



ANEXO VI

LISTAGENS DE SAÍDA DO PROGRAMA PHAST

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6



Candiota Fases A B C - 2011



Study

Cen12C - Vazamento linha de OC tanque de 300 m

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	55 m3

Scenario

Scenario Type	Line rupture
Phase to be Released	Liquid
Building Wake Effect	None
Pump Head	30 m
Specify Pump Head	Pump head supplied
Tank Head	6 m
Number of Excess Flow Valves	0
Number of Non-Return Valves	0
Number of Shut-Off Valves	0

Pipe

Internal Diameter	50,8 mm
Line length	100 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	707 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

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Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	4,206E4 kg

Fireball Parameters

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

Toxic Parameters

[Indoor Calculations	Unselected]
[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)	7 m
North(1)	9 m

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	42.064,73 kg
Scenario	Line rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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	17,10 degC
Final Velocity	4,29 m/s
Droplet Diameter	402,39 um
Continuous Release Data:	
Mass Flowrate	6.64601E+000 kg/s
Release Duration	3.600,00 s
Orifice Velocity	4,29 m/s
Exit Pressure	0,89 bar

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Exit Temperature	17,10 degC
Discharge Coefficient	1,00
Expanded Radius	0,03 m

Weather: Global Weathers\Noturno 2,97/E

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
FinalTemperature	17,10 degC
Final Velocity	4,29 m/s
Droplet Diameter	402,39 um

Continuous Release Data:

Mass Flowrate	6.64601E+000 kg/s
Release Duration	3.600,00 s
Orifice Velocity	4,29 m/s
Exit Pressure	0,89 bar
Exit Temperature	17,10 degC
Discharge Coefficient	1,00
Expanded Radius	0,03 m

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Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Diurno 4,39/B-C Noturno 2,97/E

Release Segment 1			
Release Duration	s	3600	3600
Liquid Rainout	fraction	0,999977	0,99999

Maximum Pool Radius	m	15,0015	15,0015
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	1,97045	1,75954
LFL	(5000)	18,75	s	1,98948	1,76028
LFL Frac	(2500)	18,75	s	1,99066	1,76033

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,12131	0,183298
LFL	(5000)	18,75	s	0,111307	0,182618
LFL Frac	(2500)	18,75	s	0,110682	0,182576

Jet Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Jet fire method used: Cone model - DNV recommended

		Diurno 4,39/B-C Noturno 2,97/E	
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

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

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	Not Reached	Not Reached
Radiation Level	12,5	kW/m2	Not Reached	Not Reached
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Radiation Effects: Jet Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Early Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Early Pool Fire Status
Diurno 4,39/B-C Noturno 2,97/E
Hazard Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	40,9331	39,3519
Radiation Level	12,5	kW/m2	21,2354	18,9525
Radiation Level	37,5	kW/m2	7,59122	7,35979
Radiation Level	71,2	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Late Pool Fire Status
Diurno 4,39/B-C Noturno 2,97/E
Hazard Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	72,3162	67,7053
Radiation Level	12,5	kW/m2	21,6078	20,4633
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

All flammable results are reported at the cloud centreline height

				Distance (m)	
				Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	2500	ppm		1,99066	1,76033
Furthest Extent	5000	ppm		1,98948	1,76028
				Heights (m) for above distances	
				Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	2500	ppm		0,110682	0,182576
Furthest Extent	5000	ppm		0,111307	0,182618

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Cen12C - Vazamento linha de OC tanque de 300 m3 Fase C

			Diurno 4,39/B-C	Noturno 2,97/E
Wind Speed	m/s		4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length	mm		170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature	degC		19,2	15,9
Surface Temperature	degC		24,2	20,9
Relative Humidity	fraction		0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

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Cen18C - Explosão de OC na fornalha da Fase C

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cen18C - Explosão de OC na fornalha da Fase C

User-Defined Data

Material

Material Identifier n-TETRADECANE

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	900 m
Flammable Mass	634 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency 100 %

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	7 m
North(1)	9 m

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Study Folder: Candiota Fases A B C - 2011

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Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Cen18C - Explosão de OC na fornalha da Fase C

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			634	634
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	309,447	309,447
Overpressure	0,1	bar	192,1	192,1
Overpressure	0,3	bar	95,9224	95,9224
Overpressure	0,43	bar	77,4332	77,4332
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	634	634
Overpressure	0,1	bar	634	634
Overpressure	0,3	bar	634	634
Overpressure	0,43	bar	634	634

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Cen18C - Explosão de OC na fornalha da Fase C

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

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Cen22C - BLEVE da caldeira Fase C

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cen22C - BLEVE da caldeira Fase C

User-Defined Data

Material

Material Identifier	WATER
First Thermodynamic Specification	Pressure given
Second Thermodynamic Specification	Temperature given
Temperature	540 degC
Pressure - gauge	213 bar
Volume Inventory	150 m3

Explosion Distances

Maximum Distance	900 m
Distance Step Size	1 m

Vessel/Tank

Vessel Shape	Cylindrical
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Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	7 m
North(1)	9 m

Bleve Parameters

Ground Reflection	Air Burst
[Ideal Gas Modeling	Model as real gas]

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Consequence Results

Explosion effects: BLEVE

Path: \Candiota Fases A B C - 2011\Study\Cen22C - BLEVE da caldeira Fase C

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			9867,87	9867,87
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	242,696	242,696
Overpressure	0,1	bar	162,973	162,973
Overpressure	0,3	bar	82,1919	82,1919
Overpressure	0,43	bar	66,944	66,944
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	9867,87	9867,87
Overpressure	0,1	bar	9867,87	9867,87
Overpressure	0,3	bar	9867,87	9867,87
Overpressure	0,43	bar	9867,87	9867,87

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Cen22C - BLEVE da caldeira Fase C

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Cen42C - Explosão de H2 no prédio do gerador d

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cen42C - Explosão de H2 no prédio do gerador de energia elétrica

User-Defined Data

Material

Material Identifier

HYDROGEN

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	300 m
Flammable Mass	34 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency	100 %
Air or Ground burst	Ground burst

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	-32 m
North(1)	-23 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Cen42C - Explosão de H2 no prédio do gerador de energia elétrica

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			34	34
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	205,364	205,364
Overpressure	0,1	bar	127,487	127,487
Overpressure	0,3	bar	63,6589	63,6589
Overpressure	0,43	bar	51,3885	51,3885
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	34	34
Overpressure	0,1	bar	34	34
Overpressure	0,3	bar	34	34
Overpressure	0,43	bar	34	34

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Cen42C - Explosão de H2 no prédio do gerador de energia elétrica

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

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Cen64C - Explosão de H2 na casa de baterias

