

ANNUAL SUMMARY OF COMPONENT LEAK DETECTION AND REPAIRS – 2021

A total of three component leak surveys were conducted during 2021, in accordance with subsection 39(1). The first survey was completed by Arlanxeo prior to the sale of the Olefins plant on the following date:

- May 3rd, 2021-May 18th, 2021

DPCC took over operation of the Olefins plant on August 3rd and completed two LDAR surveys between August 3rd, 2021 and December 31, 2021 on the following dates:

- September 7th, 2021-September 16th, 2021
- November 15th, 2021-November 26th, 2021

This report is a combined summary of annual LDAR performance for both the Arlanxeo and DPCC leak surveys.

The annual average concentration of leaking components is 5019.49 ppm

1.78% of valves tested in 2021 were identified with a leak rate greater than 1000ppm.

BE#3

Plant Description:

The BE3 unit removes 1,3- Butadiene from the C4 feedstock stream via an extraction process utilizing acetonitrile. The hydrocarbon feedstock stream received from the K-1 Area is vapourized and then contacted with acetonitrile (solvent). The acetonitrile carries the butadiene to the bottom of the tower and the remaining hydrocarbons, mainly butene and isobutene, leave the top of the tower and are water washed before sending to K-1 Area.

The butadiene is then stripped from the acetonitrile solvent and sent to the butadiene purifying process. Impurities are removed from the butadiene stream via distillation in the finishing tower. The purified 1,3 -butadiene stream from the top of the finishing tower is sent to the K-1 Area for storage as product. The tower bottoms (impurities or purge) are also sent back to K-1 to be added to Raffinate 2 storage.

Acetonitrile is recovered from the water wash stream and from the reflux drum boot streams via distillation within the solvent recovery tower. The clean wash water is reused, and the recovered acetonitrile is injected into the circulating solvent stream. As needed, fresh acetonitrile is received via tank truck and is stored in storage tanks.

2021 Operation Dates

BE#3 unit was shut down for maintenance turnarounds May 4, 2021-May 23rd, 2021 (Arlanxco) and September 20th, 2021 to October 12th, 2021, and was otherwise operating normally throughout 2021. The BE#3 Unit was charged with hydrocarbon during LDAR monitoring surveys in 2021.

Components

As of the end of 2021, there were a total of 2764 components containing a minimum of 2% 1:3-butadiene in BE#3, and therefore subject to the Petrochemical – Industry Standard (PCIS) Leak Detection and Repair (LDAR) requirements. None of these components have been identified as unsafe components, but 698 of these components are excluded from LDAR monitoring because they are inaccessible components.

Component Leak Surveys

The BE#3 2021 surveys were performed by a portable gas detector, and these surveys occurred on the following dates:

- May 3rd, 2021-May 18th, 2021 (Arlanxco)
- September 7th, 2021 – September 16th, 2021 (DPCC)
- November 15th, 2021 – November 26th, 2021 (DPCC)

A total of 2066 components were surveyed in 2021 in the B.E. #3 unit, which includes all accessible components.

The BE#3 2021 LDAR component leak performance was as follows:

99.02% of components had leak rates ≤ 1000 ppm
0.69% of components had readings >1000 ppm and ≤ 5000 ppm
0.14% of components had readings >5000 ppm and $\leq 10,000$ ppm
0.22% of components had leak rates $>10,000$ ppm and $\leq 25,000$ ppm
0% of components had leak rates $>25,000$ ppm

Component Repairs

A total of 27 components were identified as having a leak rate of ≥ 1000 ppm in 2021. 2 components were repaired to <1000 ppm more than once in 2021, representing 0.072% of total components in BE#3.

The following table provides a summary of successful repair timeframes for components with leak rates ≥ 1000 ppm in 2021.

BE#3 – 2021 Component Repair Summary				
Component Type	Number Repaired to <1000ppm Leak Rate	Shortest Repair Timeframe ⁽¹⁾	Longest Repair Timeframe ⁽¹⁾	Average Repair Timeframe ⁽¹⁾
Valves	6	same day	18	2
Pumps	1	7 days	7 days	7
Flanges/Connectors	22	same day	34 days	6

⁽¹⁾ Timeframe between leak detection and successful component repair (includes days component was out of service awaiting completion of repair)

In 2021 there were no valves in BE#3 that required replacement with a low-emission valve, or for packing to be replaced with a low emission packing.

The following table provides a summary of component repairs for the calendar years since the date registered to the Petrochemical – Industry Standard.

