

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6



Terminal LLX



Oleo Diesel

31.HA71

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\31.HA71

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	81 m3

Scenario

Scenario Type	Line rupture
Phase to be Released	Liquid
Building Wake Effect	None
Specify Pump Head	No pump head supplied
Tank Head	2.7 m
Number of Excess Flow Valves	0
Number of Non-Return Valves	0
Number of Shut-Off Valves	0

Pipe

Internal Diameter	152.4 mm
Line length	1 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	976 m2
[Type of Bund Surface	Concrete]
Bund Height	0.1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Jet Fire Method	Cone Model
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Dispersion

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Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	5.885E4 kg

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1145 m
North(1)	1134 m

Path: \Terminal LLX\Oleo Diesel\31.HA71

Discharge Data

User-Defined Quantities

Material	CANE (Imported Study Querosene)
Temperature	25,00 degC
Pressure	1,01 bar
Inventory	58.853,40 kg
Scenario	Line rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only)	n/a
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Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
Final Temperature	25,01 degC
Final Velocity	4,80 m/s
Droplet Diameter	592,52 um
Continuous Release Data:	
Mass Flowrate	6.36792E+001 kg/s
Release Duration	924,22 s
Orifice Velocity	4,80 m/s
Exit Pressure	1,01 bar
Exit Temperature	25,01 degC
Discharge Coefficient	1,00

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Expanded Radius	0,08 m
Weather:	Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno
Mass Flow of Air (Vent from Vapor Space Only)	n/a
Average Values for Segment Number	1
Liquid Fraction	1,00 fraction
FinalTemperature	25,01 degC
Final Velocity	4,80 m/s
Droplet Diameter	592,52 um
Continuous Release Data:	
Mass Flowrate	6.36792E+001 kg/s
Release Duration	924,22 s
Orifice Velocity	4,80 m/s
Exit Pressure	1,01 bar
Exit Temperature	25,01 degC
Discharge Coefficient	1,00
Expanded Radius	0,08 m

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Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\31.HA71

Release Segment 1			Diurno	Noturno
Release Duration	s		924.217	924.217
Liquid Rainout	fraction		0.999598	0.999815
Maximum Pool Radius	m		17.6258	17.6258

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\31.HA71

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL	(54000)	18.75	s	2.18048	2.07294
LFL	(7000)	18.75	s	2.19098	2.0764
LFL Frac	(7000)	18.75	s	2.19098	2.0764
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL	(54000)	18.75	s	0.0792979	0.103743
LFL	(7000)	18.75	s	0.0738816	0.101436
LFL Frac	(7000)	18.75	s	0.0738816	0.101436

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\31.HA71

Jet fire method used: Cone model - DNV recommended

		Diurno	Noturno
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\31.HA71

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	8.1035	6.14908
Radiation Level	18.18	kW/m2	6.00062	4.38671
Radiation Level	100	kW/m2	Not Reached	Not Reached

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Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\31.HA71

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\31.HA71

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\31.HA71

			Diurno	Distance (m)
Radiation Level	5	kW/m2	53.6608	Noturno
Radiation Level	18.18	kW/m2	20.818	47.9125
Radiation Level	100	kW/m2		20.7026

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\31.HA71

	Radiation Level (kW/m2)
Diurno	Noturno

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\31.HA71

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\31.HA71

			Diurno	Distance (m)
Radiation Level	5	kW/m2	53.6608	Noturno
Radiation Level	18.18	kW/m2	20.818	47.9125
Radiation Level	100	kW/m2	Not Reached	20.7026
				Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\31.HA71

	Radiation Level (kW/m2)
Diurno	Noturno

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Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\31.HA71

All flammable results are reported at the cloud centreline height

				Distance (m)	
				Diurno	Noturno
Furthest Extent	7000	ppm		2.19098	2.0764
Furthest Extent	7000	ppm		2.19098	2.0764
				Heights (m) for above distances	
				Diurno	Noturno
Furthest Extent	7000	ppm		0.0738816	0.101436
Furthest Extent	7000	ppm		0.0738816	0.101436

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\31.HA71

			Diurno	Noturno
Wind Speed	m/s		3.916	2.329
Pasquill Stability			D	F
Surface Roughness Length	mm		950.891	950.891
Surface Roughness Parameter			0.17	0.17
Atmospheric Temperature	degC		25.287	21.695
Surface Temperature	degC		25.287	21.695
Relative Humidity	fraction		0.69625	0.84719

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32.HA73

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\32.HA73

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 976 m2
[Type of Bund Surface Concrete]
Bund Height 0.1 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1.82 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 24.22 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 5.885E4 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

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Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1145 m
North(1)	1134 m

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Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\32.HA73

			Diurno	Noturno
Release Segment 1				
Release Duration	s		600	600
Liquid Rainout	fraction		0.99893	0.999786
Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s		577.201	586.851
Pool Vaporization Rate	kg/s		0.0778061	0.0508948
Total Vapor Flowrate	kg/s		0.103724	0.0560794
Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s		446.549	448.13
Pool Vaporization Rate	kg/s		0.100926	0.0665509
Total Vapor Flowrate	kg/s		0.126844	0.0717356
Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s		733.706	745.609
Pool Vaporization Rate	kg/s		0.122534	0.080066
Total Vapor Flowrate	kg/s		0.100926	0.0665509
Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s		1842.54	
Pool Vaporization Rate	kg/s		0.146094	
Total Vapor Flowrate	kg/s		0.122534	0.080066
Maximum Pool Radius	m		17.6258	17.6258

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\32.HA73

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		0.865271	0.788017
LFL (7000)	18.75	s		2.57815	5.58048
LFL Frac (7000)	18.75	s		2.57815	5.58048
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.003379	0.0867386
LFL (7000)	18.75	s		0	0
LFL Frac (7000)	18.75	s		0	0

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Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\32.HA73

Jet fire method used: Cone model - DNV recommended

	Diurno	Noturno
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\32.HA73

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	8.1425	4.12825
Radiation Level	18.18	kW/m2	6.1426	2.71264
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\32.HA73

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\32.HA73

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\32.HA73

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	41.6489	37.9844
Radiation Level	18.18	kW/m2	13.1249	12.9494
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\32.HA73

	Radiation Level (kW/m2)
Diurno	Noturno

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Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\32.HA73

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\32.HA73

			Diurno	Noturno
				Distance (m)
Radiation Level	5	kW/m2	52.3366	46.6245
Radiation Level	18.18	kW/m2	19.4938	19.4146
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\32.HA73

	Diurno	Noturno
		Radiation Level (kW/m2)

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\32.HA73

All flammable results are reported at the cloud centreline height

			Diurno	Noturno
				Distance (m)
Furthest Extent	7000	ppm	2.57815	5.58048
Furthest Extent	7000	ppm	2.57815	5.58048
				Heights (m) for above distances
			Diurno	Noturno
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\32.HA73

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

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33.HA75

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\33.HA75

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 1800 m2
[Type of Bund Surface Concrete]
Bund Height 0.1 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1.82 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 24.22 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 5.885E4 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

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Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1134 m
North(1)	1163 m

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Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\33.HA75

