

Study Folder: UTE Pampa rev_0_Hidrogenio

UTE Pampa rev 0 Hidrogenio

🔓 Study

6

Cenário 002A

Base Case

CASE Name: Data

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002A

User-Defined Data

Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	1	bar
	Temperature	25	degC
	Mass Inventory	1E6	kg
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	10.16	mm
	Building Wake Effect	None	
	Tank Head	0	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	No bund present	
	Type of Bund Surface	Concrete]	
	Bund Height	0	m]
	Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	loor		
	Location of release	Open air release	
	Outdoor Release Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	1
	Mass Inventory of material to Disperse	IE6	кg
Fireball Par	ameters		
	Iviass iviodification Factor	3	

Study Folder:

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	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Para	meters		
	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

UTE Pampa rev_0_Hidrogenio

Path:



Phast 6.7

DISCHARGE DATA for Weather: Globa	al Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	2.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion)):	
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe rele	eases) 18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	703.00	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s
DISCHARGE DATA for Weather: Globa	al Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	2.01	bar
- Temperature	25.00	degC

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CALCULATED QUANTITIES

- Fluid State

Non-saturated liquid



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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



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Consequence Results

Pool Vaporization Results

Path: \	UTE Pampa re	ev_0_Hidrogenio	Study\Carregamer	nto\Cenário 002A	
				Dia	Noite
		Release Segmen	it 1	<00	(3)
Release	e Duration		S	600	600
Liquid	Rainout		fraction	0.943826	0.947333
Maxim	um Pool Radii	us	m	5.60193	5.61013
		Dista	nce to Concentra	ation Results	
Path:	UTE Pampa re	ev_0_Hidrogenio\	Study\Carregamer	nto\Cenário 002A	
		The height for u	ser defined concer	ntrations is the user d	efined height 0 m
		All toxic results	are reported at the	e toxic effect height 0	m
		All flammable r	esults are reported	l at the flammable eff	ect height 0 m
Concer	ntration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	No Hazard	No Hazard
LFL Fr	rac (7000)	18.75	S	No Hazard	No Hazard
Concer	ntration(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL	(56000)	18.75	S	0	0
LFL	(7000)	18.75	S	0	0
LFL Fr	ac (7000)	18.75	S	0	0
			Jet Fire Haz	ard	
Path: \	UTE Pampa re	ev_0_Hidrogenio\	Study\Carregame	nto\Cenário 002A	
		Jet fire method u	used: Cone model	- DNV recommended	1
				Dia	Noite
Jet Fire	e Status			Hazard	Hazard
Flame	Direction			Angled	Angled
		Radi	ation Effects: Jet	Fire Ellipse	
Path: \	UTE Pampa re	ev_0_Hidrogenio\	Study\Carregamer	nto\Cenário 002A	
		This table gives for each jet fire	the distances to the listed in the above	ne specified radiation hazard table	levels
					Distance (m)
		_		Dia	Noite
Radiati	on Level	3	kW/m2	9.53352	9.17269
Radiati	on Level	12.5	kW/m2	5.17448	4.81731
Radiati	on Level	37.5	kW/m2	Not Reached	Not Reached
Radiati	on Level	44	kW/m2	Not Reached	Not Reached



	ŀ	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pan	npa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002A	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire	Hazard	
Path: \UTE Pan	npa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002A	
			Dia	Noite
Early Pool Fire	Status		Hazard	Hazard
	Rad	liation Effects: Early	Pool Fire Ellipse	
Path: \UTE Pan	npa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002A	
Radiation Level Radiation Level Radiation Level Radiation Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 28.3936 20.7824 14.3883 13.5262	Distance (m) Noite 27.7117 19.8608 13.5876 12.7963
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pan	npa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002A	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire F	lazard	
Path: \UTE Pan	npa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002A	
Late Pool Fire S	tatus		Dia Hazard	Noite Hazard
	Rad	diation Effects: Late F	ool Fire Ellipse	
Path: \UTE Pan	npa rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002A	
			Dia	Distance (m) Noite
Radiation Level	3	kW/m2	46.7364	45.1935
Radiation Level	12.5	kW/m2	30.1177	28.1165
Radiation Level	37.5	kW/m2	16.4125	15.8611
Radiation Level	44	kW/m2	16.4125	15.8611



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002A

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Nam	ne: Data		
Dath.	UTE Dama ray 0 Hidrogonia Study/Carragemente/Ca	opária 002U	
r atn:	VTE Fampa rev_0_murogenio/study/Carregamento/Ce		
	User-Defined Da	ata	
Material			
	Material Identifier	n-NONANE	
	lype of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	1	
	Mass Inventory	1E6]
Scenario	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	10.16	
	Building Wake Effect	None	
	Tank Head	0	1
Location			
Location	Elevation	1	1
	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	
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/C	Dutdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flamma	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersio	on		
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	ļ
Fireball	Parameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	TNO model flame temperature	1727	,
Toxic Pa	rameters		
	[Wind Dependent Exchange Rate	Case Specified]	

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North(1)

	[Building Exchange Rate [Tail Time [Set averaging time equal to exposure time [Cut-off fraction of toxic load for exposure time calcul [Cut-off concentration for exposure time calculations	4 1800 Use a fixed averaging time] ation 0.05 0	/hr] s] fraction] fraction]
Multi Enorg	ny Evolosion		
WINE LENCE	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
-	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia		
Wind Speed:		3.73	m/s
Wind Speed at Height (Calculated)		2.10	m/s
Pasquill Stability:		C/D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long pip	be):		
- Pressure		2.01	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	
CALCULATED QUANTITIES			
Mass Flow of Air (Vent from Vapor Space only)		n/a	
Mass Flowrate		6.33301E-001	kg/s
Release Duration		600.00	s
Orifice or pipe exit data (before atmospheric exp	pansion):		
- Pressure		1.01	bar
- Temperature		24.98	degC
- Vena Contracta Velocity (exit velocity for p	pipe releases)	18.23	m/s
- Discharge Coefficient		0.60	
Final data (after atmospheric expansion):			
- Temperature		24.98	degC
- Liquid Mass Fraction		1.00	fraction
- Droplet Diameter		703.00	um
- Expanded Radius		0.00	m
- Velocity		18.23	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite		
Wind Speed:		2.78	m/s
Wind Speed at Height (Calculated)		1.45	m/s
Pasquill Stability:		D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long pip	be):		
- Pressure		2.01	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	

 $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002H $$$

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Carregamento\	Cenário 002H	
				Dia	Noite
		Release Segmen	t 1		
Relea	se Duration		S	600	600
Liqui	d Rainout		fraction	0.985013	0.985624
Maxi	mum Pool Radiu	15	m	5.72211	5.72255
		Dista	nce to Concentration	n Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio\\$	Study\Carregamento\	Cenário 002H	
		The height for u All toxic results All flammable re	ser defined concentra are reported at the to: esults are reported at	tions is the user de xic effect height 0 the flammable effe	efined height 0 m m ect height 0 m
Conc	entration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	4.288	No Hazard
LFL I	Frac (7000)	18.75	S	4.288	No Hazard
Conc	entration(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL	(56000)	18.75	S	0	0
LFL	(7000)	18.75	S	0	0
LFL I	Frac (7000)	18.75	S	0	0
			Jet Fire Hazard		
Path:	\UTE Pampa re	ev_0_Hidrogenio\\$	Study\Carregamento\	Cenário 002H	
		Jet fire method u	ised: Cone model - D	NV recommended	1
				Dia	Noite
Jet Fi	re Status			Hazard	Hazard
Flam	e Direction			Horizontal	Horizontal
		Radi	ation Effects: Jet Fir	re Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\\$	Study\Carregamento\	Cenário 002H	
		This table gives for each jet fire	the distances to the splitter to the splitter to the splitter to the above has	pecified radiation l zard table	levels
					Distance (m)
				Dia	Noite
Radia	ation Level	3	kW/m2	5.76623	5.89985
Radia	ation Level	12.5	kW/m2	3.76023	3.86571
Radia	ation Level	37.5	kW/m2	2.55485	Not Reached
ituali					

Study Folder:



	F	Radiation Effects: Jet 1	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002H	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire I	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002H	
Early Pool Fire Sta	tus		Dia Hazard	Noite Hazard
	Rad	iation Effects: Early I	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	to\Cenário 002H	
Radiation Level Radiation Level Radiation Level Radiation Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 23.2676 15.5418 9.04394 8.14558	Distance (m) Noite 23.1052 15.1447 8.77555 7.96859
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	to\Cenário 002H	
Late Pool Fire State	15		Dia Hazard	Noite Hazard
	Rad	liation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 002H	
Radiation Level Radiation Level Radiation Level	3 12.5 37.5	kW/m2 kW/m2 kW/m2	Dia 41.7069 24.8257 11.1371	Distance (m) Noite 40.6593 23.3385 11.1216
Radiation Level	44	kW/m2	11.1371	11.1216

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		Radi	ation Effects: Late I	Pool Fire Distance	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregame	ento\Cenário 002H	
				Dia	Radiation Level (kW/m2) Noite
			Flash Fire En	velope	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregame	ento\Cenário 002H	
		All flammal	ble results are reporte	ed at the flammable	effect height 0 m
					Distance (m)
				Dia	
Furth	nest Extent	7000	ppm	4.288	
Furth	nest Extent	7000	ppm	4.288	
					Heights (m) for above distances
				Dia	
Furth	nest Extent	7000	ppm	0	
Furth	nest Extent	7000	ppm	0	

Weather Conditions

Path: $\label{eq:carregamento} $$ UTE Pampa rev_0_Hidrogenio\\Study\\Carregamento\\Cenário 002H$

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 002I **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002I **User-Defined Data** Material Material Identifier n-NONANE Type of Vessel Padded Liquid Pressure Specification Pressure specified Storage Pressure - gauge 1 bar Temperature 25 degC 1E6 kg Mass Inventory Scenario Scenario Type Leak Phase to be Released Liquid Hole Diameter 10.16 mm Building Wake Effect None Tank Head 0 m Location 1 m] [Elevation Use ERPG averaging time ERPG not selected IDLH not selected Use IDLH averaging time 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 Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg **Fireball Parameters** [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC] **Toxic Parameters** [Wind Dependent Exchange Rate Case Specified]

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Study Folder:	UTE Pampa rev_0_Hidrogenio
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East(1)

North(1)

	[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 calcu	llation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	

0 m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Gl	obal Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	2.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansi	ion):	
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe	releases) 18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	703.00	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s
DISCHARGE DATA for Weather: GI	obal Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	2.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	

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CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Patl	Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002I					
					Dia	Noite
		I	Release Segment 1			
	Release Duratio	on		S	600	600
	Liquid Rainout			fraction	1	1
	Maximum Pool	Radius		m	5.76474	5.76419
			Distanc	e to Concentration	Results	
Patl	h: \UTE Par	mpa rev_	_0_Hidrogenio\Stu	ndy\Carregamento\Ce	enário 002I	
]	The height for user	defined concentration	ons is the user def	ined height 0 m
		I	All toxic results are	e reported at the toxic	e effect height 0 m	n
		I	All flammable resu	ilts are reported at the	e flammable effec	t height 0 m
	~					
	Concentration()	opm) A	Averaging Time		D.'	Distance (m)
	UEL (5600		10.75		Dia	Noite
	UFL (56000) 1	18.75	S	0	0
	LFL (7000)	0) 1	18.75	S	0	0
	LFL Frac (700	0) 1	18.75	S	0	0
	Concentration()	opm) A	Averaging Time			Heights (m) for above distances
					Dia	Noite
	UFL (56000)) 1	18.75	S	0	0
	LFL (7000)	1	18.75	S	0	0
	LFL Frac (700	0) 1	18.75	S	0	0
				Jet Fire Hazard		
Pat	h: \UTE Par	mpa rev_	_0_Hidrogenio\Stu	udy\Carregamento\Ce	enário 002I	
		J	let fire method use	d: Cone model - DN	V recommended	
					Dia	Noite
	Jet Fire Status				No Hazard	No Hazard
	Flame Direction	n			Along Ground	Along Ground
		u			Thong Ground	Thong Ground
			Ea	arly Pool Fire Hazar	·d	
Patl	h: \UTE Par	mpa rev_	_0_Hidrogenio\Stu	udy\Carregamento\Ce	enário 002I	
					Dia	Noite
	Early Pool Fire	Status			Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio