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cen64C - Explosão de H2 na casa de baterias

User-Defined Data

Material

Material Identifier

HYDROGEN

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	300 m
Flammable Mass	4,12 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency	100 %
Air or Ground burst	Ground burst

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	-81 m
North(1)	10 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Cen64C - Explosão de H2 na casa de baterias

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			4,12	4,12
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	101,624	101,624
Overpressure	0,1	bar	63,087	63,087
Overpressure	0,3	bar	31,5015	31,5015
Overpressure	0,43	bar	25,4296	25,4296
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	4,12	4,12
Overpressure	0,1	bar	4,12	4,12
Overpressure	0,3	bar	4,12	4,12
Overpressure	0,43	bar	4,12	4,12

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Cen64C - Explosão de H2 na casa de baterias

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

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Cilindro de GLP ruptura

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

User-Defined Data

Material

Material Identifier	GLP
Material to Track	GLP
Type of Vessel	Saturated Liquid (Equilibrium vapor/liquid)
Pressure Specification	Pressure not used
Temperature	19,2 degC
Mass Inventory	45 kg

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None

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	No bund present
[Type of Bund Surface	Concrete]
[Bund Height	0 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	45 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

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

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[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) 0 m
North(1) 0 m

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

Discharge Data

User-Defined Quantities

Material GLP
Temperature 19,20 degC
Pressure 6,22 bar
Inventory 45,00 kg
Scenario Catastrophic rupture
Fixed Duration n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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

Average Values for Segment Number 1

Liquid Fraction 0,70 fraction
FinalTemperature -38,37 degC
Final Velocity 152,51 m/s
Droplet Diameter 145,88 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: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction 0,70 fraction
FinalTemperature -38,37 degC
Final Velocity 152,51 m/s
Droplet Diameter 145,88 um

Continuous Release Data:

Mass Flowrate n/a kg/s

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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: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C	Noturno 2,97/E
UFL	(93442,6)	18,75	s	3,70491	3,04697
LFL	(18181,8)	18,75	s	27,7936	19,8739
LFL Frac	(9090,91)	18,75	s	49,2362	36,2743
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C	Noturno 2,97/E
UFL	(93442,6)	18,75	s	1	1
LFL	(18181,8)	18,75	s	0	0
LFL Frac	(9090,91)	18,75	s	0	0

Fireball Hazard

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

Fireball Flame Status	Diurno 4,39/B-C		Noturno 2,97/E	
	Hazard		Hazard	

Radiation Effects: Fireball Ellipse

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	1,7	kW/m2	79,2281	79,3493
Radiation Level	5	kW/m2	44,3543	44,4216
Radiation Level	12,5	kW/m2	23,6452	23,691

Radiation Effects: Fireball Distance

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

Radiation Level (kW/m2)	
Diurno 4,39/B-C	Noturno 2,97/E

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	9090,91	ppm	49,2362	36,2743
Furthest Extent	18181,8	ppm	27,7936	19,8739

			Heights (m) for above distances	
			Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	9090,91	ppm	0	0
Furthest Extent	18181,8	ppm	0	0

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

		Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass	kg	45	45

			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C	Noturno 2,97/E
Overpressure	0,05	bar	58,0095	58,0095
Overpressure	0,1	bar	36,0115	36,0115
Overpressure	0,3	bar	17,9818	17,9818
Overpressure	0,43	bar	14,5158	14,5158

			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C	Noturno 2,97/E
Overpressure	0,05	bar	39,8707	39,8707
Overpressure	0,1	bar	39,8707	39,8707
Overpressure	0,3	bar	39,8707	39,8707
Overpressure	0,43	bar	39,8707	39,8707

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Explosion Effects: Late Ignition

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP ruptura

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Front (LFL Fraction)

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

			Maximum Distance (m) at Overpressure Level	
			Diurno 4,39/B-C	Noturno 2,97/E
Overpressure	0,05	bar	59,5486	53,9099
Overpressure	0,1	bar	45,8539	40,2327
Overpressure	0,3	bar	42,6406	35,021
Overpressure	0,43	bar	42,1317	34,0532

			Supplementary Data at 0,05 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		24,8457	17,2919
Used Flammable Mass	kg		24,8457	17,2919
Overpressure Radius	m		49,5486	43,9099
Distance to:				
- Ignition Source	m		10	10
- Cloud Front/Centre	m		3,53002	3,13647
- Explosion Centre	m		10	10

			Supplementary Data at 0,1 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		3,40202	7,0712
Used Flammable Mass	kg		3,40202	7,0712
Overpressure Radius	m		15,8539	20,2327
Distance to:				
- Ignition Source	m		30	20
- Cloud Front/Centre	m		18,7376	8,83868
- Explosion Centre	m		30	20

			Supplementary Data at 0,3 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,126265	0,86801
Used Flammable Mass	kg		0,126265	0,86801
Overpressure Radius	m		2,64064	5,021
Distance to:				
- Ignition Source	m		40	30
- Cloud Front/Centre	m		28,8478	16,7629
- Explosion Centre	m		40	30

			Supplementary Data at 0,43 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,126265	0,86801
Used Flammable Mass	kg		0,126265	0,86801
Overpressure Radius	m		2,13165	4,05319
Distance to:				
- Ignition Source	m		40	30
- Cloud Front/Centre	m		28,8478	16,7629

SUMMARY REPORT

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Study Folder: Candiotia Fases A B C - 2011

Phast 6.6

- Explosion Centre	m	40	30
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Weather Conditions

Path: \Candiotia Fases A B C - 2011\Study\Cilindro de GLP ruptura

		Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s	4,39	2,97
Pasquill Stability		B/C	E
Surface Roughness Length	mm	170	170
Surface Roughness Parameter		0,0981705	0,0981705
Atmospheric Temperature	degC	19,2	15,9
Surface Temperature	degC	24,2	20,9
Relative Humidity	fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Cilindro de GLP vazamento

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

User-Defined Data

Material

Material Identifier	GLP
Material to Track	GLP
Type of Vessel	Saturated Liquid (Equilibrium vapor/liquid)
Pressure Specification	Pressure not used
Temperature	19,2 degC
Mass Inventory	45 kg

Scenario

Scenario Type	Leak
Phase to be Released	Vapor
Hole Diameter	12,7 mm
Building Wake Effect	None

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	No bund present
[Type of Bund Surface	Concrete]
[Bund Height	0 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	45 kg

Fireball Parameters

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

Toxic Parameters

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

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Study Folder: Candiota Fases A B C - 2011

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)	0 m
North(1)	0 m

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

Discharge Data

User-Defined Quantities

Material	GLP
Temperature	19,20 degC
Pressure	6,22 bar
Inventory	45,00 kg
Scenario	Leak
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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