			Diurno	Noturno
Release Segment 1				
Release Duration	s		600	600
Liquid Rainout	fraction		0.99893	0.999786
Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s		632.272	651.276
Pool Vaporization Rate	kg/s		0.134463	0.0868661
Total Vapor Flowrate	kg/s		0.160381	0.0920507
Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s		414	424.314
Pool Vaporization Rate	kg/s		0.205721	0.133485
Total Vapor Flowrate	kg/s		0.134463	0.0868661
Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s		2553.73	1044.76
Pool Vaporization Rate	kg/s		0.266077	0.162993
Total Vapor Flowrate	kg/s		0.205721	0.133485
Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s			1479.65
Pool Vaporization Rate	kg/s			0.190598
Total Vapor Flowrate	kg/s		0.266077	0.162993
Maximum Pool Radius	m		23.9365	23.9365

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\33.HA75

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		0.865428	0.78816
LFL (7000)	18.75	s		3.2056	6.36663
LFL Frac (7000)	18.75	s		3.2056	6.36663
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.00318236	0.0864112
LFL (7000)	18.75	s		0	0
LFL Frac (7000)	18.75	s		0	0

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Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\33.HA75

Jet fire method used: Cone model - DNV recommended

	Diurno	Noturno
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\33.HA75

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	8.1425	4.12825
Radiation Level	18.18	kW/m2	6.1426	2.71264
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\33.HA75

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\33.HA75

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\33.HA75

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	41.6489	37.9844
Radiation Level	18.18	kW/m2	13.1249	12.9494
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\33.HA75

	Radiation Level (kW/m2)
Diurno	Noturno

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Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\33.HA75

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\33.HA75

			Diurno	Noturno
				Distance (m)
Radiation Level	5	kW/m2	64.0396	56.9434
Radiation Level	18.18	kW/m2	25.8045	25.7253
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\33.HA75

	Diurno	Noturno
		Radiation Level (kW/m2)

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\33.HA75

All flammable results are reported at the cloud centreline height

			Diurno	Noturno
				Distance (m)
Furthest Extent	7000	ppm	3.2056	6.36663
Furthest Extent	7000	ppm	3.2056	6.36663
				Heights (m) for above distances
			Diurno	Noturno
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\33.HA75

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

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Phast 6.6

34.HA77

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\34.HA77

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 4548 m2
[Type of Bund Surface Concrete]
[Bund Height 1.5 m]
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1.82 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 24.22 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 5.885E4 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

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Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1241 m
North(1)	1217 m

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Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\34.HA77

			Diurno	Noturno
Release Segment 1				
Release Duration	s		600	600
Liquid Rainout	fraction		0.99893	0.999786
Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s		740.951	772.59
Pool Vaporization Rate	kg/s		0.231102	0.149049
Total Vapor Flowrate	kg/s		0.25702	0.154234
Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s		372.69	401.936
Pool Vaporization Rate	kg/s		0.460107	0.286302
Total Vapor Flowrate	kg/s		0.231102	0.149049
Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s		2486.36	355.99
Pool Vaporization Rate	kg/s		0.550291	0.322769
Total Vapor Flowrate	kg/s		0.460107	0.286302
Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s			2069.48
Pool Vaporization Rate	kg/s			0.38786
Total Vapor Flowrate	kg/s		0.550291	0.322769
Maximum Pool Radius	m		35.6656	35.6837

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\34.HA77

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		0.865882	0.788599
LFL (7000)	18.75	s		3.87999	7.34524
LFL Frac (7000)	18.75	s		3.87999	7.34524
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.00261281	0.0854058
LFL (7000)	18.75	s		0	0
LFL Frac (7000)	18.75	s		0	0

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Study Folder: Terminal LLX

Phast 6.6

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\34.HA77

Jet fire method used: Cone model - DNV recommended

	Diurno	Noturno
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\34.HA77

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	8.1425	4.12825
Radiation Level	18.18	kW/m2	6.1426	2.71264
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\34.HA77

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\34.HA77

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\34.HA77

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	41.6489	37.9844
Radiation Level	18.18	kW/m2	13.1249	12.9494
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\34.HA77

	Radiation Level (kW/m2)
Diurno	Noturno

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Study Folder: Terminal LLX

Phast 6.6

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\34.HA77

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\34.HA77

			Diurno	Noturno
				Distance (m)
Radiation Level	5	kW/m2	86.6844	77.4324
Radiation Level	18.18	kW/m2	37.5336	37.4724
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\34.HA77

	Diurno	Noturno
		Radiation Level (kW/m2)

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\34.HA77

All flammable results are reported at the cloud centreline height

			Diurno	Noturno
				Distance (m)
Furthest Extent	7000	ppm	3.87999	7.34524
Furthest Extent	7000	ppm	3.87999	7.34524
				Heights (m) for above distances
			Diurno	Noturno
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\34.HA77

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

35.HA79

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\35.HA79

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	40.5 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	2.25 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	976 m2
[Type of Bund Surface	Concrete]
Bund Height	0.1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
---------------------	------------------

Flammable

Jet Fire Method	Cone Model
-----------------	------------

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	2.943E4 kg
Use Burst Pressure	No - Use release pressure for fireball

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

[Set averaging time equal to exposure time Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation 0.05 fraction]
[Cut-off concentration for exposure time calculations 0 fraction]

Geometry

Shape Point
Dimension 2D
System Absolute
East(1) 1145 m
North(1) 1134 m

Path: \Terminal LLX\Oleo Diesel\35.HA79

Discharge Data

User-Defined Quantities

Material CANE (Imported Study Querosene)
Temperature 25,00 degC
Pressure 1,01 bar
Inventory 29.426,70 kg
Scenario Catastrophic rupture
Fixed Duration n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
FinalTemperature 25,00 degC
Final Velocity 2,04 m/s
Droplet Diameter 10.000,00 um

Continuous Release Data:

Mass Flowrate n/a kg/s
Release Duration n/a s
Orifice Velocity n/a m/s
Exit Pressure n/a bar
Exit Temperature n/a degC
Discharge Coefficient n/a
Expanded Radius n/a m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
FinalTemperature 25,00 degC
Final Velocity 2,04 m/s
Droplet Diameter 10.000,00 um

Continuous Release Data:

Mass Flowrate n/a kg/s

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Study Folder: Terminal LLX

Phast 6.6

Release Duration	n/a s
Orifice Velocity	n/a m/s
Exit Pressure	n/a bar
Exit Temperature	n/a degC
Discharge Coefficient	n/a
Expanded Radius	n/a m

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\35.HA79

N.B. Pool vaporization segments begin when the cloud has left the pool

		Diurno	Noturno
Liquid Rainout	fraction	0.999935	0.999935
Initial Vapor Cloud	kg	1.89898	
Time Pool Left Behind	s	16.0842	
Cloud Segment 1			
Cloud Segment Duration	s	534.766	
Pool Vaporization Rate	kg/s	0.0765136	
Cloud Segment 2			
Cloud Segment Duration	s	438.674	
Pool Vaporization Rate	kg/s	0.0934762	
Cloud Segment 3			
Cloud Segment Duration	s	757.12	
Pool Vaporization Rate	kg/s	0.108258	
Cloud Segment 4			
Cloud Segment Duration	s	1869.44	
Pool Vaporization Rate	kg/s	0.131111	
Maximum Pool Radius	m	17.6258	17.6258

