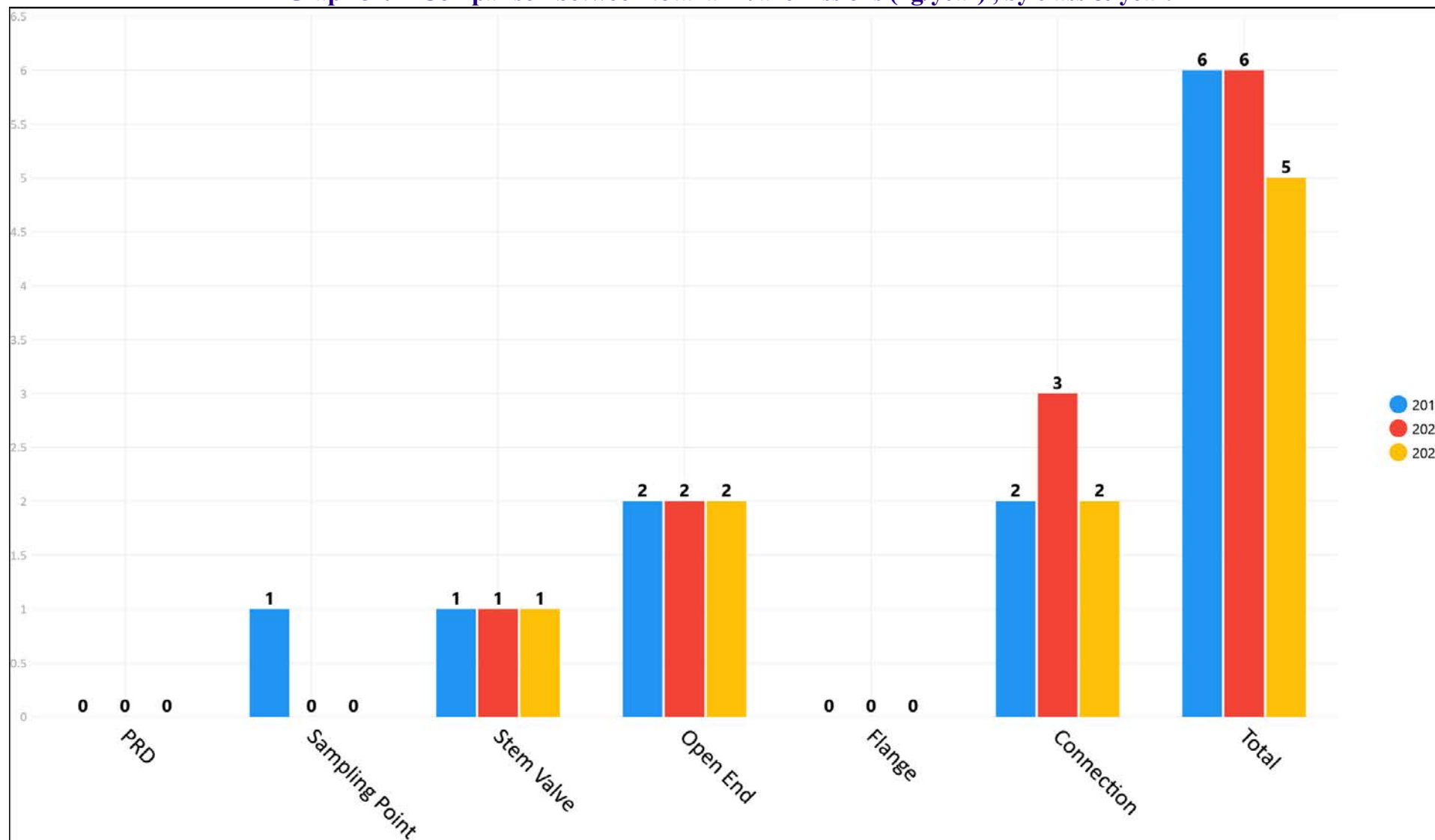
Plant	Unit	Monitoring Round
Energy Infrastructures LTD	Alroy	Round 1-2-3-4-5-6

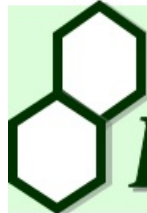
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt

Graph 5-6 – Comparison between count of components & emissions, 01/01/2021-31/12/2021.



Graph 5-7 – Comparison between total annual emissions (kg/year) , by class & year.





6. Summary by monitoring period, Round 1

In the chapter "Summary by monitoring period" we present two scenarios:

1. Estimated annual emission rate, calculated according to hourly emission rate obtained by the first measurement without reference to a round of repairs.
2. Estimated annual emission rate, calculated according to hourly emission rate obtained at the end of the last round of repairs (if performed).

This data may help understand the effectiveness of the round of repairs and its effect on the full-year emission rate.

Summary of Monitoring Period Round 1

First measurement:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.1 - First measurements, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.2 – First measurement, overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Measurement after repair attempt:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.3 -Measurement after repair attempt, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.4 -Measurement after repair attempt, Overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Table 6.5 - Form 07: First Measurement and Measurement after repair

Energy Infrastructures LTD										Company name		Round 1		Monitoring round	
Alroy										Production Unit		First measurement		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State			
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6												GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL			
6												HL	Sampling Point		
6												GV			
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL			
6												HL			
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Subtotal G1			
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Total Components			
												0.28	Total Annual Emission Rate		
Energy infrastructures LTD										Company name		Round 1		Monitoring round	
Alroy										Production Unit		Measurement after repair attempt		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750- 999 ppm	Components in reading range 500- 749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State			
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6												GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL			
6												HL	Sampling Point		
6												GV			
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL			
6												HL			
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Subtotal G1			
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Total Components			
												0.28	Total Annual Emission Rate		

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

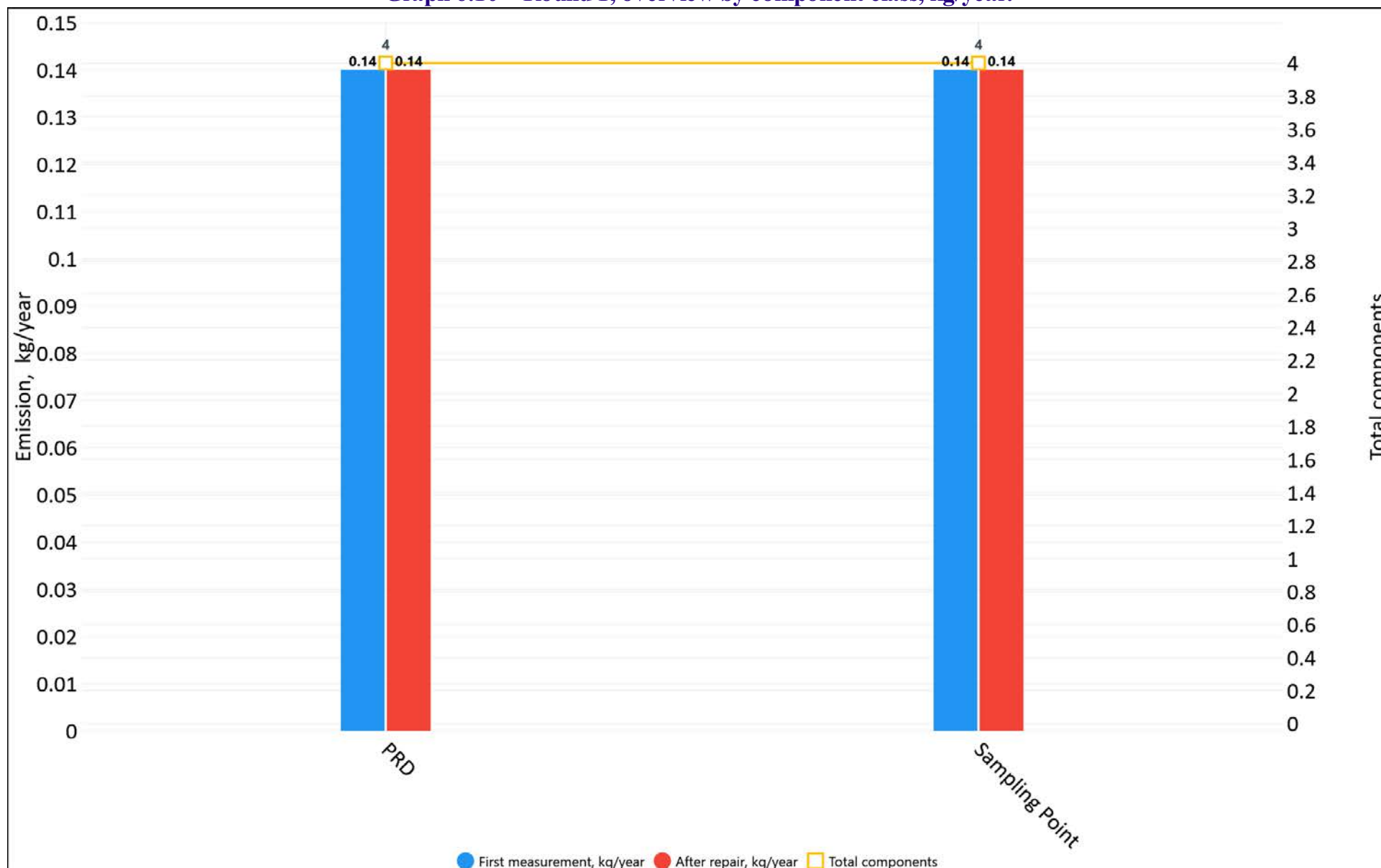
Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

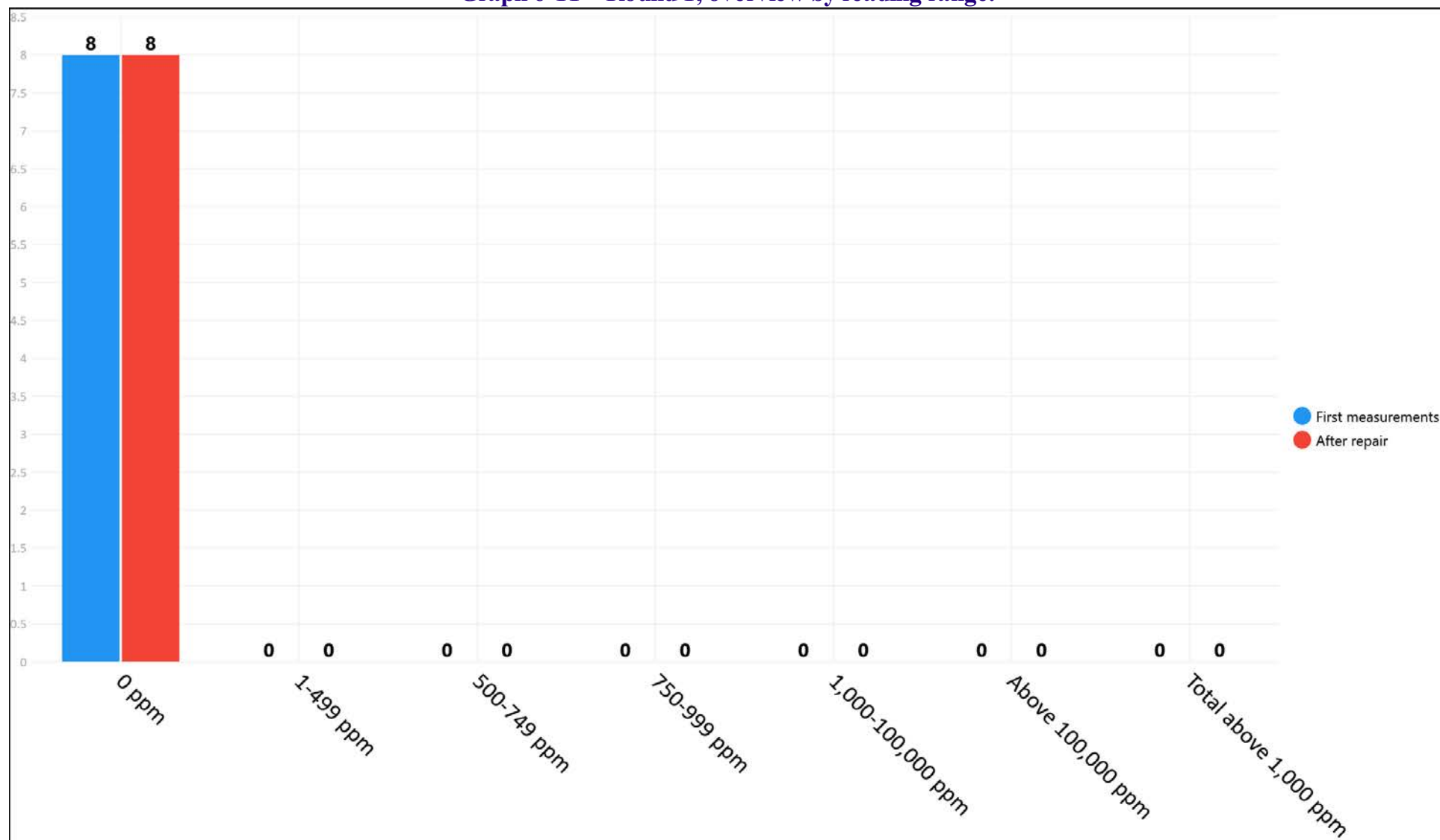
Table 6.8-LDAR report for production facilities

Plant										Unit									
Energy Infrastructures LTD										Alroy									
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	

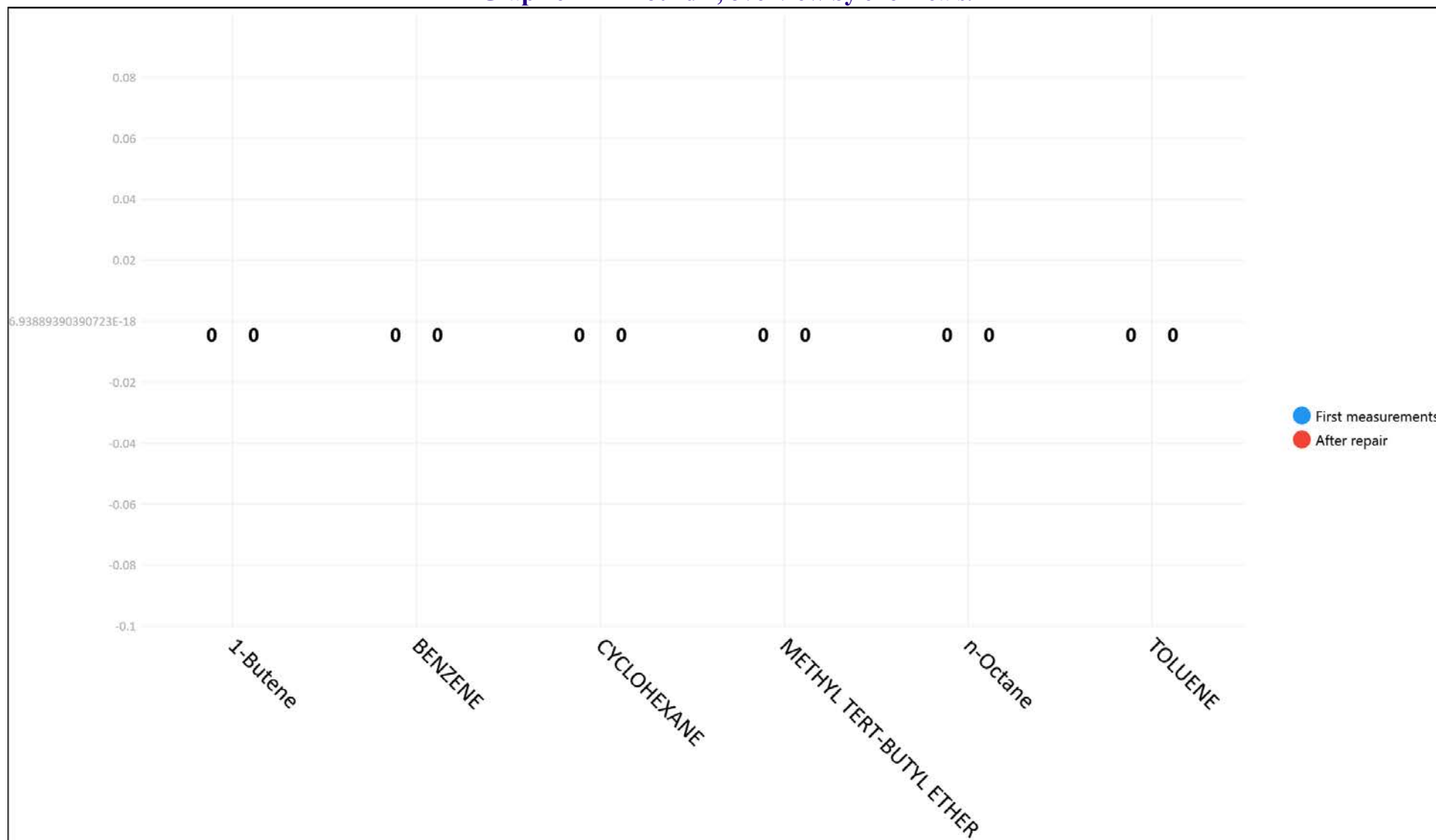
Graph 6.10 – Round 1, overview by component class, kg/year.



Graph 6-11 – Round 1, overview by reading range.



Graph 6-12 – Round 1, overview by chemicals.





6. Summary by monitoring period, Round 2

In the chapter "Summary by monitoring period" we present two scenarios:

1. Estimated annual emission rate, calculated according to hourly emission rate obtained by the first measurement without reference to a round of repairs.
2. Estimated annual emission rate, calculated according to hourly emission rate obtained at the end of the last round of repairs (if performed).

This data may help understand the effectiveness of the round of repairs and its effect on the full-year emission rate.