Average Values for Segment Number 1

Liquid Fraction	0,00 fraction
FinalTemperature	-35,35 degC
Final Velocity	365,83 m/s
Droplet Diameter	0,00 um

Continuous Release Data:

Mass Flowrate	2.07506E-001 kg/s
Release Duration	216,86 s
Orifice Velocity	211,99 m/s
Exit Pressure	3,77 bar
Exit Temperature	0,61 degC
Discharge Coefficient	0,87
Expanded Radius	0,01 m

Weather: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction	0,00 fraction
FinalTemperature	-35,35 degC
Final Velocity	365,83 m/s
Droplet Diameter	0,00 um

Continuous Release Data:

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Mass Flowrate	2.07506E-001 kg/s
Release Duration	216,86 s
Orifice Velocity	211,99 m/s
Exit Pressure	3,77 bar
Exit Temperature	0,61 degC
Discharge Coefficient	0,87
Expanded Radius	0,01 m

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 0 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(93442,6)	18,75	s	0,90518	0,864165
LFL	(18181,8)	18,75	s	4,0373	4,25703
LFL Frac	(9090,91)	18,75	s	5,88542	6,58472
Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(93442,6)	18,75	s	0,999937	0,999953
LFL	(18181,8)	18,75	s	0,996096	0,994765
LFL Frac	(9090,91)	18,75	s	0,991024	0,984895

Jet Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

Jet fire method used: Cone model - DNV recommended

		Diurno 4,39/B-C Noturno 2,97/E	
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

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

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	7,92894	7,91523
Radiation Level	12,5	kW/m2	Not Reached	Not Reached
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	9090,91	ppm	5,88542	6,58472
Furthest Extent	18181,8	ppm	4,0373	4,25703
			Heights (m) for above distances	
			Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	9090,91	ppm	0,991024	0,984895
Furthest Extent	18181,8	ppm	0,996096	0,994765

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Cilindro de GLP vazamento

			Diurno 4,39/B-C	Noturno 2,97/E
Wind Speed	m/s		4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length	mm		170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature	degC		19,2	15,9
Surface Temperature	degC		24,2	20,9
Relative Humidity	fraction		0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip11B - Ruptura do tanque de diesel 200 m3 Fas

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	200 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	6 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	254 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

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

Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	1,53E5 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

[Indoor Calculations	Unselected]
[Wind Dependent Exchange Rate	Case Specified]

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

[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)	27,7 m
North(1)	-143,3 m

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	152.962,66 kg
Scenario	Catastrophic rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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
FinalTemperature	16,90 degC
Final Velocity	4,41 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: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
FinalTemperature	16,90 degC
Final Velocity	4,41 m/s
Droplet Diameter	10.000,00 um

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Study Folder: Candiotia Fases A B C - 2011

Phast 6.6

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

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

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

Liquid Rainout Initial Vapor Cloud Time Pool Left Behind	fraction	Diurno 4,39/B-C Noturno 2,97/E	
		0,999553	0,998695

Maximum Pool Radius	m	8,9917	8,9917
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	13,8512	15,2364
LFL	(5000)	18,75	s	13,9809	15,378
LFL Frac	(2500)	18,75	s	14,0105	59,07

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,95234	0,809979
LFL	(5000)	18,75	s	0,95234	0,809979
LFL Frac	(2500)	18,75	s	0,95234	0

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

Late Pool Fire Status	Diurno 4,39/B-C Noturno 2,97/E	
	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	55,7785	53,7401
Radiation Level	12,5	kW/m2	20,5341	19,4539
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Fireball Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

Diurno 4,39/B-C Noturno 2,97/E

Fireball Flame Status No Hazard No Hazard

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	14,0105	59,07
Furthest Extent	5000	ppm	13,9809	15,378
			Heights (m) for above distances	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	0,95234	0
Furthest Extent	5000	ppm	0,95234	0,809979

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

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

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass		kg	152963	152963
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	No Hazard	No Hazard
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
Overpressure	0,43	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	0	0
Overpressure	0,1	bar	0	0
Overpressure	0,3	bar	0	0
Overpressure	0,43	bar	0	0

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Explosion Effects: Late Ignition

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Front (LFL Fraction)

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

			Maximum Distance (m) at Overpressure Level	
			Diurno 4,39/B-C	Noturno 2,97/E
Overpressure	0,05	bar	13,4706	34,7233
Overpressure	0,1	bar	12,1545	32,9322
Overpressure	0,3	bar	11,0758	31,4641
Overpressure	0,43	bar	10,8685	31,1819

			Supplementary Data at 0,05 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,00894459	0,0225466
Used Flammable Mass	kg		0,00894459	0,0225466
Overpressure Radius	m		3,47064	4,72334
Distance to:				
- Ignition Source	m		10	30
- Cloud Front/Centre	m		1,11619	14,8389
- Explosion Centre	m		10	30

			Supplementary Data at 0,1 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,00894459	0,0225466
Used Flammable Mass	kg		0,00894459	0,0225466
Overpressure Radius	m		2,15453	2,93219
Distance to:				
- Ignition Source	m		10	30
- Cloud Front/Centre	m		1,11619	14,8389
- Explosion Centre	m		10	30

			Supplementary Data at 0,3 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,00894459	0,0225466
Used Flammable Mass	kg		0,00894459	0,0225466
Overpressure Radius	m		1,07583	1,46414
Distance to:				
- Ignition Source	m		10	30
- Cloud Front/Centre	m		1,11619	14,8389
- Explosion Centre	m		10	30

			Supplementary Data at 0,43 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,00894459	0,0225466
Used Flammable Mass	kg		0,00894459	0,0225466
Overpressure Radius	m		0,868463	1,18193
Distance to:				
- Ignition Source	m		10	30
- Cloud Front/Centre	m		1,11619	14,8389

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

- Explosion Centre	m	10	30
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Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip11B - Ruptura do tanque de diesel 200 m3 Fase B

		Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s	4,39	2,97
Pasquill Stability		B/C	E
Surface Roughness Length	mm	170	170
Surface Roughness Parameter		0,0981705	0,0981705
Atmospheric Temperature	degC	19,2	15,9
Surface Temperature	degC	24,2	20,9
Relative Humidity	fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip13ABC - Vazamento linha de OC tanque 5000

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	5000 m3

Scenario

Scenario Type	Line rupture
Phase to be Released	Liquid
Building Wake Effect	None
Pump Head	40 m
Specify Pump Head	Pump head supplied
Tank Head	15 m
Number of Excess Flow Valves	0
Number of Non-Return Valves	0
Number of Shut-Off Valves	0