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\35.HA79

The height for user defined concentrations is the user defined height 1 m

All toxic results are reported at the toxic effect height 1 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time			Distance (m)	
					Diurno	Noturno
UFL	(54000)	18.75	s		4.69468	4.505
LFL	(7000)	18.75	s		4.73861	4.54907
LFL Frac	(7000)	18.75	s		4.73861	4.54907
Concentration(ppm)		Averaging Time			Heights (m) for above distances	
					Diurno	Noturno
UFL	(54000)	18.75	s		0.806227	0.80587
LFL	(7000)	18.75	s		0.806227	0.80587
LFL Frac	(7000)	18.75	s		0.806227	0.80587

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\35.HA79

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

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Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\35.HA79

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	52.1511	46.2705
Radiation Level	18.18	kW/m2	19.3083	19.0606
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\35.HA79

Radiation Level (kW/m2)	
Diurno	Noturno

Fireball Hazard

Path: \Terminal LLX\Oleo Diesel\35.HA79

		Diurno	Noturno
Fireball Flame Status		No Hazard	No Hazard

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\35.HA79

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	4.73861	4.54907
Furthest Extent	7000	ppm	4.73861	4.54907
			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.806227	0.80587
Furthest Extent	7000	ppm	0.806227	0.80587

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Study Folder: Terminal LLX

Phast 6.6

Explosion Effects: Early Explosion

Path: \Terminal LLX\Oleo Diesel\35.HA79

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Diurno	Noturno
Supplied Flammable Mass			29426.7	29426.7
			Distance (m) at Overpressure Levels	
			Diurno	Noturno
Overpressure	0.069	bar	No Hazard	No Hazard
Overpressure	0.1	bar	No Hazard	No Hazard
Overpressure	0.45	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno	Noturno
Overpressure	0.069	bar	0	0
Overpressure	0.1	bar	0	0
Overpressure	0.45	bar	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\35.HA79

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

36.HA80

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\36.HA80

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	40.5 m3

Scenario

Scenario Type	Leak
Phase to be Released	Liquid
Hole Diameter	10 mm
Building Wake Effect	None
Tank Head	2.25 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	976 m2
[Type of Bund Surface	Concrete]
Bund Height	0.1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Jet Fire Method	Cone Model
-----------------	------------

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	2.943E4 kg

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]

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Study Folder: Terminal LLX

Phast 6.6

[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1145 m
North(1)	1134 m

Path: \Terminal LLX\Oleo Diesel\36.HA80

Discharge Data

User-Defined Quantities

Material	CANE (Imported Study Querosene)
Temperature	25,00 degC
Pressure	1,01 bar
Inventory	29.426,70 kg
Scenario	Leak
Fixed Duration	n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only)	n/a
---	-----

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
Final Temperature	25,00 degC
Final Velocity	7,31 m/s
Droplet Diameter	605,90 um
Continuous Release Data:	
Mass Flowrate	2.50286E-001 kg/s
Release Duration	3.600,00 s
Orifice Velocity	7,31 m/s
Exit Pressure	1,01 bar
Exit Temperature	25,00 degC
Discharge Coefficient	0,60
Expanded Radius	0,00 m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only)	n/a
---	-----

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
Final Temperature	25,00 degC
Final Velocity	7,31 m/s
Droplet Diameter	605,90 um
Continuous Release Data:	

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Phast 6.6



Mass Flowrate	2.50286E-001 kg/s
Release Duration	3.600,00 s
Orifice Velocity	7,31 m/s
Exit Pressure	1,01 bar
Exit Temperature	25,00 degC
Discharge Coefficient	0,60
Expanded Radius	0,00 m

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Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\36.HA80

Release Segment 1			Diurno	Noturno
Release Duration	s		3600	3600
Liquid Rainout	fraction		0.993392	0.99462
Maximum Pool Radius	m		8.64198	8.731

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\36.HA80

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL	(54000)	18.75	s	1.88155	2.11677
LFL	(7000)	18.75	s	2.42495	2.38857
LFL Frac	(7000)	18.75	s	2.42495	2.38857
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL	(54000)	18.75	s	0.711593	0.500135
LFL	(7000)	18.75	s	0.579226	0.357951
LFL Frac	(7000)	18.75	s	0.579226	0.357951

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\36.HA80

Jet fire method used: Cone model - DNV recommended

		Diurno	Noturno
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\36.HA80

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	1.7774	1.49705
Radiation Level	18.18	kW/m2	Not Reached	Not Reached
Radiation Level	100	kW/m2	Not Reached	Not Reached

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Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\36.HA80

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\36.HA80

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\36.HA80

			Diurno	Distance (m)
				Noturno
Radiation Level	5	kW/m2	13.7379	13.3472
Radiation Level	18.18	kW/m2	9.558	8.87202
Radiation Level	100	kW/m2	4.62702	4.55913

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\36.HA80

	Radiation Level (kW/m2)
Diurno	Noturno

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\36.HA80

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\36.HA80

			Diurno	Distance (m)
				Noturno
Radiation Level	5	kW/m2	39.1852	36.5017
Radiation Level	18.18	kW/m2	14.8231	13.933
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\36.HA80

	Radiation Level (kW/m2)
Diurno	Noturno

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Study Folder: Terminal LLX

Phast 6.6

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\36.HA80

All flammable results are reported at the cloud centreline height

				Distance (m)	
				Diurno	Noturno
Furthest Extent	7000	ppm		2.42495	2.38857
Furthest Extent	7000	ppm		2.42495	2.38857
				Heights (m) for above distances	
				Diurno	Noturno
Furthest Extent	7000	ppm		0.579226	0.357951
Furthest Extent	7000	ppm		0.579226	0.357951

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\36.HA80

			Diurno	Noturno
Wind Speed	m/s		3.916	2.329
Pasquill Stability			D	F
Surface Roughness Length	mm		950.891	950.891
Surface Roughness Parameter			0.17	0.17
Atmospheric Temperature	degC		25.287	21.695
Surface Temperature	degC		25.287	21.695
Relative Humidity	fraction		0.69625	0.84719

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

37.HA82

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\37.HA82

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	81 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	2.7 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	976 m2
[Type of Bund Surface	Concrete]
Bund Height	0.1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
---------------------	------------------

Flammable

Jet Fire Method	Cone Model
-----------------	------------

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	5.885E4 kg
Use Burst Pressure	No - Use release pressure for fireball

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]

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Study Folder: Terminal LLX

Phast 6.6

[Set averaging time equal to exposure time Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation 0.05 fraction]
[Cut-off concentration for exposure time calculations 0 fraction]

Geometry

Shape Point
Dimension 2D
System Absolute
East(1) 1145 m
North(1) 1134 m

Path: \Terminal LLX\Oleo Diesel\37.HA82

Discharge Data

User-Defined Quantities

Material CANE (Imported Study Querosene)
Temperature 25,00 degC
Pressure 1,01 bar
Inventory 58.853,40 kg
Scenario Catastrophic rupture
Fixed Duration n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
FinalTemperature 25,00 degC
Final Velocity 2,26 m/s
Droplet Diameter 10.000,00 um