Summary of Monitoring Period Round 2

First measurement:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.1 - First measurements, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.2 – First measurement, overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Measurement after repair attempt:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.3 -Measurement after repair attempt, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.4 -Measurement after repair attempt, Overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Table 6.5 - Form 07: First Measurement and Measurement after repair

Energy Infrastructures LTD										Company name		Round 2		Monitoring round	
Alroy										Production Unit		First measurement		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State			
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6												GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL			
6												HL	Sampling Point		
6												GV			
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL			
6												HL			
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Subtotal G1			
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Total Components			
												0.28 Total Annual Emission Rate			
Energy Infrastructures LTD										Company name		Round 2		Monitoring round	
Alroy										Production Unit		Measurement after repair attempt		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750- 999 ppm	Components in reading range 500- 749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State			
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6												GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL			
6												HL	Sampling Point		
6												GV			
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL			
6												HL			
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Subtotal G1			
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Total Components			
												0.28 Total Annual Emission Rate			

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

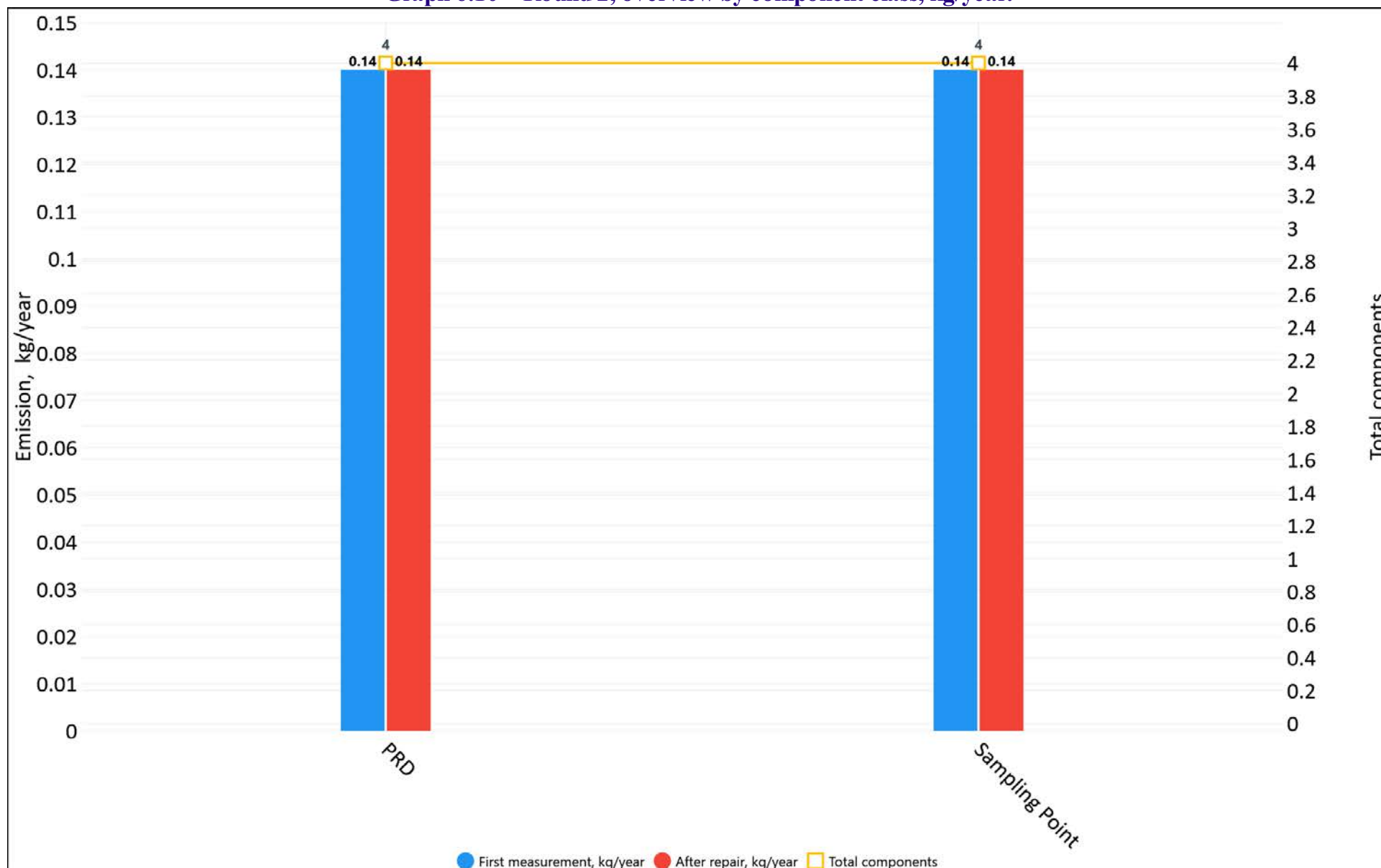
Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

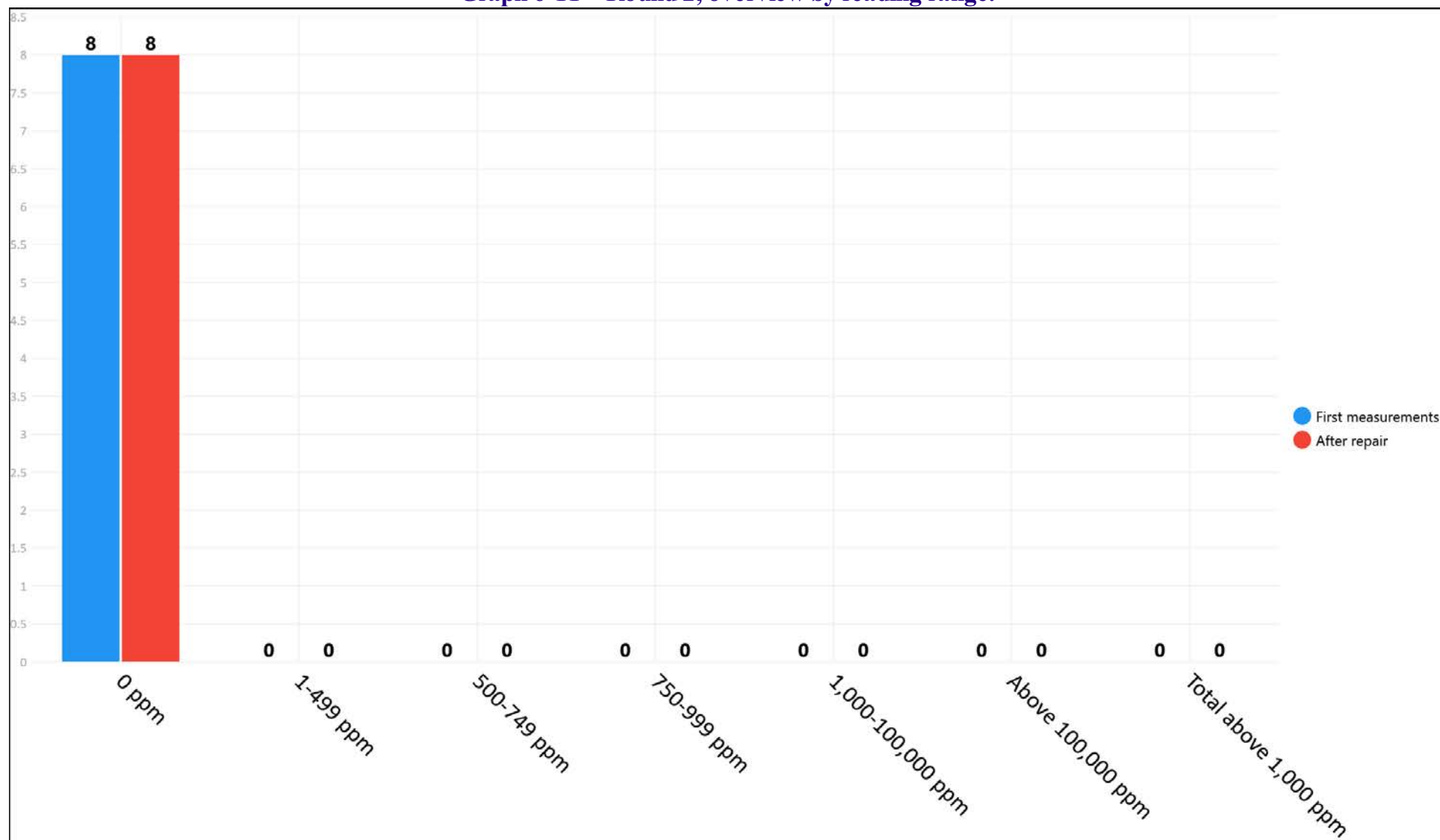
Table 6.8-LDAR report for production facilities

Plant										Unit									
Energy Infrastructures LTD										Alroy									
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	

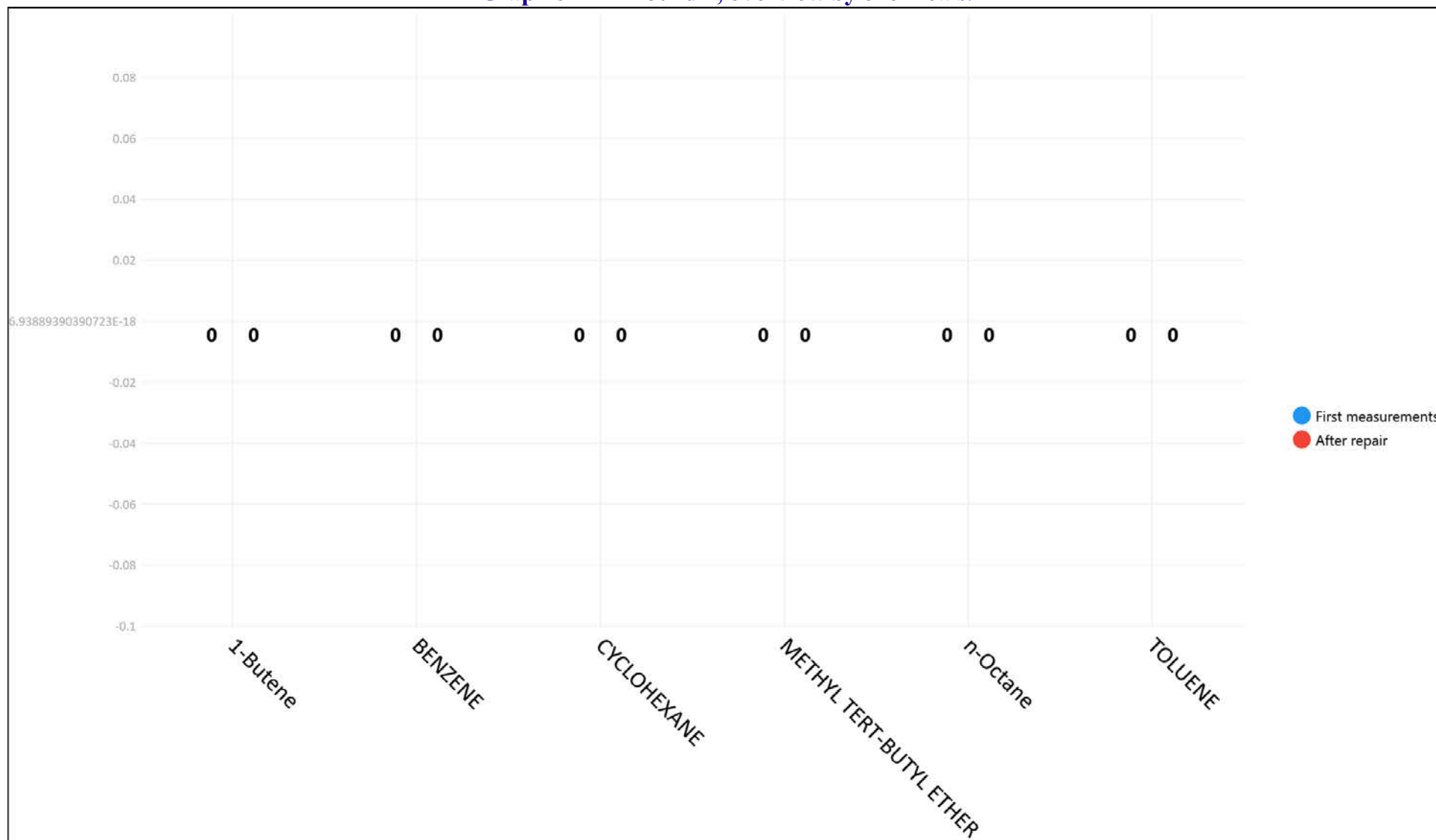
Graph 6.10 – Round 2, overview by component class, kg/year.

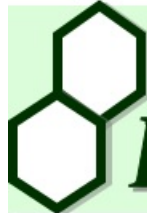


Graph 6-11 – Round 2, overview by reading range.



Graph 6-12 – Round 2, overview by chemicals.





6. Summary by monitoring period, Round 3

In the chapter "Summary by monitoring period" we present two scenarios:

1. Estimated annual emission rate, calculated according to hourly emission rate obtained by the first measurement without reference to a round of repairs.
2. Estimated annual emission rate, calculated according to hourly emission rate obtained at the end of the last round of repairs (if performed).

This data may help understand the effectiveness of the round of repairs and its effect on the full-year emission rate.

Summary of Monitoring Period Round 3

First measurement:

0 "difficult to monitor" sources.

223 default-zero sources with a calculated emission rate: **6.06 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **6.06 kg/year**

Table 6.1 - First measurements, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Stem Valve	20	0	0	0.00%	0	1.36
Open End	102	0	0	0.00%	0	1.78
Flange	55	0	0	0.00%	0	0.15
Connection	38	0	0	0.00%	0	2.49
Total:	223	0	0	0.00%	0	6.06

Table 6.2 – First measurement, overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	223	100.00%	6.06	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	223	100%	6.06	100%

Measurement after repair attempt:

0 "difficult to monitor" sources.

223 default-zero sources with a calculated emission rate: **6.06 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **6.06 kg/year**

Table 6.3 -Measurement after repair attempt, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Stem Valve	20	0	0	0.00%	0	1.36
Open End	102	0	0	0.00%	0	1.78
Flange	55	0	0	0.00%	0	0.15
Connection	38	0	0	0.00%	0	2.49
Total:	223	0	0	0.00%	0	6.06

Table 6.4 -Measurement after repair attempt, Overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	223	100.00%	6.06	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	223	100%	6.06	100%

Table 6.5 - Form 07: First Measurement and Measurement after repair

Energy Infrastructures LTD										Company name		Round 3		Monitoring round			
Alroy										Production Unit		First measurement		Component Class	Group		
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State					
cycles/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count					
6													GV	PRD	G1		
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL					
6												HL					
6												GV	Sampling Point				
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL					
6												HL					
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Subtotal G1					
2													GV	Stem Valve	G2		
2	0.0%	1.36	0	0	0	0	20	20	0	0	20	LL					
2												HL					
2												GV	Open End				
2	0.0%	1.78	0	0	0	0	102	102	0	0	102	LL					
2												HL					
	0.0%	3.14	0	0	0	0	122	122	0	0	122	Subtotal G2					
1													GV	Flange	G3		
1	0.0%	0.15	0	0	0	0	55	55	0	0	55	LL					
1												HL					
1												GV	Connection				
1	0.0%	2.49	0	0	0	0	38	38	0	0	38	LL					
1												HL					
	0.0%	2.64	0	0	0	0	93	93	0	0	93	Subtotal G3					
	0.0%	6.06	0	0	0	0	223	223	0	0	223	Total Components					
												6.06		Total Annual Emission Rate			
Energy Infrastructures LTD										Company name		Round 3		Monitoring round			
Alroy										Production Unit		Measurement after repair attempt		Component Class	Group		
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750- 999 ppm	Components in reading range 500- 749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State					
cycles/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count						
6													GV	PRD	G1		
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL					
6												HL					
6												GV	Sampling Point				
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL					
6												HL					
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Subtotal G1					
2													GV	Stem Valve	G2		
2	0.0%	1.36	0	0	0	0	0	20	0	0	20	LL					
2												HL					
2												GV	Open End				
2	0.0%	1.78	0	0	0	0	0	102	0	0	102	LL					
2												HL					
	0.0%	3.14	0	0	0	0	0	122	0	0	122	Subtotal G2					
1													GV	Flange	G3		
1	0.0%	0.15	0	0	0	0	0	55	0	0	55	LL					
1												HL					
1												GV	Connection				
1	0.0%	2.49	0	0	0	0	0	38	0	0	38	LL					
1												HL					
	0.0%	2.64	0	0	0	0	0	93	0	0	93	Subtotal G3					
	0.0%	6.06	0	0	0	0	0	223	0	0	223	Total Components					
												6.06		Total Annual Emission Rate			

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
Component Class:	1-Butene	106-98-9	0.01
PRD	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
Component Class:	1-Butene	106-98-9	0.01
Sampling Point	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
Component Class:	1-Butene	106-98-9	0.14
Stem Valve	BENZENE	71-43-2	0.01
	CYCLOHEXANE	110-82-7	0.07
	METHYL TERT-BUTYL ETHER	1634-04-4	0.14
	n-Octane	111-65-9	0.55
	TOLUENE	108-88-3	0.46
			1.37
Component Class:	1-Butene	106-98-9	0.18
Open End	BENZENE	71-43-2	0.02
	CYCLOHEXANE	110-82-7	0.09
	METHYL TERT-BUTYL ETHER	1634-04-4	0.18
	n-Octane	111-65-9	0.71
	TOLUENE	108-88-3	0.61
			1.79

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
Component Class:	1-Butene	106-98-9	0.01
Flange	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
Component Class:	1-Butene	106-98-9	0.25
Connection	BENZENE	71-43-2	0.02
	CYCLOHEXANE	110-82-7	0.12
	METHYL TERT-BUTYL ETHER	1634-04-4	0.25
	n-Octane	111-65-9	1
	TOLUENE	108-88-3	0.85
			2.49
Component Class:	1-Butene	106-98-9	0.6
All	BENZENE	71-43-2	0.05
	CYCLOHEXANE	110-82-7	0.31
	METHYL TERT-BUTYL ETHER	1634-04-4	0.6
	n-Octane	111-65-9	2.44
	TOLUENE	108-88-3	2.07
			6.07
Grand Total			6.07