	Radi	ation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 002I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	18.9486	18.7965
Radiation Level	12.5	kW/m2	11.1821	10.7956
Radiation Level	37.5	kW/m2	4.64565	4.39151
Radiation Level	44	kW/m2	3.74325	3.57063
	Radia	tion Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 002I	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire F	lazard	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 002I	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Radi	iation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 002I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	37.42	36.3765
Radiation Level	12.5	kW/m2	20.4444	18.9649
Radiation Level	37.5	kW/m2	6.76474	6.76419
Radiation Level	44	kW/m2	6.76474	6.76419
	Radia	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 002I	
			Dia	Radiation Level (kW/m2) Noite
		Weather Cond	itions	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 002I	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness	Length	mm	950.891	950.891
Surface Roughness	Parameter		0.17	0.17
Atmospheric Temp	erature	degC	19.6	16.5
Surface Temperatur	e	degC	24.6	16.5
		· ·	A 27 1	



se Case		
CASE Name:	Data	
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Carregamento\Ce	nário 002V
	User-Defined Da	ıta
Material		
	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1
	Temperature	25
	Mass Inventory	1E6
Scenario		
	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	10.16
	Building Wake Effect	None
	Tank Head	0
Location		
	Elevation	1
	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
	Bund Failure Modeling	Bund cannot fail
Indoor/Out	tdoor	
		Open air release
	Outdoor Release Direction	vertical
Flammable	Explosion Method	Multi Engrav
	Lat Fire Method	Cone Medel
	jet i ne metilou	Colle Model
Dispersion	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	110 Igintion location
	Mass inventory of material to Disperse	TEO
Fireball Pa	rameters Mass Modification Factor	21
	Calculation method for fireball	DNV Recommended
	[TNO model flame temperature	1727
		1/2/
Toxic Para	meters [Wind Donordont Evolution Pote	Co C: 17 - 17
	white Dependent Exchange Rate	Case Specified

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Phast 6.7	DNV

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Dia Wind Speed: 3.73 m/s Wind Speed at Height (Calculated) 2.10 m/s Pasquill Stability: C/D **USER-DEFINED QUANTITIES** n-NONANE Material Scenario Leak Inventory 1,000,000.00 kg Fixed Duration n/a s Stagnation data (data at upstream end for long pipe): 2.01 bar - Pressure 25.00 degC - Temperature - Fluid State Non-saturated liquid **CALCULATED QUANTITIES** Mass Flow of Air (Vent from Vapor Space only) n/a 6.33301E-001 kg/s Mass Flowrate Release Duration 600.00 s Orifice or pipe exit data (before atmospheric expansion): 1.01 bar - Pressure - Temperature 24.98 degC - Vena Contracta Velocity (exit velocity for pipe releases) 18.23 m/s - Discharge Coefficient 0.60 Final data (after atmospheric expansion): - Temperature 24.98 degC 1.00 fraction - Liquid Mass Fraction - Droplet Diameter 703.00 um - Expanded Radius 0.00 m - Velocity 18.23 m/s Global Weathers\Noite **DISCHARGE DATA for Weather:** Wind Speed: 2.78 m/s Wind Speed at Height (Calculated) 1.45 m/s Pasquill Stability: D **USER-DEFINED QUANTITIES** Material n-NONANE Leak Scenario Inventory 1,000,000.00 kg Fixed Duration n/a s Stagnation data (data at upstream end for long pipe): - Pressure 2.01 bar - Temperature

\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002V

25.00 degC Non-saturated liquid

CALCULATED QUANTITIES

- Fluid State

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Carregamento\C	Cenário 002V	
				Dia	Noite
D -1		Release Segment	-	(00	(00
Kele	ease Duration		S	600	600
Liqu	uid Rainout		fraction	0.93/254	0.94076
Max	ximum Pool Radii	us	m	5.58241	5.59062
		Distar	nce to Concentration	n Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Carregamento\C	Cenário 002V	
		The height for us	er defined concentrat	tions is the user de	fined height 0 m
		All toxic results a	are reported at the tox	tic effect height 0	m
		All flammable re	sults are reported at t	he flammable effe	ect height 0 m
Con	ncentration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFI	L (56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	No Hazard	No Hazard
LFI	L Frac (7000)	18.75	S	No Hazard	No Hazard
Con	ncentration(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFI	L (56000)	18.75	S	0	0
LFL	(7000)	18.75	S	0	0
LFL	L Frac (7000)	18.75	S	0	0
			Jet Fire Hazard		
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Carregamento\C	Cenário 002V	
		Jet fire method us	sed: Cone model - DI	NV recommended	
				Dia	Noite
Jet I	Fire Status			Hazard	Hazard
Flar	ne Direction			Vertical	Vertical
		Radia	ntion Effects: Jet Fir	e Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Carregamento\C	Cenário 002V	
		This table gives t	he distances to the sp	ecified radiation l	evels
		for each jet fire li	isted in the above haz	ard table	Distance (m)
				Dia	Noite
Rad	liation Level	3	kW/m2	9 4411	9 21441
Rad	liation Level	12.5	kW/m2	5.26769	4.70586
Rad	liation Level	37.5	kW/m2	2.99696	Not Reached
Rad	liation Level	44	kW/m2	44	Not Reached
ituu					

UTE Pampa rev_0_Hidrogenio

Study Folder:



	I	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002V	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire I	Hazard	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002V	
Early Pool Fire Stat	us		Dia Hazard	Noite Hazard
	Rad	liation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002V	
Radiation Level Radiation Level Radiation Level Radiation Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 27.5402 19.9476 13.5672 12.7092	Distance (m) Noite 26.171 18.3392 12.0844 11.293
	Radi	iation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002V	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	lazard	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002V	
Late Pool Fire Statu	IS		Dia Hazard	Noite Hazard
	Ra	diation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Carregamer	nto\Cenário 002V	
Radiation Level Radiation Level	3 12.5	kW/m2 kW/m2	Dia 45.8666 29.2902	Distance (m) Noite 43.6398 26.6042



Path: \U	TE Pampa rev_	0_Hidro	genio\Stud	y\Carregamento	o\Cenário	002V
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Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 002V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



se Case			
CASE Name:	Data		
	TE Domino roy, 0. Hidrogonio/Study/Correspondento/	Conório 002 A	
	TE Fampa rev_0_morogenio\Study\Carregamento\C	chano 005A	
	User-Defined I	Data	
Material			
	Material Identifier	n-NONANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank	ζ.		
	Release Type	Continuous	
Location			
Location	Elevation	1	n
	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	n
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
	Location of release	Open air release	
	Outdoor Release Angle	45	d
	Outdoor Release Direction	Angled from Horizontal	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	10.94	n
	Droplet Diameter(1)	1952	u
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.06	d
	Release Rate(1)	19.84	k
	Pre-Dilution Air Rates(1)	0	k
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	k
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	d

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Study Folder:	UTE Pampa rev	0 Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	

North(1)

Toxic Parai	neters		
	[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 calcu	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003A

			Dia	Noite
Rel	ease Segment 1			
Release Duration		S	600	600
Liquid Rainout		fraction	0.988609	0.989622
Release Segment 1 Clo	oud Segment 1			
Cloud Segment Duration		S	200.931	179.56
Pool Vaporization Rate		kg/s	0.121023	0.0576759
Total Vapor Flowrate		kg/s	0.347022	0.263567
Release Segment 1 Clo	oud Segment 2			
Cloud Segment Duration		S	78.795	78.8456
Pool Vaporization Rate		kg/s	0.307195	0.131444
Total Vapor Flowrate		kg/s	0.533194	0.337335
Release Segment 1 Clo	oud Segment 3			
Cloud Segment Duration		S	59.755	61.11
Pool Vaporization Rate		kg/s	0.406193	0.168733
Total Vapor Flowrate		kg/s	0.632192	0.374624
Release Segment 1 Clo	oud Segment 4			
Cloud Segment Duration		S	50.5819	52.01
Pool Vaporization Rate		kg/s	0.48741	0.198241
Total Vapor Flowrate		kg/s	0.713409	0.404132
Release Segment 1 Clo	oud Segment 5			
Cloud Segment Duration		S	43.6181	46.6769
Pool Vaporization Rate		kg/s	0.558204	0.223619
Total Vapor Flowrate		kg/s	0.784203	0.42951
Release Segment 1 Clo	oud Segment 6			
Cloud Segment Duration		S	75.95	81.32
Pool Vaporization Rate		kg/s	0.649891	0.256086
Total Vapor Flowrate		kg/s	0.875891	0.461977
Release Segment 1 Clo	oud Segment 7			
Cloud Segment Duration		S	90.3694	100.477
Pool Vaporization Rate		kg/s	0.780225	0.301519
Total Vapor Flowrate		kg/s	1.00622	0.50741
Maximum Pool Radius		m	32.1566	32.1246



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003A

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 flammable effect height 0 m

Concentration(ppn	n) Averaging Tim	e		Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	10.0927	10.2592
LFL Frac (7000)	18.75	S	10.0927	10.2592
Concentration(ppm	n) Averaging Tim	e		Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003A

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003A

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

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	22.7456	21.5807
Radiation Level	12.5	kW/m2	12.7084	11.6016
Radiation Level	37.5	kW/m2	7.8308	Not Reached
Radiation Level	44	kW/m2	6.31262	Not Reached

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 003A

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003A

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

UTE Pampa rev_0_Hidrogenio

Study Folder:



ance (m) e 218 043 Reached Reached
e 218 043 Reached Reached
218 043 Reached Reached
043 Reached Reached
Reached Reached
Reached
ation Level (kW/m2 e
e
urd
ance (m)
e
423
123
Reached
Reached
ation Level (kW/m2
e



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003A

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

Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 10.0927 10.0927	Distance (m) Noite 10.2592 10.2592
Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 0 0	Heights (m) for above distances Noite 0 0



Study Folder: UTE Pampa rev_0_Hidrogenio

Explosion	Effects:	Late	Ignition
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Path: \U	TE Pampa re	v_0_Hidroge	enio\Study\Carregam	ento\Cenário 003A	
		Explosion M Explosion I All distance	Model Used : Multi E Location Criterion: C es are measured from	Energy Floud Front (LFL Fract the Source	tion)
		All flamma	ble results are report	ed at the flammable ef	ffect height 0 m
				Maximum D	istance (m) at Overpressure Level
				Dia	Noite
Overpres	ssure	0.05	bar	35.5171	33.1673
Overpres	ssure	0.1	bar	23.7763	22.5077
Overpres	ssure	0.3	bar	15.4506	14.9487
Overpres	ssure	0.4	bar	13.9451	13.5818
				Supplementa	ry Data at 0.05 bar
				Dia	Noite
Supplied Used Fla	l Flammable Mas	Mass	kg	0.283528	0.212192
Overnres	sure Radius	5	m	25 5171	23 1673
Distance	to:			23.3171	23.1075
- Ignitio	n Source		m	10	10
- Cloud	Front/Centre		m	10	10
- Explos	sion Centre		m	10	10
				Supplementa	ry Data at 0.1 bar
				Dia	Noite
Supplied Used Fla	l Flammable M Immable Mas	Mass S	kg	0.283528	0.212192
Overpres	ssure Radius		m	13.7763	12.5077
Distance	to:				
- Ignitio	n Source		m	10	10
- Cloud	Front/Centre		m	10	10
- Explos	sion Centre		m	10	10
				Supplementa	ry Data at 0.3 bar
				Dia	Noite
Supplied Used Fla	l Flammable Mas	Mass s	kg	0.283528	0.212192
Overpres	ssure Radius		m	5.45058	4.94866
Distance	to:				
- Ignitio	n Source		m	10	10
- Cloud	Front/Centre		m	10	10
- Explos	sion Centre		m	10	10
				Supplementa	ry Data at 0.4 bar
				Dia	Noite
Supplied Used Fla	l Flammable Mas	Mass s	kg	0.283528	0.212192
Overpres	ssure Radius		m	3.94506	3.58177
- Ignitio	n Source		m	10	10
- Cloud	Front/Centre		m	10	10