Continuous Release Data:

Mass Flowrate n/a kg/s
Release Duration n/a s
Orifice Velocity n/a m/s
Exit Pressure n/a bar
Exit Temperature n/a degC
Discharge Coefficient n/a
Expanded Radius n/a m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
FinalTemperature 25,00 degC
Final Velocity 2,26 m/s
Droplet Diameter 10.000,00 um

Continuous Release Data:

Mass Flowrate n/a kg/s

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Study Folder: Terminal LLX

Phast 6.6

Release Duration	n/a s
Orifice Velocity	n/a m/s
Exit Pressure	n/a bar
Exit Temperature	n/a degC
Discharge Coefficient	n/a
Expanded Radius	n/a m

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Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\37.HA82

N.B. Pool vaporization segments begin when the cloud has left the pool

		Diurno	Noturno
Liquid Rainout	fraction	0.999923	0.999923
Initial Vapor Cloud	kg	4.50681	
Time Pool Left Behind	s	16.5187	
Cloud Segment 1			
Cloud Segment Duration	s	491.731	
Pool Vaporization Rate	kg/s	0.0694483	
Cloud Segment 2			
Cloud Segment Duration	s	829.592	
Pool Vaporization Rate	kg/s	0.0824056	
Cloud Segment 3			
Cloud Segment Duration	s	1382.68	
Pool Vaporization Rate	kg/s	0.098969	
Cloud Segment 4			
Cloud Segment Duration	s	896	
Pool Vaporization Rate	kg/s	0.113374	
Maximum Pool Radius	m	17.6258	17.6258

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\37.HA82

The height for user defined concentrations is the user defined height 1 m

All toxic results are reported at the toxic effect height 1 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time			Diurno	Noturno
UFL	(54000)	18.75	s		7.99946	7.69557
LFL	(7000)	18.75	s		8.07412	7.77044
LFL Frac	(7000)	18.75	s		8.07412	7.77044
Concentration(ppm)		Averaging Time			Diurno	Heights (m) for above distances
UFL	(54000)	18.75	s		0.807042	0.806456
LFL	(7000)	18.75	s		0.807042	0.806456
LFL Frac	(7000)	18.75	s		0.807042	0.806456

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\37.HA82

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\37.HA82

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	52.5152	46.5211
Radiation Level	18.18	kW/m2	19.6724	19.3112
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\37.HA82

		Radiation Level (kW/m2)	
		Diurno	Noturno

Fireball Hazard

Path: \Terminal LLX\Oleo Diesel\37.HA82

		Diurno	Noturno
Fireball Flame Status		No Hazard	No Hazard

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\37.HA82

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	8.07412	7.77044
Furthest Extent	7000	ppm	8.07412	7.77044
			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.807042	0.806456
Furthest Extent	7000	ppm	0.807042	0.806456

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Explosion Effects: Early Explosion

Path: \Terminal LLX\Oleo Diesel\37.HA82

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Diurno	Noturno
Supplied Flammable Mass			58853.4	58853.4
			Distance (m) at Overpressure Levels	
			Diurno	Noturno
Overpressure	0.069	bar	No Hazard	No Hazard
Overpressure	0.1	bar	No Hazard	No Hazard
Overpressure	0.45	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno	Noturno
Overpressure	0.069	bar	0	0
Overpressure	0.1	bar	0	0
Overpressure	0.45	bar	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\37.HA82

			Diurno	Noturno
Wind Speed	m/s		3.916	2.329
Pasquill Stability			D	F
Surface Roughness Length	mm		950.891	950.891
Surface Roughness Parameter			0.17	0.17
Atmospheric Temperature	degC		25.287	21.695
Surface Temperature	degC		25.287	21.695
Relative Humidity	fraction		0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

38.HA83

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\38.HA83

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	81 m3

Scenario

Scenario Type	Leak
Phase to be Released	Liquid
Hole Diameter	10 mm
Building Wake Effect	None
Tank Head	2.7 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	976 m2
[Type of Bund Surface	Concrete]
Bund Height	0.1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Jet Fire Method	Cone Model
-----------------	------------

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	5.885E4 kg

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

[Tail Time 1800 s]
[Set averaging time equal to exposure time Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation 0.05 fraction]
[Cut-off concentration for exposure time calculations 0 fraction]

Geometry

Shape Point
Dimension 2D
System Absolute
East(1) 1145 m
North(1) 1134 m

Path: \Terminal LLX\Oleo Diesel\38.HA83

Discharge Data

User-Defined Quantities

Material CANE (Imported Study Querosene)
Temperature 25,00 degC
Pressure 1,01 bar
Inventory 58.853,40 kg
Scenario Leak
Fixed Duration n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
Final Temperature 25,00 degC
Final Velocity 8,01 m/s
Droplet Diameter 592,52 um

Continuous Release Data:

Mass Flowrate 2.74175E-001 kg/s
Release Duration 3.600,00 s
Orifice Velocity 8,01 m/s
Exit Pressure 1,01 bar
Exit Temperature 25,00 degC
Discharge Coefficient 0,60
Expanded Radius 0,00 m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
Final Temperature 25,00 degC
Final Velocity 8,01 m/s
Droplet Diameter 592,52 um

Continuous Release Data:

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Mass Flowrate	2.74175E-001 kg/s
Release Duration	3.600,00 s
Orifice Velocity	8,01 m/s
Exit Pressure	1,01 bar
Exit Temperature	25,00 degC
Discharge Coefficient	0,60
Expanded Radius	0,00 m

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\38.HA83

Release Segment 1			Diurno	Noturno
Release Duration	s		3600	3600
Liquid Rainout	fraction		0.993114	0.994424
Maximum Pool Radius	m		9.04451	9.13786

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\38.HA83

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL	(54000)	18.75	s	1.97935	2.16729
LFL	(7000)	18.75	s	2.44383	2.42185
LFL Frac	(7000)	18.75	s	2.44383	2.42185
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL	(54000)	18.75	s	0.724537	0.557849
LFL	(7000)	18.75	s	0.614753	0.443691
LFL Frac	(7000)	18.75	s	0.614753	0.443691

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\38.HA83

Jet fire method used: Cone model - DNV recommended

		Diurno	Noturno
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\38.HA83

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	1.98445	1.6609
Radiation Level	18.18	kW/m2	Not Reached	Not Reached
Radiation Level	100	kW/m2	Not Reached	Not Reached

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\38.HA83

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\38.HA83

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\38.HA83

			Diurno	Noturno
Radiation Level	5	kW/m2	14.1351	13.7496
Radiation Level	18.18	kW/m2	9.79901	9.10704
Radiation Level	100	kW/m2	4.68611	4.64231

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\38.HA83

	Radiation Level (kW/m2)
Diurno	Noturno

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\38.HA83

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\38.HA83

			Diurno	Noturno
Radiation Level	5	kW/m2	39.9141	37.0897
Radiation Level	18.18	kW/m2	14.8164	13.9532
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\38.HA83