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Stem Valve	1-Butene	106-98-9	0.14
	BENZENE	71-43-2	0.01
	CYCLOHEXANE	110-82-7	0.07
	METHYL TERT-BUTYL ETHER	1634-04-4	0.14
	n-Octane	111-65-9	0.55
	TOLUENE	108-88-3	0.46
			1.37
<u>Component Class:</u> Open End	1-Butene	106-98-9	0.18
	BENZENE	71-43-2	0.02
	CYCLOHEXANE	110-82-7	0.09
	METHYL TERT-BUTYL ETHER	1634-04-4	0.18
	n-Octane	111-65-9	0.71
	TOLUENE	108-88-3	0.61
			1.79

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

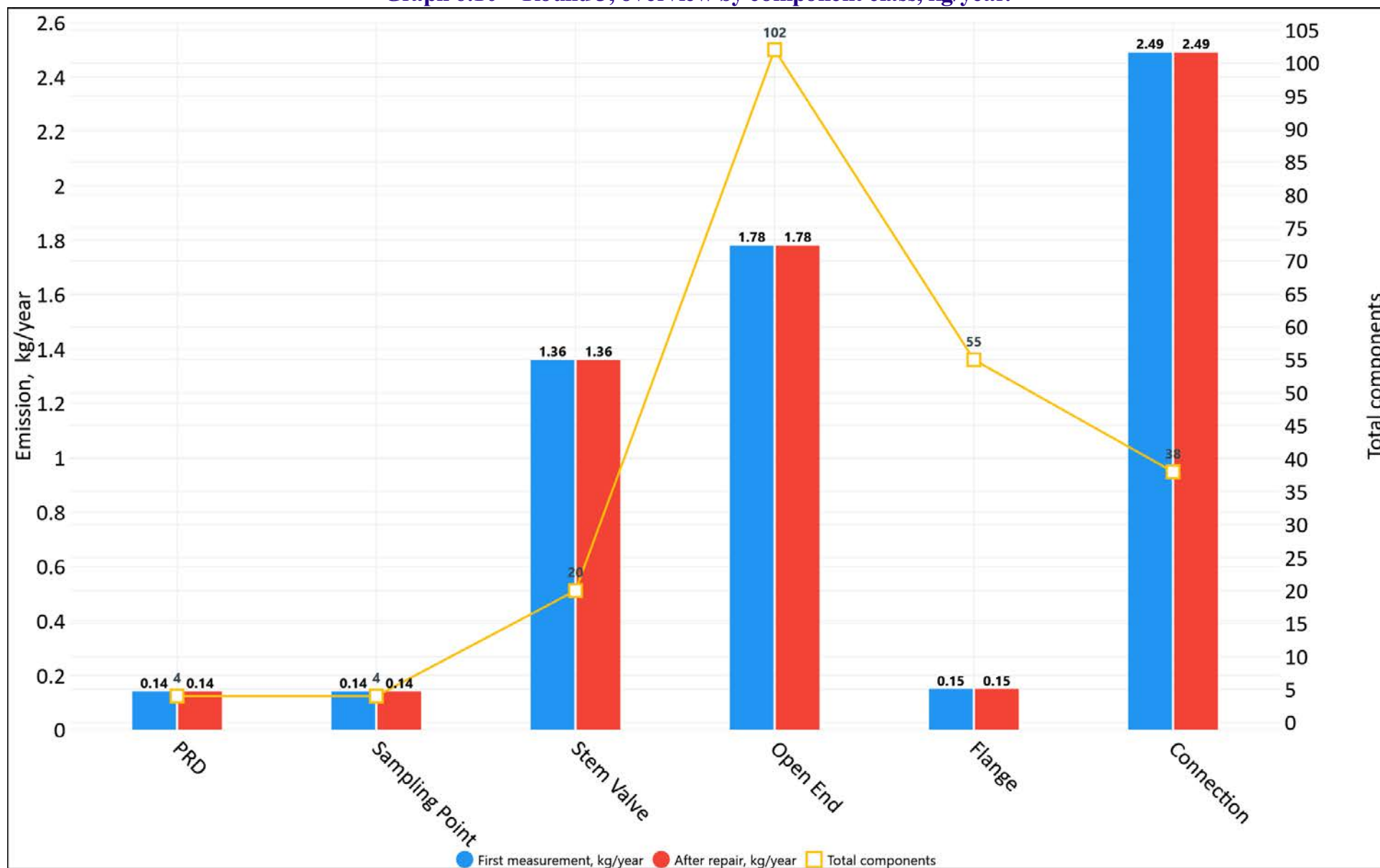
Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
Component Class:	1-Butene	106-98-9	0.01
Flange	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
Component Class:	1-Butene	106-98-9	0.25
Connection	BENZENE	71-43-2	0.02
	CYCLOHEXANE	110-82-7	0.12
	METHYL TERT-BUTYL ETHER	1634-04-4	0.25
	n-Octane	111-65-9	1
	TOLUENE	108-88-3	0.85
			2.49
Component Class:	1-Butene	106-98-9	0.6
All	BENZENE	71-43-2	0.05
	CYCLOHEXANE	110-82-7	0.31
	METHYL TERT-BUTYL ETHER	1634-04-4	0.6
	n-Octane	111-65-9	2.44
	TOLUENE	108-88-3	2.07
			6.07
Grand Total			6.07

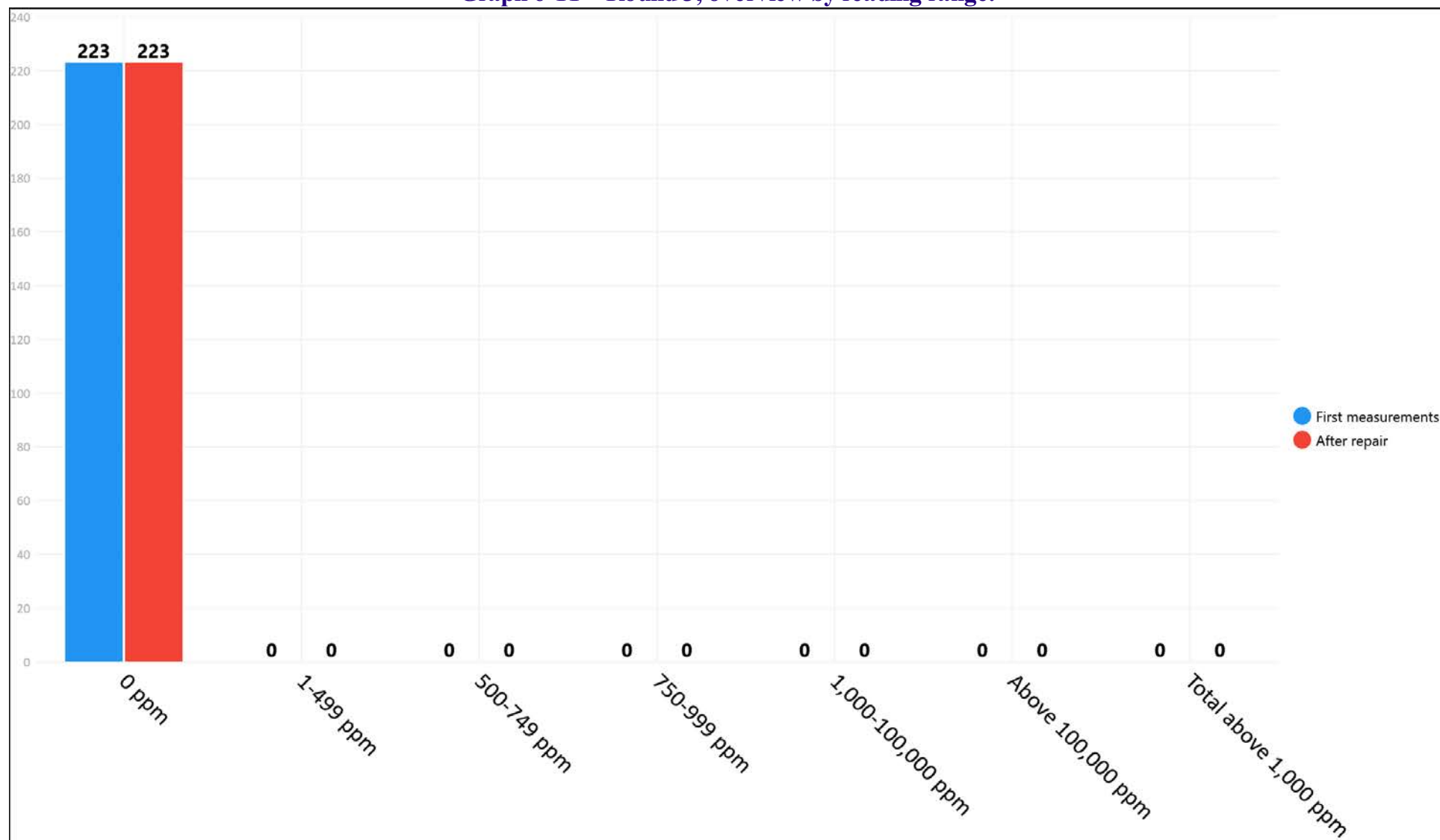
Table 6.8-LDAR report for production facilities

Plant										Unit									
Energy Infrastructures LTD										Alroy									
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	

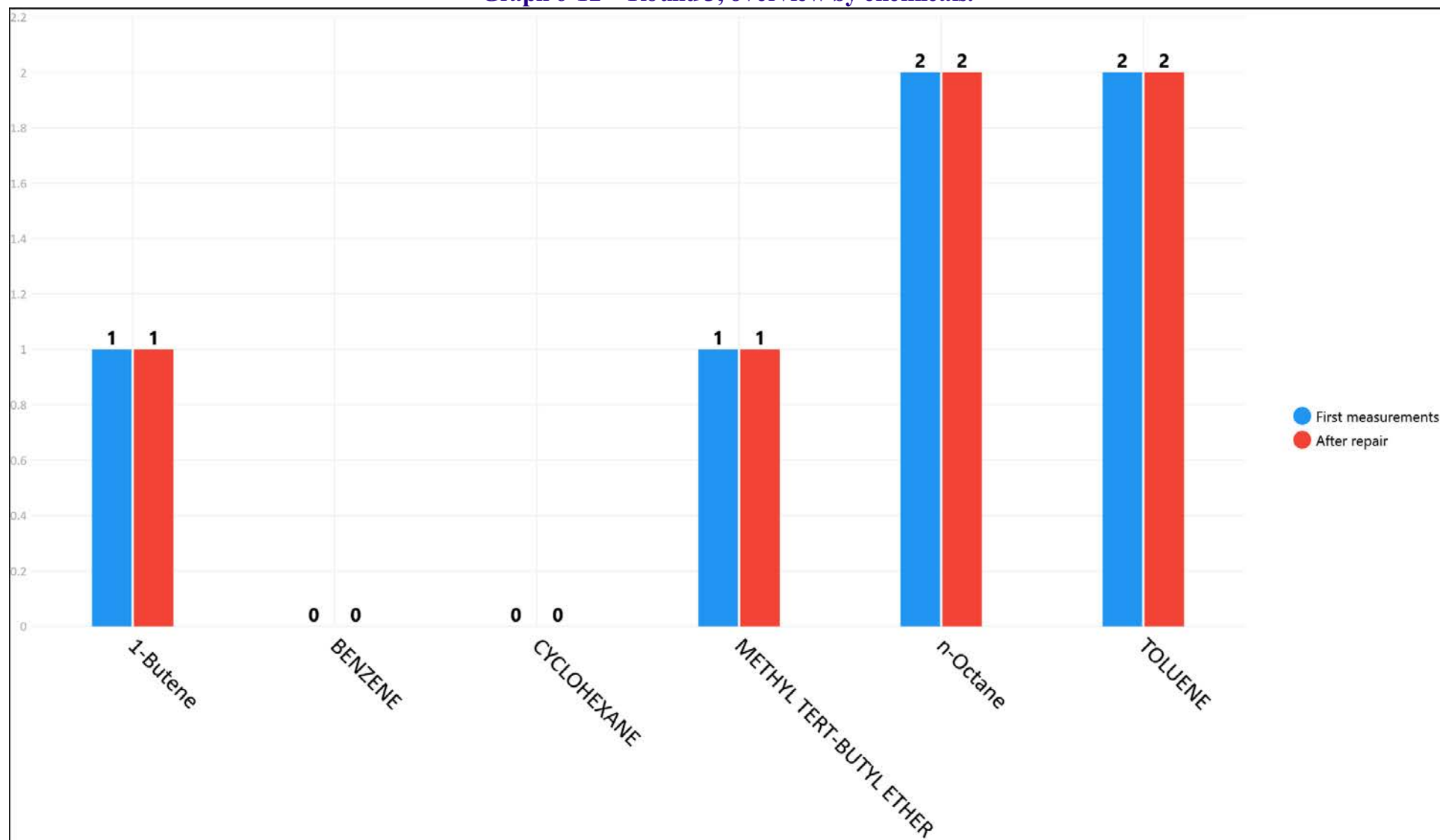
Graph 6.10 – Round 3, overview by component class, kg/year.

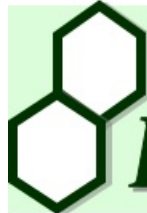


Graph 6-11 – Round 3, overview by reading range.



Graph 6-12 – Round 3, overview by chemicals.





6. Summary by monitoring period, Round 4

In the chapter "Summary by monitoring period" we present two scenarios:

1. Estimated annual emission rate, calculated according to hourly emission rate obtained by the first measurement without reference to a round of repairs.
2. Estimated annual emission rate, calculated according to hourly emission rate obtained at the end of the last round of repairs (if performed).

This data may help understand the effectiveness of the round of repairs and its effect on the full-year emission rate.

Summary of Monitoring Period Round 4

First measurement:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.1 - First measurements, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.2 – First measurement, overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Measurement after repair attempt:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.3 -Measurement after repair attempt, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.4 -Measurement after repair attempt, Overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Table 6.5 - Form 07: First Measurement and Measurement after repair

Energy Infrastructures LTD										Company name		Round 4		Monitoring round	
Alroy										Production Unit		First measurement		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State			
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6												GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL			
6												HL	Sampling Point		
6												GV			
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL			
6												HL			
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Subtotal G1			
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Total Components			
												0.28 Total Annual Emission Rate			
Energy Infrastructures LTD										Company name		Round 4		Monitoring round	
Alroy										Production Unit		Measurement after repair attempt		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750- 999 ppm	Components in reading range 500- 749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State			
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6												GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL			
6												HL	Sampling Point		
6												GV			
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL			
6												HL			
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Subtotal G1			
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Total Components			
												0.28 Total Annual Emission Rate			

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

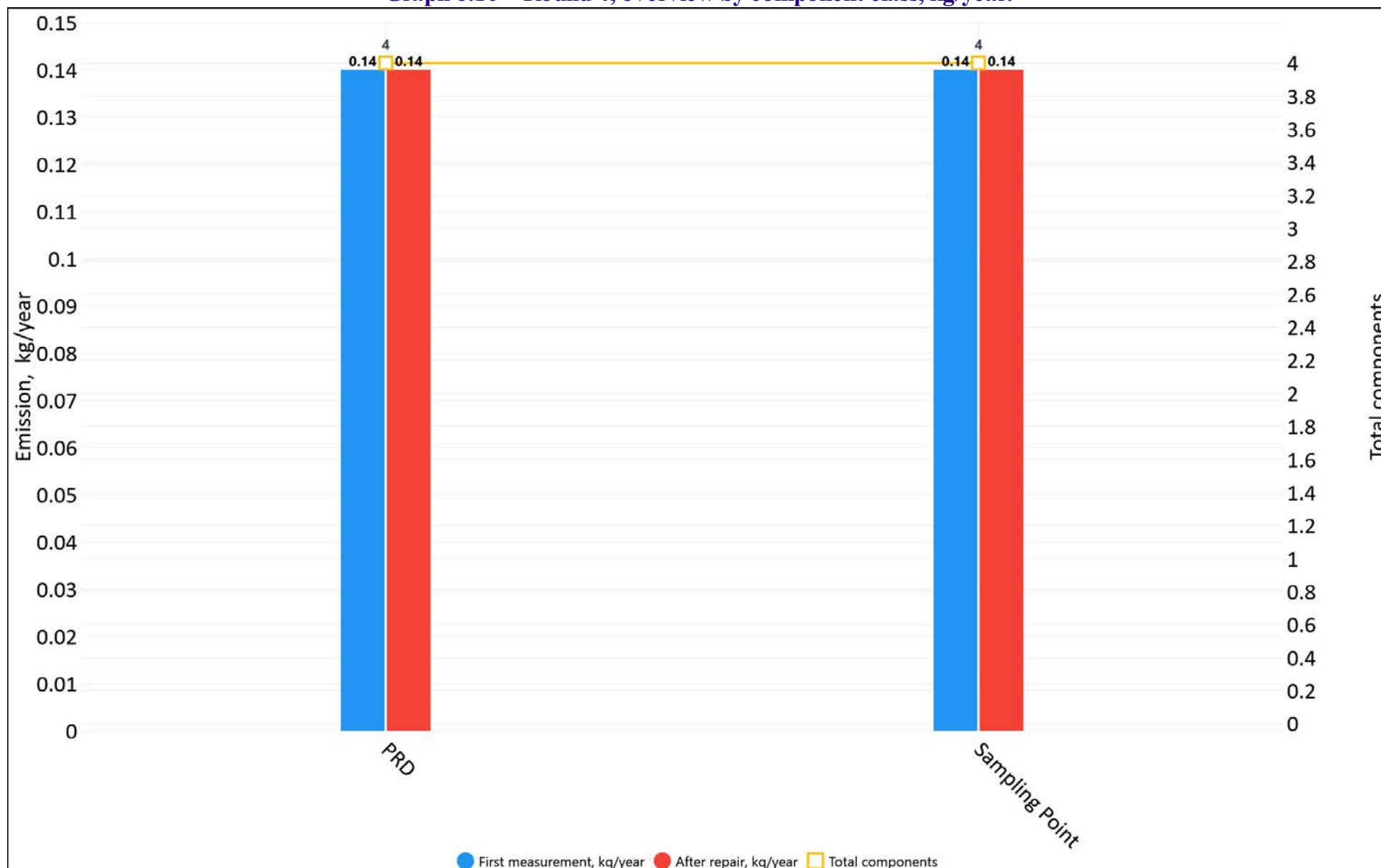
Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