BE#3 – Component Repair Summary				
Component Type	2018 Number Repaired to <1000ppm Leak Rate	2019 Number Repaired to <1000ppm Leak Rate	2020 Number Repaired to <1000ppm Leak Rate	2021 Number Repaired to <1000ppm Leak Rate
Valves	6	7	4	6
Pumps	4	4	1	1
Flanges/Connectors	33	25	26	22

K-1 East

Plant Operating Description

There are several hydrocarbon storage spheres located within the K-1 East operating area which handle feed, intermediate, off-spec and product streams. The spheres are vented to the flare during filling or pressure relief conditions. The spheres handling 1,3-butadiene product are cooled via two refrigeration systems.

2021 Operation Dates

The K-1 East equipment operated for the full year in 2021.

Components

As of the end of 2021, there were 2075 DPCC components containing a minimum of 2% 1:3-butadiene in K-1 East, and therefore subject to the Petrochemical – Industry Standard (PCIS) Leak Detection and Repair (LDAR) requirements. None of these components have been identified as unsafe components, but 837 of these components are excluded from LDAR monitoring because they are inaccessible components.

Note that 179 K-1 East components, that contained a minimum of 2% 1,3 butadiene, were retained by Arlanxeo following the Olefins asset transfer to DPCC in August. Of these 179 components, 92 are inaccessible components. 85 of the 179 ARLANXEO components were tested in 2021 and all were below 1000 ppm. The components retained by Arlanxeo are not subject to the Petrochemical-Industry Standard (PCIS) Leak Detection and Repair requirements and therefore were only included in the first component leak survey in 2021.

Component Leak Surveys

The K-1 East 2021 surveys were performed by a portable gas detector, and these surveys occurred on the following dates:

- May 3rd, 2021- May 18th, 2021
- September 7th, 2021-September 16th, 2021
- November 15th, 2021-November 26th, 2021

A total of 1328 components were surveyed in K-1 East in 2021, which includes the 85 components retained by Arlanxeo. All DPCC K-1 East accessible components were tested in 2021. Two of the 87 accessible components retained by ARLANXEO were not in service during the May 3rd to May 18th monitoring survey .

The K-1 East 2021 LDAR component leak performance was as follows:

99.26% of components had leak rate \leq 1000 ppm

0.60% of components had leak rate $>$ 1000 ppm and \leq 5000 ppm

0.14 % of components had leak rate $>$ 5000 ppm and \leq 10,000 ppm

0.05% of components had leak rate $>$ 10,000 ppm and \leq 25,000 ppm

0% of components had leak rate $>$ 25,000 ppm

Component Repairs

A total of 16 components were identified as having a leak rate \geq 1000 ppm in 2021. Of the components identified with a leak rate \geq 1000 ppm, 1 was repaired to $<$ 1000 ppm more than once in 2021, representing 0.05% of total components in K-1 East.

The table on the following page provides a summary of successful repair timeframes for components with leak rates \geq 1000 ppm in 2021.

K-1 East – 2021 Component Repair Summary				
Component Type	Number Repaired to <1000ppm Leak Rate	Shortest Repair Timeframe ⁽¹⁾	Longest Repair Timeframe ⁽¹⁾	Average Repair Timeframe ⁽¹⁾
Valves	8	2 day	126 days	30 days
Pumps	1	56 days	56 days	56 days
Flanges/Connectors	8	same day	56 days	11 days

⁽¹⁾ Timeframe between leak detection and successful component repair (includes days component was out of service awaiting completion of repair)

In 2021 the valve that was on the delay of repair list, was replaced with a low emission valve on September 9, 2022. No valve packing was replaced with low emission packing in 2021.

The following table provides a summary of component repairs for the calendar years since the date registered to the Petrochemical – Industry Standard.

K-1 East – Component Repair Summary				
Component Type	2018 Number Repaired to <1000ppm Leak Rate	2019 Number Repaired to <1000ppm Leak Rate	2020 Number Repaired to <1000ppm Leak Rate	2021 Number Repaired to <1000ppm Leak Rate
Valves	5	8	8	8
Pumps	2	2	2	1
Flanges/Connectors	20	15	15	8

K-1 West

Operating Description

The K-1 West rack is used to both load and off-load rail cars. During loading and off-loading, the rail cars are depressured to the flare. Rail cars are loaded with product such as 1,3-butadiene, Raffinate-2 and off-spec C4 streams. Rail cars received from external suppliers containing materials such as isobutylene, and recovered fuels (low flash fuel), as well as off-spec rail cars returned to ARLANXEO, are off-loaded at K-1.

There are several hydrocarbon storage spheres located within the K-1 West Operating area also which handle feed, intermediate, off-spec and product streams. The spheres are vented to the flare during filling or pressure relief conditions. The spheres handling 1,3-butadiene product are cooled via two refrigeration systems.