	Radiation Level (kW/m2)
Diurno	Noturno

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\38.HA83

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	2.44383	2.42185
Furthest Extent	7000	ppm	2.44383	2.42185
			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.614753	0.443691
Furthest Extent	7000	ppm	0.614753	0.443691

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\38.HA83

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

39.HA85 e HA94

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 1600 m2
[Type of Bund Surface Concrete]
Bund Height 0.1 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 2.28 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 121.1 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 6.539E6 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1176 m
North(1)	1039 m

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

			Diurno	Noturno
Release Segment 1				
Release Duration	s		600	600
Liquid Rainout	fraction		0.999721	0.999925
Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s		489.516	495.063
Pool Vaporization Rate	kg/s		0.122319	0.0774159
Total Vapor Flowrate	kg/s		0.15614	0.086508
Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s		838.837	842.418
Pool Vaporization Rate	kg/s		0.14281	0.0911666
Total Vapor Flowrate	kg/s		0.176631	0.100259
Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s		1378	1060.82
Pool Vaporization Rate	kg/s		0.173909	0.108579
Total Vapor Flowrate	kg/s		0.14281	0.0911666
Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s		893.649	1201.7
Pool Vaporization Rate	kg/s		0.199687	0.12678
Total Vapor Flowrate	kg/s		0.173909	0.108579
Maximum Pool Radius	m		22.5676	22.5676

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		1.01856	0.971274
LFL (7000)	18.75	s		2.66428	6.66891
LFL Frac (7000)	18.75	s		2.66428	6.66891
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.0614486	0.11671
LFL (7000)	18.75	s		0	0
LFL Frac (7000)	18.75	s		0	0

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

Jet fire method used: Cone model - DNV recommended

	Diurno	Noturno
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	9.2085	5.43732
Radiation Level	18.18	kW/m2	6.99328	3.71336
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	61.5718	54.7876
Radiation Level	18.18	kW/m2	24.5883	24.539
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

	Radiation Level (kW/m2)
Diurno	Noturno

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

			Diurno	Noturno
				Distance (m)
Radiation Level	5	kW/m2	61.5718	54.7876
Radiation Level	18.18	kW/m2	24.5883	24.539
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

	Diurno	Radiation Level (kW/m2)
		Noturno

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

All flammable results are reported at the cloud centreline height

			Diurno	Noturno
				Distance (m)
Furthest Extent	7000	ppm	2.66428	6.66891
Furthest Extent	7000	ppm	2.66428	6.66891
				Heights (m) for above distances
				Noturno
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\39.HA85 e HA94

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

40.HA87

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\40.HA87

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 4548 m2
[Type of Bund Surface Concrete]
[Bund Height 1.5 m]
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1.9 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 100.9 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 6.539E6 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1241 m
North(1)	1217 m

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\40.HA87

			Diurno	Noturno
Release Segment 1				
Release Duration	s		600	600
Liquid Rainout	fraction		0.999773	0.999918
Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s		606.141	616.031
Pool Vaporization Rate	kg/s		0.32879	0.213493
Total Vapor Flowrate	kg/s		0.351686	0.221723
Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s		440.132	446.479
Pool Vaporization Rate	kg/s		0.452699	0.295432
Total Vapor Flowrate	kg/s		0.32879	0.213493
Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s		727.993	739.243
Pool Vaporization Rate	kg/s		0.548446	0.356404
Total Vapor Flowrate	kg/s		0.452699	0.295432
Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s		1825.73	1798.25
Pool Vaporization Rate	kg/s		0.653986	0.437676
Total Vapor Flowrate	kg/s		0.548446	0.356404
Maximum Pool Radius	m		38.0483	38.0483

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\40.HA87

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		0.829315	0.813482
LFL (7000)	18.75	s		3.25068	8.93022
LFL Frac (7000)	18.75	s		3.25068	8.93022
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.0936432	0.108941
LFL (7000)	18.75	s		0	0
LFL Frac (7000)	18.75	s		0	0

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\40.HA87

Jet fire method used: Cone model - DNV recommended

	Diurno	Noturno
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\40.HA87

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	7.68151	5.18466
Radiation Level	18.18	kW/m2	5.77337	3.56625
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\40.HA87

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\40.HA87

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\40.HA87

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	61.4754	54.9939
Radiation Level	18.18	kW/m2	24.4471	24.5958
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\40.HA87

	Radiation Level (kW/m2)
Diurno	Noturno

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\40.HA87

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\40.HA87

			Diurno	Noturno
				Distance (m)
Radiation Level	5	kW/m2	91.161	81.5321
Radiation Level	18.18	kW/m2	39.8783	39.8618
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\40.HA87

	Diurno	Noturno
		Radiation Level (kW/m2)

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\40.HA87

All flammable results are reported at the cloud centreline height

			Diurno	Noturno
				Distance (m)
Furthest Extent	7000	ppm	3.25068	8.93022
Furthest Extent	7000	ppm	3.25068	8.93022
				Heights (m) for above distances
			Diurno	Noturno
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\40.HA87

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

41.HA92

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\41.HA92

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	9000 m3

Scenario

Scenario Type	Line rupture
Phase to be Released	Liquid
Building Wake Effect	None
Specify Pump Head	No pump head supplied
Tank Head	15.9 m
Number of Excess Flow Valves	0
Number of Non-Return Valves	0
Number of Shut-Off Valves	0

Pipe

Internal Diameter	304.8 mm
Line length	1 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	4548 m2
[Type of Bund Surface	Concrete]
[Bund Height	1.5 m]
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Jet Fire Method	Cone Model
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Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	6.539E6 kg

Fireball Parameters

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1241 m
North(1)	1217 m

Path: \Terminal LLX\Oleo Diesel\41.HA92

Discharge Data

User-Defined Quantities

Material	CANE (Imported Study Querosene)
Temperature	25,00 degC
Pressure	1,01 bar
Inventory	6.539.266,50 kg
Scenario	Line rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only)	n/a
---	-----

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
Final Temperature	25,07 degC
Final Velocity	11,66 m/s
Droplet Diameter	462,37 um

Continuous Release Data:

Mass Flowrate	6.18110E+002 kg/s
Release Duration	3.600,00 s
Orifice Velocity	11,66 m/s
Exit Pressure	1,01 bar
Exit Temperature	25,07 degC
Discharge Coefficient	1,00
Expanded Radius	0,15 m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only)	n/a
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SUMMARY REPORT

Study Folder: Terminal LLX

Unique Audit Number: 193.279

Phast 6.6



Average Values for Segment Number		1
Liquid Fraction		1,00 fraction
FinalTemperature		25,07 degC
Final Velocity		11,66 m/s
Droplet Diameter		462,37 um
Continuous Release Data:		
Mass Flowrate		6.18110E+002 kg/s
Release Duration		3.600,00 s
Orifice Velocity		11,66 m/s
Exit Pressure		1,01 bar
Exit Temperature		25,07 degC
Discharge Coefficient		1,00
Expanded Radius		0,15 m