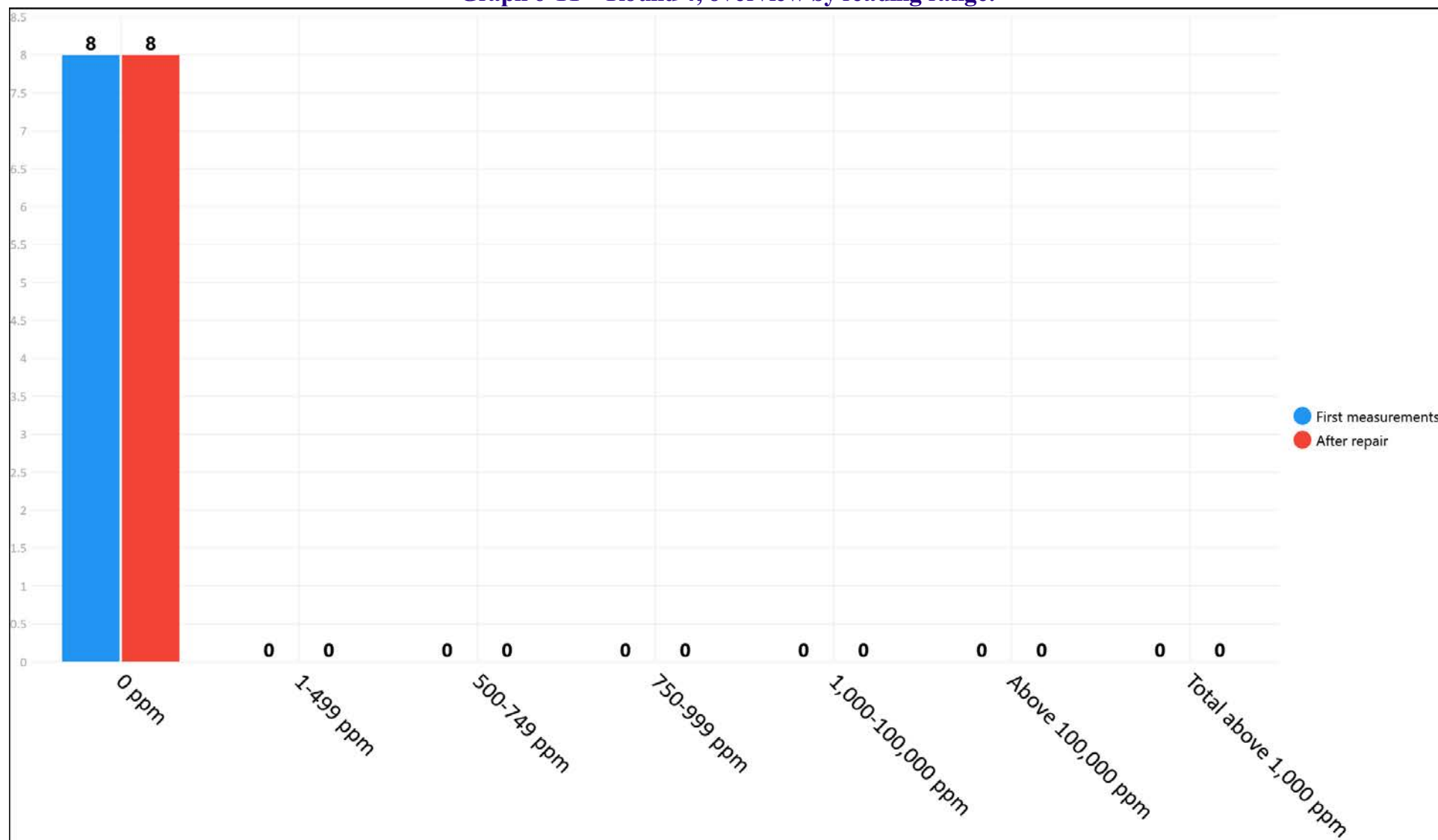
Table 6.8-LDAR report for production facilities

Plant										Unit									
Energy Infrastructures LTD										Alroy									
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	

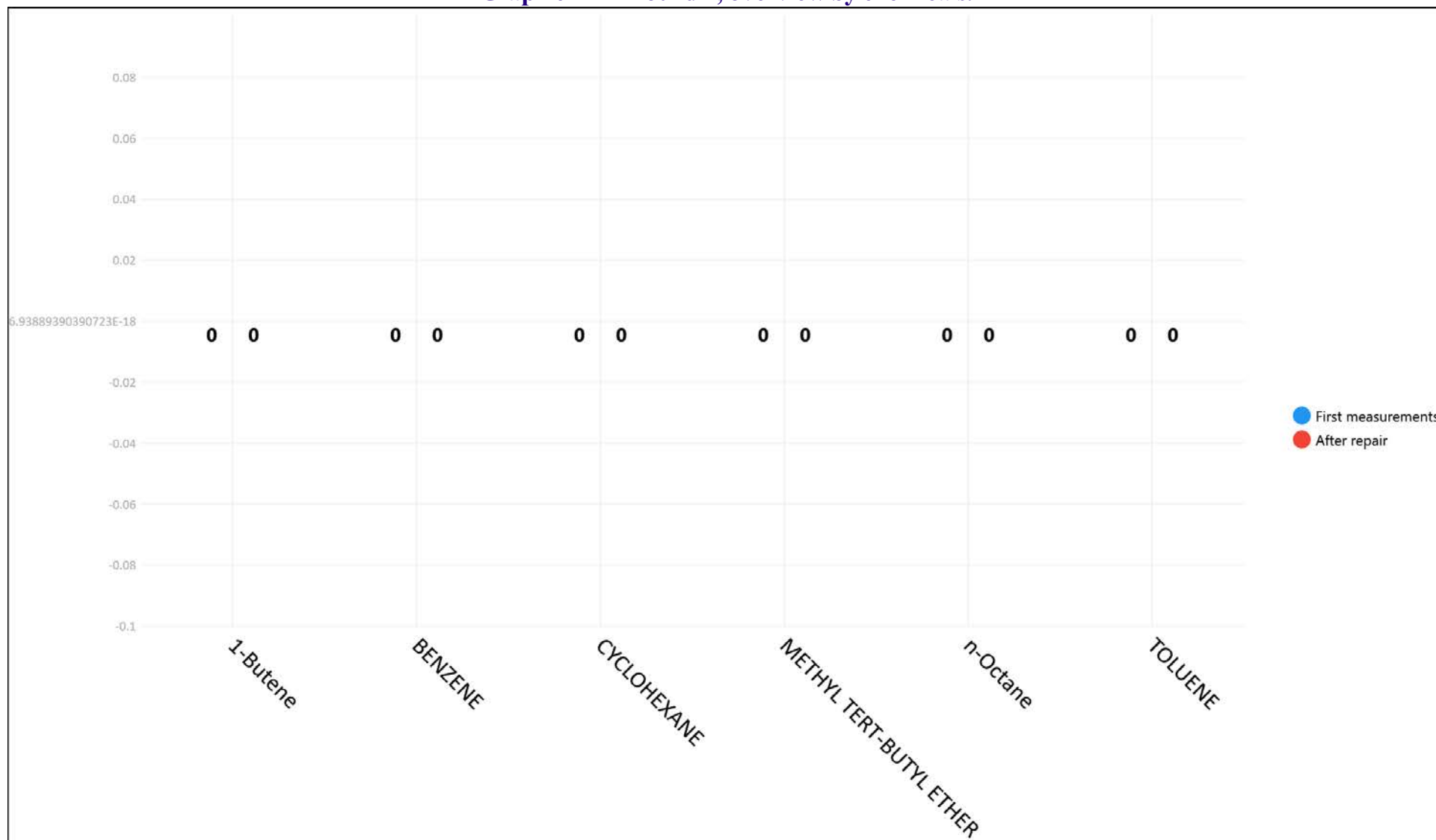
Graph 6.10 – Round 4, overview by component class, kg/year.



Graph 6-11 – Round 4, overview by reading range.



Graph 6-12 – Round 4, overview by chemicals.





6. Summary by monitoring period, Round 5

In the chapter "Summary by monitoring period" we present two scenarios:

1. Estimated annual emission rate, calculated according to hourly emission rate obtained by the first measurement without reference to a round of repairs.
2. Estimated annual emission rate, calculated according to hourly emission rate obtained at the end of the last round of repairs (if performed).

This data may help understand the effectiveness of the round of repairs and its effect on the full-year emission rate.

Summary of Monitoring Period Round 5

First measurement:

0 "difficult to monitor" sources.

130 default-zero sources with a calculated emission rate: **3.46 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **3.46 kg/year**

Table 6.1 - First measurements, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Stem Valve	20	0	0	0.00%	0	1.38
Open End	102	0	0	0.00%	0	1.8
Total:	130	0	0	0.00%	0	3.46

Table 6.2 – First measurement, overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	130	100.00%	3.46	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	130	100%	3.46	100%

Measurement after repair attempt:

0 "difficult to monitor" sources.

130 default-zero sources with a calculated emission rate: **3.46 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **3.46 kg/year**

Table 6.3 -Measurement after repair attempt, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Stem Valve	20	0	0	0.00%	0	1.38
Open End	102	0	0	0.00%	0	1.8
Total:	130	0	0	0.00%	0	3.46

Table 6.4 -Measurement after repair attempt, Overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	130	100.00%	3.46	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	130	100%	3.46	100%

Table 6.5 - Form 07: First Measurement and Measurement after repair

Energy Infrastructures LTD											Company name		Round 5		Monitoring round	
Alroy											Production Unit		First measurement		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State				
cycles/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count				
6													GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL				
6												HL				
6													GV	Sampling Point		
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL				
6												HL				
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Subtotal G1				
2													GV	Stem Valve	G2	
2	0.0%	1.38	0	0	0	0	20	20	0	0	20	LL				
2													HL			
2													GV	Open End		
2	0.0%	1.8	0	0	0	0	102	102	0	0	102	LL				
2													HL			
	0.0%	3.18	0	0	0	0	122	122	0	0	122	Subtotal G2				
	0.0%	3.46	0	0	0	0	130	130	0	0	130	Total Components				
											3.46	Total Annual Emission Rate				
Energy Infrastructures LTD											Company name		Round 5		Monitoring round	
Alroy											Production Unit		Measurement after repair attempt		Component Class	Group
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State				
cycles/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count					
6													GV	PRD	G1	
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL				
6												HL				
6													GV	Sampling Point		
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL				
6												HL				
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Subtotal G1				
2													GV	Stem Valve	G2	
2	0.0%	1.38	0	0	0	0	0	20	0	0	20	LL				
2													HL			
2													GV	Open End		
2	0.0%	1.8	0	0	0	0	0	102	0	0	102	LL				
2													HL			
	0.0%	3.18	0	0	0	0	0	122	0	0	122	Subtotal G2				
	0.0%	3.46	0	0	0	0	0	130	0	0	130	Total Components				
											3.46	Total Annual Emission Rate				

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Stem Valve	1-Butene	106-98-9	0.14
	BENZENE	71-43-2	0.01
	CYCLOHEXANE	110-82-7	0.07
	METHYL TERT-BUTYL ETHER	1634-04-4	0.14
	n-Octane	111-65-9	0.55
	TOLUENE	108-88-3	0.47
			1.38
<u>Component Class:</u> Open End	1-Butene	106-98-9	0.18
	BENZENE	71-43-2	0.02
	CYCLOHEXANE	110-82-7	0.09
	METHYL TERT-BUTYL ETHER	1634-04-4	0.18
	n-Octane	111-65-9	0.72
	TOLUENE	108-88-3	0.61
			1.8

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u>	1-Butene	106-98-9	0.34
All	BENZENE	71-43-2	0.03
	CYCLOHEXANE	110-82-7	0.18
	METHYL TERT-BUTYL ETHER	1634-04-4	0.34
	n-Octane	111-65-9	1.39
	TOLUENE	108-88-3	1.18
			<u>3.46</u>
<u>Grand Total</u>			<u>3.46</u>

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
Component Class: PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
Component Class: Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
Component Class: Stem Valve	1-Butene	106-98-9	0.14
	BENZENE	71-43-2	0.01
	CYCLOHEXANE	110-82-7	0.07
	METHYL TERT-BUTYL ETHER	1634-04-4	0.14
	n-Octane	111-65-9	0.55
	TOLUENE	108-88-3	0.47
			1.38
Component Class: Open End	1-Butene	106-98-9	0.18
	BENZENE	71-43-2	0.02
	CYCLOHEXANE	110-82-7	0.09
	METHYL TERT-BUTYL ETHER	1634-04-4	0.18
	n-Octane	111-65-9	0.72
	TOLUENE	108-88-3	0.61
			1.8

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

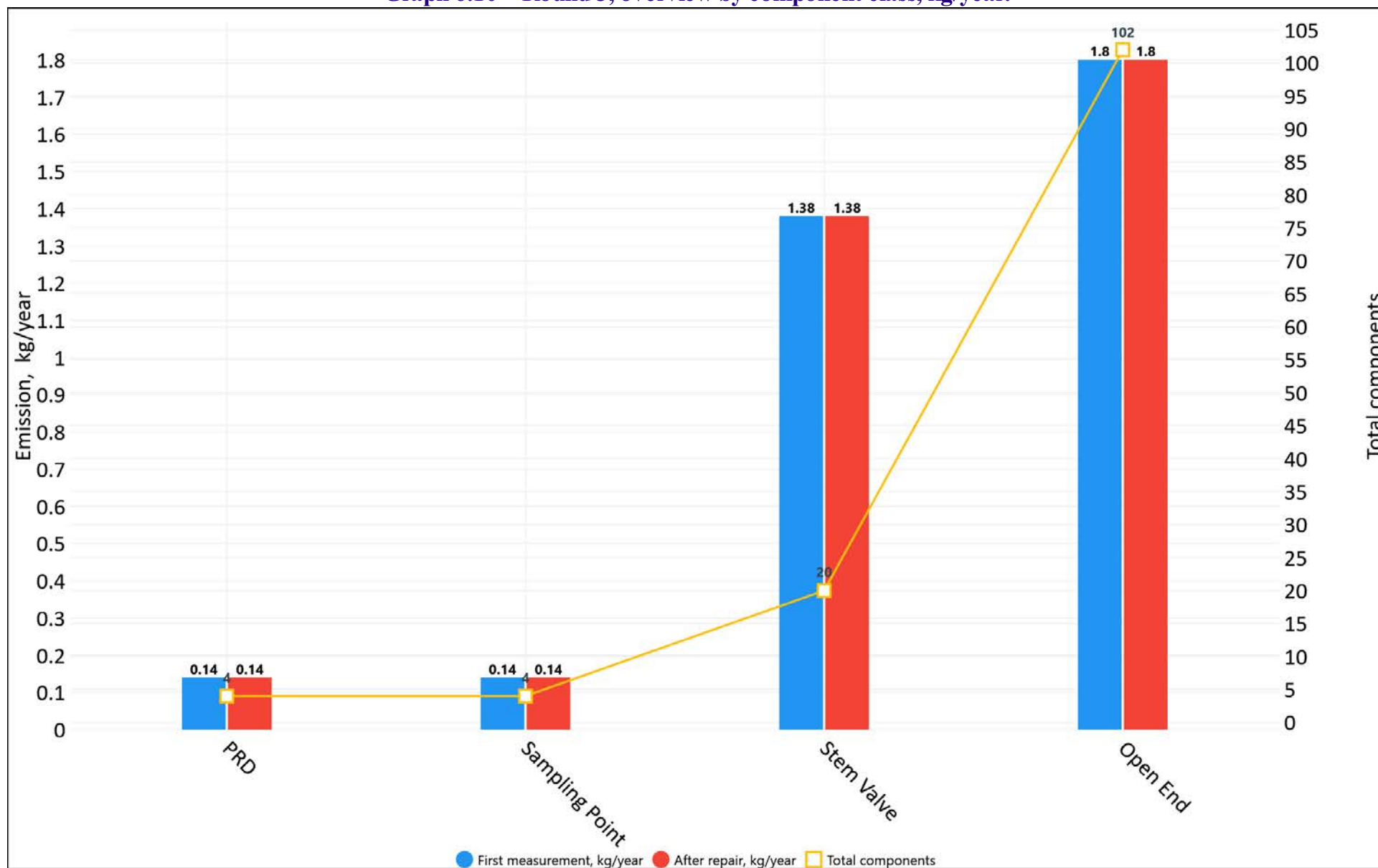
Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u>	1-Butene	106-98-9	0.34
All	BENZENE	71-43-2	0.03
	CYCLOHEXANE	110-82-7	0.18
	METHYL TERT-BUTYL ETHER	1634-04-4	0.34
	n-Octane	111-65-9	1.39
	TOLUENE	108-88-3	1.18
			<u>3.46</u>
<u>Grand Total</u>			<u>3.46</u>