2021 Operation Dates

The K-1 West unit was in operation for the full year except for the components of the West Flare which did not operate for most of the year.

Components

As of the end of 2021, there were a total of 2224 DPCC components containing a minimum of 2% 1:3-butadiene in K-1 West, and therefore subject to the Petrochemical – Industry Standard (PCIS) Leak Detection and Repair (LDAR) requirements. None of these components have been identified as unsafe components but 634 are excluded from LDAR monitoring because they are inaccessible components.

Note that 88 K-1 West components that contained a minimum of 2% 1,3 butadiene, were retained by Arlanxeo following the Olefins assets transfer to DPCC in August. Of these 88 components, 53 are inaccessible components and the remaining components were not tested, because they are associated with the West Flare which was out of service during monitoring. The components retained by Arlanxeo are not subject to the Petrochemical-Industry Standard (PCIS) Leak Detection and Repair requirements and therefore were only included in the first component leak survey in 2021.

Component Leak Surveys

The K-1 West 2021 surveys were performed by a portable gas detector, and these surveys occurred on the following dates:

- May 3rd, 2021- May 18th, 2021
- September 7th, 2021-September 16th, 2021
- November 15th, 2021-November 26th, 2021

A total of 1603 components were surveyed in 2021, but 19 have since been decommissioned. A total of 6 accessible components were not in service in 2021 and therefore were not tested.

The K-1 West 2021 LDAR component leak performance was as follows:

99.1% of components had leak rate <=1000 ppm

0.72% of components had leak rate >1000 ppm and <=5000 ppm

0.13% of components had leak rate >5000 ppm and <=10,000 ppm

0.13% of components had leak rate >10,000 ppm and <=25,000 ppm

0% of components had leak rate >25,000 ppm

Component Repairs

A total of 20 components were identified as having a leak rate >=1000 ppm in 2021. Of the components identified with a leak rate >=1000 ppm, 2 were repaired to <1000 ppm more than once in 2021, representing 0.09% of total components in K-1 West.

The following table provides a summary of successful repair timeframes for components with leak rates >=1000 ppm in 2021.

K-1 West – 2021 Component Repair Summary				
Component Type	Number Repaired to <1000ppm Leak Rate	Shortest Repair Timeframe ⁽¹⁾	Longest Repair Timeframe ⁽¹⁾	Average Repair Timeframe ⁽¹⁾
Valves	10	1 day	50 days	12 days
Pumps	1	37 days	37 days	37 days
Flanges/Connectors	11	same day	35 days	12 days

⁽¹⁾ Timeframe between leak detection and successful component repair (includes days component was out of service awaiting completion of repair)

In 2021 there were no valves in K-1 West that required replacement with a low-emission valve, or for packing to be replaced with a low emission packing.

The following table provides a summary of component repairs for the calendar years since the date registered to the Petrochemical – Industry Standard.

K-1 West – Component Repair Summary				
Component Type	2018 Number Repaired to <1000ppm Leak Rate	2019 Number Repaired to <1000ppm Leak Rate	2020 Number Repaired to <1000ppm Leak Rate	2021 Number Repaired to <1000ppm Leak Rate
Valves	1	8	5	10
Pumps	0	2	1	1
Flanges/Connectors	26	18	9	11

Most Recent Delay of Repair Report as per S.44(4)

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December 13, 2021

RE: Delay of Repair 6-month Report

Dear Erin,

Please refer to the details of our Delay of Repair 6-month Report outlined below.

44(4) 1-4. During the 6-month period for which this report is required, there are no components or valves that could not be repaired as required in Table 7-43 of the Technical Standards and therefore S.44 (4) 1-4 are not applicable.

5. The previous report component that had a delay of repair was (ID#016357 A) which is a 2" orbit valve on Sphere-16 at our K-1 West Area.

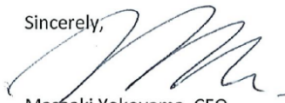
6. When the 2" orbit valve was replaced on sphere-16 on September 9th, 2021, the emissions were measured at 0ppm.

7. There were 0 components set out in this report compared to 1 in the previous delay of repair report in the first 6 months of 2021, under Arlanxco's ownership.

8. The sum of concentration referred to in paragraph 4 of S.44, is 0 as there were no delay of repair components during this report period. The previous report submitted by Arlanxco had a sum of 1913.1ppm for the 2" orbit valve (ID#016357).

If you have any questions or require any clarification, please do not hesitate to contact Craig Journeay (craig.journeay@diamondpetrochemicals.com).

Sincerely,



Masaaki Yokoyama, CEO