Study Folder:	UTE Pampa rev 0 Hidi	ogenio

Phast 6.7

- E:	- Explosion Centre		10	10	
	Weather Conditions				
Path:	nto\Cenário 003A				
			Dia	Noite	
Win	nd Speed	m/s	3.73	2.78	
Pasquill Stability			C/D	D	
Surface Roughness Length		mm	950.891	950.891	
Surface Roughness Parameter			0.17	0.17	
Atmospheric Temperature		degC	19.6	16.5	
Sur	face Temperature	degC	24.6	16.5	
Rela	ative Humidity	fraction	0.636	0.749	



Cenário 003H			
Base Case			
CASE Nar	ne: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Ce	nário 003H	
	User-Defined Da	ata	
Materia	1		
	Material Identifier	n-NONANE	
Scenario	0		
	Building Wake Effect	None	
Vessel/T	'ank		
v c35ch 1	Release Type	Continuous	
. .			
Location	n [Flevation	1	ml
	Use FRPG averaging time	FRPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
D J			
Buna	Status of Bund	No bund present	
	Type of Bund Surface	Concrete]	
	[Bund Height	0	ml
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/	Outdoor		
muoon	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flamma	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
D:			
Dispersi	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	10.94	m/s
	Droplet Diameter(1)	1952	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.06	degC
	Release Rate(1)	19.84	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Firehall	Parameters		
i ii cuali	[Mass Modification Factor	31	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters


[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time ca	lculation 0.05	fraction]
[Cut-off concentration for exposure time calculatio	ns 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003H

			Dia	Noite
	Release Segment	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.997469	0.997626
Release Segment 1	Cloud Segment 1			
Cloud Segment Durat	ion	S	198.81	176.89
Pool Vaporization Rat	te	kg/s	0.125643	0.0605714
Total Vapor Flowrate		kg/s	0.17586	0.107665
Release Segment 1	Cloud Segment 2			
Cloud Segment Durat	ion	S	79.2456	79.11
Pool Vaporization Rat	te	kg/s	0.31596	0.136271
Total Vapor Flowrate		kg/s	0.366178	0.183365
Release Segment 1	Cloud Segment 3			
Cloud Segment Durat	ion	S	60.5044	61.7306
Pool Vaporization Rat	te	kg/s	0.417894	0.174716
Total Vapor Flowrate		kg/s	0.468112	0.22181
Release Segment 1	Cloud Segment 4			
Cloud Segment Durat	ion	S	50.5156	52.8319
Pool Vaporization Rate		kg/s	0.501191	0.20525
Total Vapor Flowrate		kg/s	0.551408	0.252344
Release Segment 1	Cloud Segment 5			
Cloud Segment Durat	ion	S	43.5644	46.6181
Pool Vaporization Rat	te	kg/s	0.573193	0.231336
Total Vapor Flowrate		kg/s	0.62341	0.27843
Release Segment 1	Cloud Segment 6			
Cloud Segment Durat	ion	S	75.8625	82.3419
Pool Vaporization Rat	te	kg/s	0.666367	0.264658
Total Vapor Flowrate		kg/s	0.716585	0.311751
Release Segment 1	Cloud Segment 7			
Cloud Segment Durat	ion	S	91.4975	100.477
Pool Vaporization Rat	te	kg/s	0.799699	0.311139
Total Vapor Flowrate		kg/s	0.849917	0.358233
Maximum Pool Radiu	IS	m	32.2978	32.2557



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003H

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 flammable effect height 0 m

Averaging Time			Distance (m)
		Dia	Noite
18.75	S	4.77993	4.81917
18.75	S	10.5517	6.94538
18.75	S	10.5517	6.94538
Averaging Time			Heights (m) for above distances
		Dia	Noite
18.75	S	0	0
18.75	S	0	0
18.75	S	0	0
	Averaging Time 18.75 18.75 18.75 Averaging Time 18.75 18.75 18.75	Averaging Time 18.75 s 18.75 s 18.75 s Averaging Time 18.75 s 18.75 s	Averaging Time Dia 18.75 s 4.77993 18.75 s 10.5517 18.75 s 10.5517 Averaging Time Dia 18.75 s 0 18.75 s 0 18.75 s 0 18.75 s 0 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003H

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	12.8956	13.0837
Radiation Level	12.5	kW/m2	9.10264	9.33152
Radiation Level	37.5	kW/m2	7.27337	7.51554
Radiation Level	44	kW/m2	7.07469	7.43305

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 003H

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003H

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

UTE Pampa rev_0_Hidrogenio

Study Folder:

2,739,689 Phast 6.7

	Rad	iation Effects: Early I	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 003H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	52.6483	51.5541
Radiation Level	12.5	kW/m2	24.126	23.0716
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Early Pe	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 003H	
			Dia	Radiation Level (kW/m2) Noite
			r I	
		Late Pool Fire H	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 003H	
			Dia	Noite
Late Pool Fire Stati	15		Hazard	Hazard
	Rad	liation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 003H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	107.886	103.587
Radiation Level	12.5	kW/m2	39.3813	38.5981
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	iation Effects: Late Po	ol Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 003H	
				Radiation Level (kW/m2)
			Dia	Noite



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003H

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

Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 10.5517 10.5517	Distance (m) Noite 6.94538 6.94538
Furthest Extent Furthest Extent	7000 7000	ppm	Dia 0 0	Heights (m) for above distances Noite 0 0

Study Folder:



		Explosion Effects:	Late Ignition
h: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregan	nento\Cenário 003H
	Explosion M	Model Used : Multi I	Energy
	Explosion I	Location Criterion: C	Cloud Front (LFL Fraction)
	All distance	es are measured fron	n the Source
	All flamma	ble results are report	ted at the flammable effect height 0 m
			Maximum Distance (m) at Overpressure Leve
			Dia
Overpressure	0.05	bar	36.202
Overpressure	0.1	bar	24.1461
Overpressure	0.3	bar	15.5969
Overpressure	0.4	bar	14.0509
			Supplementary Data at 0.05 bar
			Dia
Supplied Flamma	ble Mass	kg	0.306975
Used Flammable	Mass		26.222
Overpressure Rad	ius	m	26.202
Distance to:			10
- Ignition Source		m	10
- Cloud Front/Cel	ntre	m	10
- Explosion Centi	re	m	10
			Supplementary Data at 0.1 bar
			Dia
Supplied Flammal	ble Mass	kg	0.306975
Used Flammable	Mass		
Overpressure Rad	ius	m	14.1461
Distance to:			
- Ignition Source		m	10
- Cloud Front/Cer	ntre	m	10
- Explosion Centr	re	m	10
			Supplementary Data at 0.3 bar
			Dia
Supplied Flamma	ble Mass	kg	0.306975
Used Flammable	Mass		
Overpressure Rad	ius	m	5.59687
Distance to:			
- Ignition Source		m	10
- Cloud Front/Cer	ntre	m	10
- Explosion Cent	re	m	10
			Supplementary Data at 0.4 bar
			Dia
Supplied Flamma	ble Mass	kg	0.306975
Used Flammable	Mass		
Overpressure Rad	ius	m	4.05094
Distance to:			
- Ignition Source		m	10
- Cloud Front/Cer	ntre	m	10

UTE Pampa rev_0_Hidrogenio

Surface Temperature

Relative Humidity

Study Folder:

- Explosion Centre	m	10			
	Weather Conditions				
Path: \UTE Pampa rev_0_H	Hidrogenio\Study\Carregament	o\Cenário 003H			
		Dia	Noite		
Wind Speed	m/s	3.73	2.78		
Pasquill Stability		C/D	D		
Surface Roughness Length	mm	950.891	950.891		
Surface Roughness Paramet	ter	0.17	0.17		
Atmospheric Temperature	degC	19.6	16.5		

degC

fraction

24.6

0.636

16.5

0.749

UTE Pampa rev_0_Hidrogenio

Date: 28/04/2014



Cenário 003I			
Base Case			
CASE Name:	Data		
Path: \UT	TE Pampa rev_0_Hidrogenio\Study\Carregan	nento\Cenário 003I	
	User-Def	iined Data	
Material			
	Material Identifier	n-NONANE	
Scenario			
Sechario	Building Wake Effect	None	
Vessel/Tank	Deleger Terre	Continuous	
	Release Type	Continuous	
Location			
	Elevation	1	m]
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	Concrete]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
Indoor/Out	Location of release	Open air release	
	Outdoor Release Direction	Down - Impinging on the Ground	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	10.94	m/s
	Droplet Diameter(1)	1952	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.06	degC
	Release Rate(1)	19.84	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



UTE Pampa rev_0_Hidrogenio **Study Folder:**

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003I

			Dia	Noite
	Release Segment 1			
Release Duration		S	600	600
Liquid Rainout		fraction	1	1
Release Segment 1	Cloud Segment 1			
Cloud Segment Durat	ion	S	198.106	176.226
Pool Vaporization Rat	te	kg/s	0.127043	0.0615532
Total Vapor Flowrate		kg/s	0.127044	0.0615538
Release Segment 1	Cloud Segment 2			
Cloud Segment Durat	ion	S	79.1169	78.975
Pool Vaporization Rat	te	kg/s	0.318381	0.137838
Total Vapor Flowrate		kg/s	0.318382	0.137838
Release Segment 1	Cloud Segment 3			
Cloud Segment Durat	ion	S	60.4181	61.6394
Pool Vaporization Rat	te	kg/s	0.420768	0.176508
Total Vapor Flowrate		kg/s	0.420769	0.176509
Release Segment 1	Cloud Segment 4			
Cloud Segment Durat	ion	S	50.4494	52.7606
Pool Vaporization Rat	te	kg/s	0.504405	0.207202
Total Vapor Flowrate		kg/s	0.504406	0.207202
Release Segment 1	Cloud Segment 5			
Cloud Segment Durat	ion	S	44.55	89.43
Pool Vaporization Rat	te	kg/s	0.577494	0.244592
Total Vapor Flowrate		kg/s	0.577494	0.244592
Release Segment 1	Cloud Segment 6			
Cloud Segment Durat	ion	S	75.8625	112.179
Pool Vaporization Rat	te	kg/s	0.671917	0.296544
Total Vapor Flowrate		kg/s	0.671918	0.296544
Release Segment 1	Cloud Segment 7			
Cloud Segment Durat	ion	S	91.4975	28.79
Pool Vaporization Rat	te	kg/s	0.805907	0.332305
Total Vapor Flowrate		kg/s	0.805907	0.332305
Maximum Pool Radiu	15	m	32.3379	32.2944



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003I

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003I

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Along Ground	Along Ground

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003I

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

				Distance (m)
			Dia	Noite
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	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 003I

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003I

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard



Study Folder:	UTE Pampa rev_0	_Hidrogenio
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		Rad	lation Effects: Early P	ool Fire Ellipse	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregament	to\Cenário 003I	
					Distance (m)
				Dia	Noite
Radi	ation Level	3	kW/m2	47.7798	46.6469
Radi	ation Level	12.5	kW/m2	19.2313	18.1424
Radi	ation Level	37.5	kW/m2	Not Reached	Not Reached
Radi	ation Level	44	kW/m2	Not Reached	Not Reached
		Radi	ation Effects: Early Po	ol Fire Distance	
Path:	\UTE Pampa	rev 0 Hidroge	nio\Study\Carregament	to\Cenário 003I	
	1	0	, ,		Padiation Laval (kW/m2)
				Dia	Noite
			Late Pool Fire H	azard	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregament	to\Cenário 003I	
				Dia	Noite
Late	Pool Fire Statu	IS		Hazard	Hazard
		Rad	liation Effects: Late Po	ool Fire Ellipse	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregament	to\Cenário 003I	
					Distance (m)
D 1		2	1.111/ 0	Dia	Noite
Radi	ation Level	3	kW/m2	103.089	98.7482
Radi	ation Level	12.5	kW/m2	34.5248	33.6501 Not Decelo 1
Radi Dadi	ation Level	37.5	kW/m2	Not Reached	Not Reached
Radi	ation Level	44	kW/m2	Not Reached	Not Reached
		Radi	ation Effects: Late Po	ol Fire Distance	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregament	to\Cenário 003I	
				Dia	Radiation Level (kW/m2) Noite
			Weather Condi	tions	
Path:	\UTE Pampa	rev_0_Hidroge	nio\Study\Carregament	to\Cenário 003I	
				Dia	Noite
Wind	d Speed		m/s	3.73	2.78
Pasq	uill Stability			C/D	D
Surfa	ace Roughness	Length	mm	950.891	950.891
Surfa	ace Roughness	Parameter		0.17	0.17
Atmo	ospheric Tempe	erature	degC	19.6	16.5
Surfa	ace Temperatur	e	degC	24.6	16.5
Relative Humidity fraction			0.636	0.749	