Pipe

Internal Diameter	50,8 mm
Line length	100 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	707 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	3,824E6 kg

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Fireball Parameters

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

Toxic Parameters

[Indoor Calculations	Unselected]
[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)	-108 m
North(1)	-230 m

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	3.824.066,50 kg
Scenario	Line rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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	17,20 degC
Final Velocity	5,30 m/s
Droplet Diameter	371,28 um

Continuous Release Data:

Mass Flowrate	8.21447E+000 kg/s
Release Duration	3.600,00 s
Orifice Velocity	5,30 m/s
Exit Pressure	0,89 bar
Exit Temperature	17,20 degC
Discharge Coefficient	1,00
Expanded Radius	0,03 m

SUMMARY REPORT

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Weather: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction

Final Temperature 17,20 degC

Final Velocity 5,30 m/s

Droplet Diameter 371,28 um

Continuous Release Data:

Mass Flowrate 8.21447E+000 kg/s

Release Duration 3.600,00 s

Orifice Velocity 5,30 m/s

Exit Pressure 0,89 bar

Exit Temperature 17,20 degC

Discharge Coefficient 1,00

Expanded Radius 0,03 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Diurno 4,39/B-C Noturno 2,97/E

Release Segment 1			
Release Duration	s	3600	3600
Liquid Rainout	fraction	0,999979	0,99999

Maximum Pool Radius	m	15,0015	15,0015
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

The height for user defined concentrations is the user defined height 0 m
All toxic results are reported at the toxic effect height 0 m
All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C	Noturno 2,97/E
UFL (45000)	18,75	s		2,34873	2,27717
LFL (5000)	18,75	s		2,36694	2,28272
LFL Frac (2500)	18,75	s		2,36808	2,28306

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C	Noturno 2,97/E
UFL (45000)	18,75	s		0,147536	0,114969
LFL (5000)	18,75	s		0,139433	0,111676
LFL Frac (2500)	18,75	s		0,138926	0,11147

Jet Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Jet fire method used: Cone model - DNV recommended

		Diurno 4,39/B-C		Noturno 2,97/E	
Jet Fire Status		Hazard		Hazard	
Flame Direction		Horizontal		Horizontal	

Radiation Effects: Jet Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

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

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	Not Reached	Not Reached
Radiation Level	12,5	kW/m2	Not Reached	Not Reached
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

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Radiation Effects: Jet Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Early Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Diurno 4,39/B-C Noturno 2,97/E
Early Pool Fire Status Hazard Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	43,4015	41,9925
Radiation Level	12,5	kW/m2	21,7774	19,7298
Radiation Level	37,5	kW/m2	8,4826	8,39683
Radiation Level	71,2	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Diurno 4,39/B-C Noturno 2,97/E
Late Pool Fire Status Hazard Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	72,6936	68,2283
Radiation Level	12,5	kW/m2	21,9852	20,9863
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

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Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

Radiation Level (kW/m2)

Diurno 4,39/B-C Noturno 2,97/E

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

All flammable results are reported at the cloud centreline height

				Distance (m)	
				Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	2500	ppm		2,36808	2,28306
Furthest Extent	5000	ppm		2,36694	2,28272
				Heights (m) for above distances	
				Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	2500	ppm		0,138926	0,11147
Furthest Extent	5000	ppm		0,139433	0,111676

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip13ABC - Vazamento linha de OC tanque 5000 m3 Fase A(1)

			Diurno 4,39/B-C	Noturno 2,97/E
Wind Speed	m/s		4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length	mm		170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature	degC		19,2	15,9
Surface Temperature	degC		24,2	20,9
Relative Humidity	fraction		0,699	0,821

SUMMARY REPORT

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip15ABC - Ruptura do tanque de OC 5000 m3

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	5000 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	6 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	1930 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
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Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	3,824E6 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

[Indoor Calculations	Unselected]
[Wind Dependent Exchange Rate	Case Specified]

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

[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)	-118,5 m
North(1)	-148,3 m

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	3.824.066,50 kg
Scenario	Catastrophic rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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
FinalTemperature	16,90 degC
Final Velocity	4,41 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: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
FinalTemperature	16,90 degC
Final Velocity	4,41 m/s
Droplet Diameter	10.000,00 um

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Study Folder: Candiotia Fases A B C - 2011

Phast 6.6

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

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

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

Liquid Rainout Initial Vapor Cloud Time Pool Left Behind	fraction	Diurno 4,39/B-C Noturno 2,97/E	
		0,99996	0,999893

Maximum Pool Radius	m	24,7858	24,7858
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	46,8759	49,9642
LFL	(5000)	18,75	s	47,2665	50,3585
LFL Frac	(2500)	18,75	s	47,3557	50,4485

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,809372	0,809847
LFL	(5000)	18,75	s	0,809372	0,809847
LFL Frac	(2500)	18,75	s	0,809372	0,809847

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

Late Pool Fire Status	Diurno 4,39/B-C Noturno 2,97/E	
	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	109,327	105,537
Radiation Level	12,5	kW/m2	38,2353	40,2164
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Fireball Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

Diurno 4,39/B-C Noturno 2,97/E

Fireball Flame Status No Hazard No Hazard

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

All flammable results are reported at the cloud centreline height

				Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm		47,3557	50,4485
Furthest Extent	5000	ppm		47,2665	50,3585
				Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm		0,809372	0,809847
Furthest Extent	5000	ppm		0,809372	0,809847

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

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

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass		kg	3,82407e+006	3,82407e+006
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	No Hazard	No Hazard
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
Overpressure	0,43	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	0	0
Overpressure	0,1	bar	0	0
Overpressure	0,3	bar	0	0
Overpressure	0,43	bar	0	0

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Explosion Effects: Late Ignition

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Front (LFL Fraction)

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

			Maximum Distance (m) at Overpressure Level	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	51,9851	94,4186
Overpressure	0,1	bar	47,4402	77,5745
Overpressure	0,3	bar	43,7151	63,7689
Overpressure	0,43	bar	42,999	61,1149

			Supplementary Data at 0,05 bar	
			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass	kg		0,368343	18,7511
Used Flammable Mass	kg		0,368343	18,7511
Overpressure Radius	m		11,9851	44,4186
Distance to:				
- Ignition Source	m		40	50
- Cloud Front/Centre	m		9,00811	13,1113
- Explosion Centre	m		40	50

			Supplementary Data at 0,1 bar	
			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass	kg		0,368343	18,7511
Used Flammable Mass	kg		0,368343	18,7511
Overpressure Radius	m		7,44016	27,5745
Distance to:				
- Ignition Source	m		40	50
- Cloud Front/Centre	m		9,00811	13,1113
- Explosion Centre	m		40	50