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\41.HA92

		Diurno	Noturno
Release Segment 1			
Release Duration	s	3600	3600
Liquid Rainout	fraction	0.999784	0.999854
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	s	62.8056	119.902
Pool Vaporization Rate	kg/s	0.114548	0.143089
Total Vapor Flowrate	kg/s	0.248075	0.233225
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	s	3537.19	3480.1
Pool Vaporization Rate	kg/s	0.303338	0.216464
Total Vapor Flowrate	kg/s	0.436865	0.306601
Maximum Pool Radius	m	38.0483	38.0483

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\41.HA92

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		6.27914	6.08899
LFL (7000)	18.75	s		6.32168	6.10982
LFL Frac (7000)	18.75	s		6.32168	6.10982
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.189849	0.163078
LFL (7000)	18.75	s		0.187731	0.162145
LFL Frac (7000)	18.75	s		0.187731	0.162145

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\41.HA92

Jet fire method used: Cone model - DNV recommended

		Diurno	Noturno
Jet Fire Status		Truncated	Truncated
Flame Direction		Horizontal	Horizontal

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\41.HA92

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	17.2043	15.5959
Radiation Level	18.18	kW/m2	12.8761	11.8433
Radiation Level	100	kW/m2	9.75363	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\41.HA92

		Radiation Level (kW/m2)
		Diurno
		Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\41.HA92

		Diurno	Noturno
Early Pool Fire Status		Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\41.HA92

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	96.6533	86.8289
Radiation Level	18.18	kW/m2	45.3706	45.1586
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\41.HA92

		Radiation Level (kW/m2)
		Diurno
		Noturno

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\41.HA92

		Diurno	Noturno
Late Pool Fire Status		Hazard	Hazard

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\41.HA92

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	96.6533	86.8289
Radiation Level	18.18	kW/m2	45.3706	45.1586
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\41.HA92

		Radiation Level (kW/m2)	
		Diurno	Noturno

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\41.HA92

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	6.32168	6.10982
Furthest Extent	7000	ppm	6.32168	6.10982
			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.187731	0.162145
Furthest Extent	7000	ppm	0.187731	0.162145

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\41.HA92

			Diurno	Noturno
Wind Speed	m/s		3.916	2.329
Pasquill Stability			D	F
Surface Roughness Length	mm		950.891	950.891
Surface Roughness Parameter			0.17	0.17
Atmospheric Temperature	degC		25.287	21.695
Surface Temperature	degC		25.287	21.695
Relative Humidity	fraction		0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

42.HA96

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\42.HA96

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 1800 m2
[Type of Bund Surface Concrete]
Bund Height 0.1 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1.32 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 48.44 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 6.539E6 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1134 m
North(1)	1163 m

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\42.HA96

			Diurno	Noturno
Release Segment 1				
Release Duration	s		600	600
Liquid Rainout	fraction		0.999514	0.999875
Release Segment 1 Cloud Segment 1				
Cloud Segment Duration	s		578.403	584.431
Pool Vaporization Rate	kg/s		0.138343	0.0904615
Total Vapor Flowrate	kg/s		0.161874	0.0965091
Release Segment 1 Cloud Segment 2				
Cloud Segment Duration	s		450.153	452.159
Pool Vaporization Rate	kg/s		0.17813	0.117327
Total Vapor Flowrate	kg/s		0.20166	0.123374
Release Segment 1 Cloud Segment 3				
Cloud Segment Duration	s		739.397	750.336
Pool Vaporization Rate	kg/s		0.216737	0.141292
Total Vapor Flowrate	kg/s		0.17813	0.117327
Release Segment 1 Cloud Segment 4				
Cloud Segment Duration	s		1832.05	1545
Pool Vaporization Rate	kg/s		0.261162	0.171988
Total Vapor Flowrate	kg/s		0.216737	0.141292
Release Segment 1 Cloud Segment 5				
Cloud Segment Duration	s			268.074
Pool Vaporization Rate	kg/s			0.189546
Total Vapor Flowrate	kg/s		0.261162	0.171988
Maximum Pool Radius	m		23.9365	23.9365

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\42.HA96

The height for user defined concentrations is the user defined height 1 m

All toxic results are reported at the toxic effect height 1 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL	(54000)	18.75	s	0.592191	0.566457
LFL	(7000)	18.75	s	2.82178	6.74335
LFL Frac	(7000)	18.75	s	2.82178	6.74335
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL	(54000)	18.75	s	0.0645274	0.106698
LFL	(7000)	18.75	s	0	0
LFL Frac	(7000)	18.75	s	0	0

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\42.HA96

Jet fire method used: Cone model - DNV recommended

	Diurno	Noturno
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\42.HA96

This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	7.7988	4.47822
Radiation Level	18.18	kW/m2	5.88936	3.05311
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\42.HA96

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\42.HA96

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\42.HA96

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	48.7164	43.7208
Radiation Level	18.18	kW/m2	17.261	17.3528
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\42.HA96

	Radiation Level (kW/m2)
Diurno	Noturno

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\42.HA96

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\42.HA96

			Diurno	Noturno
				Distance (m)
Radiation Level	5	kW/m2	63.7645	56.7232
Radiation Level	18.18	kW/m2	25.5294	25.5052
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\42.HA96

	Diurno	Noturno
		Radiation Level (kW/m2)

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\42.HA96

All flammable results are reported at the cloud centreline height

			Diurno	Noturno
				Distance (m)
Furthest Extent	7000	ppm	2.82178	6.74335
Furthest Extent	7000	ppm	2.82178	6.74335
				Heights (m) for above distances
			Diurno	Noturno
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\42.HA96

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

43.HA98 e HA100

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

User-Defined Data

Material

Material Identifier n-DECANE (Imported Study Querosene)

Scenario

Building Wake Effect None

Vessel/Tank

Release Type Continuous

Location

[Elevation 1 m]
Use ERPG averaging time ERPG not selected
Use IDLH averaging time IDLH not selected
Use STEL averaging time STEL not selected
Supply a user defined averaging time Not supplied

Bund

Status of Bund Bund present
Bund Area 976 m2
[Type of Bund Surface Concrete]
Bund Height 0.1 m
[Bund Failure Modeling Bund cannot fail]

Indoor/Outdoor

Location of release Open air release
Outdoor Release Direction Horizontal

Flammable

Jet Fire Method Cone Model

Dispersion

Number of Release Segments 1
Fluid Phase(1) Liquid
Discharge Velocity(1) 1.32 m/s
Droplet Diameter(1) 100 um
Duration of Discharge(1) 600 s
Final Temperature(1) 25 degC
Release Rate(1) 48.44 kg/s
Pre-Dilution Air Rates(1) 0 kg/s
Late Ignition Location No ignition location
Mass Inventory of material to Disperse 6.539E6 kg
Model Risk Effects for Vertical Jet Fires Do not model vertical jet fires

Fireball Parameters

[Mass Modification Factor 3]
[Calculation method for fireball DNV Recommended]
[TNO model flame temperature 1727 degC]

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]
[Set averaging time equal to exposure time	Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation	0.05 fraction]
[Cut-off concentration for exposure time calculations	0 fraction]