Cenário 003V			
Base Case			
CASE Name:	Data		
Path: \U'	TE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V		
	User-Defined Data		
Material	Matarial Idantifiar	n NONANE	
		IFICONANL	
Scenario			
	Building Wake Effect	None	
Vassal/Tanl	,		
vessel/Tallf	Release Type	Continuous	
Location	Floration	1	l
	Lice ERPG averaging time	I FRPG not selected	m
	Use IDLH averaging time	IDI H not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund		NT 1 1	
	Status of Bund	No bund present	
	Type of Bund Surface	Concrete	ml
	Bund Failure Modeling	Bund cannot faill	1111
Indoor/Out	idoor		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
Dispersion	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	10.94	m/s
	Droplet Diameter(1)	1952	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.06	degC
	Release Rate(1)	19.84	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Firehall Pa	rameters		
i neban i a	[Mass Modification Factor	31	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V $$$

			Dia	Noite
	Release Segment 1	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.983855	0.985124
Release Segment 1	Cloud Segment 1			
Cloud Segment Durat	ion	S	201.64	180.231
Pool Vaporization Rat	e	kg/s	0.11867	0.0560457
Total Vapor Flowrate		kg/s	0.438995	0.35119
Release Segment 1	Cloud Segment 2			
Cloud Segment Durat	ion	S	78.9225	78.9794
Pool Vaporization Rat	e	kg/s	0.30284	0.12872
Total Vapor Flowrate		kg/s	0.623166	0.423864
Release Segment 1	Cloud Segment 3			
Cloud Segment Durat	ion	S	59.84	61.2
Pool Vaporization Rat	e	kg/s	0.40098	0.165599
Total Vapor Flowrate		kg/s	0.721305	0.460743
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		S	49.66	52.08
Pool Vaporization Rate		kg/s	0.480812	0.194814
Total Vapor Flowrate		kg/s	0.801137	0.489958
Release Segment 1	Cloud Segment 5			
Cloud Segment Durat	ion	S	43.6181	46.7356
Pool Vaporization Rat	e	kg/s	0.550271	0.219955
Total Vapor Flowrate		kg/s	0.870596	0.515099
Release Segment 1	Cloud Segment 6			
Cloud Segment Durat	ion	S	75.95	81.415
Pool Vaporization Rat	e	kg/s	0.641145	0.252138
Total Vapor Flowrate		kg/s	0.96147	0.547281
Release Segment 1	Cloud Segment 7			
Cloud Segment Durat	ion	S	90.3694	99.3594
Pool Vaporization Rat	e	kg/s	0.770379	0.296895
Total Vapor Flowrate		kg/s	1.0907	0.592039
Maximum Pool Radiu	S	m	32.0803	32.0507



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V

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 flammable effect height 0 m

(ppm) Averaging	Гime		Distance (m)
		Dia	Noite
0) 18.75	S	No Hazard	No Hazard
) 18.75	S	5.89514	4.30283
00) 18.75	S	5.89514	4.30283
(ppm) Averaging	Гime		Heights (m) for above distances
		Dia	Noite
0) 18.75	S	0	0
) 18.75	S	0	0
00) 18.75	S	0	0
	ppm) Averaging 0) 18.75) 18.75)0) 18.75)0) 18.75 (ppm) Averaging 0) 18.75 0) 18.75 0) 18.75 0) 18.75 0) 18.75 0) 18.75	ppm) Averaging Time 0) 18.75 s 0) 18.75 s 00) 18.75 s	ppm) Averaging Time Dia 0) 18.75 s No Hazard) 18.75 s 5.89514 00) 18.75 s 5.89514 00) 18.75 s 5.89514 (ppm) Averaging Time Dia 00) 18.75 s 0 18.75 s 0 0 00) 18.75 s 0 00) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Vertical	Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V

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

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	25.3955	24.4898
Radiation Level	12.5	kW/m2	14.3136	12.8417
Radiation Level	37.5	kW/m2	8.99051	7.71481
Radiation Level	44	kW/m2	8.3949	6.55396

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 003V

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path:	UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V
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	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

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Path VITE Pampa	rev 0 Hidroge	nio\Study\Carregamer	nto\Cenário 003V	
	lev_o_meroge	mo Study Carregamer		
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	55.7328	52.3649
Radiation Level	12.5	kW/m2	27.4902	24.1074
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 003V	
				Radiation Level (kW/m2)
			Dia	Noite
		Lata Daal Fire L	Iozond	
		Late Fool Fire r	1828FU	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 003V	
			Dia	Noite
Late Pool Fire Statu	15		Hazard	Hazard
	Rad	liation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 003V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	110.582	104.035
Radiation Level	12.5	kW/m2	42.4004	39.33
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 003V	
				Radiation Level (kW/m2)



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 003V

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

Furthest Extent	7000	ppm	Dia 5.89514	Distance (m) Noite 4.30283
Furthest Extent	7000	ppm	5.89514	4.30283
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 003V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



iário 005A			
ase Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Carregamento\G	Cenário 005A	
	User-Defined I	Data	
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	1	dar C
	Mass Inventory	23 1F6	degC kø
		120	n 5
Scenario	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	10.16	mm
	Building Wake Effect	None	mm
	Tank Head	0	m
Location			
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/Out	door		
	Location of release	Open air release	
	Outdoor Release Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	rameters		
	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	TNO model flame temperature	1727	degC]



Study Folder: UTE Pampa rev_0_Hidrogenio

[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 calcula	tions 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



....

Path: \UTE	E Pampa rev_0_Hidrogenio\Stu	dy\Carregamento\Cenário 00	95A	
DISCHARGE	DATA for Weather:	Global Weathers\Dia		
Wind Speed	:		3.73	m/s
Wind Speed	at Height (Calculated)		2.10	m/s
Pasquill Stal	bility:		C/D	
USER-DEF	INED QUANTITIES			
Material			n-NONANE	
Scenario			Leak	
Inventory			1,000,000.00	kg
Fixed Durat	ion		n/a	S
Stagnation d	lata (data at upstream end for long	pipe):		
- Pre	essure		2.01	bar
- Ter	nperature		25.00	degC
- Flu	id State		Non-saturated liquid	
CALCULA	TED QUANTITIES			
Mass Flow	of Air (Vent from Vapor Space on	ly)	n/a	
Mass Flow	rate		6.33301E-001	kg/s
Release Du	iration		600.00	s
Orifice or p	pipe exit data (before atmospheric e	expansion):		
- Press	ure		1.01	bar
- Temp	erature		24.98	degC
- Vena	Contracta Velocity (exit velocity for	or pipe releases)	18.23	m/s
- Disch	arge Coefficient		0.60	
Final data ((after atmospheric expansion):			
- Temp	erature		24.98	degC
- Liqui	d Mass Fraction		1.00	fraction
- Dropl	let Diameter		703.00	um
- Expar	nded Radius		0.00	m
- Veloc	ity		18.23	m/s
DISCHARGE	DATA for Weather:	Global Weathers\Noite		
Wind Speed			2.78	m/s
Wind Speed	at Height (Calculated)		1.45	m/s
Pasquill Stal	bility:		D	
USER-DEF	INED QUANTITIES			
Material			n-NONANE	
Scenario			Leak	
Inventory			1,000,000.00	kg
Fixed Durat	ion		n/a	S
Stagnation d	lata (data at upstream end for long	pipe):	-	
- Pre	ssure		2.01	bar
- Ter	nperature		25.00	degC
- Flu	id State		Non-saturated liquid	

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005A	
			Dia	Noite
D.L. D	Release Segmen	t 1	(00	(00
Release Duration		S Currentian	600	600
Liquid Kainout		Iraction	0.943826	0.94/333
Maximum Pool Radi	us	m	5.60193	5.61013
	Dista	nce to Concentration	on Results	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005A	
	The height for us	ser defined concentr	ations is the user de	efined height 0 m
	All toxic results	are reported at the t	oxic effect height 0	m
	All flammable re	esults are reported at	t the flammable effe	ect height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazar	d	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005A	
	Jet fire method u	sed: Cone model - I	DNV recommended	1
			Dia	Noite
Jet Fire Status			Hazard	Hazard
Flame Direction			Angled	Angled
	Radi	ation Effects: Jet F	ire Ellipse	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005A	
	This table gives	the distances to the	specified radiation	levels
	for each jet fire l	isted in the above h	azard table	Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	9 53352	9 17269
Radiation Level	12.5	kW/m^2	5 17448	4 81731
Radiation Level	37.5	kW/m^2	Not Reached	Not Reached
Radiation Level	44	kW/m^2	Not Reached	Not Reached
		K 11/1112	The Reached	Tot Reached

Study Folder:

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UTE Pampa rev_0_Hidrogenio



	ŀ	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa r	ev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005A	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa r	ev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005A	
			Dia	Noite
Early Pool Fire Statu	IS		Hazard	Hazard
	Rad	iation Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	28.3936	27.7117
Radiation Level	12.5	kW/m2	20.7824	19.8608
Radiation Level	37.5	kW/m2	14.3883	13.5876
Radiation Level	44	kW/m2	13.5262	12.7963
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa r	ev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005A	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire H	Iazard	
Path: \UTE Pampa r	ev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005A	
			Dia	Noite
Late Pool Fire Status	3		Hazard	Hazard
	Rad	liation Effects: Late I	Pool Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	46.7364	45.1935
	12.5	kW/m2	30 1177	28 1165
Radiation Level	12.3	K VV / 1112	50.1177	20.1105
Radiation Level Radiation Level	37.5	kW/m2	16.4125	15.8611



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005A

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Na		
	nme: Data	
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Ce	enário 005H
	User-Defined D	ata
Materi	al	
	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1
	Temperature	25
	Mass Inventory	1E6
Scenar	io	
	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	10.16
	Building Wake Effect	None
	Tank Head	0
Locatio	Dn	
	Elevation	1
	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
	[Bund Failure Modeling	Bund cannot fail]
Indoor	/Outdoor	
	Location of release	Open air release
	Outdoor Release Direction	Horizontal
Flamm	able	
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Disper	sion	
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	1E6
Firebal	II Parameters	
	[Mass Modification Factor	3]
	[Calculation method for fireball	DNV Recommended]
	[TNO model flame temperature	1727

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Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



SCHARGE DATA for Weather:	Global Weathers\Dia		
Wind Speed:		3.73	m/s
Wind Speed at Height (Calculated)		2.10	m/s
Pasquill Stability:		C/D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long p	ipe):		
- Pressure		2.01	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	
CALCULATED QUANTITIES			
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate		6.33301E-001	kg/s
Release Duration		600.00	s
Orifice or pipe exit data (before atmospheric ex	xpansion):		
- Pressure		1.01	bar
- Temperature		24.98	degC
- Vena Contracta Velocity (exit velocity for	pipe releases)	18.23	m/s
- Discharge Coefficient		0.60	
Final data (after atmospheric expansion):			
- Temperature		24.98	degC
- Liquid Mass Fraction		1.00	fraction
- Droplet Diameter		703.00	um
- Expanded Radius		0.00	m
- Velocity		18.23	m/s
SCHARGE DATA for Weather:	Global Weathers\Noite		
Wind Speed:		2.78	m/s
Wind Speed at Height (Calculated)		1.45	m/s
Pasquill Stability:		D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long p	ipe):	2 • •	,
- Pressure		2.01	bar daaC
- Temperature Eluid State		25.00	degC
- Fluid State		Non-saturated liquid	