			Supplementary Data at 0,3 bar	
			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass	kg		0,368343	18,7511
Used Flammable Mass	kg		0,368343	18,7511
Overpressure Radius	m		3,71513	13,7689
Distance to:				
- Ignition Source	m		40	50
- Cloud Front/Centre	m		9,00811	13,1113
- Explosion Centre	m		40	50

			Supplementary Data at 0,43 bar	
			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass	kg		0,368343	18,7511
Used Flammable Mass	kg		0,368343	18,7511
Overpressure Radius	m		2,99904	11,1149
Distance to:				
- Ignition Source	m		40	50
- Cloud Front/Centre	m		9,00811	13,1113

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

- Explosion Centre	m	40	50
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Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip15ABC - Ruptura do tanque de OC 5000 m3

		Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s	4,39	2,97
Pasquill Stability		B/C	E
Surface Roughness Length	mm	170	170
Surface Roughness Parameter		0,0981705	0,0981705
Atmospheric Temperature	degC	19,2	15,9
Surface Temperature	degC	24,2	20,9
Relative Humidity	fraction	0,699	0,821

SUMMARY REPORT

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip15ABCa - Explosão de OC no tanque de 5000

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip15ABCa - Explosão de OC no tanque de 5000 m3

User-Defined Data

Material

Material Identifier n-TETRADECANE

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	900 m
Flammable Mass	405 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency	100 %
Air or Ground burst	Ground burst

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	-118,5 m
North(1)	-148,3 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip15ABCa - Explosão de OC no tanque de 5000 m3

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			405	405
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	335,777	335,777
Overpressure	0,1	bar	208,446	208,446
Overpressure	0,3	bar	104,084	104,084
Overpressure	0,43	bar	84,0219	84,0219
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	405	405
Overpressure	0,1	bar	405	405
Overpressure	0,3	bar	405	405
Overpressure	0,43	bar	405	405

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip15ABCa - Explosão de OC no tanque de 5000 m3

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip17A - Ruptura do tanque de OC 125 m3 Fase

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	125 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	6 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	160 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

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

Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	9,56E4 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

[Indoor Calculations	Unselected]
[Wind Dependent Exchange Rate	Case Specified]

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

[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)	-119 m
North(1)	-290 m

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	95.601,66 kg
Scenario	Catastrophic rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
FinalTemperature	16,90 degC
Final Velocity	4,41 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: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
FinalTemperature	16,90 degC
Final Velocity	4,41 m/s
Droplet Diameter	10.000,00 um

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Study Folder: Candiotia Fases A B C - 2011

Phast 6.6

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

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

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

Liquid Rainout Initial Vapor Cloud Time Pool Left Behind	fraction	Diurno 4,39/B-C Noturno 2,97/E	
		0,999802	0,999397

Maximum Pool Radius	m	7,1365	7,1365
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	11,6868	12,8869
LFL	(5000)	18,75	s	11,7981	13,009
LFL Frac	(2500)	18,75	s	11,8235	13,0369

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,952344	0,80994
LFL	(5000)	18,75	s	0,952344	0,80994
LFL Frac	(2500)	18,75	s	0,952344	0,80994

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

Late Pool Fire Status	Diurno 4,39/B-C Noturno 2,97/E	
	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	49,601	48,194
Radiation Level	12,5	kW/m2	20,5773	19,1337
Radiation Level	37,5	kW/m2	9,58254	9,78199
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Fireball Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

Diurno 4,39/B-C Noturno 2,97/E
Fireball Flame Status No Hazard No Hazard

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	11,8235	13,0369
Furthest Extent	5000	ppm	11,7981	13,009
			Heights (m) for above distances	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	0,952344	0,80994
Furthest Extent	5000	ppm	0,952344	0,80994

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

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

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass		kg	95601,7	95601,7
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	No Hazard	No Hazard
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
Overpressure	0,43	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	0	0
Overpressure	0,1	bar	0	0
Overpressure	0,3	bar	0	0
Overpressure	0,43	bar	0	0

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Explosion Effects: Late Ignition

Path: \Candiota Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Front (LFL Fraction)

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

			Maximum Distance (m) at Overpressure Level	
			Diurno 4,39/B-C	Noturno 2,97/E
Overpressure	0,05	bar	13,2209	12,9479
Overpressure	0,1	bar	11,9995	11,83
Overpressure	0,3	bar	10,9984	10,9138
Overpressure	0,43	bar	10,806	10,7377

			Supplementary Data at 0,05 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,0071493	0,00548122
Used Flammable Mass	kg		0,0071493	0,00548122
Overpressure Radius	m		3,2209	2,94792
Distance to:				
- Ignition Source	m		10	10
- Cloud Front/Centre	m		1,08917	1,14036
- Explosion Centre	m		10	10

			Supplementary Data at 0,1 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,0071493	0,00548122
Used Flammable Mass	kg		0,0071493	0,00548122
Overpressure Radius	m		1,99949	1,83003
Distance to:				
- Ignition Source	m		10	10
- Cloud Front/Centre	m		1,08917	1,14036
- Explosion Centre	m		10	10

			Supplementary Data at 0,3 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,0071493	0,00548122
Used Flammable Mass	kg		0,0071493	0,00548122
Overpressure Radius	m		0,998416	0,913796
Distance to:				
- Ignition Source	m		10	10
- Cloud Front/Centre	m		1,08917	1,14036
- Explosion Centre	m		10	10

			Supplementary Data at 0,43 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,0071493	0,00548122
Used Flammable Mass	kg		0,0071493	0,00548122
Overpressure Radius	m		0,80597	0,737661
Distance to:				
- Ignition Source	m		10	10
- Cloud Front/Centre	m		1,08917	1,14036

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Study Folder: Candiotá Fases A B C - 2011

Phast 6.6

- Explosion Centre	m	10	10
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Weather Conditions

Path: \Candiotá Fases A B C - 2011\Study\Hip17A - Ruptura do tanque de OC 125 m3 Fase A

		Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s	4,39	2,97
Pasquill Stability		B/C	E
Surface Roughness Length	mm	170	170
Surface Roughness Parameter		0,0981705	0,0981705
Atmospheric Temperature	degC	19,2	15,9
Surface Temperature	degC	24,2	20,9
Relative Humidity	fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip20B - Ruptura do tanque de OC 500 m3 Fase B

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	500 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	6 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	254 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
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Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	3,824E5 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

[Indoor Calculations	Unselected]
[Wind Dependent Exchange Rate	Case Specified]