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	1145 m
North(1)	1134 m

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

		Release Segment 1		Diurno	Noturno
Release Duration	s			600	600
Liquid Rainout	fraction			0.999514	0.999875
Maximum Pool Radius	m			17.6258	17.6258

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL (54000)	18.75	s		0.591975	0.562907
LFL (7000)	18.75	s		0.592784	0.568058
LFL Frac (7000)	18.75	s		0.592784	0.568058
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL (54000)	18.75	s		0.0651256	0.116913
LFL (7000)	18.75	s		0.0628836	0.102089
LFL Frac (7000)	18.75	s		0.0628836	0.102089

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

Jet fire method used: Cone model - DNV recommended

		Diurno	Noturno
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

				Distance (m)	
				Diurno	Noturno
Radiation Level	5	kW/m2		7.7988	4.47822
Radiation Level	18.18	kW/m2		5.88936	3.05311
Radiation Level	100	kW/m2		Not Reached	Not Reached

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

			Diurno	Distance (m)
Radiation Level	5	kW/m2	48.7164	Noturno
Radiation Level	18.18	kW/m2	17.261	43.7208
Radiation Level	100	kW/m2		17.3528

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

	Radiation Level (kW/m2)
Diurno	Noturno

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

			Diurno	Distance (m)
Radiation Level	5	kW/m2	52.0615	Noturno
Radiation Level	18.18	kW/m2	19.2187	46.4044
Radiation Level	100	kW/m2	Not Reached	19.1945
				Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

	Radiation Level (kW/m2)
Diurno	Noturno

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.592784	0.568058
Furthest Extent	7000	ppm	0.592784	0.568058
			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.0628836	0.102089
Furthest Extent	7000	ppm	0.0628836	0.102089

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\43.HA98 e HA100

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

Unique Audit Number: 193.279



Study Folder: Terminal LLX

Phast 6.6

44.HA102

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\44.HA102

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	9000 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	15.9 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	4548 m2
[Type of Bund Surface	Concrete]
[Bund Height	1.5 m]
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
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Flammable

Jet Fire Method	Cone Model
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Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	6.539E6 kg
Use Burst Pressure	No - Use release pressure for fireball

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]
[Tail Time	1800 s]

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Study Folder: Terminal LLX

Phast 6.6

[Set averaging time equal to exposure time Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation 0.05 fraction]
[Cut-off concentration for exposure time calculations 0 fraction]

Geometry

Shape Point
Dimension 2D
System Absolute
East(1) 1241 m
North(1) 1217 m

Path: \Terminal LLX\Oleo Diesel\44.HA102

Discharge Data

User-Defined Quantities

Material CANE (Imported Study Querosene)
Temperature 25,00 degC
Pressure 1,01 bar
Inventory 6.539.266,50 kg
Scenario Catastrophic rupture
Fixed Duration n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
FinalTemperature 24,99 degC
Final Velocity 5,69 m/s
Droplet Diameter 10.000,00 um

Continuous Release Data:

Mass Flowrate n/a kg/s
Release Duration n/a s
Orifice Velocity n/a m/s
Exit Pressure n/a bar
Exit Temperature n/a degC
Discharge Coefficient n/a
Expanded Radius n/a m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
FinalTemperature 24,99 degC
Final Velocity 5,69 m/s
Droplet Diameter 10.000,00 um

Continuous Release Data:

Mass Flowrate n/a kg/s

SUMMARY REPORT

Study Folder: Terminal LLX

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Phast 6.6



Release Duration	n/a s
Orifice Velocity	n/a m/s
Exit Pressure	n/a bar
Exit Temperature	n/a degC
Discharge Coefficient	n/a
Expanded Radius	n/a m

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\44.HA102

N.B. Pool vaporization segments begin when the cloud has left the pool

		Diurno	Noturno
Liquid Rainout	fraction	0.999617	0.998867
Initial Vapor Cloud	kg	2503.85	7411.85
Time Pool Left Behind	s	39.9834	263.983

Cloud Segment 1

Cloud Segment Duration	s	3600	3600
Pool Vaporization Rate	kg/s	0.273288	0.208821

Maximum Pool Radius	m	38.0483	38.0483
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Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\44.HA102

The height for user defined concentrations is the user defined height 1 m

All toxic results are reported at the toxic effect height 1 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)	Averaging Time		Diurno	Noturno
UFL (54000)	18.75	s	70.7552	72.8608
LFL (7000)	18.75	s	71.2317	73.3895
LFL Frac (7000)	18.75	s	71.2317	73.3895

Concentration(ppm)	Averaging Time		Diurno	Heights (m) for above distances
UFL (54000)	18.75	s	1	Noturno
LFL (7000)	18.75	s	1	0.813727
LFL Frac (7000)	18.75	s	1	0.813727

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\44.HA102

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\44.HA102

			Distance (m)
			Diurno
Radiation Level	5	kW/m2	Noturno
Radiation Level	18.18	kW/m2	116.127
Radiation Level	100	kW/m2	103.742
			64.8439
			62.0714
			Not Reached
			Not Reached

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Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\44.HA102

	Radiation Level (kW/m2)
Diurno	Noturno

Fireball Hazard

Path: \Terminal LLX\Oleo Diesel\44.HA102

	Diurno	Noturno
Fireball Flame Status	No Hazard	No Hazard

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\44.HA102

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	71.2317	73.3895
Furthest Extent	7000	ppm	71.2317	73.3895

			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	1	0.813727
Furthest Extent	7000	ppm	1	0.813727

Explosion Effects: Early Explosion

Path: \Terminal LLX\Oleo Diesel\44.HA102

Early Explosions are assumed to be centered at the release location
Explosion Model Used : TNT

			Diurno	Noturno
Supplied Flammable Mass		kg	6.53927e+006	6.53927e+006

			Distance (m) at Overpressure Levels	
			Diurno	Noturno
Overpressure	0.069	bar	No Hazard	No Hazard
Overpressure	0.1	bar	No Hazard	No Hazard
Overpressure	0.45	bar	No Hazard	No Hazard

			Used Mass (kg) at Overpressure Levels	
			Diurno	Noturno
Overpressure	0.069	bar	0	0
Overpressure	0.1	bar	0	0
Overpressure	0.45	bar	0	0

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Study Folder: Terminal LLX

Phast 6.6

Explosion Effects: Late Ignition

Path: \Terminal LLX\Oleo Diesel\44.HA102

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Center

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

			Maximum Distance (m) at Overpressure Level	
			Diurno	Noturno
Overpressure	0.069	bar	94.2242	104.254
Overpressure	0.1	bar	78.7738	85.9964
Overpressure	0.45	bar	45.8709	47.1152

			Supplementary Data at 0.069 bar	
			Diurno	Noturno
Supplied Flammable Mass	kg		141.388	233.308
Used Flammable Mass	kg		141.388	233.308
Overpressure Radius	m		69.6114	82.2594
Distance to:				
- Ignition Source	m		70	70
- Cloud Front/Centre	m		24.6128	21.9947
- Explosion Centre	m		24.6128	21.9947