 $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005H $$$

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio	\Study\Carregament	o\Cenário 005H	
				Dia	Noite
		Release Segme	nt 1		
Rele	ase Duration		S	600	600
Liqu	iid Rainout		fraction	0.985013	0.985624
Max	imum Pool Radiu	us	m	5.72211	5.72255
		Dist	ance to Concentrat	ion Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio	\Study\Carregament	o\Cenário 005H	
		The height for a All toxic results All flammable	user defined concent s are reported at the results are reported a	trations is the user d toxic effect height 0 at the flammable eff	efined height 0 m 0 m èct height 0 m
Con	centration(ppm)	Averaging Time	e		Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	4.288	No Hazard
LFL	Frac (7000)	18.75	S	4.288	No Hazard
Con	centration(ppm)	Averaging Time	e		Heights (m) for above distances
				Dia	Noite
UFL	(56000)	18.75	S	0	0
LFL	(7000)	18.75	S	0	0
LFL	Frac (7000)	18.75	S	0	0
			Jet Fire Haza	rd	
Path:	\UTE Pampa re	ev_0_Hidrogenio	\Study\Carregament	o\Cenário 005H	
		Jet fire method	used: Cone model -	DNV recommended	1
				Dia	Noite
Jet F	ire Status			Hazard	Hazard
Flan	ne Direction			Horizontal	Horizontal
		Rad	liation Effects: Jet l	Fire Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio	\Study\Carregament	o\Cenário 005H	
		This table gives for each jet fire	s the distances to the listed in the above l	specified radiation hazard table	levels
					Distance (m)
				Dia	Noite
	iation Level	3	kW/m2	5.76623	5.89985
Radi					
Radi Radi	iation Level	12.5	kW/m2	3.76023	3.865/1
Radi Radi Radi	ation Level ation Level	12.5 37.5	kW/m2 kW/m2	3.76023 2.55485	3.86571 Not Reached

Study Folder:



		R	adiation Effects: Jet	Fire Distance	
Path: \U	TE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005H	
				Dia	Radiation Level (kW/m2) Noite
			Early Pool Fire I	Hazard	
Path: \U	TE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005H	
				Dia	Noite
Early Po	ol Fire Sta	tus		Hazard	Hazard
		Rad	iation Effects: Early 1	Pool Fire Ellipse	
Path: \U	TE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005H	
					Distance (m)
				Dia	Noite
Radiation	n Level	3	kW/m2	23.2676	23.1052
Radiation	n Level	12.5	kW/m2	15.5418	15.1447
Radiation Level 37.5		37.5	kW/m2	9.04394	8.77555
Radiation	n Level	44	kW/m2	8.14558	7.96859
		Radi	ation Effects: Early P	ool Fire Distance	
Path: \U	TE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005H	
				Dia	Radiation Level (kW/m2) Noite
			Late Pool Fire H	lazard	
Path: \U	TE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 005H	
				Dia	Noite
Late Poo	l Fire Statu	ıs		Hazard	Hazard
		Rad	liation Effects: Late F	ool Fire Ellipse	
Path: \U	TE Pampa	rev 0 Hidroge	enio\Study\Carregamer	nto\Cenário 005H	
	•	0			Distance (m)
				Dia	Noite
Radiatio	n Level	3	kW/m2	41.7069	40.6593
Radiatio	n Level	12.5	kW/m2	24.8257	23.3385
Radiatio	n Level	37.5	kW/m2	11 1371	11 1216

UTE Pampa rev_0_Hidrogenio

Radiation Level

44

11.1371

11.1216

kW/m2



	Radi	ation Effects: Late l	Pool Fire Distance	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Carregam	ento\Cenário 005H	
			Dia	Radiation Level (kW/m2) Noite
		Flash Fire En	velope	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Carregam	ento\Cenário 005H	
	All flamma	ble results are reporte	ed at the flammable	effect height 0 m
				Distance (m)
			Dia	
Furthest Extent	7000	ppm	4.288	
Furthest Extent	7000	ppm	4.288	
				Heights (m) for above distances
			Dia	
Furthest Extent	7000	ppm	0	
Furthest Extent	7000	ppm	0	

Weather Conditions

Path: $\label{eq:carregamento} $$ UTE Pampa rev_0_Hidrogenio\\Study\\Carregamento\\Cenário 005H$

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ise Case	Data		
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Carregame	nto\Cenário 005I	
	User-Defin	ied Data	
Material			
	Material Identifier	n-NONANE	
	lype of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	,
	Storage Pressure - gauge	1	
	Mass Inventory	1E6]
Saanania			
Scenario	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	10.16	
	Building Wake Effect	None	
	Tank Head	0	1
Location			
	Elevation	1	
	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	
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Ou	tdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Down - Impinging on the Ground	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6]
Fireball Pa	rameters		
	Mass Modification Factor	3]	
	Calculation method for fireball	DNV Recommended]	
	I NO model flame temperature	1727	(
Toxic Para	meters		
	Wind Dependent Exchange Rate	Case Specified]	

2,739,689	Ĵ.Å
Phast 6.7	DNV

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

DISCHARGE DATA for Weather:

Path:



Phast 6.7

V	Vind Speed:	3.73	m/s
V	Vind Speed at Height (Calculated)	2.10	m/s
F	asquill Stability:	C/D	
τ	JSER-DEFINED QUANTITIES		
Ν	<i>f</i> aterial	n-NONANE	
S	cenario	Leak	
Ι	nventory	1,000,000.00	kg
F	ixed Duration	n/a	S
S	tagnation data (data at upstream end for long pipe):		
	- Pressure	2.01	bar
	- Temperature	25.00	degC
	- Fluid State	Non-saturated liquid	
(CALCULATED QUANTITIES		
	Mass Flow of Air (Vent from Vapor Space only)	n/a	
	Mass Flowrate	6.33301E-001	kg/s
	Release Duration	600.00	s
	Orifice or nine exit data (before atmospheric expansion):		
	- Pressure	1.01	bar
	- Temperature	24.98	degC
	- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
	- Discharge Coefficient	0.60	
	Final data (after atmospheric expansion):		
	- Temperature	24.98	degC
	- Liquid Mass Fraction	1.00	fraction
	- Droplet Diameter	703.00	um
	- Expanded Radius	0.00	m
	- Velocity	18.23	m/s
DISC	HARGE DATA for Weather: Global Weathers\Noite		
V	Vind Speed:	2.78	m/s
V	Vind Speed at Height (Calculated)	1.45	m/s
F	asquill Stability:	D	
τ	JSER-DEFINED QUANTITIES		
Ν	<i>M</i> aterial	n-NONANE	
S	cenario	Leak	
Ι	nventory	1,000,000.00	kg
F	ixed Duration	n/a	S
S	tagnation data (data at upstream end for long pipe):		
	- Pressure	2.01	bar
	- Temperature	25.00	degC
	- Fluid State	Non-saturated liquid	

\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005I

Global Weathers\Dia

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Study Folder:	UTE Pampa rev	0 Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	- · · · •

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s


Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\C	Cenário 005I		
		Palassa Sagmant	1	Dia	Noite	
Rele	ase Duration	Release Segment	1	600	600	
Liau	uid Rainout		5 fraction	1	1	
Liqu	na Ramout		naction	1	1	
Max	imum Pool Radiu	us	m	5.76474	5.76419	
		Distan	ce to Concentration	Results		
Path:	\UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\C	Cenário 005I		
		The height for use	er defined concentrati	ions is the user def	fined height 0 m	
		All toxic results a	re reported at the tox	ic effect height 0 r	n at haight 0 m	
		All fiammable res	suits are reported at tr	ne frammable effec	ct neight 0 m	
Con	centration(ppm)	Averaging Time			Distance (m)	
				Dia	Noite	
UFL	(56000)	18.75	S	0	0	
LFL	(7000)	18.75	S	0	0	
LFL	Frac (7000)	18.75	S	0	0	
Con	centration(nnm)	Averaging Time			Heights (m) for above distances	
con	•••••••(pp)			Dia	Noite	
UFL	(56000)	18.75	S	0	0	
LFL	(7000)	18.75	S	0	0	
LFL	Frac (7000)	18.75	S	0	0	
			.Iet Fire Hazard			
Path:	\UTE Pampa re	ev_0_Hidrogenio\St	tudy\Carregamento\C	cenário 0051		
		Jet fire method us	ed: Cone model - DN	V recommended		
				Dia	Noite	
Jet F	Fire Status			No Hazard	No Hazard	
Flan	ne Direction			Along Ground	Along Ground	
		_				
		ŀ	Carly Pool Fire Haza	ird		
Path:	\UTE Pampa re	ev_0_Hidrogenio\St	tudy\Carregamento\C	Cenário 005I		
				Dia	Noite	
Earl	y Pool Fire Status	5		Hazard	Hazard	



Study Folder:	UTE Pampa rev_0_Hidrogenio
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Path: \UTE Pampa	rev_0_Hidrogenic	\Study\Carregamen	to\Cenário 005I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	18,9486	18.7965
Radiation Level	12.5	kW/m2	11.1821	10.7956
Radiation Level	37.5	kW/m2	4.64565	4.39151
Radiation Level	44	kW/m2	3.74325	3.57063
	Radiatio	on Effects: Early Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidrogenic)\Study\Carregamen	to\Cenário 005I	
			Dia	Radiation Level (kW/m2)
			Dia	None
		Late Pool Fire H	azard	
Path: \UTE Pampa	rev_0_Hidrogenic	\Study\Carregamen	to\Cenário 005I	
			Dia	Noite
Late Pool Fire Statu	lS		Hazard	Hazard
	Radiat	ion Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrogenic)\Study\Carregamen	to\Cenário 005I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	37.42	36.3765
Radiation Level	12.5	kW/m2	20.4444	18.9649
Radiation Level	37.5	kW/m2	6.76474	6.76419
Radiation Level	44	kW/m2	6.76474	6.76419
	Radiati	on Effects: Late Po	ol Fire Distance	
Path: \UTE Pampa	rev_0_Hidrogenic)\Study\Carregamen	to\Cenário 005I	
				Radiation Level (kW/m2)
			Dia	Noite
		Weather Condi	tions	
	rev 0 Hidrogenio)\Study\Carregamen	to\Cenário 005I	
Path: \UTE Pampa				
Path: \UTE Pampa			Dia	Noite
Path: \UTE Pampa	<u>-</u>	m/s	Dia 3.73	Noite 2.78
Path: \UTE Pampa Wind Speed Pasquill Stability		m/s	Dia 3.73 C/D	Noite 2.78 D
Path: \UTE Pampa Wind Speed Pasquill Stability Surface Roughness	Length	m/s mm	Dia 3.73 C/D 950.891	Noite 2.78 D 950.891
Path: \UTE Pampa Wind Speed Pasquill Stability Surface Roughness Surface Roughness	Length Parameter	m/s mm	Dia 3.73 C/D 950.891 0.17	Noite 2.78 D 950.891 0.17
Path: \UTE Pampa Wind Speed Pasquill Stability Surface Roughness Surface Roughness Atmospheric Temp	Length Parameter erature	m/s mm degC	Dia 3.73 C/D 950.891 0.17 19.6	Noite 2.78 D 950.891 0.17 16.5
Path: \UTE Pampa Wind Speed Pasquill Stability Surface Roughness Surface Roughness Atmospheric Temp Surface Temperatur	Length Parameter erature re	m/s mm degC degC	Dia 3.73 C/D 950.891 0.17 19.6 24.6	Noite 2.78 D 950.891 0.17 16.5 16.5



ário 005V 1se Case			
CASE Name	:: Data		
Path: \	UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Co	enário 005V	
	User-Defined D	ata	
Material			
	Material Identifier	n-NONANE	
	lype of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	1	bar
	Mass Inventory	25 1E6	kg
Scenario			
Stenario	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	10.16	mm
	Building Wake Effect	None	
	Tank Head	0	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	No bund present	
	Type of Bund Surface	Concrete]	_
	Bund Height	0	m]
	Bund Failure Modeling	Bund cannot fail	
Indoor/O	utdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammab		M k' E	
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion	n		
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball P	Parameters	21	
	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended	1
	I INO model flame temperature	1727	deg
Toxic Par	ameters	Core Specific J	
	wind Dependent Exchange Kate	Case Specified	

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Phast 6.7	DNV

Study Folder:	UTE Pampa rev_0_Hidrogenio
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North(1)