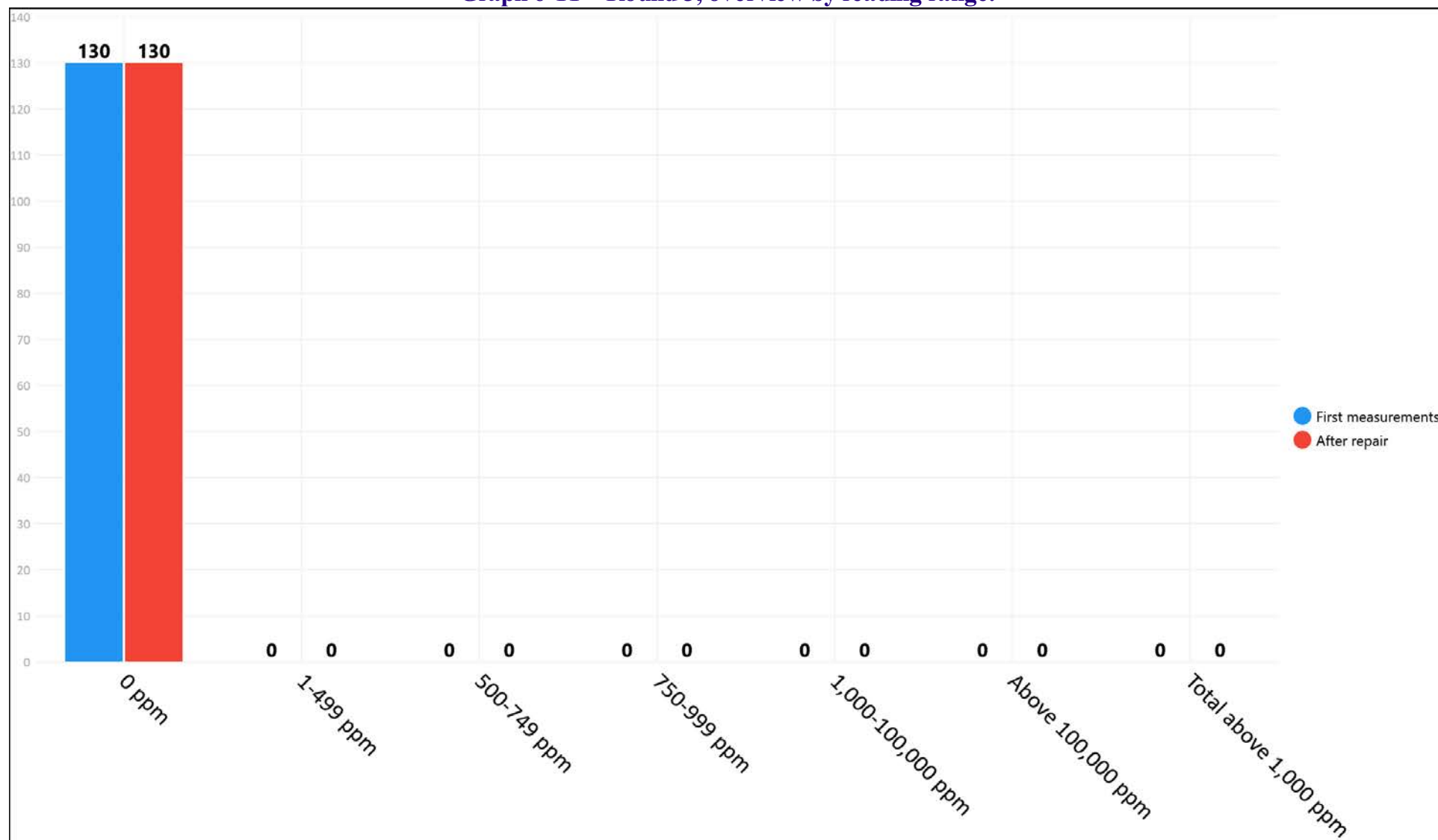
Table 6.8-LDAR report for production facilities

Plant										Unit									
Energy Infrastructures LTD										Alroy									
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	

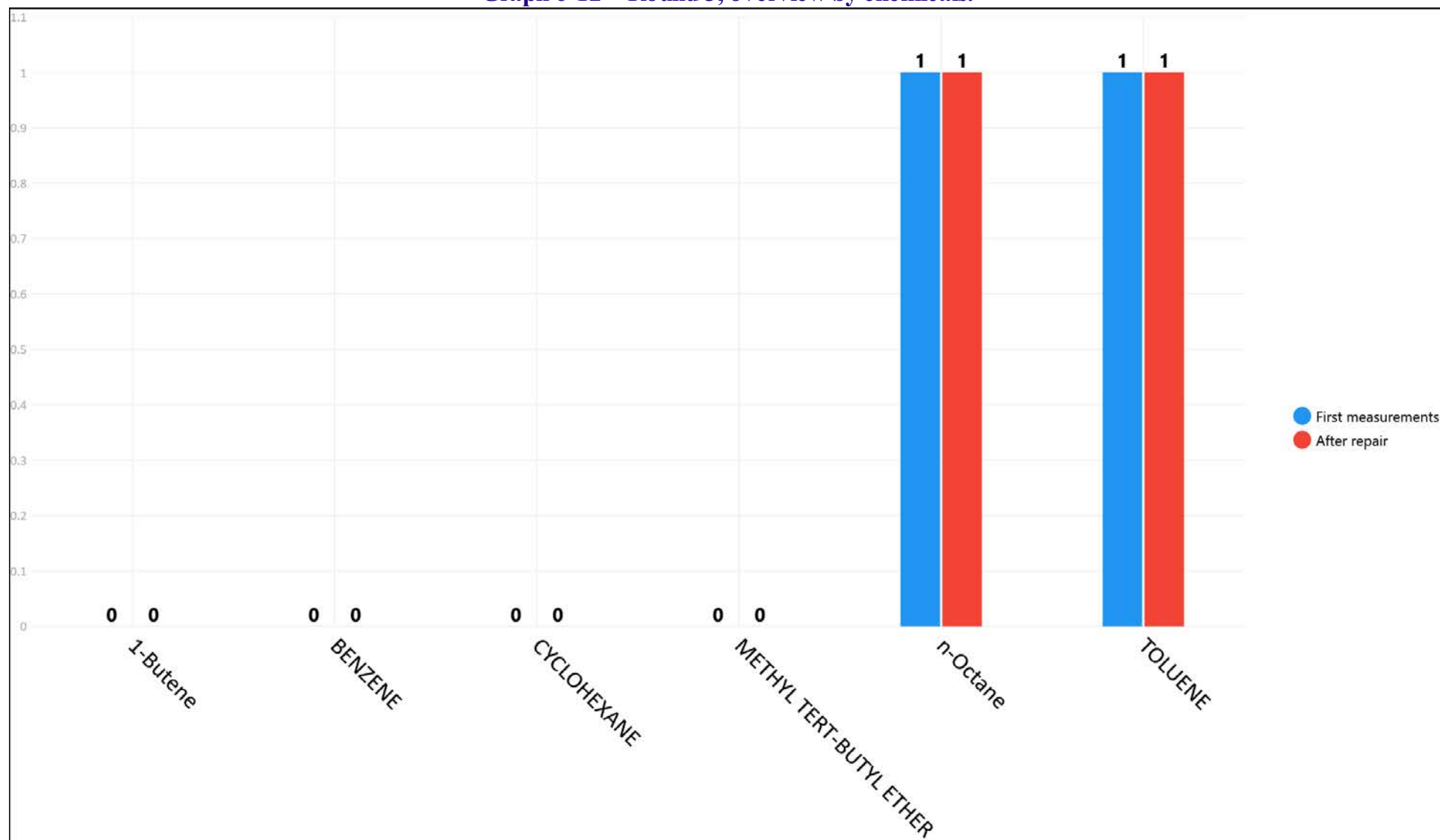
Graph 6.10 – Round 5, overview by component class, kg/year.

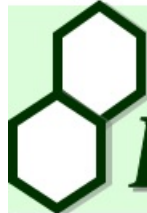


Graph 6-11 – Round 5, overview by reading range.



Graph 6-12 – Round 5, overview by chemicals.





6. Summary by monitoring period, Round 6

In the chapter "Summary by monitoring period" we present two scenarios:

1. Estimated annual emission rate, calculated according to hourly emission rate obtained by the first measurement without reference to a round of repairs.
2. Estimated annual emission rate, calculated according to hourly emission rate obtained at the end of the last round of repairs (if performed).

This data may help understand the effectiveness of the round of repairs and its effect on the full-year emission rate.

Summary of Monitoring Period Round 6

First measurement:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.1 - First measurements, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.2 – First measurement, overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Measurement after repair attempt:

0 "difficult to monitor" sources.

8 default-zero sources with a calculated emission rate: **0.28 kg/year**

0 registered sources with a calculated emission rate: **0 kg/year**

The total calculated emission rate: **0.28 kg/year**

Table 6.3 -Measurement after repair attempt, overview by component class

Component Class	Total components count	Components 1-999ppm count	Components above leak definition count	% emission rate of components above leak definition %	Emission rate of components above leak definition kg/year	Total annual emission rate (all components) kg/year
PRD	4	0	0	0.00%	0	0.14
Sampling Point	4	0	0	0.00%	0	0.14
Total:	8	0	0	0.00%	0	0.28

Table 6.4 -Measurement after repair attempt, Overview by reading range

Reading Range	Total components count	Percentage of Total Components %	Annual Emission Rate kg/year	Percentage of Total Annual Emission Rate %
0 ppm	8	100.00%	0.28	100.00%
1-499 ppm	0	0.00%	0	0.00%
500-749 ppm	0	0.00%	0	0.00%
750-999 ppm	0	0.00%	0	0.00%
1,000-100,000 ppm	0	0.00%	0	0.00%
Above 100,000 ppm	0	0.00%	0	0.00%
Total above 1,000 ppm	0	0.00%	0	0.00%
Difficult to Monitor	0	0.00%	0	0.00%
Total:	8	100%	0.28	100%

Table 6.5 - Form 07: First Measurement and Measurement after repair

Energy Infrastructures LTD											Company name		Round 6		Monitoring round	
Alroy											Production Unit		First measurement			
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750-999 ppm	Components in reading range 500-749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State	Component Class	Group		
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count					
6												GV	PRD	G1		
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL				
6												HL				
6												GV	Sampling Point			
6	0.0%	0.14	0	0	0	0	4	4	0	0	4	LL				
6												HL				
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Subtotal G1				
	0.0%	0.28	0	0	0	0	8	8	0	0	8	Total Components				
											0.28	Total Annual Emission Rate				
Energy Infrastructures LTD											Company name		Round 6		Monitoring round	
Alroy											Production Unit		Measurement after repair attempt			
Monitoring Frequency	Components above Leak Definition	Annual Emission Rate	Components above 100,000 ppm	Components in reading range 1,000- 100,000 ppm	Components in reading range 750- 999 ppm	Components in reading range 500- 749 ppm	Components in reading range 1-499 ppm	Components in reading range 0 ppm	Total Components above Leak Definition	Difficult to Monitor	Total Components	Chemical State	Component Class	Group		
cydes/year	%	kg/year	Count	Count	Count	Count	Count	Count	Count	Count	Count					
6												GV	PRD	G1		
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL				
6												HL				
6												GV	Sampling Point			
6	0.0%	0.14	0	0	0	0	0	4	0	0	4	LL				
6												HL				
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Subtotal G1				
	0.0%	0.28	0	0	0	0	0	8	0	0	8	Total Components				
											0.28	Total Annual Emission Rate				

Table 6.6 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary First Measurement

Equation Set: SOCM1

Units of Measurement: KG/year

Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

Table 6.7 Chemical Summary by Component Class

Calculation Period: 01/01/2021- 31/12/2021

Report Chemical Summary After Repair

Equation Set: SOCM1

Units of Measurement: KG/year

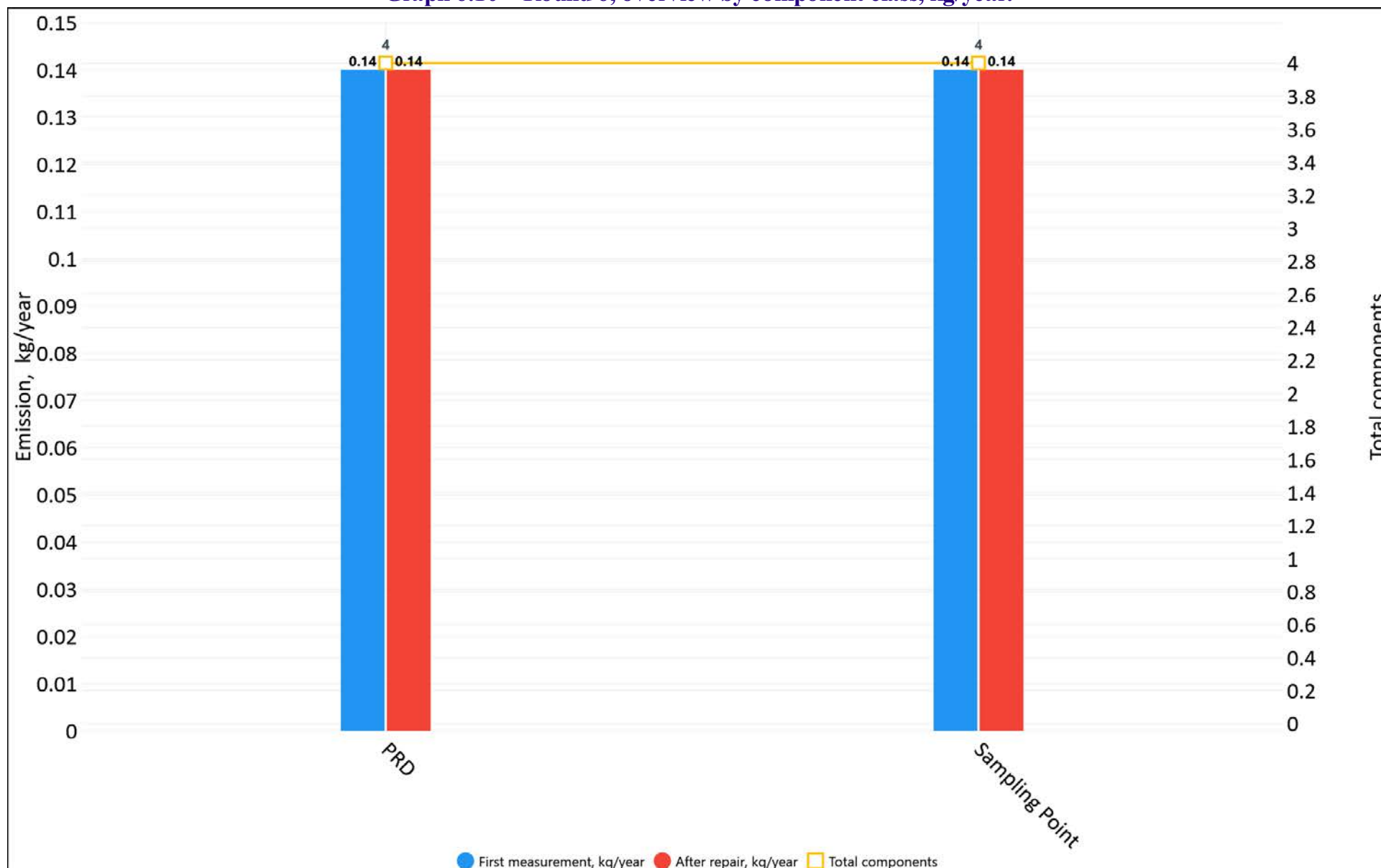
Report Date: 17.02.2022

Alroy			
Unit	Chemical Name (Stream Name if Not Speciated)	CAS Number	Emissions
<u>Component Class:</u> PRD	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> Sampling Point	1-Butene	106-98-9	0.01
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.01
	METHYL TERT-BUTYL ETHER	1634-04-4	0.01
	n-Octane	111-65-9	0.06
	TOLUENE	108-88-3	0.05
			0.14
<u>Component Class:</u> All	1-Butene	106-98-9	0.02
	BENZENE	71-43-2	0
	CYCLOHEXANE	110-82-7	0.02
	METHYL TERT-BUTYL ETHER	1634-04-4	0.02
	n-Octane	111-65-9	0.12
	TOLUENE	108-88-3	0.1
			0.28
<u>Grand Total</u>			0.28

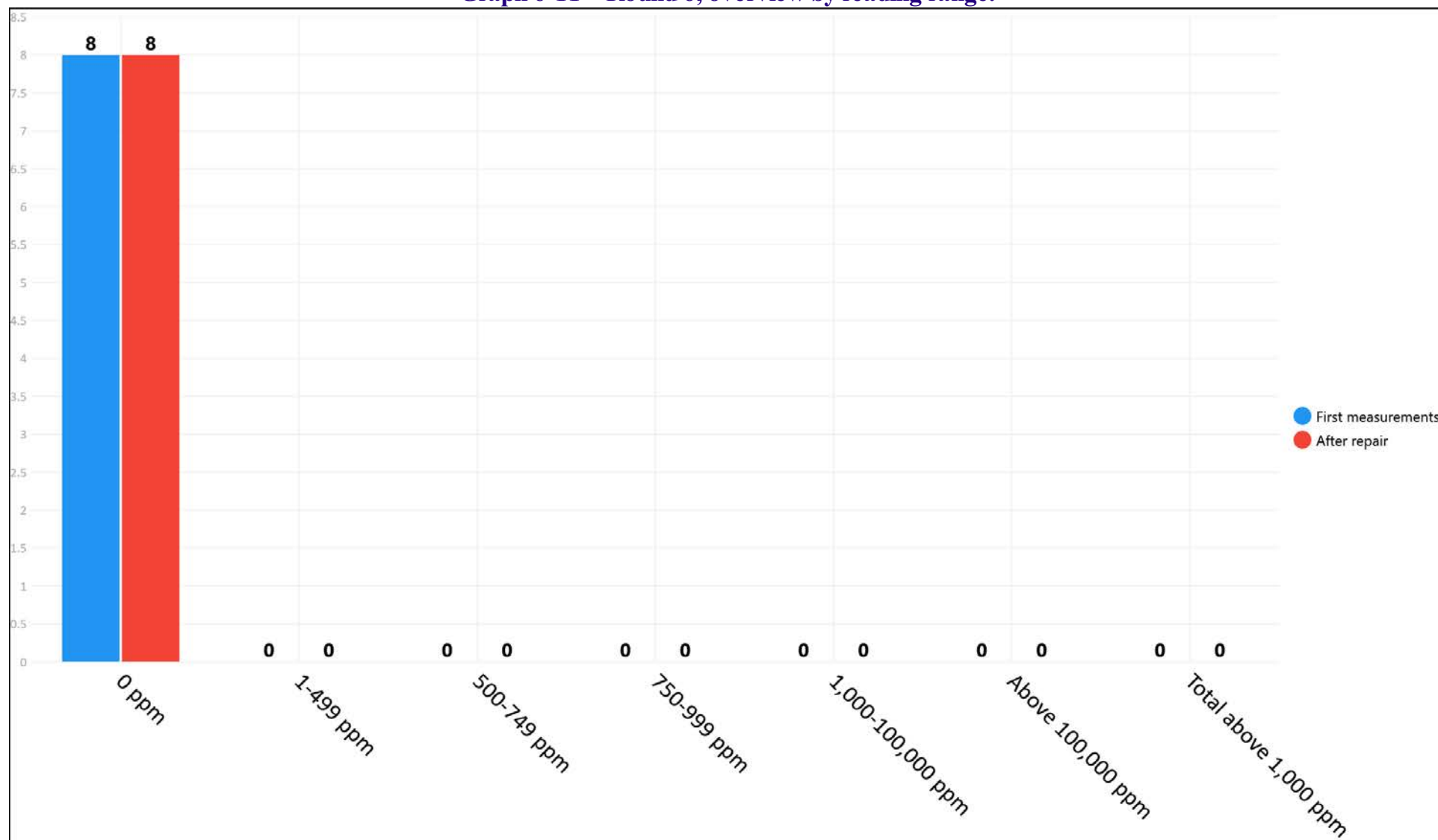
Table 6.8-LDAR report for production facilities