			Supplementary Data at 0.1 bar	
			Diurno	Noturno
Supplied Flammable Mass	kg		141.388	233.308
Used Flammable Mass	kg		141.388	233.308
Overpressure Radius	m		54.161	64.0018
Distance to:				
- Ignition Source	m		70	70
- Cloud Front/Centre	m		24.6128	21.9947
- Explosion Centre	m		24.6128	21.9947

			Supplementary Data at 0.45 bar	
			Diurno	Noturno
Supplied Flammable Mass	kg		141.388	233.308
Used Flammable Mass	kg		141.388	233.308
Overpressure Radius	m		21.2581	25.1205
Distance to:				
- Ignition Source	m		70	70
- Cloud Front/Centre	m		24.6128	21.9947
- Explosion Centre	m		24.6128	21.9947

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\44.HA102

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719

SUMMARY REPORT

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Study Folder: Terminal LLX

Phast 6.6

45.HA103

Base Case

CASE Name: Data

Path: \Terminal LLX\Oleo Diesel\45.HA103

User-Defined Data

Material

Material Identifier	n-DECANE (Imported Study Querosene)
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	25 degC
Volume Inventory	9000 m3

Scenario

Scenario Type	Leak
Phase to be Released	Liquid
Hole Diameter	10 mm
Building Wake Effect	None
Tank Head	15.9 m

Location

[Elevation	1 m]
Use ERPG averaging time	ERPG not selected
Use IDLH averaging time	IDLH not selected
Use STEL averaging time	STEL not selected
Supply a user defined averaging time	Not supplied

Bund

Status of Bund	Bund present
Bund Area	4548 m2
[Type of Bund Surface	Concrete]
[Bund Height	1.5 m]
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Jet Fire Method	Cone Model
-----------------	------------

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	6.539E6 kg

Fireball Parameters

[Mass Modification Factor	3]
[Calculation method for fireball	DNV Recommended]
[TNO model flame temperature	1727 degC]

Toxic Parameters

[Wind Dependent Exchange Rate	Case Specified]
[Building Exchange Rate	4 /hr]

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Study Folder: Terminal LLX

Phast 6.6

[Tail Time 1800 s]
[Set averaging time equal to exposure time Use a fixed averaging time]
[Cut-off fraction of toxic load for exposure time calculation 0.05 fraction]
[Cut-off concentration for exposure time calculations 0 fraction]

Geometry

Shape Point
Dimension 2D
System Absolute
East(1) 1241 m
North(1) 1217 m

Path: \Terminal LLX\Oleo Diesel\45.HA103

Discharge Data

User-Defined Quantities

Material CANE (Imported Study Querosene)
Temperature 25,00 degC
Pressure 1,01 bar
Inventory 6.539.266,50 kg
Scenario Leak
Fixed Duration n/a s

Calculated Quantities

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Diurno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
Final Temperature 24,98 degC
Final Velocity 19,43 m/s
Droplet Diameter 462,37 um

Continuous Release Data:

Mass Flowrate 6.65328E-001 kg/s
Release Duration 3.600,00 s
Orifice Velocity 19,43 m/s
Exit Pressure 1,01 bar
Exit Temperature 24,98 degC
Discharge Coefficient 0,60
Expanded Radius 0,00 m

Weather: Oleo Diesel\Estação Automatica MPX (from Global Weathers)\Noturno

Mass Flow of Air (Vent from Vapor Space Only) n/a

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction
Final Temperature 24,98 degC
Final Velocity 19,43 m/s
Droplet Diameter 462,37 um

Continuous Release Data:

SUMMARY REPORT

Study Folder: Terminal LLX

Unique Audit Number: 193.279

Phast 6.6



Mass Flowrate	6.65328E-001 kg/s
Release Duration	3.600,00 s
Orifice Velocity	19,43 m/s
Exit Pressure	1,01 bar
Exit Temperature	24,98 degC
Discharge Coefficient	0,60
Expanded Radius	0,00 m

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Study Folder: Terminal LLX

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Terminal LLX\Oleo Diesel\45.HA103

Release Segment 1			Diurno	Noturno
Release Duration	s		3600	3600
Liquid Rainout	fraction		0.989284	0.990995
Maximum Pool Radius	m		14.0703	14.2164

Distance to Concentration Results

Path: \Terminal LLX\Oleo Diesel\45.HA103

The height for user defined concentrations is the user defined height 1 m
All toxic results are reported at the toxic effect height 1 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno	Noturno
UFL	(54000)	18.75	s	3.15677	3.49773
LFL	(7000)	18.75	s	4.40786	4.32187
LFL Frac	(7000)	18.75	s	4.40786	4.32187
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno	Noturno
UFL	(54000)	18.75	s	0.841899	0.756624
LFL	(7000)	18.75	s	0.678839	0.598273
LFL Frac	(7000)	18.75	s	0.678839	0.598273

Jet Fire Hazard

Path: \Terminal LLX\Oleo Diesel\45.HA103

Jet fire method used: Cone model - DNV recommended

		Diurno	Noturno
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\45.HA103

This table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno	Noturno
Radiation Level	5	kW/m2	4.14155	4.09413
Radiation Level	18.18	kW/m2	2.58302	2.53929
Radiation Level	100	kW/m2	Not Reached	Not Reached

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Study Folder: Terminal LLX

Phast 6.6

Radiation Effects: Jet Fire Distance

Path: \Terminal LLX\Oleo Diesel\45.HA103

	Radiation Level (kW/m2)
Diurno	Noturno

Early Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\45.HA103

	Diurno	Noturno
Early Pool Fire Status	Hazard	Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\45.HA103

			Diurno	Distance (m)
				Noturno
Radiation Level	5	kW/m2	20.3301	19.7453
Radiation Level	18.18	kW/m2	14.2271	13.2177
Radiation Level	100	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\45.HA103

	Radiation Level (kW/m2)
Diurno	Noturno

Late Pool Fire Hazard

Path: \Terminal LLX\Oleo Diesel\45.HA103

	Diurno	Noturno
Late Pool Fire Status	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Terminal LLX\Oleo Diesel\45.HA103

			Diurno	Distance (m)
				Noturno
Radiation Level	5	kW/m2	49.9677	45.4605
Radiation Level	18.18	kW/m2	19.5235	19.6551
Radiation Level	100	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \Terminal LLX\Oleo Diesel\45.HA103

	Radiation Level (kW/m2)
Diurno	Noturno

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Study Folder: Terminal LLX

Phast 6.6

Flash Fire Envelope

Path: \Terminal LLX\Oleo Diesel\45.HA103

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno	Noturno
Furthest Extent	7000	ppm	4.40786	4.32187
Furthest Extent	7000	ppm	4.40786	4.32187
			Heights (m) for above distances	
			Diurno	Noturno
Furthest Extent	7000	ppm	0.678839	0.598273
Furthest Extent	7000	ppm	0.678839	0.598273

Weather Conditions

Path: \Terminal LLX\Oleo Diesel\45.HA103

		Diurno	Noturno
Wind Speed	m/s	3.916	2.329
Pasquill Stability		D	F
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	25.287	21.695
Surface Temperature	degC	25.287	21.695
Relative Humidity	fraction	0.69625	0.84719