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

[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)	16 m
North(1)	-124 m

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	382.406,66 kg
Scenario	Catastrophic rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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
FinalTemperature	16,90 degC
Final Velocity	4,41 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: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
FinalTemperature	16,90 degC
Final Velocity	4,41 m/s
Droplet Diameter	10.000,00 um

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Study Folder: Candiotia Fases A B C - 2011

Phast 6.6

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

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

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

Liquid Rainout Initial Vapor Cloud Time Pool Left Behind	fraction	Diurno 4,39/B-C Noturno 2,97/E	
		0,997902	0,999844

Maximum Pool Radius	m	8,9917	8,9917
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	19,3207	21,2165
LFL	(5000)	18,75	s	45,6275	21,4057
LFL Frac	(2500)	18,75	s	155,121	21,4489

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,952327	0,81
LFL	(5000)	18,75	s	0	0,81
LFL Frac	(2500)	18,75	s	0	0,81

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

Late Pool Fire Status	Diurno 4,39/B-C Noturno 2,97/E	
	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	57,0558	55,3262
Radiation Level	12,5	kW/m2	21,8114	21,04
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Fireball Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

Diurno 4,39/B-C Noturno 2,97/E
Fireball Flame Status No Hazard No Hazard

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	155,121	21,4489
Furthest Extent	5000	ppm	45,6275	21,4057
			Heights (m) for above distances	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	0	0,81
Furthest Extent	5000	ppm	0	0,81

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

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

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass		kg	382407	382407
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	No Hazard	No Hazard
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
Overpressure	0,43	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	0	0
Overpressure	0,1	bar	0	0
Overpressure	0,3	bar	0	0
Overpressure	0,43	bar	0	0

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Explosion Effects: Late Ignition

Path: \Candiota Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

Explosion Model Used : TNT

Explosion Location Criterion: Cloud Front (LFL Fraction)

All distances are measured from the Source

All flammable results are reported at the cloud centreline height

			Maximum Distance (m) at Overpressure Level	
			Diurno 4,39/B-C	Noturno 2,97/E
Overpressure	0,05	bar	129,983	38,5382
Overpressure	0,1	bar	88,2756	31,5083
Overpressure	0,3	bar	63,2742	25,7465
Overpressure	0,43	bar	62,6431	24,6388

			Supplementary Data at 0,05 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		284,645	1,36312
Used Flammable Mass	kg		284,645	1,36312
Overpressure Radius	m		109,983	18,5382
Distance to:				
- Ignition Source	m		20	20
- Cloud Front/Centre	m		3,17937	3,40346
- Explosion Centre	m		20	20

			Supplementary Data at 0,1 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		284,645	1,36312
Used Flammable Mass	kg		284,645	1,36312
Overpressure Radius	m		68,2756	11,5083
Distance to:				
- Ignition Source	m		20	20
- Cloud Front/Centre	m		3,17937	3,40346
- Explosion Centre	m		20	20

			Supplementary Data at 0,3 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,252134	1,36312
Used Flammable Mass	kg		0,252134	1,36312
Overpressure Radius	m		3,27417	5,74648
Distance to:				
- Ignition Source	m		60	20
- Cloud Front/Centre	m		44,6974	3,40346
- Explosion Centre	m		60	20

			Supplementary Data at 0,43 bar	
			Diurno 4,39/B-C	Noturno 2,97/E
Supplied Flammable Mass	kg		0,252134	1,36312
Used Flammable Mass	kg		0,252134	1,36312
Overpressure Radius	m		2,64307	4,63884
Distance to:				
- Ignition Source	m		60	20
- Cloud Front/Centre	m		44,6974	3,40346

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Study Folder: Candiotia Fases A B C - 2011

Phast 6.6

- Explosion Centre m 60 20

Weather Conditions

Path: \Candiotia Fases A B C - 2011\Study\Hip20B - Ruptura do tanque de OC 500 m3 Fase B

		Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s	4,39	2,97
Pasquill Stability		B/C	E
Surface Roughness Length	mm	170	170
Surface Roughness Parameter		0,0981705	0,0981705
Atmospheric Temperature	degC	19,2	15,9
Surface Temperature	degC	24,2	20,9
Relative Humidity	fraction	0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip29A - Explosão de diesel na fornalha Fase A

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip29A - Explosão de diesel na fornalha Fase A

User-Defined Data

Material

Material Identifier

n-TETRADECANE

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	900 m
Flammable Mass	177 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency	100 %
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Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	-22,4 m
North(1)	-328 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip29A - Explosão de diesel na fornalha Fase A

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			177	177
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	202,246	202,246
Overpressure	0,1	bar	125,552	125,552
Overpressure	0,3	bar	62,6924	62,6924
Overpressure	0,43	bar	50,6083	50,6083
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	177	177
Overpressure	0,1	bar	177	177
Overpressure	0,3	bar	177	177
Overpressure	0,43	bar	177	177

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip29A - Explosão de diesel na fornalha Fase A

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

SUMMARY REPORT

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip29Aa - BLEVE da caldeira Fase A

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip29Aa - BLEVE da caldeira Fase A

User-Defined Data

Material

Material Identifier	WATER
First Thermodynamic Specification	Pressure given
Second Thermodynamic Specification	Temperature given
Temperature	530 degC
Pressure - gauge	131 bar
Volume Inventory	23 m3

Explosion Distances

Maximum Distance	300 m
Distance Step Size	1 m

Vessel/Tank

Vessel Shape	Cylindrical
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Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	-22,4 m
North(1)	-328 m

Bleve Parameters

Ground Reflection	Air Burst
[Ideal Gas Modeling	Model as real gas]

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion effects: BLEVE

Path: \Candiota Fases A B C - 2011\Study\Hip29Aa - BLEVE da caldeira Fase A

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass	kg		897,913	897,913
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	107,515	107,515
Overpressure	0,1	bar	72,1976	72,1976
Overpressure	0,3	bar	36,4113	36,4113
Overpressure	0,43	bar	29,6564	29,6564
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	897,913	897,913
Overpressure	0,1	bar	897,913	897,913
Overpressure	0,3	bar	897,913	897,913
Overpressure	0,43	bar	897,913	897,913

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip29Aa - BLEVE da caldeira Fase A

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s		4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length	mm		170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature	degC		19,2	15,9
Surface Temperature	degC		24,2	20,9
Relative Humidity	fraction		0,699	0,821

SUMMARY REPORT

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip2ABC - Explosão no prédio do gerador de H2

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip2ABC - Explosão no prédio do gerador de H2

User-Defined Data

Material

Material Identifier

HYDROGEN

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	300 m
Flammable Mass	8,5 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency	100 %
Air or Ground burst	Ground burst