Plant										Unit									
Energy Infrastructures LTD										Alroy									
Unit	Drawing	Chemical State	Component Tag	Component Type	Component Class	Location Description	ppm value, First Measurement	More than 3 drops per minute	Date of First Measurement	Repair Due	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	Date of repair	Repair type	date of remeasurement after repair attempt	ppm value of remeasurement after repair attempt	

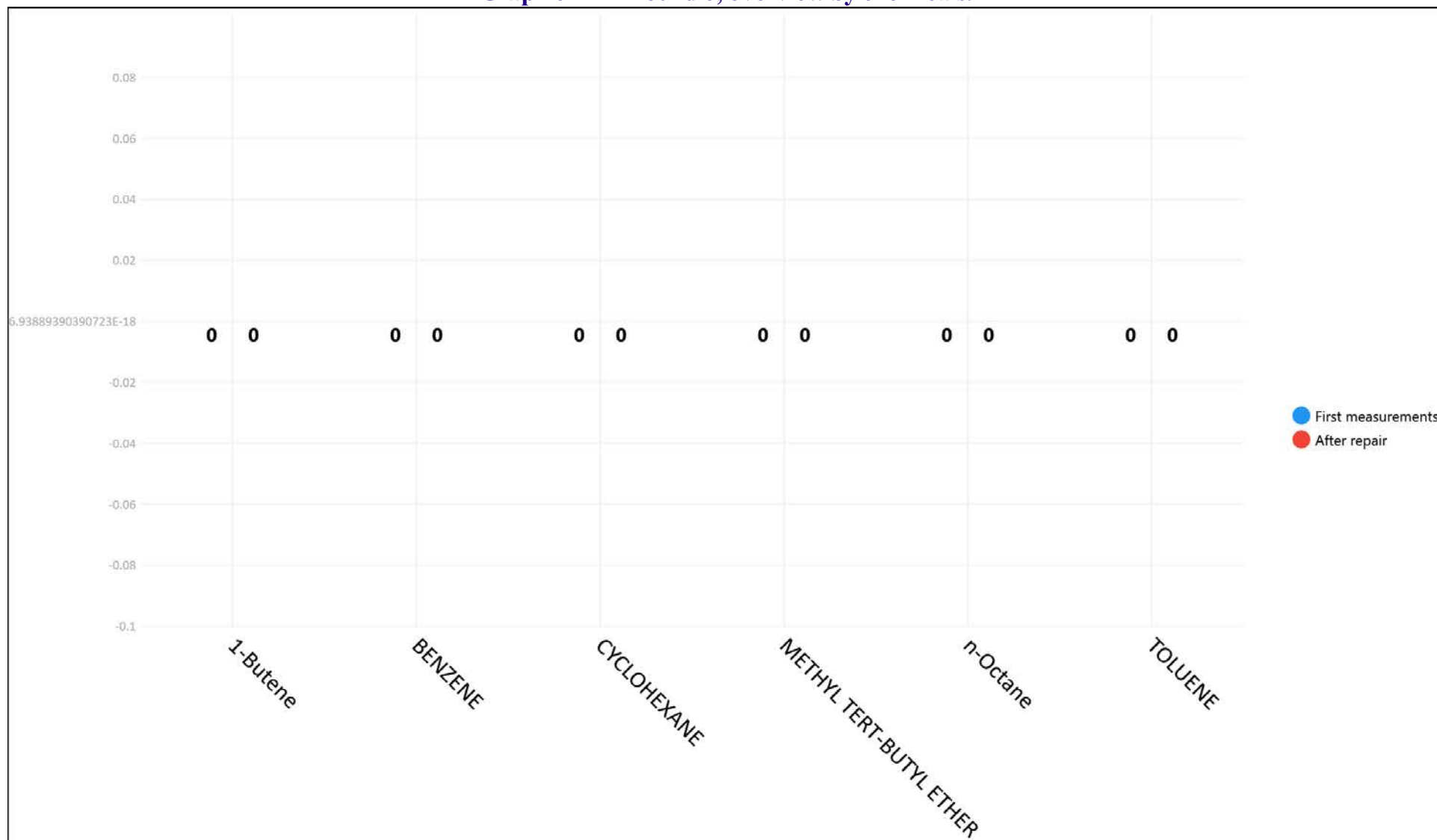
Graph 6.10 – Round 6, overview by component class, kg/year.

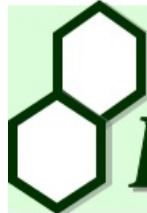


Graph 6-11 – Round 6, overview by reading range.



Graph 6-12 – Round 6, overview by chemicals.





**Ecological
Laboratories**

A.P. Ltd.

Environmental Services and Solutions

POB 13337, HaPrat Str. 2, Yavne, 8122702, Israel.

Tel.: +972-8-9322115, Fax: +972-8-9322116,

Mobile: +972-52-7361309, E-mail: michael@labs-eco.com

[Attachments](#)

7.1 General remarks

Table 7-1-1 - Monitored components

Unit	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6	
	In scope	Measured	In scope	Measured	In scope	Measured	In scope	Measured	In scope	Measured	In scope	Measured
Alroy	8	8	8	8	223	223	8	8	130	130	8	8
Total	8	8	8	8	223	223	8	8	130	130	8	8

7.2 Project schedule (excluding measurements after repair)

Unit	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6	
	Start date	End date	Start date	End date	Start date	End date	Start date	End date	Start date	End date	Start date	End date
Alroy	06/01/2021	06/01/2021	21/02/2021	21/02/2021	07/06/2021	07/06/2021	23/08/2021	23/08/2021	20/10/2021	20/10/2021	12/12/2021	12/12/2021

7.3 Methodology

Definitions

Chemical State:

Gas/Vapor: stream which is in process conditions under gaseous or vapor form.

Light Liquid: a liquid having a VOC content greater than 10% (by volume) that evaporates at 150°C

Heavy Liquid: a liquid having a VOC content of 10% or less (by volume) that evaporates at 150°C

Leak definition: 1,000 ppm (all sources)

Difficult to monitor components:

Any component positioned at a level higher than five meters above ground level or any component situated at a distance further than two meters from a platform and which cannot be accessed by employees in a safe way.

Any component which access requires the elevation of a person to a level higher than two meters above regular surfaces, and which cannot be accessed safely.

Registered components:

Components with a leak value greater than 0 ppm.

Default-zero:

This equation is valid for sources with a leak value of 0 ppm.

A fixed EPA emission calculation rule is used for all these components.

Total components:

All of the existing active components.

Total measured components:

All of the components, measured in specific monitoring round.

Methodology

Formulas:

Measured ppm values are converted to emission loss (kg/year) and these calculations are based on the E.P.A. "Correlation method"

Modified Trapezoidal Emission Calculation Method:

The modified trapezoid method assumes that the mass leak rate changes linearly between any two monitoring points, except for periods between leak leak detection and repair; the leak monitor reading is used from the time the leak is detected to the time it is repaired (i.e., re-screened).

Cumulative data:

In "Cumulative data" tables we provide the results of all of the measurements that performed from the beginning of the year till the end of current monitoring period (quarter). We also calculate the real sum of previous emissions based on the all rounds of the measurements (before and after repairing attempts).

(US EPA "Emission Estimation Protocol for Petroleum Refineries")

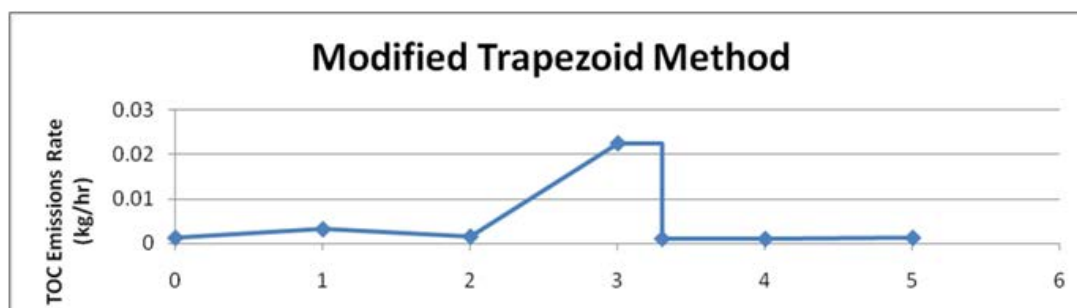


Table 7.4 - Calibration log list

Plant	Round	Equipment Type	Analyzer Type	Ultra-Zero	Span Gas	Span gas Cylinder No	Span concentration ppm	Check gas	Check gas Cylinder No	Check gas concentration (A) ppm	Date	Equipment No	Equipment Serial No	Check			Calibration error (CP)	Result
														1-st check (A1) ppm	2-st check (A2) ppm	3-st check (A3) ppm		
Energy Infrastructures LTD	1	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022865	995	Methane	FF524456	504	06-Jan-2021	5	202016061436	512	513	511	1.59%	OK
Energy Infrastructures LTD	2	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022865	995	Methane	FF524456	504	21-Feb-2021	5	202016061436	501	507	496	-0.53%	OK
Energy Infrastructures LTD	2	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF524456	504	02-Mar-2021	3	0115248937	503	505	505	0.07%	OK
Energy Infrastructures LTD	2	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF524456	504	02-Mar-2021	1	0715622657	549	496	495	1.85%	OK
Energy Infrastructures LTD	3	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022865	995	Methane	FF524456	504	06-Jun-2021	9	33461300	507	509	504	0.53%	OK
Energy Infrastructures LTD	3	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022865	995	Methane	FF524456	504	06-Jun-2021	5	202016061436	512	510	507	1.12%	OK
Energy Infrastructures LTD	3	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022865	995	Methane	FF524456	504	07-Jun-2021	9	33461300	494	491	498	-1.92%	OK
Energy Infrastructures LTD	3	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022865	995	Methane	FF524456	504	07-Jun-2021	5	202016061436	503	496	507	-0.40%	OK
Energy Infrastructures LTD	3	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	08-Jun-2021	5	202016061436	507	506	506	-0.72%	OK
Energy Infrastructures LTD	3	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	08-Jun-2021	3	0115248937	508	507	508	-0.46%	OK
Energy Infrastructures LTD	3	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	15-Jun-2021	3	0115248937	481	481	480	-5.75%	OK
Energy Infrastructures LTD	3	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	15-Jun-2021	5	202016061436	495	491	503	-2.68%	OK
Energy Infrastructures LTD	3	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	20-Jun-2021	5	202016061436	512	510	511	0.20%	OK
Energy Infrastructures LTD	4	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	23-Aug-2021	5	202016061436	490	488	495	-3.73%	OK
Energy Infrastructures LTD	4	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	19-Sep-2021	2	0115248185	510	514	508	0.13%	OK
Energy Infrastructures LTD	5	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	20-Oct-2021	9	33461300	509	507	503	-0.72%	OK
Energy Infrastructures LTD	5	TVA2020	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	20-Oct-2021	5	202016061436	496	504	508	-1.44%	OK
Energy Infrastructures LTD	5	TVA1000B	FID	Air, THC <0.5ppm	Methane	ET0022842	995	Methane	FF32161	510	07-Nov-2021	9	33461300	510	512	506	-0.13%	OK
Energy Infrastructures LTD	5	TVA1000B	FID	Air, THC <0.5ppm	Methane	12663	1,000	Methane	93531	500	12-Dec-2021	9	33461300	490	488	499	-1.53%	OK
Energy Infrastructures LTD	5	TVA2020	FID	Air, THC <0.5ppm	Methane	12663	1,000	Methane	93531	500	30-Dec-2021	5	202016061436	509	512	506	1.80%	OK
Energy Infrastructures LTD	5	TVA2020	FID	Air, THC <0.5ppm	Methane	12663	1,000	Methane	93531	500	20-Jan-2022	5	202016061436	513	509	506	1.87%	OK
Energy Infrastructures LTD	5	TVA2020	FID	Air, THC <0.5ppm	Methane	12663	1,000	Methane	93531	500	03-Feb-2022	5	202016061436	509	504	506	1.27%	OK
Energy Infrastructures LTD	5	TVA2020	FID	Air, THC <0.5ppm	Methane	12663	1,000	Methane	93531	500	06-Feb-2022	5	202016061436	514	514	515	2.87%	OK

Airgas USA, LLC

Airgas Specialty Gases
600 Union Landing Road
Cinnaminson, NJ 08077
856-829-7878 Fax: 856-829-6576
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: CERTIFIED STANDARD-SPEC

Part Number: X02AI99C33AC035
Cylinder Number: FF524456
Laboratory: 124 - Riverton - NJ
Analysis Date: Oct 07, 2016
Lot Number: 82-124579671-1

Customer PO Number: 6867
Reference Number: 82-124579671-1
Cylinder Volume: 30.3 Cubic Feet
Cylinder Pressure: 2100 PSIG
Valve Outlet: 590

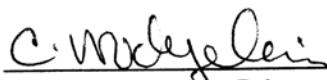
Expiration Date: Oct 07, 2024

Product composition verified by direct comparison to calibration standards traceable to N.I.S.T. weights and/or N.I.S.T. Gas Mixture reference materials.

ANALYTICAL RESULTS

Component	Req Conc	Actual Concentration (Mole %)	Analytical Uncertainty
METHANE	500.0 PPM	504.0 PPM	+/- 2%
AIR	Balance		




Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02AI99E33A00JC	Reference Number: 82-401332856-1
Cylinder Number: FF32161	Cylinder Volume: 32.0 CF
Laboratory: 124 - Riverton (SAP) - NJ	Cylinder Pressure: 2216 PSIG
PGVP Number: B52018	Valve Outlet: 590
Gas Code: CH4,BALA	Certification Date: Nov 14, 2018

Expiration Date: Nov 14, 2026

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
METHANE	500.0 PPM	510.0 PPM	G1	+/- 0.7% NIST Traceable	11/14/2018
AIR	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	16060402	CC470398	500.5 PPM METHANE/NITROGEN	+/- 0.6	Jun 21, 2022

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
MKS 2031 - CH4	FTIR	Nov 06, 2018

Triad Data Available Upon Request

NOTES: NET QTY: 2.38lbs

GROSS QTY: 18.19lbs

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2000 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02AI99E80A3203	Reference Number:	82-401411340-1
Cylinder Number:	ET0022865	Cylinder Volume:	85.0 CF
Laboratory:	124 - Riverton (SAP) - NJ	Cylinder Pressure:	2015 PSIG
PGVP Number:	B52019	Valve Outlet:	590
Gas Code:	CH ₄ ,BALA	Certification Date:	Jan 31, 2019

Expiration Date: Jan 31, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
METHANE	1000 PPM	994.6 PPM	G1	+/- 0.8% NIST Traceable	01/31/2019
AIR	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	07010320	K026312	1001 PPM METHANE/AIR	+/- 0.7%	Aug 24, 2023

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 APW1100391 CH ₄	FTIR	Jan 10, 2019

Triad Data Available Upon Request

NOTES:

Gross Weight: 38.87lbs.

Net Weight: 6.29lbs.

PO #8579

K=2 Uncertainty 95 %

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Don Mac
Approved for Release

Page 1 of 82-401411340-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02AI99E80A3203	Reference Number: 82-401411340-1
Cylinder Number: ET0022842	Cylinder Volume: 85.0 CF
Laboratory: 124 - Riverton (SAP) - NJ	Cylinder Pressure: 2015 PSIG
PGVP Number: B52019	Valve Outlet: 590
Gas Code: CH4,BALA	Certification Date: Jan 31, 2019

Expiration Date: Jan 31, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
METHANE	1000 PPM	995.0 PPM	G1	+/- 0.9% NIST Traceable	01/31/2019
AIR	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	07010320	K026312	1001 PPM METHANE/AIR	+/- 0.7%	Aug 24, 2023

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 APW1100391 CH4	FTIR	Jan 10, 2019

Triad Data Available Upon Request

NOTES:

Gross Weight: 38.87lbs.
Net Weight: 6.29lbs.
PO #8579
K=2 Uncertainty 95 %

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release



CERTIFICATE OF ANALYSIS

Customer Name: Emproco Ltd.
Stock or Analyzer Tag Number: J19711000PA
Customer Reference: PO210239
MESA Reference: 130369
Date of Certification: October 22, 2021
Recommended Shelf Life: 3 Years

Cylinder Number: (2) 103L Cylinders
Product Class: Certified Standard
Cylinder Contents (1): 103 Liters @ 1000 PSI
Cylinder CGA: 103L/C-10
Analysis Method: GC-TCD
Preparation Method: Transfill

Component	Requested Concentration (2)	Reported Concentration (2,3)
Methane	1000 ppm	1000 ppm
Air	Balance	Balance

Lot#: 1-266-3



Authorized Signature: 

(1) The fill pressure shown on the COA is as originally quoted. The fill pressure measured by the customer may differ from the fill pressure originally quoted due to temperature effects, compressibility of the individual components when blended together in the cylinder, gauge accuracy or reduction in content volume before shipping as a result of samples withdrawn for laboratory QC necessary to ensure product quality.

(2) Unless otherwise stated, concentrations are given in molar units.