	[Building Exchange Rate [Tail Time [Set averaging time equal to exposure time [Cut-off fraction of toxic load for exposure time calcul [Cut-off concentration for exposure time calculations	4 1800 Use a fixed averaging time] ation 0.05 0	/hr] s] fraction] fraction]
Multi Enorg	ny Evolosion		
WITHIN PURCH	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
-	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.	73 m/s
Wind Speed at Height (Calculated)	2.	0 m/s
Pasquill Stability:	С	D
USER-DEFINED QUANTITIES		
Material	n-NONAN	Е
Scenario	Le	ık
Inventory	1,000,000.0	0 kg
Fixed Duration	Т	/a s
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	2.	I bar
- Temperature	25. Non estimated lies	iu degC
- Fluid State	Non-saturated liqu	Id
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	1	/a
Mass Flowrate	6.33301E-0)1 kg/s
Release Duration	600.)0 s
Orifice or pipe exit data (before atmospheric expa	ansion):	
- Pressure	1.)1 bar
- Temperature	24.	v8 degC
- Vena Contracta velocity (exit velocity for p - Discharge Coefficient	(pe releases) 18.	50 m/s
Final data (after atmospheric expansion):		
- Temperature	24.	98 degC
- Liquid Mass Fraction	1.	00 fraction
- Droplet Diameter	703.)0 um
- Expanded Radius	0.	00 m
- Velocity	18.	23 m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.	78 m/s
Wind Speed at Height (Calculated)	1.4	5 m/s
Pasquill Stability:		D
USER-DEFINED QUANTITIES		
Material	n-NONAN	Е
Scenario	Le	ık
Inventory	1,000,000.	0 kg
Fixed Duration	I	/a s
Stagnation data (data at upstream end for long pipe	ə):	
- Pressure	2.)1 bar
- Temperature	25.)0 degC
- Fluid State	Non-saturated liqu	id

\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005V

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.33301E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.98	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	18.23	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.98	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	695.43	um
- Expanded Radius	0.00	m
- Velocity	18.23	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005V	
				Dia	Noite
Dala	Duration	Release Segment	t 1	(00	(00
Kele	ease Duration		S	600	600
Liqu	iid Rainout		fraction	0.937254	0.94076
Max	kimum Pool Radii	us	m	5.58241	5.59062
		Dista	nce to Concentratio	on Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005V	
		The height for us	ser defined concentra	ations is the user d	lefined height 0 m
		All toxic results	are reported at the to	oxic effect height () m
		All flammable re	esults are reported at	the flammable eff	fect height 0 m
Con	centration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	. (7000)	18.75	S	No Hazard	No Hazard
LFL	Frac (7000)	18.75	S	No Hazard	No Hazard
Con	centration(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL	. (56000)	18.75	S	0	0
LFL	. (7000)	18.75	S	0	0
LFL	Frac (7000)	18.75	S	0	0
			Jet Fire Hazard	I	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005V	
		Jet fire method u	sed: Cone model - I	ONV recommende	d
				Dia	Noite
Jet I	Fire Status			Hazard	Hazard
Flan	ne Direction			Vertical	Vertical
		Radia	ation Effects: Jet Fi	re Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Carregamento	Cenário 005V	
		This table gives t	the distances to the s	specified radiation	levels
		for each jet fire l	isted in the above ha	izard table	Distance (m)
				Dia	Noite
Rad	iation Level	3	kW/m2	9 4411	9 21441
Rad	iation Level	12.5	kW/m^2	5 26769	4 70586
Rad	iation Level	37.5	kW/m2	2.99696	Not Reached
Rad	iation Level	44	kW/m2	44	Not Reached
ixau			K 11/1112		The reaction

UTE Pampa rev_0_Hidrogenio

Study Folder:



D-4L. \LITE Downs			eta) Cantaia 005M	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenario 005 v	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 005V	
			Dia	Noite
Early Pool Fire Status			Hazard	Hazard
	Rad	iation Effects: Early	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 005V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	27.5402	26.171
Radiation Level	12.5	kW/m2	19.9476	18.3392
Radiation Level	37.5	kW/m2	13.5672	12.0844
Radiation Level	44	kW/m2	12.7092	11.293
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 005V	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire F	lazard	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 005V	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 005V Dia	Noite
Path: \UTE Pampa Late Pool Fire Statu	rev_0_Hidroge 18	nio\Study\Carregamer	nto\Cenário 005V Dia Hazard	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu	rev_0_Hidroge 15 Rac	nio\Study\Carregamer	nto∖Cenário 005V Dia Hazard Pool Fire Ellipse	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge 1s Rac rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 005V Dia Hazard Pool Fire Ellipse nto\Cenário 005V	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge is Rac rev_0_Hidroge	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer	nto\Cenário 005V Dia Hazard Pool Fire Ellipse nto\Cenário 005V	Noite Hazard Distance (m)
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge 1s Rac rev_0_Hidroge	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer	nto\Cenário 005V Dia Hazard Pool Fire Ellipse nto\Cenário 005V Dia	Noite Hazard Distance (m) Noite
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level	rev_0_Hidroge 1s Rac rev_0_Hidroge 3	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer kW/m2	nto\Cenário 005V Dia Hazard Pool Fire Ellipse nto\Cenário 005V Dia 45.8666	Noite Hazard Distance (m) Noite 43.6398
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level Radiation Level	rev_0_Hidroge ls rev_0_Hidroge 3 12.5	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer kW/m2 kW/m2	nto\Cenário 005V Dia Hazard Pool Fire Ellipse nto\Cenário 005V Dia 45.8666 29.2902	Noite Hazard Distance (m) Noite 43.6398 26.6042
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level Radiation Level Radiation Level Radiation Level	rev_0_Hidroge Is rev_0_Hidroge 3 12.5 37.5	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer kW/m2 kW/m2 kW/m2	nto\Cenário 005V Dia Hazard Pool Fire Ellipse nto\Cenário 005V Dia 45.8666 29.2902 15.5835	Noite Hazard Distance (m) Noite 43.6398 26.6042 14.3437



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005V

Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 005V $$$

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Phast 6.7

Cenário 006A			
Base Case			
CASE Nam	e: Data		
Path:	UTE Pampa rev_0_Hidrogenio\Study\Carregamento\	Cenário 006A	
	User-Defined	Data	
Material	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vessel/Ta	nk		
	Release Type	Continuous	
Location	Elevation	1	ml
	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/O	Putdoor		
	Location of release	Open air release	
	Outdoor Release Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	
Flammat	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersio	n		
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	10.94	m/s
	Droplet Diameter(1)	1952	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.06	degC
	Release Rate(1)	19.84	kg/s
	Pre-Dilution Air Kates(1)		Kg/S
	Late Ignition Location	No ignition location	l.~
	mass inventory of material to Disperse	IEO	ку
Fireball I	Parameters		
	Mass Modification Factor	3]	
	Calculation method for fireball	DNV Recommended]	1 6
	I NO model flame temperature	1727	degC

2,739,689 Phast 6.7

Study Folder:	UTE Pampa rev	0 Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	

North(1)

Toxic Parar	neters		
	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006A

			Dia	Noite
	Release Segment 1	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.988609	0.989622
Release Segment 1	Cloud Segment 1			
Cloud Segment Durati	on	S	200.931	179.56
Pool Vaporization Rate	e	kg/s	0.121023	0.0576759
Total Vapor Flowrate		kg/s	0.347022	0.263567
Release Segment 1	Cloud Segment 2			
Cloud Segment Durati	on	S	78.795	78.8456
Pool Vaporization Rate	e	kg/s	0.307195	0.131444
Total Vapor Flowrate		kg/s	0.533194	0.337335
Release Segment 1	Cloud Segment 3			
Cloud Segment Durati	ion	S	59.755	61.11
Pool Vaporization Rate	e	kg/s	0.406193	0.168733
Total Vapor Flowrate		kg/s	0.632192	0.374624
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		S	50.5819	52.01
Pool Vaporization Rate		kg/s	0.48741	0.198241
Total Vapor Flowrate		kg/s	0.713409	0.404132
Release Segment 1	Cloud Segment 5			
Cloud Segment Durati	ion	S	43.6181	46.6769
Pool Vaporization Rate	e	kg/s	0.558204	0.223619
Total Vapor Flowrate		kg/s	0.784203	0.42951
Release Segment 1	Cloud Segment 6			
Cloud Segment Durati	ion	S	75.95	81.32
Pool Vaporization Rate		kg/s	0.649891	0.256086
Total Vapor Flowrate		kg/s	0.875891	0.461977
Release Segment 1	Cloud Segment 7			
Cloud Segment Durati	ion	S	90.3694	100.477
Pool Vaporization Rate	e	kg/s	0.780225	0.301519
Total Vapor Flowrate		kg/s	1.00622	0.50741
Maximum Pool Radiu	S	m	32.1566	32.1246



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006A

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 flammable effect height 0 m

(ppm) Averagi	ng Time		Distance (m)
		Dia	Noite
00) 18.75	S	No Hazard	No Hazard
) 18.75	S	10.0927	10.2592
00) 18.75	S	10.0927	10.2592
(ppm) Averagi	ng Time		Heights (m) for above distances
		Dia	Noite
00) 18.75	S	0	0
) 18.75	S	0	0
00) 18.75	S	0	0
	(ppm) Averagii (0) 18.75 (0) 18.75 (0) 18.75 (0) 18.75 (ppm) Averagin (0) 18.75 (0) 18.75 ((ppm) Averaging Time 10) 18.75 s 10) 18.75 s 10) 18.75 s 10) 18.75 s (ppm) Averaging Time 10) 18.75 s 10) 18.75 s 10) 18.75 s 00) 18.75 s 00) 18.75 s 00) 18.75 s	Averaging Time Dia 00) 18.75 s No Hazard 0) 18.75 s 10.0927 00) 18.75 s 10.0927 00) 18.75 s 10.0927 00) 18.75 s 0.0927 00) 18.75 s 0 01) 18.75 s 0 00) 18.75 s 0 00) 18.75 s 0 00) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006A

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006A

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

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	22.7456	21.5807
Radiation Level	12.5	kW/m2	12.7084	11.6016
Radiation Level	37.5	kW/m2	7.8308	Not Reached
Radiation Level	44	kW/m2	6.31262	Not Reached

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 006A

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006A

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio



Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 006A	
Padiation Laval	3	kW/m2	Dia	Distance (m) Noite
Radiation Level	12.5	kW/m^2	30,6124	20 20/2
Radiation Level	37.5	kW/m^2	Not Reached	27.5045 Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 006A	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire F	Iazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 006A	
Lata Da al Fire State	_		Dia	Noite
Late Pool Fire Statt	IS		Hazard	Hazard
	Rad	liation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 006A	
				Distance (m)
Dell'strend sol	2	1.11/	Dia	Noite
Radiation Level	5 12 5	kW/m2	115.914	109.425
Radiation Level	12.3 37.5	kW/m^2	45.0100 Not Reached	44.0125 Not Reached
	44	kW/m2	Not Reached	Not Reached
Radiation Level				
Radiation Level	Rad	iation Effects: Late Po	ool Fire Distance	
Radiation Level Path: \UTE Pampa	Rad rev_0_Hidroge	iation Effects: Late Po enio\Study\Carregamer	ool Fire Distance	



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006A

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

Furthest Extent	7000	ppm	Dia 10.0927	Distance (m) Noite 10.2592
Furthest Extent	7000	ppm	10.0927	10.2592 Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0



Study Folder: UTE Pampa rev_0_Hidrogenio

Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 006A	
	Explosion N	Model Used : Multi I	Energy	
	Explosion I	Location Criterion: C	Cloud Front (LFL Fract	tion)
	All distance	es are measured from	the Source	
	All flamma	ble results are report	ed at the flammable ef	ffect height 0 m
			Maximum D	istance (m) at Overpressure Level
			Dia	Noite
Overpressure	0.05	bar	35.5171	33.1673
Overpressure	0.1	bar	23.7763	22.5077
Overpressure	0.3	bar	15.4506	14.9487
Overpressure	0.4	bar	13.9451	13.5818
			Supplementa	ry Data at 0.05 bar
			Dia	Noite
Supplied Flammal	ole Mass	kg	0.283528	0.212192
Used Flammable I	Mass			
Overpressure Rad	ius	m	25.5171	23.1673
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
- Explosion Centr	re	m	10	10
			Supplemente	ry Data at 0.1 bar
			Dia	Noite
Supplied Flammal	ole Mass	ka	0 283528	0.212192
Used Flammable 1	Mass	кд	0.205520	0.212172
Overpressure Rad	ius	m	13,7763	12.5077
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
- Explosion Centr	e	m	10	10
				D
			Supplementa	ry Data at 0.3 bar
	1.14	1	Dia	Noite
Supplied Flammat	ble Mass	kg	0.283528	0.212192
Osed Flammable I	Viass		5 45059	4.04966
Distance to:	ius	m	5.45058	4.94800
Instance to.			10	10
- Ignition Source	atro	m	10	10
- Cloud Fiolit/Cer		m	10	10
- Explosion Cenu	C	111	10	10
			Supplementa	ry Data at 0.4 bar
a	1.14		Dia	Noite
Supplied Flammable	ble Mass	kg	0.283528	0.212192
	v1a55	m	2 0/506	3 58177
Distance to:	105	111	5.94500	5.301//
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
	V	111	10	- 0