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	8,27 m
North(1)	-447 m

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip2ABC - Explosão no prédio do gerador de H2

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			8,5	8,5
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	129,371	129,371
Overpressure	0,1	bar	80,3119	80,3119
Overpressure	0,3	bar	40,1026	40,1026
Overpressure	0,43	bar	32,3727	32,3727
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	8,5	8,5
Overpressure	0,1	bar	8,5	8,5
Overpressure	0,3	bar	8,5	8,5
Overpressure	0,43	bar	8,5	8,5

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip2ABC - Explosão no prédio do gerador de H2

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip30B Explosão de GLP na fornalha da Fase B

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip30B Explosão de GLP na fornalha da Fase B

User-Defined Data

Material

Material Identifier GLP

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	900 m
Flammable Mass	476 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency 100 %

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	17 m
North(1)	-279 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip30B Explosão de GLP na fornalha da Fase B

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			476	476
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	285,638	285,638
Overpressure	0,1	bar	177,32	177,32
Overpressure	0,3	bar	88,5423	88,5423
Overpressure	0,43	bar	71,4756	71,4756
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	476	476
Overpressure	0,1	bar	476	476
Overpressure	0,3	bar	476	476
Overpressure	0,43	bar	476	476

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip30B Explosão de GLP na fornalha da Fase B

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip31B - Explosão de diesel na fornalha Fase B

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip31B - Explosão de diesel na fornalha Fase B

User-Defined Data

Material

Material Identifier

n-TETRADECANE

TNT Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	900 m
Flammable Mass	510 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1

TNT Explosion Parameters

Explosion efficiency	100 %
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Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	17 m
North(1)	-279 m

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip31B - Explosão de diesel na fornalha Fase B

Early Explosions are assumed to be centered at the release location

Explosion Model Used : TNT

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			510	510
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	287,793	287,793
Overpressure	0,1	bar	178,658	178,658
Overpressure	0,3	bar	89,21	89,21
Overpressure	0,43	bar	72,0147	72,0147
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	510	510
Overpressure	0,1	bar	510	510
Overpressure	0,3	bar	510	510
Overpressure	0,43	bar	510	510

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip31B - Explosão de diesel na fornalha Fase B

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip5ABC - Explosão do cilindro de H2

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip5ABC - Explosão do cilindro de H2

User-Defined Data

Material

Material Identifier

HYDROGEN

Multi Energy Explosion

Distance Step Size	1 m
Minimum Distance	5 m
Maximum Distance	300 m
Flammable Mass	14,7 kg
Liquid Fraction	0 fraction
Mass Modification Factor	1
Use Unconfined Strength	Do not use unconfined strength
Use Fractions	Use volumes
Source 1 (Source in Use)	Yes
Source 2 (Source in Use)	No
Source 3 (Source in Use)	No
Source 4 (Source in Use)	No
Source 5 (Source in Use)	No
Source 6 (Source in Use)	No
Source 7 (Source in Use)	No
Source 1 (Strength)	5
Source 1 (Volume)	3000 m3

Geometry

Shape	Point
Dimension	2D
System	Absolute
East(1)	6,7 m
North(1)	-439 m

SUMMARY REPORT

Unique Audit Number:

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Explosion Effects: Early Explosion

Path: \Candiota Fases A B C - 2011\Study\Hip5ABC - Explosão do cilindro de H2

Early Explosions are assumed to be centered at the release location

Explosion Model Used : Multi Energy

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass			kg	
			14,7	14,7
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	56,2125	56,2125
Overpressure	0,1	bar	27,9641	27,9641
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,43	bar	Not Reachable	Not Reachable
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	14,7	14,7
Overpressure	0,1	bar	14,7	14,7
Overpressure	0,3	bar	Not Reachable	Not Reachable
Overpressure	0,43	bar	Not Reachable	Not Reachable

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip5ABC - Explosão do cilindro de H2

			Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed		m/s	4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length		mm	170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature		degC	19,2	15,9
Surface Temperature		degC	24,2	20,9
Relative Humidity		fraction	0,699	0,821

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip7A - Vazamento linha diesel 55 m3 Fase A

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	55 m3

Scenario

Scenario Type	Line rupture
Phase to be Released	Liquid
Building Wake Effect	None
Pump Head	30 m
Specify Pump Head	Pump head supplied
Tank Head	6 m
Number of Excess Flow Valves	0
Number of Non-Return Valves	0
Number of Shut-Off Valves	0

Pipe

Internal Diameter	50,8 mm
Line length	100 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	707 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
Outdoor Release Direction	Horizontal

Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	4,206E4 kg

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Fireball Parameters

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

Toxic Parameters

[Indoor Calculations	Unselected]
[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)	-22,4 m
North(1)	-328 m

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	42.064,73 kg
Scenario	Line rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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	17,10 degC
Final Velocity	4,29 m/s
Droplet Diameter	402,39 um
Continuous Release Data:	
Mass Flowrate	6.64601E+000 kg/s
Release Duration	3.600,00 s
Orifice Velocity	4,29 m/s
Exit Pressure	0,89 bar
Exit Temperature	17,10 degC
Discharge Coefficient	1,00
Expanded Radius	0,03 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Weather: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction 1,00 fraction

Final Temperature 17,10 degC

Final Velocity 4,29 m/s

Droplet Diameter 402,39 um

Continuous Release Data:

Mass Flowrate 6.64601E+000 kg/s

Release Duration 3.600,00 s

Orifice Velocity 4,29 m/s

Exit Pressure 0,89 bar

Exit Temperature 17,10 degC

Discharge Coefficient 1,00

Expanded Radius 0,03 m

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Diurno 4,39/B-C Noturno 2,97/E

Release Segment 1			
Release Duration	s	3600	3600
Liquid Rainout	fraction	0,999977	0,99999

Maximum Pool Radius	m	15,0015	15,0015
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	1,97045	1,75954
LFL	(5000)	18,75	s	1,98948	1,76028
LFL Frac	(2500)	18,75	s	1,99066	1,76033

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,12131	0,183298
LFL	(5000)	18,75	s	0,111307	0,182618
LFL Frac	(2500)	18,75	s	0,110682	0,182576

Jet Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Jet fire method used: Cone model - DNV recommended

		Diurno 4,39/B-C Noturno 2,97/E	
Jet Fire Status		Hazard	Hazard
Flame Direction		Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase AThis table gives the distances to the specified radiation levels
for each jet fire listed in the above hazard table

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	Not Reached	Not Reached
Radiation Level	12,5	kW/m2	Not Reached	Not Reached
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Jet Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Early Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Early Pool Fire Status
Diurno 4,39/B-C Noturno 2,97/E
Hazard Hazard