(3) Vapor pressure mixes are blended at a sufficiently low pressure so as to eliminate phase separation under most low temperature conditions encountered during transport or storage. However, it is generally recommended that cylinders containing vapor pressure restricted mixes be placed on the floor in a horizontal position and rolled back and forth to improve homogeneity of the gas phase mixture before being put into service.

Analytical Gas Standards are prepared and analyzed using combinations of NIST traceable weights, SRM's provided by NIST, or internal gas standards that have been verified for accuracy using procedures published by the US-EPA. Pure gases are analyzed and certified for purity using minor component Analytical Gas Standards prepared according to the methods specified above. Balances are calibrated to NIST test weights covered by NIST test number 822/278982-10. Reference Certification #'s: 1072/AB, 833/AD and 3280/J. Calibration methods are in conformance with MIL-STD 45662A.

MESA Specialty Gases & Equipment

division of MESA International Technologies, Inc.
2427 S. Anne St. • Santa Ana, California 92704 • USA
TEL: 714-434-7102 • FAX: 714-434-8006 • E-mail: mail@mesagas.com
On-line Catalog at www.mesagas.com



CERTIFICATE OF ANALYSIS

Customer Name: Emproco Ltd.
Stock or Analyzer Tag Number: J1971500PA
Customer Reference: PO210239
MESA Reference: 130369
Date of Certification: October 22, 2021
Recommended Shelf Life: 3 Years

Cylinder Number: (2) 103L Cylinders
Product Class: Certified Standard
Cylinder Contents (1): 103 Liters @ 1000 PSI
Cylinder CGA: 103L/C-10
Analysis Method: GC-TCD
Preparation Method: Transfill

Component	Requested Concentration (2)	Reported Concentration (2,3)
Methane	500 ppm	500 ppm
Air	Balance	Balance

Lot#: 9-353-1



Authorized Signature: 

(1) The fill pressure shown on the COA is as originally quoted. The fill pressure measured by the customer may differ from the fill pressure originally quoted due to temperature effects, compressibility of the individual components when blended together in the cylinder, gauge accuracy or reduction in content volume before shipping as a result of samples withdrawn for laboratory QC necessary to ensure product quality.

(2) Unless otherwise stated, concentrations are given in molar units.

(3) Vapor pressure mixes are blended at a sufficiently low pressure so as to eliminate phase separation under most low temperature conditions encountered during transport or storage. However, it is generally recommended that cylinders containing vapor pressure restricted mixes be placed on the floor in a horizontal position and rolled back and forth to improve homogeneity of the gas phase mixture before being put into service.

Analytical Gas Standards are prepared and analyzed using combinations of NIST traceable weights, SRM's provided by NIST, or internal gas standards that have been verified for accuracy using procedures published by the US-EPA. Pure gases are analyzed and certified for purity using minor component Analytical Gas Standards prepared according to the methods specified above. Balances are calibrated to NIST test weights covered by NIST test number 822/278982-10. Reference Certification #'s: 1072/AB, 833/AD and 3280/J. Calibration methods are in conformance with MIL-STD 45662A.

MESA Specialty Gases & Equipment

division of MESA International Technologies, Inc.
2427 S. Anne St. • Santa Ana, California 92704 • USA
TEL: 714-434-7102 • FAX: 714-434-8006 • E-mail: mail@mesagas.com
On-line Catalog at: www.mesagas.com

Table 7.6 - Stream Composition Summary

Stream Name	Stream Content	Stream Content Dates	TVA	MiniRAE 10.6	MiniRAE 11.7
Gasoline	TOLUENE-34 %, n-Octane-40 %, METHYL TERT-BUTYL ETHER-10 %, CYCLOHEXANE-5 %, BENZENE-1 %, 1-Butene-10 %		A=0.42, B=0.29		
Petroleum	TOLUENE-7.5 %, n-Octane-55.3 %, CYCLOHEXANE-35.2 %, BENZENE-2 %		A=0.39, B=0.31		

Table 7.7 - Quarterly Validation of LDAR Devices

Date: 30-Dec-2020			Quarter:	1			Sampling Flow Rate Check		Accuracy Check								Response Time				
Equipment No	Equip.Ser. No	Equipment Type	Analyzer	Span Gas	Span gas Cylinder No	Span Gas Concentration ppm	Sampling Flow Rate l/min	Result	Check Gas	Check gas Cylinder No	Check Gas Concentration ppm	1-st check	2nd check	3rd check	Calibration error	Result	90% of Span ppm	Response Time 1 sec	Response Time 2 sec	Response Time 3 sec	Result
1	0715622657	TVA1000B	FID	Methane	ET0022842	995	0.94	OK	Methane	FF16599	501	504	503	506	0.46%	OK	895.5	4	4	4	OK
2	0115248185	TVA1000B	FID	Methane	ET0022842	995	0.9	OK	Methane	FF16599	501	502	505	505	0.4%	OK	895.5	4	4	4	OK
3	0115248937	TVA1000B	FID	Methane	ET0022842	995	0.91	OK	Methane	FF16599	501	498	501	502	-0.33%	OK	895.5	4	4	4	OK
5	202016061436	TVA2020	FID	Methane	ET0022842	995	1.13	OK	Methane	FF16599	501	501	502	503	0%	OK	895.5	4	4	4	OK
6		MiniRAE2000	PID	Isobutylene	EA0010369	996	0.51	OK	Isobutylene	995-286088	500	510	510	511	1.92%	OK	896.9	6	5	5	OK
7	110219070002	NEO	PID	Isobutylene	EA0010369	996	0.52	OK	Isobutylene	995-286088	500	519	517	520	3.59%	OK	896.9	6	6	6	OK
8	05355151349	TVA1000B	FID	Methane	ET0022842	995	0.98	OK	Methane	FF16599	501	499	501	502	-0.27%	OK	895.5	4	4	4	OK
9	33461300	TVA1000B	FID	Methane	ET0022842	995	1.11	OK	Methane	FF16599	501	501	502	502	-0.07%	OK	895.5	4	4	4	OK

Table 7.8 - Quarterly Validation of LDAR Devices

Date: 30-Mar-2021			Quarter:	2			Sampling Flow Rate Check		Accuracy Check								Response Time				
Equipment No	Equip.Ser. No	Equipment Type	Analyzer	Span Gas	Span gas Cylinder No	Span Gas Concentration ppm	Sampling Flow Rate l/min	Result	Check Gas	Check gas Cylinder No	Check Gas Concentration ppm	1-st check	2nd check	3rd check	Calibration error	Result	90% of Span ppm	Response Time 1 sec	Response Time 2 sec	Response Time 3 sec	Result
1	0715622657	TVA1000B	FID	Methane	ET0022842	995	1.1	OK	Methane	FF16599	501	507	509	506	1.06%	OK	895.5	4	4	4	OK
2	0115248185	TVA1000B	FID	Methane	ET0022842	995	0.92	OK	Methane	FF16599	501	505	503	504	0.4%	OK	895.5	4	4	4	OK
3	0115248937	TVA1000B	FID	Methane	ET0022842	995	1.36	OK	Methane	FF16599	501	506	504	504	0.53%	OK	895.5	4	4	4	OK
5	202016061436	TVA2020	FID	Methane	ET0022842	995	1.2	OK	Methane	FF16599	501	499	502	501	-0.27%	OK	895.5	4	4	4	OK
6		MiniRAE2000	PID	Isobutylene	EA0010369	996	0.49	OK	Isobutylene	995-286088	500	504	504	504	0.66%	OK	896.9	4	4	4	OK
7	110219070002	NEO	PID	Isobutylene	EA0010369	996	0.44	OK	Isobutylene	995-286088	500	491	492	492	-1.8%	OK	896.9	4	4	4	OK
8	05355151349	TVA1000B	FID	Methane	ET0022842	995	1.24	OK	Methane	FF16599	501	504	509	508	1%	OK	895.5	4	4	4	OK
9	33461300	TVA1000B	FID	Methane	ET0022842	995	1.36	OK	Methane	FF16599	501	501	502	501	-0.13%	OK	895.5	4	4	4	OK

Table 7.9 - Quarterly Validation of LDAR Devices

Date: 30-Jun-2021			Quarter:	3			Sampling Flow Rate Check		Accuracy Check								Response Time				
Equipment No	Equip.Ser. No	Equipment Type	Analyzer	Span Gas	Span gas Cylinder No	Span Gas Concentration ppm	Sampling Flow Rate l/min	Result	Check Gas	Check gas Cylinder No	Check Gas Concentration ppm	1-st check	2nd check	3rd check	Calibration error	Result	90% of Span ppm	Response Time 1 sec	Response Time 2 sec	Response Time 3 sec	Result
1	0715622657	TVA1000B	FID	Methane	ET0022842	995	1.07	OK	Methane	FF16599	501	511	510	510	1.66%	OK	895.5	4	4	4	OK
2	0115248185	TVA1000B	FID	Methane	ET0022842	995	0.92	OK	Methane	FF16599	501	501	502	498	-0.33%	OK	895.5	4	4	4	OK
3	0115248937	TVA1000B	FID	Methane	ET0022842	995	1.13	OK	Methane	FF16599	501	501	499	498	-0.53%	OK	895.5	4	4	4	OK
5	202016061436	TVA2020	FID	Methane	ET0022842	995	1.08	OK	Methane	FF16599	501	507	506	504	0.73%	OK	895.5	4	4	4	OK
6		MiniRAE2000	PID	Isobutylene	EA0010369	996	0.49	OK	Isobutylene	995-286088	500	510	509	509	1.72%	OK	896.9	5	5	5	OK
7	110219070002	NEO	PID	Isobutylene	EA0010369	996	0.53	OK	Isobutylene	995-286088	500	511	512	512	2.19%	OK	896.9	5	4	5	OK
8	05355151349	TVA1000B	FID	Methane	ET0022842	995	1.12	OK	Methane	FF16599	501	508	508	507	1.13%	OK	895.5	4	4	4	OK
9	33461300	TVA1000B	FID	Methane	ET0022842	995	1.21	OK	Methane	FF16599	501	501	503	501	-0.07%	OK	895.5	4	4	4	OK

Table 7.10 - Quarterly Validation of LDAR Devices

Date: 30-Sep-2021			Quarter:	4			Sampling Flow Rate Check		Accuracy Check								Response Time				
Equipment No	Equip.Ser. No	Equipment Type	Analyzer	Span Gas	Span gas Cylinder No	Span Gas Concentration ppm	Sampling Flow Rate l/min	Result	Check Gas	Check gas Cylinder No	Check Gas Concentration ppm	1-st check	2nd check	3rd check	Calibration error	Result	90% of Span ppm	Response Time 1 sec	Response Time 2 sec	Response Time 3 sec	Result
1	0715622657	TVA1000B	FID	Methane	ET0022865	995	0.91	OK	Methane	FF16599	501	506	505	503	0.53%	OK	895.5	4	3	4	OK
2	0115248185	TVA1000B	FID	Methane	ET0022865	995	1	OK	Methane	FF16599	501	502	503	501	0%	OK	895.5	4	4	4	OK
3	0115248937	TVA1000B	FID	Methane	ET0022865	995	1.22	OK	Methane	FF16599	501	504	501	499	-0.13%	OK	895.5	4	3	4	OK
5	202016061436	TVA2020	FID	Methane	ET0022865	995	1.15	OK	Methane	FF16599	501	503	501	504	0.13%	OK	895.5	3	4	4	OK
6		MiniRAE2000	PID	Isobutylene	EA0010369	996	0.51	OK	Isobutylene	995-286088	500	500	599	500	6.45%	OK	896.9	4	4	4	OK
7	110219070002	NEO	PID	Isobutylene	EA0010369	996	0.54	OK	Isobutylene	995-286088	500	501	500	501	-0.01%	OK	896.9	5	5	4	OK
8	05355151349	TVA1000B	FID	Methane	ET0022865	995	0.96	OK	Methane	FF16599	501	498	497	501	-0.66%	OK	895.5	5	5	5	OK
9	33461300	TVA1000B	FID	Methane	ET0022865	995	1.26	OK	Methane	FF16599	501	507	504	505	0.66%	OK	895.5	4	4	4	OK

Table 7.11 - PRODUCTION HOURS TEMPLATE

Plant	Energy Infrastructures LTD
-------	----------------------------

Unit	Drawing	Stream Name	Remark	Annual Production Hours	Q1	Q2	Q3	Q4
					01/01-31/03	01/04-30/06	01/07-30/09	01/10-31/12
					Quarter =	Quarter =	Quarter =	Quarter =
					Quarterly Production hours	Quarterly Production hours	Quarterly Production hours	Quarterly Production hours
Alroy	6006-100-006	Gasoline		8,760	2,160	2,184	2,208	2,208
Alroy	6006-100-007	Gasoline		8,760	2,160	2,184	2,208	2,208

נספח ג'

דוגמת חישוב עבור מיכל גג חיצוני צף מס' 2 המאחסן קרוסין

3013.18-034-T2

3013.18-025

T2 - kerosene

External Floating roof

1. Tank data

Diameter of the tank	D	m	Tank data	48.77	
		feet	---	160.01	
Effective height of the stock liquid (while roof landing episode)	h_{le}	m	Tank data		
		feet	---	11.00	
Shell Color and condition	α	color condition	חום טובה	0.58	Table 7.1-6 Brown
Roof color and condition	α	color condition	לבן טוב	0.17	Table 7.1-6
Tank paint solar absorptance	α	dimensionless		0.38	Table 7.1-6
Vapor space outage (while roof landing episode)	H_{VO}	m	assumption - equal to legs height		Possible to use also equation 1-15
		feet		11.00	
Volume of the vapor space (while roof landing episode)	V_V	ft ³	$V_V = \pi(D)^2/4 * H_{VO}$	221,185	Equation 1-3
Breather vent pressure setting	ΔP_{BP}	psi	Typical value	0.50	Equation 1-11
Breather vent vacuum setting	ΔP_{BV}	psi	Typical value	0.00	Equation 1-11
Breather vent pressure setting range	ΔP_B	psi	$\Delta P_B = P_{BP} - P_{BV}$	0.50	Equation 1-11

2. Material data - קרוסין

Stock vapor molecular weight	M_V	gr/gr-mole lb/lb-mole	msds data	130	
Density of the liquid inside the tank	W_l	g/ml lb/gal	msds data	0.80	0
			---	6.68	
Vapor density	W_V	kg/m ³ lb/ft ³	msds data	4.5	
			---	0.28	
True vapor pressure of the stock liquid	P	mm Hg	PEI data	0.833	at 20°C
		psia	---	0.02	
Vapor pressure at daily average liquid surface temperature	P_{VA}	psia	הנחה: $P_V = nRT \rightarrow$ $P_2 = P_1 * (T_2/T_1)$	0.02	
Vapor pressure at the daily maximum liquid surface temperature, psia	P_{VX}	psia		0.02	
Vapor pressure at the daily minimum liquid surface temperature	P_{VN}	psia	$T_1(k) = 20C + 273$ $T_2(k) = 37.5C + 273$	0.02	
Daily vapor pressure range	ΔP_V	psia	$\Delta P_V = P_{VX} - P_{VN}$	0.00	Equation 1-9

3. Operation data

Number of days that the tank stands idle (on roof landing episode)	n_d	days/landing episode	site data	4	
Number of degassing and cleaning episode		landing episode/year	site data	0.07	
Number of roof landing episode		landing episode/year	site data	0.07	

4. Normal operation (Tanks program)

Working (withdrawal) losses		lb per year	Tanks Program	38	T2 - B&W 2021
		Kg per year	---	17	
Total emissions (Breathing & Working)		lb per year	Tanks Program	74	T2 - B&W 2021
		Kg per year	---	33	
Breathing (standing) losses		Kg per year		16	

5. Degassing and Cleaning (Tanks program)

Degassing: emission from one turnover of floating roof	$E_{\text{degass-floating}}$	lb per emptying	Tanks Program	59	T2 - DFloating 2019
		Kg per emptying	---	27	
Degassing: fixed roof with a height of roof legs	$E_{\text{degass-legs}}$	lb per emptying	Tanks Program	61	T2- DFixed 2019 (Only working losses)
		Kg per emptying	---	28	
Liquid fraction in sludge	F_{liquid}			0.8	Tanks FAQ - degassing and cleaning
Sludge volume	V_s	m3 per emptying		70	
Sludge weight	W_s	Kg per emptying		56,000	
Cleaning emissions	E_{cleaning}	lb per emptying	$E_{\text{cleaning}} = W_s * (1 - F_{\text{liquid}})$	24,692	
		Kg per emptying		11,200	
Total Degassing and Cleaning emissions	$E_{\text{degass-total}}$	lb per emptying	$E_{\text{degass-total}} = E_{\text{degass-floating}} + E_{\text{degass-legs}} + E_{\text{cleaning}}$	24,811	
		Kg per emptying		11,254	

6. Roof landing

Daily average liquid surface temperature	T_{LA}	°R	$T_{LA} = 0.44T_{AA} + 0.56T_B + 0.0079 * \alpha * I$	532.17	Equation 1-26
Daily vapor temperature range	ΔT_V	°R	$\Delta T_V = 0.72\Delta T_A + 0.028 * \alpha * I$	32.95	Equation 1-8
Daily maximum liquid surface temperature	T_{LX}	°R	$T_{LX} = T_{LA} + 0.25\Delta T_V$	540.41	Figure 7.1-17
Daily minimum liquid surface temperature	T_{LN}	°R	$T_{LN} = T_{LA} - 0.25\Delta T_V$	523.93	Figure 7.1-17
Liquid bulk temperature	T_B	°R	$T_B = T_{AA} + 6\alpha - 1$	527.22	Equation 1-28
Max standing idle losses during roof landing	L_{SL-max}	lb per landing episode	$L_{SL-max} = 5.9 * D^2 * h_{le} * W_I$	11,093,038	Equation 2-13
		Kg per landing episode	---	5,031,769	
Filling saturation factor	S	dimensionless	0.60 for a full liquid heel 0.50 for a partial 0.15 for drain-dry	0.50	Equation 2-26 (pages No 33,35)
saturation factor	K_S	dimensionless	$K_S = \frac{1}{1 + 0.053 * P_{VA} * H_{VO}}$	0.5	Equation 1-20 <i>KS is assumed to be less than or equal to the saturation factor during filling (S) .</i>
Vapor space expansion factor	K_E	dimensionless	$K_E = \frac{\Delta T_V}{T_{LA}} + \frac{\Delta P_V - \Delta P_B}{P_A - P_{VA}}$	0.028	Liquid stock has a true vapor pressure greater than 0.1psia - Equation 1-7.
Standing idle losses during roof landing	L_{SL}	lb per landing episode	$L_{SL} = n_d K_E \left(\frac{PV_V}{RT_{AA}} \right) M_V K_S$	5	Equation 2-16
Filling losses during roof landing	L_{FL}	lb per landing episode	$L_{FL} = \left(\frac{P * V_V}{R * T_{AA}} \right) M_V * S$	41	Equation 2-26
Total losses during roof landing	L_{TL}	lb per landing episode	$L_{TL} = L_{SL} + L_{FL}$	46	Equation 2-10
		Kg per landing episode		21	