2,739,689 Phast 6.7

- Explosion Centre	m	10	10
	Weather Cond	itions	
Path: \UTE Pampa rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 006A	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749

Study Folder: UTE Pampa rev_0_Hidrogenio



Cenário 006H			
Base Case CASE Nan	ne: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\C	enário 006H	
	User-Defined D	Pata	
Materia	l Marini Hiland Cha		
	Material Identifier	n-NONANE	
Scenario	0 Building Wake Effect	None	
	Building wake Effect	Ivone	
Vessel/T	ank Release Type	Continuous	
		Continuous	
Location	n [Elevation	1	ml
	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	
Flamma	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersi	ion		
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	,
	Discharge Velocity(1)	10.94	m/s
	Droplet Diameter(1)	1952	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.06	degC
	Release Rate(1)	19.84	Kg/S
	Late Ignition Location	U No ignition location	Kg/S
	Mass Inventory of material to Disperse	1NO Ignition location 1E6	kg
Fireball	Parameters		
	Inviass modification Factor	3 DNN/ Doctored 1, 41	
	TVO model flame temperature	DINV RECOMMENDED	decCl
		1/2/	uugu

Toxic Parameters



[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time ca	lculation 0.05	fraction]
[Cut-off concentration for exposure time calculatio	ns 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006H

			Dia	Noite
	Release Segment	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.997469	0.997626
Release Segment 1	Cloud Segment 1			
Cloud Segment Durat	ion	S	198.81	176.89
Pool Vaporization Rat	te	kg/s	0.125643	0.0605714
Total Vapor Flowrate		kg/s	0.17586	0.107665
Release Segment 1	Cloud Segment 2			
Cloud Segment Durat	ion	S	79.2456	79.11
Pool Vaporization Rat	te	kg/s	0.31596	0.136271
Total Vapor Flowrate		kg/s	0.366178	0.183365
Release Segment 1	Cloud Segment 3			
Cloud Segment Durat	ion	S	60.5044	61.7306
Pool Vaporization Rat	te	kg/s	0.417894	0.174716
Total Vapor Flowrate		kg/s	0.468112	0.22181
Release Segment 1	Cloud Segment 4			
Cloud Segment Durat	ion	S	50.5156	52.8319
Pool Vaporization Rat	te	kg/s	0.501191	0.20525
Total Vapor Flowrate		kg/s	0.551408	0.252344
Release Segment 1	Cloud Segment 5			
Cloud Segment Durat	ion	S	43.5644	46.6181
Pool Vaporization Rat	te	kg/s	0.573193	0.231336
Total Vapor Flowrate		kg/s	0.62341	0.27843
Release Segment 1	Cloud Segment 6			
Cloud Segment Durat	ion	S	75.8625	82.3419
Pool Vaporization Rat	te	kg/s	0.666367	0.264658
Total Vapor Flowrate		kg/s	0.716585	0.311751
Release Segment 1	Cloud Segment 7			
Cloud Segment Durat	ion	S	91.4975	100.477
Pool Vaporization Rat	te	kg/s	0.799699	0.311139
Total Vapor Flowrate		kg/s	0.849917	0.358233
Maximum Pool Radiu	IS	m	32.2978	32.2557



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006H

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	4.77993	4.81917
LFL (7000)	18.75	S	10.5517	6.94538
LFL Frac (7000)	18.75	S	10.5517	6.94538
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006H

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	12.8956	13.0837
Radiation Level	12.5	kW/m2	9.10264	9.33152
Radiation Level	37.5	kW/m2	7.27337	7.51554
Radiation Level	44	kW/m2	7.07469	7.43305

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 006H

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006H

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

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	Radi	iation Effects: Early P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamen	to\Cenário 006H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	52.6483	51.5541
Radiation Level	12.5	kW/m2	24.126	23.0716
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radia	ation Effects: Early Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamen	to\Cenário 006H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	azard	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamen	to\Cenário 006H	
			Dia	Noite
Late Pool Fire Status	S		Hazard	Hazard
	Rad	iation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamen	to\Cenário 006H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	107.886	103.587
Radiation Level	12.5	kW/m2	39.3813	38.5981
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Late Po	ol Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamen	to\Cenário 006H	
			Dia	Radiation Level (kW/m2) Noite



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006H

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

Furthest Extent	7000	ppm	Dia 10.5517	Distance (m) Noite 6.94538
Futurest Extent	7000	ppm	Dia	Heights (m) for above distances
Furthest Extent Furthest Extent	7000 7000	ppm ppm	0 0	0 0

UTE Pampa rev 0 Hidrogenio

Study Folder:



Explosion Effects: Late Ignition Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 006H Explosion Model Used : Multi Energy Explosion Location Criterion: Cloud Front (LFL Fraction) All distances are measured from the Source All flammable results are reported at the flammable effect height 0 m Maximum Distance (m) at Overpressure Level Dia 0.05 36.202 Overpressure bar Overpressure 0.1 bar 24.1461 Overpressure 0.3 bar 15.5969 Overpressure 0.4 bar 14.0509 Supplementary Data at 0.05 bar Dia Supplied Flammable Mass kg 0.306975 Used Flammable Mass **Overpressure Radius** 26.202 m Distance to: - Ignition Source m 10 - Cloud Front/Centre 10 m - Explosion Centre 10 m Supplementary Data at 0.1 bar Dia 0.306975 Supplied Flammable Mass kg Used Flammable Mass 14.1461 **Overpressure Radius** m Distance to: 10 - Ignition Source m - Cloud Front/Centre m 10 - Explosion Centre 10 m Supplementary Data at 0.3 bar Dia Supplied Flammable Mass 0.306975 kg Used Flammable Mass **Overpressure Radius** m 5.59687 Distance to: 10 - Ignition Source m - Cloud Front/Centre 10 m - Explosion Centre 10 m Supplementary Data at 0.4 bar Dia Supplied Flammable Mass 0.306975 kg Used Flammable Mass 4.05094 **Overpressure Radius** m Distance to: - Ignition Source 10 m - Cloud Front/Centre 10 m

Study Folder:

- E	xplosion Centre	m	10	
		Weather Cond	litions	
Path:	\UTE Pampa rev_0_Hid	rogenio\Study\Carregame	ento\Cenário 006H	
			Dia	Noite
Wir	d Speed	m/s	2 72	2 78

UTE Pampa rev_0_Hidrogenio

m/s	3.73	2.78
	C/D	D
mm	950.891	950.891
	0.17	0.17
degC	19.6	16.5
degC	24.6	16.5
fraction	0.636	0.749
	m/s mm degC degC fraction	m/s 3.73 C/D mm 950.891 0.17 degC 19.6 degC 24.6 fraction 0.636



enário 006I			
Base Case			
CASE Name:	Data		
Path: $\setminus U'$	TE Pampa rev_0_Hidrogenio\Study\Carregame	ento\Cenário 006I	
	User-Defin	ned Data	
Material	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vessel/Tank	Release Type	Continuous	
Location			
	[Elevation	1	m]
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
Dunu	Status of Bund	No bund present	
	[Type of Bund Surface	Concrete]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
	Location of release	Open air release	
	Outdoor Release Direction	Down - Impinging on the Ground	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion	N		
	Number of Release Segments	l Liouid	
	Fluid Phase(1) Discharge Velocity(1)	2 43	m
	Dronlet Diameter(1)		111/ 1110
	Duration of Discharge(1)	600	s
	Final Temperature(1)	25.06	de
	Release Rate(1)	10.94	kg
	Pre-Dilution Air Rates(1)	0	kg
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	Calculation method for fireball	DNV Recommended]	
	I NO model flame temperature	1727	de

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006I

		Dia	Noite
Release Segment	1		
Release Duration	S	600	600
Liquid Rainout	fraction	1	1
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	S	197.403	176.226
Pool Vaporization Rate	kg/s	0.0721096	0.0351241
Total Vapor Flowrate	kg/s	0.0721098	0.0351243
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	S	79.82	78.975
Pool Vaporization Rate	kg/s	0.179704	0.0782448
Total Vapor Flowrate	kg/s	0.179705	0.0782451
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	S	60.4181	61.6394
Pool Vaporization Rate	kg/s	0.237447	0.100214
Total Vapor Flowrate	kg/s	0.237447	0.100214
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	S	50.4494	52.7606
Pool Vaporization Rate	kg/s	0.284281	0.117658
Total Vapor Flowrate	kg/s	0.284281	0.117658
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	S	44.55	89.43
Pool Vaporization Rate	kg/s	0.325142	0.138913
Total Vapor Flowrate	kg/s	0.325142	0.138913
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	S	75.8625	112.179
Pool Vaporization Rate	kg/s	0.377846	0.168453
Total Vapor Flowrate	kg/s	0.377847	0.168453
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	S	91.4975	28.79
Pool Vaporization Rate	kg/s	0.4525	0.188789
Total Vapor Flowrate	kg/s	0.4525	0.188789
Maximum Pool Radius	m	24 0042	23 977
wiaziniuni i ooi Kaulus	111	27.0072	45.711



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006I

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 flammable effect height 0 m

on(ppm)	Averaging Time			Distance (m)
			Dia	Noite
000)	18.75	S	0	0
00)	18.75	S	0	0
7000)	18.75	S	0	0
on(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
000)	18.75	S	0	0
00)	18.75	S	0	0
7000)	18 75	e e	0	0
	on(ppm) 000) 00) 7000) on(ppm) 000) 000)	on(ppm) Averaging Time 000) 18.75 000) 18.75 000) 18.75 on(ppm) Averaging Time 000) 18.75 on(ppm) Averaging Time 000) 18.75 000) 18.75 000) 18.75 000) 18.75	on(ppm) Averaging Time 000) 18.75 s 000) 18.75 s 000) 18.75 s on(ppm) Averaging Time 000) 18.75 s 000) 18.75 s	Dia Dia 000) 18.75 s 0 000) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006I

Jet fire method used: Cone model - DNV recommended

Jet Fi Flame	re Status e Direction			Dia No Hazard Along Ground	Noite No Hazard Along Ground
		E	Carly Pool Fire Hazar	·d	
Path:	\UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\Ce	enário 006I	
Early	Pool Fire Statu	5		Dia Hazard	Noite Hazard
		Radiation	Effects: Early Pool I	Fire Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\Ce	enário 006I	
				Dia	Distance (m) Noite
Radia	tion Level	3	kW/m2	41.6403	40.792
Radia	tion Level	12.5	kW/m2	20.0757	18.8145
Radia	tion Level	37.5	kW/m2	8.35241	8.40222
Radia	tion Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Early Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006I

Radiation Level (kW/m2) Noite

Dia

Path:

Path:



Study Folder: UTE Pampa rev_0_Hidrogenio

h: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 006I				
			Dia	Noite			
Late Pool Fire Status			Hazard	Hazard			
Radiation Effects: Late Pool Fire Ellipse							
	rev_o_maioge	mo (Study (Carregamen		Distance (m)			
			Dia	Noite			
Radiation Level	3	kW/m2	81.8688	78.4252			
Radiation Level	12.5	kW/m2	26.457	25.7806			
Radiation Level	37.5	kW/m2	Not Reached	Not Reached			
Radiation Level	44	kW/m2	Not Reached	Not Reached			