Radiation Effects: Early Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	40,9331	39,3519
Radiation Level	12,5	kW/m2	21,2354	18,9525
Radiation Level	37,5	kW/m2	7,59122	7,35979
Radiation Level	71,2	kW/m2		

Radiation Effects: Early Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Late Pool Fire Status
Diurno 4,39/B-C Noturno 2,97/E
Hazard Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Radiation Level	3	kW/m2	72,3162	67,7053
Radiation Level	12,5	kW/m2	21,6078	20,4633
Radiation Level	37,5	kW/m2	Not Reached	Not Reached
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	2500	ppm	1,99066	1,76033
Furthest Extent	5000	ppm	1,98948	1,76028
			Heights (m) for above distances	
			Diurno 4,39/B-C	Noturno 2,97/E
Furthest Extent	2500	ppm	0,110682	0,182576
Furthest Extent	5000	ppm	0,111307	0,182618

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip7A - Vazamento linha diesel 55 m3 Fase A

			Diurno 4,39/B-C	Noturno 2,97/E
Wind Speed	m/s		4,39	2,97
Pasquill Stability			B/C	E
Surface Roughness Length	mm		170	170
Surface Roughness Parameter			0,0981705	0,0981705
Atmospheric Temperature	degC		19,2	15,9
Surface Temperature	degC		24,2	20,9
Relative Humidity	fraction		0,699	0,821

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

Base Case

CASE Name: Data

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

User-Defined Data

Material

Material Identifier	n-TETRADECANE
Type of Vessel	Unpressurized (at atmospheric pressure)
Pressure Specification	Pressure not used
Temperature	16,9 degC
Volume Inventory	55 m3

Scenario

Scenario Type	Catastrophic rupture
Phase to be Released	Liquid
Building Wake Effect	None
Tank Head	6 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	60 m2
[Type of Bund Surface	Concrete]
Bund Height	1 m
[Bund Failure Modeling	Bund cannot fail]

Indoor/Outdoor

Location of release	Open air release
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Flammable

Explosion Method	TNT
Jet Fire Method	Cone Model

Dispersion

Late Ignition Location	No ignition location
Mass Inventory of material to Disperse	4,206E4 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

[Indoor Calculations	Unselected]
[Wind Dependent Exchange Rate	Case Specified]

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

[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)	-109,5 m
North(1)	-271,4 m

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

Discharge Data

User-Defined Quantities

Material	n-TETRADECANE
Temperature	16,90 degC
Pressure	0,89 bar
Inventory	42.064,73 kg
Scenario	Catastrophic rupture
Fixed Duration	n/a s

Calculated Quantities

Weather: Global Weathers\Diurno 4,39/B-C

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
FinalTemperature	16,90 degC
Final Velocity	4,41 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: Global Weathers\Noturno 2,97/E

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

Average Values for Segment Number 1

Liquid Fraction	1,00 fraction
FinalTemperature	16,90 degC
Final Velocity	4,41 m/s
Droplet Diameter	10.000,00 um

SUMMARY REPORT

Study Folder: Candiota Fases A B C - 2011

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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

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Consequence Results

Pool Vaporization Results

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

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

Liquid Rainout Initial Vapor Cloud Time Pool Left Behind	fraction	Diurno 4,39/B-C Noturno 2,97/E	
		0,999953	0,999847

Maximum Pool Radius	m	4,37019	4,37019
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Distance to Concentration Results

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

The height for user defined concentrations is the user defined height 0 m

All toxic results are reported at the toxic effect height 0 m

All flammable results are reported at the cloud centreline height

Concentration(ppm)		Averaging Time		Distance (m)	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	8,70065	9,65722
LFL	(5000)	18,75	s	8,78576	9,75149
LFL Frac	(2500)	18,75	s	8,80519	9,77301

Concentration(ppm)		Averaging Time		Heights (m) for above distances	
				Diurno 4,39/B-C Noturno 2,97/E	
UFL	(45000)	18,75	s	0,952347	0,809821
LFL	(5000)	18,75	s	0,952347	0,809821
LFL Frac	(2500)	18,75	s	0,952347	0,809821

Late Pool Fire Hazard

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

Late Pool Fire Status	Diurno 4,39/B-C Noturno 2,97/E	
	Hazard	Hazard

Radiation Effects: Late Pool Fire Ellipse

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Radiation Level	3	kW/m2	38,7517	37,549
Radiation Level	12,5	kW/m2	19,9975	18,1995
Radiation Level	37,5	kW/m2	6,18367	6,33888
Radiation Level	71,2	kW/m2	Not Reached	Not Reached

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Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Radiation Effects: Late Pool Fire Distance

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

Radiation Level (kW/m2)
Diurno 4,39/B-C Noturno 2,97/E

Fireball Hazard

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Fireball Flame Status
Diurno 4,39/B-C Noturno 2,97/E
No Hazard No Hazard

Flash Fire Envelope

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

All flammable results are reported at the cloud centreline height

			Distance (m)	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	8,80519	9,77301
Furthest Extent	5000	ppm	8,78576	9,75149
			Heights (m) for above distances	
			Diurno 4,39/B-C Noturno 2,97/E	
Furthest Extent	2500	ppm	0,952347	0,809821
Furthest Extent	5000	ppm	0,952347	0,809821

Explosion Effects: Early Explosion

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

			Diurno 4,39/B-C Noturno 2,97/E	
Supplied Flammable Mass		kg	42064,7	42064,7
			Distance (m) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	No Hazard	No Hazard
Overpressure	0,1	bar	No Hazard	No Hazard
Overpressure	0,3	bar	No Hazard	No Hazard
Overpressure	0,43	bar	No Hazard	No Hazard
			Used Mass (kg) at Overpressure Levels	
			Diurno 4,39/B-C Noturno 2,97/E	
Overpressure	0,05	bar	0	0
Overpressure	0,1	bar	0	0
Overpressure	0,3	bar	0	0
Overpressure	0,43	bar	0	0

SUMMARY REPORT

Unique Audit Number: 396.402



Study Folder: Candiota Fases A B C - 2011

Phast 6.6

Weather Conditions

Path: \Candiota Fases A B C - 2011\Study\Hip8A - Ruptura do tanque de diesel 55 m3 Fase A

		Diurno 4,39/B-C Noturno 2,97/E	
Wind Speed	m/s	4,39	2,97
Pasquill Stability		B/C	E
Surface Roughness Length	mm	170	170
Surface Roughness Parameter		0,0981705	0,0981705
Atmospheric Temperature	degC	19,2	15,9
Surface Temperature	degC	24,2	20,9
Relative Humidity	fraction	0,699	0,821