7. Summary

Working (withdrawal) losses		Kg per year		17	
Breathing (standing) losses		Kg per year		16	
Total Degassing and Cleaning emissions		Kg per year		750	
Total losses during roof landing		Kg per year		1	
				785	Kg per year

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	T2 - B&W 2021
City:	Haifa
State:	Israel
Company:	PEI
Type of Tank:	External Floating Roof Tank
Description:	kerosene

Tank Dimensions

Diameter (ft):	160.01
Volume (gallons):	7,599,816.00
Turnovers:	0.68

Paint Characteristics

Internal Shell Condition:	Dense Rust
Shell Color/Shade:	Aluminum/Diffuse
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Shoe-mounted

Deck Fitting/Status**Quantity**

Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	3
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	2
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1

Meteorological Data used in Emissions Calculations: Haifa, Israel (Avg Atmospheric Pressure = 14.69 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

T2 - B&W 2021 - External Floating Roof Tank
Haifa, Israel

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Jet kerosene	All	76.52	65.35	87.69	68.86	0.0136	N/A	N/A	130.0000			162.00	Option 1: VP70 = .011 VP80 = .015

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

T2 - B&W 2021 - External Floating Roof Tank
Haifa, Israel

Annual Emission Calculations	
Rim Seal Losses (lb):	34.5005
Seal Factor A (lb-mole/ft-yr):	1.6000
Seal Factor B (lb-mole/ft-yr (mph) ⁿ):	0.3000
Average Wind Speed (mph):	6.2000
Seal-related Wind Speed Exponent:	1.6000
Value of Vapor Pressure Function:	0.0002
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0136
Tank Diameter (ft):	160.0100
Vapor Molecular Weight (lb/lb-mole):	130.0000
Product Factor:	1.0000
Withdrawal Losses (lb):	38.3228
Annual Net Throughput (gal/yr.):	5,202,143.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0075
Average Organic Liquid Density (lb/gal):	7.0000
Tank Diameter (ft):	160.0100
Roof Fitting Losses (lb):	0.8398
Value of Vapor Pressure Function:	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	27.8819
Average Wind Speed (mph):	6.2000
Total Losses (lb):	73.6631

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors		m	Losses(lb)
		KFa(lb-mole/yr)	KFb(lb-mole/(yr mph ⁿ))		
Access Hatch (24-in. Diam.)Bolted Cover, Gasketed	3	1.60	0.00	0.00	0.1446
Vacuum Breaker (10-in. Diam.)Weighted Mech. Actuation, Gask.	2	6.20	1.20	0.94	0.6608
Rim Vent (6-in. Diameter)Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	0.0345

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

T2 - B&W 2021 - External Floating Roof Tank
Haifa, Israel

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Jet kerosene	34.50	38.32	0.84	0.00	73.66

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	T2 - DFixed 2019
City:	Haifa
State:	Israel
Company:	PEI
Type of Tank:	Vertical Fixed Roof Tank
Description:	kerosene

Tank Dimensions

Shell Height (ft):	11.00
Diameter (ft):	160.01
Liquid Height (ft) :	11.00
Avg. Liquid Height (ft):	5.50
Volume (gallons):	1,654,664.74
Turnovers:	1.00
Net Throughput(gal/yr):	1,654,664.74
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Aluminum/Diffuse
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.00

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.50

Meteorological Data used in Emissions Calculations: Haifa, Israel (Avg Atmospheric Pressure = 14.69 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

T2 - DFixed 2019 - Vertical Fixed Roof Tank
Haifa, Israel

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Jet kerosene	Apr	72.10	62.74	81.45	67.57	0.0118	0.0092	0.0159	130.0000			162.00	Option 1: VP70 = .011 VP80 = .015

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

T2 - DFixed 2019 - Vertical Fixed Roof Tank
Haifa, Israel

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):												
Vapor Space Volume (cu ft):												
Vapor Density (lb/cu ft):												
Vapor Space Expansion Factor:												
Vented Vapor Saturation Factor:												
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):												
Tank Diameter (ft):												
Vapor Space Outage (ft):												
Tank Shell Height (ft):												
Average Liquid Height (ft):												
Roof Outage (ft):												
Roof Outage (Cone Roof)												
Roof Outage (ft):												
Roof Height (ft):												
Roof Slope (ft/ft):												
Shell Radius (ft):												
Vapor Density												
Vapor Density (lb/cu ft):												
Vapor Molecular Weight (lb/lb-mole):												
Vapor Pressure at Daily Average Liquid												
Surface Temperature (psia):												
Daily Avg. Liquid Surface Temp. (deg. R):												
Daily Average Ambient Temp. (deg. F):												
Ideal Gas Constant R												
(psia cuft / (lb-mol-deg R)):												
Liquid Bulk Temperature (deg. R):												
Tank Paint Solar Absorptance (Shell):												
Tank Paint Solar Absorptance (Roof):												
Daily Total Solar Insulation												
Factor (Btu/sqft day):												
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:												
Daily Vapor Temperature Range (deg. R):												
Daily Vapor Pressure Range (psia):												
Breather Vent Press. Setting Range(psia):												
Vapor Pressure at Daily Average Liquid												
Surface Temperature (psia):												
Vapor Pressure at Daily Minimum Liquid												
Surface Temperature (psia):												
Vapor Pressure at Daily Maximum Liquid												
Surface Temperature (psia):												
Daily Avg. Liquid Surface Temp. (deg R):												
Daily Min. Liquid Surface Temp. (deg R):												
Daily Max. Liquid Surface Temp. (deg R):												
Daily Ambient Temp. Range (deg. R):												
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:												
Vapor Pressure at Daily Average Liquid:												
Surface Temperature (psia):												
Vapor Space Outage (ft):												
Working Losses (lb):												
Vapor Molecular Weight (lb/lb-mole):												
Vapor Pressure at Daily Average Liquid												
Surface Temperature (psia):												
Net Throughput (gal/mo.):												
Annual Turnovers:												
Turnover Factor:												
Maximum Liquid Volume (gal):												
Maximum Liquid Height (ft):												
Tank Diameter (ft):												
Working Loss Product Factor:												
Total Losses (lb):												

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

T2 - DFixed 2019 - Vertical Fixed Roof Tank
Haifa, Israel

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Jet kerosene	60.63	32.78	93.41

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	T2 - DFloating 2019
City:	Haifa
State:	Israel
Company:	PEI
Type of Tank:	External Floating Roof Tank
Description:	kerosene

Tank Dimensions

Diameter (ft):	160.01
Volume (gallons):	7,599,816.00
Turnovers:	1.00

Paint Characteristics

Internal Shell Condition:	Dense Rust
Shell Color/Shade:	Aluminum/Diffuse
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Shoe-mounted

Deck Fitting/Status

	Quantity
Access Hatch (24-in. Diam./Bolted Cover, Gasketed	3
Vacuum Breaker (10-in. Diam./Weighted Mech. Actuation, Gask.	2
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1

Meteorological Data used in Emissions Calculations: Haifa, Israel (Avg Atmospheric Pressure = 14.69 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

T2 - DFloating 2019 - External Floating Roof Tank
Haifa, Israel

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Jet kerosene	Apr	76.46	63.88	89.04	68.86	0.0136	N/A	N/A	130.0000			162.00	Option 1: VP70 = .011 VP80 = .015

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

T2 - DFloating 2019 - External Floating Roof Tank
Haifa, Israel

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb): Seal Factor A (lb-mole/ft-yr): Seal Factor B (lb-mole/ft-yr (mph) ⁿ): Average Wind Speed (mph): Seal-related Wind Speed Exponent: Value of Vapor Pressure Function: Vapor Pressure at Daily Average Liquid Surface Temperature (psia): Tank Diameter (ft): Vapor Molecular Weight (lb/lb-mole): Product Factor:												
Withdrawal Losses (lb): Net Throughput (gal/mo): Shell Clingage Factor (bbl/1000 sqft): Average Organic Liquid Density (lb/gal): Tank Diameter (ft):												
Roof Fitting Losses (lb): Value of Vapor Pressure Function: Vapor Molecular Weight (lb/lb-mole): Product Factor: Tot. Roof Fitting Loss Fact.(lb-mole/yr): Average Wind Speed (mph):												
Total Losses (lb):												
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	Roof Fitting Loss Factors									
			KFb(lb-mole/(yr mph ⁿ n))		m			Losses(lb)				
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	3	1.60	0.00		0.00			0.0000				
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	2	6.20	1.20		0.94			0.0000				
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10		1.00			0.0000				

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

T2 - DFloating 2019 - External Floating Roof Tank
Haifa, Israel

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Jet kerosene	2.99	55.99	0.07	0.00	59.04

נספח ד'

חישוב פליטות ממיכל לאיסוף תשטיפים



תוכנת Tanks : חישוב פליטה כתוצאה מאחסון ושינוי מפלס

Horizontal Tank
Haifa, Israel

TANKS 4.0 Emissions Report - Detail Format Tank Identification and Physical Characteristics

Identification

User Identification: Runoff_Tank -Breathing&Working
City: Haifa
State: Israel
Company: PEI
Type of Tank: Horizontal Tank
Description: 60m3

Tank Dimensions

Shell Length (ft): 62.34
Diameter (ft): 6.56
Volume (gallons): 13,208.60
Turnovers: 3.00
Net Throughput (gal/yr): 39,625.80
Is Tank Heated (y/n): N
Is Tank Underground (y/n): Y

Paint Characteristics

Shell Color/Shade: White/White
Shell Condition:

Breather Vent Settings

Vacuum Settings (psig): 0.00
Pressure Settings (psig): 0.00

Meteorological Data used in Emissions Calculations: Haifa, Israel (Avg Atmospheric Pressure = 14.69 psia)

27/01/2010 17:35:13

Page 1



www.pazeng.co.il

3013.18-036.doc

20/30

28/02/2022

TANKS 4.0 Emissions Report - Detail Format Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk Temp. (deg F)	Vapor Pressures (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Jet kerosene	All	65.70	65.70	65.70	65.26	0.0099	0.0099	0.0099	130.0000			162.00	Option 5: A=12.39, B=8933

27/01/2010 17:35:13

Page 2

3013.18-036.doc

21/30

28/02/2022



www.pazeng.co.il

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)

Annual Emission Calculations	
No Standing Losses: Underground Tank	
Working Losses (lb):	1.2166
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0099
Annual Net Throughput (gall/yr.):	39,625.8000
Annual Turnovers:	3.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	6.5600
Working Loss Product Factor:	1.0000
Total Losses (lb):	1.2166

27/01/2010 17:35:13

Page 3

3013.18-036.doc

22/30

28/02/2022



www.pazeng.co.il

TANKS 4.0
Emissions Report - Detail Format
Individual Tank Emission Totals

Annual Emissions Report

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Jet kerosene	1.22	0.00	1.22

27/01/2010 17:35:13

Page 4



תוכנת Tanks: חישוב פליטה כתוצאה מניקוי וריקון מיכל (שלב א')

Horizontal Tank
Haifa, Israel

**TANKS 4.0
Emissions Report - Detail Format
Tank Identification and Physical Characteristics**

Identification

User Identification:	Runoff_ tank-Degassing fixed
City:	Haifa
State:	Israel
Company:	PEI
Type of Tank:	Horizontal Tank
Description:	Kerosene 60m3

Tank Dimensions

Shell Length (ft):	62.34
Diameter (ft):	6.56
Volume (gallons):	13,208.60
Turnovers:	1.00
Net Throughput (gal/yr):	13,208.60
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	Y

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig):	0.00

Meteorological Data used in Emissions Calculations: Haifa, Israel (Avg Atmospheric Pressure = 14.69 psia)

27/01/2010 17:38:14

Page 1



www.pazeng.co.il

3013.18-036.doc

24/30

28/02/2022

Horizontal Tank
Haifa, Israel

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)

27/01/2010 17:38:15

Page 2



www.pazeng.co.il

3013.18-036.doc

25/30

28/02/2022

TANKS 4.0
Emissions Report - Detail Format
Individual Tank Emission Totals

Annual Emissions Report

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Jet kerosene	0.39	0.00	0.39

27/01/2010 17:38:16

Page 3



www.pazeng.co.il

3013.18-036.doc

26/30

28/02/2022

תוכנת Tanks : חישוב פליטה כתוצאה מניקוי וריקון מיכל (שלב ב')

Internal Floating Roof Tank
Haifa, Israel

TANKS 4.0
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification: Runoff_Tank - Degassing floating
City: Haifa
State: Israel
Company: gadot east
Type of Tank: Internal Floating Roof Tank
Description: Kerosene - 60m3

Tank Dimensions

Diameter (ft): 22.82
Volume (gallons): 13,208.60
Turnovers: 1.00
Self Supp. Roof? (y/n): Y
No. of Columns: 0.00
Eff. Col. Diam. (ft): 0.00

Paint Characteristics

Internal Shell Condition: Light Rust
Shell Color/Shade: White/White
Shell Condition: Good
Roof Color/Shade: White/White
Roof Condition: Good

Rim-Seal System

Primary Seal: Mechanical Shoe
Secondary Seal: None

Deck Characteristics

Deck Fitting Category: Typical
Deck Type: Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	9
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meteorological Data used in Emissions Calculations: Haifa, Israel (Avg Atmospheric Pressure = 14.69 psia)

27/01/2010 17:47:15

Page 1



www.pazeng.co.il

3013.18-036.doc

27/30

28/02/2022

Internal Floating Roof Tank
Haifa, Israel

TANKS 4.0
Emissions Report - Detail Format
Detail Calculations (AP-42)

27/01/2010 17:47:16

Page 2



www.pazeng.co.il

3013.18-036.doc

28/30

28/02/2022

TANKS 4.0
Emissions Report - Detail Format
Individual Tank Emission Totals

Annual Emissions Report

Components	Losses(lbs)				Total Emissions
	Rim Seal Loss	Withdrawal Loss	Deck Fitting Loss	Deck Seam Loss	
Jet kerosene	0.26	0.14	0.27	0.00	0.67

27/01/2010 17:47:17

Page 3



חישובי פליטה ממיכל תשטיפים

מיכל תשטיפים - 60 מ³ - קרוסין

עבור כל החישובים הונח כי נפלט קרוסין הנהג מתמירה

Horizontal tank

1. Tank & Operation data

Diameter of the tank	D	m	site data	2	
		feet	---	6.56	
Length of the shell	L	m	site data	19	
		feet	---	62.34	
Effective tank diameter (for floating roof scenario)		feet	$D_e = \sqrt{\frac{L \cdot D}{\pi}}$	22.82	EPA-42, page 7.1-14, eq. 1-3
Tank paint solar absorptance	α	dimensionless	Gray shell & roof Paint Shade or Type: medium gray. Paint Condition: good	0.17	Table 7.1-6
Number of degassing and cleaning episode		landing episode/year	site data	0.05	
Density of the liquid inside the tank	W_l	g/ml	msds data	0.80	
Liquid bulk temperature	T_B	°F	$T_B = T_{AA} + 6a - 1$	525.99	Equation 1-28
		°C	---	19.05	

2. Normal operation (Tanks program)

Working losses		lb per year	Tanks Program	1.22	פליטה ממזל breathing&working
		Kg per year	---	0.55	
Breathing losses		lb per year	Tanks Program	0	פליטה ממזל breathing&working
		Kg per year	---	0.00	

3. Degassing and Cleaning (Tanks program)

Degassing: emission from one turnover	$E_{degass-floating}$	lb per emptying	Tanks Program	0.39	Degassing ממזל תשטיפים fixed
		Kg per emptying	---	0.18	
Degassing: floating roof, 1 turnover	$E_{degass-roofs}$	lb per emptying	Tanks Program	0.67	Degassing ממזל תשטיפים floating
		Kg per emptying	---	0	
Liquid fraction in sludge	F_{liquid}			0.9	Tanks FAQ - degassing and cleaning
Sludge weight	W_s	Kg per emptying	Distillate has no sludge	0	
Cleaning emissions	$E_{cleaning}$	lb per emptying	$E_{cleaning} = W_s * (1 - F_{liquid})$	0	
		Kg per emptying		0	
Total Degassing and Cleaning emissions	$E_{degass-total}$	lb per emptying	$E_{degass-total} = E_{degass-floating} + E_{degass-roofs} + E_{cleaning}$	1	
		Kg per emptying		0	

4. Summary

Working losses		Kg per year		1	
Breathing losses		Kg per year		0.00	
Total Degassing and Cleaning emissions		Kg per year		0.02	
				1	Kg per year

3013-124 - T

1 / 1

28/01/2010

גיליון חישוב זה הוכן על ידי "פז" הנדסה וניהול (1980) בע"מ.

אין להעתיק ו/או לעשות שימוש כלשהו במידע הנ"ל ללא הרשאה כתובה מ"פז" הנדסה וניהול (1980) בע"מ.

3013.18-036.doc

30/30

28/02/2022



www.pazeng.co.il

רח' יוסף בצרי 40, קרית אתא. כתובת לדואר: ת.ד. 5070 קרית ביאליק 27150 טל: 04-8704585 פקס: 04-8709757 pazadm@netvision.net.il