Late Pool Fire Hazard

Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006I

> Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 006I

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749





ário 006V			
ase Case			
CASE Name:	Data		
Path: \U	ΓΕ Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V		
	User-Defined Data		
Material	Material Identifier	n-NONANE	
Scenario		N	
	Building Wake Effect	None	
Vessel/Tank	4		
	Release Type	Continuous	
Location			
	Elevation	1	m]
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Supply a user defined averaging time	Not supplied	
Dund			
Dullu	Status of Bund	No bund present	
	[Type of Bund Surface	Concrete]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	l Liquid	
	Fluid Flidse(1) Discharge Velocity(1)	10.94	m/s
	Dronlet Diameter(1)	10.94	111/5 11m
	Duration of Discharge(1)	600	s
	Final Temperature(1)	25.06	degC
	Release Rate(1)	19.84	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	TNO model flame temperature	1727	degC]

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[Wind Dependent Exchange Rate [Building Exchange Rate	Case Specified] 4	/hr]
	fall filme	1800 Use a fixed averaging time]	S
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V $$$

			Dia	Noite
	Release Segment 1	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.983855	0.985124
Release Segment 1	Cloud Segment 1			
Cloud Segment Durat	ion	S	201.64	180.231
Pool Vaporization Rat	e	kg/s	0.11867	0.0560457
Total Vapor Flowrate		kg/s	0.438995	0.35119
Release Segment 1	Cloud Segment 2			
Cloud Segment Durat	ion	S	78.9225	78.9794
Pool Vaporization Rat	e	kg/s	0.30284	0.12872
Total Vapor Flowrate		kg/s	0.623166	0.423864
Release Segment 1	Cloud Segment 3			
Cloud Segment Durat	ion	S	59.84	61.2
Pool Vaporization Rat	e	kg/s	0.40098	0.165599
Total Vapor Flowrate		kg/s	0.721305	0.460743
Release Segment 1	Cloud Segment 4			
Cloud Segment Duration		S	49.66	52.08
Pool Vaporization Rate		kg/s	0.480812	0.194814
Total Vapor Flowrate		kg/s	0.801137	0.489958
Release Segment 1	Cloud Segment 5			
Cloud Segment Durat	ion	S	43.6181	46.7356
Pool Vaporization Rat	e	kg/s	0.550271	0.219955
Total Vapor Flowrate		kg/s	0.870596	0.515099
Release Segment 1	Cloud Segment 6			
Cloud Segment Durat	ion	S	75.95	81.415
Pool Vaporization Rat	e	kg/s	0.641145	0.252138
Total Vapor Flowrate		kg/s	0.96147	0.547281
Release Segment 1	Cloud Segment 7			
Cloud Segment Durat	ion	S	90.3694	99.3594
Pool Vaporization Rat	e	kg/s	0.770379	0.296895
Total Vapor Flowrate		kg/s	1.0907	0.592039
Maximum Pool Radiu	IS	m	32.0803	32.0507



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	5.89514	4.30283
LFL Frac (7000)	18.75	S	5.89514	4.30283
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Vertical	Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V

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

			Distance (m)	
			Dia	Noite
Radiation Level	3	kW/m2	25.3955	24.4898
Radiation Level	12.5	kW/m2	14.3136	12.8417
Radiation Level	37.5	kW/m2	8.99051	7.71481
Radiation Level	44	kW/m2	8.3949	6.55396

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 006V

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio



Fall: OTE Fampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 006V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	55.7328	52.3649
Radiation Level	12.5	kW/m2	27.4902	24.1074
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 006V	
				Radiation Level (kW/m2
			Dia	Noite
		Late Pool Fire F	lazard	
Path• \UTE Pamna	rev 0 Hidroge	nio\Study\Carregamer	nto\Cenário 006V	
Tatil. (OTETampa	rev_0_maioge	mo (Study (Carregamer		NI-:4-
Late Pool Fire Statu	15		Hazard	Hazard
	Rad	liation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	to Cenario 006 v	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregame	ito\Cenario 006 v	Distance (m)
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	Dia	Distance (m) Noite
Path: \UTE Pampa Radiation Level	rev_0_Hidroge	nio\Study\Carregamer kW/m2	Dia 110.582	Distance (m) Noite 104.035
Path: \UTE Pampa Radiation Level Radiation Level	rev_0_Hidroge 3 12.5	nio\Study\Carregamer kW/m2 kW/m2	Dia 110.582 42.4004	Distance (m) Noite 104.035 39.33
Path: \UTE Pampa Radiation Level Radiation Level Radiation Level	rev_0_Hidroge 3 12.5 37.5	nio\Study\Carregamer kW/m2 kW/m2 kW/m2	Dia 110.582 42.4004 Not Reached	Distance (m) Noite 104.035 39.33 Not Reached
Path: \UTE Pampa Radiation Level Radiation Level Radiation Level Radiation Level	rev_0_Hidroge 3 12.5 37.5 44	nio\Study\Carregamer kW/m2 kW/m2 kW/m2 kW/m2	Dia 110.582 42.4004 Not Reached Not Reached	Distance (m) Noite 104.035 39.33 Not Reached Not Reached
Path: \UTE Pampa Radiation Level Radiation Level Radiation Level Radiation Level	rev_0_Hidroge 3 12.5 37.5 44 Radi	nio\Study\Carregamer kW/m2 kW/m2 kW/m2 kW/m2 ation Effects: Late Pe	Dia 110.582 42.4004 Not Reached Not Reached	Distance (m) Noite 104.035 39.33 Not Reached Not Reached
Path: \UTE Pampa Radiation Level Radiation Level Radiation Level Radiation Level	rev_0_Hidroge 3 12.5 37.5 44 Radi rev_0_Hidroge	nio\Study\Carregamer kW/m2 kW/m2 kW/m2 kW/m2 ation Effects: Late Po	Dia 110.582 42.4004 Not Reached Not Reached Dol Fire Distance	Distance (m) Noite 104.035 39.33 Not Reached Not Reached



Study Folder: UTE Pampa rev_0_Hidrogenio Phast 6.7

Flash Fire Envelope

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 006V

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

			Dia	Distance (m)
Furthest Extent	7000	nnm	5 80514	1 20282
Fulliest Extent	/000	ppin	5.69514	4.50285
Furthest Extent	7000	ppm	5.89514	4.30283
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 006V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749


ário 008A			
se Case			
CASE Nan	ne: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\C	Cenário 008A	
	User-Defined I	Data	
Materia	1		
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	2	ba
	Temperature	25	de
	Mass Inventory	1E6	k
Scenario		T. J	
	Scenario Type		
	rnase to be Keleased		
	Dividing Wales Effect	10.16	m
	Tank Head	None	m
	Tank fread	0	111
Location	1 [Flevation	1	m
	Use FRPG averaging time	FRPG not selected	m
	Use IDI H averaging time	IDI H not selected	
	Use STFL 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/0	Dutdoor		
	Location of release	Open air release	
	Outdoor Release Angle	45	de
	Outdoor Release Direction	Angled from Horizontal	
Flamma	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersi	on	NT 1 1 1	
	Late Ignition Location	No ignition location	1
	Mass Inventory of material to Disperse	1E6	k
Fireball	Parameters	21	
	11viass iniounication Factor	5 DNIV D	
	TNO model flome torresenter	DINV Recommended	L
	1 INO model frame temperature	1/2/	a



Study Folder: UTE Pampa rev_0_Hidrogenio

	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Dia Wind Speed: 3.73 m/s Wind Speed at Height (Calculated) 2.10 m/s Pasquill Stability: C/D **USER-DEFINED QUANTITIES** n-NONANE Material Scenario Leak Inventory 1,000,000.00 kg Fixed Duration n/a s Stagnation data (data at upstream end for long pipe): 3.01 bar - Pressure 25.00 degC - Temperature - Fluid State Non-saturated liquid **CALCULATED QUANTITIES** Mass Flow of Air (Vent from Vapor Space only) n/a 8.95602E-001 kg/s Mass Flowrate Release Duration 600.00 s Orifice or pipe exit data (before atmospheric expansion): 1.01 bar - Pressure - Temperature 24.96 degC - Vena Contracta Velocity (exit velocity for pipe releases) 25.77 m/s - Discharge Coefficient 0.60 Final data (after atmospheric expansion): - Temperature 24.96 degC 1.00 fraction - Liquid Mass Fraction - Droplet Diameter 351.56 um - Expanded Radius 0.00 m - Velocity 25.77 m/s Global Weathers\Noite **DISCHARGE DATA for Weather:** Wind Speed: 2.78 m/s Wind Speed at Height (Calculated) 1.45 m/s Pasquill Stability: D **USER-DEFINED QUANTITIES** Material n-NONANE Leak Scenario Inventory 1,000,000.00 kg Fixed Duration n/a s Stagnation data (data at upstream end for long pipe): - Pressure 3.01 bar - Temperature 25.00 degC

\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008A

25.00 c Non-saturated liquid

CALCULATED QUANTITIES

- Fluid State

2,739,689 Phast 6.7

	Study Folder:	UTE Pampa rev_0_Hidrogenio
--	---------------	----------------------------

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	8.95602E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.96	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	25.77	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.96	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	347.78	um
- Expanded Radius	0.00	m
- Velocity	25.77	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenic	\Study\Carregamer	nto\Cenário 008A	
				Dia	Noite
		Release Segme	ent 1		
Relea	se Duration		S	600	600
Liquid	d Rainout		fraction	0.814754	0.835378
Maxir	num Pool Radii	us	m	6.19055	6.26524
		Dis	tance to Concentra	ation Results	
Path:	\UTE Pampa re	ev_0_Hidrogenic	\Study\Carregamer	nto\Cenário 008A	
		The height for	user defined concer	ntrations is the user d	efined height 0 m
		All toxic result	s are reported at the	e toxic effect height () m Coat haight () m
		All Hammable	results are reported	i at the Hammable en	ect neight 0 m
Conce	entration(ppm)	Averaging Tim	e		Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	No Hazard	No Hazard
LFL F	Frac (7000)	18.75	S	No Hazard	No Hazard
Conce	entration(ppm)	Averaging Tim	e		Heights (m) for above distances
				Dia	Noite
UFL	(56000)	18.75	S	0	0
LFL	(7000)	18.75	S	0	0
LFL F	Frac (7000)	18.75	S	0	0
			Jet Fire Haz	ard	
Path:	\UTE Pampa re	ev_0_Hidrogenic	\Study\Carregamer	nto\Cenário 008A	
		Jet fire method	used: Cone model	- DNV recommende	d
				Dia	Noite
Jet Fi	re Status			Hazard	Hazard
Flame	e Direction			Angled	Angled
		Rad	diation Effects: Jet	Fire Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenic	\Study\Carregamer	nto\Cenário 008A	
		This table give for each jet fire	s the distances to the listed in the above	ne specified radiation hazard table	levels
					Distance (m)
				Dia	Noite
Radia	tion Level	3	kW/m2	19.3622	18.2815
Radia	tion Level	12.5	kW/m2	10.6745	9.7057
Radia	tion Level	37.5	kW/m2	6.53864	Not Reached

UTE Pampa rev_0_Hidrogenio

Study Folder:

-



	ŀ	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008A	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008A	
			Dia	Noite
Early Pool Fire Sta	tus		Hazard	Hazard
	Rad	liation Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	35.9594	34.4592
Radiation Level	12.5	kW/m2	27.8019	25.9818
Radiation Level	37.5	kW/m2	20.8782	19.1564
Radiation Level	44	kW/m2	19.9477	18.3162
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008A	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire H	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008A	
			Dia	Noite
Late Pool Fire State	us		Hazard	Hazard
	Rad	diation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008A	
				Distance (m)
			Dia	Noite
	2	kW/m2	54 744	52 3384
Radiation Level	3	K ((/ 1112	0	52.5504
Radiation Level Radiation Level	3 12.5	kW/m2	36.7554	33.7457
Radiation Level Radiation Level Radiation Level	5 12.5 37.5	kW/m2 kW/m2	36.7554 23.2832	33.7457 21.8668



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008A

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ário 008H			
ise Case			
CASE Name	Data		
Path: \U	JTE Pampa rev_0_Hidrogenio\Study\Carregamento\Ce	nário 008H	
	User-Defined Da	nta	
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	2	bar
	Temperature	25	degC
	Mass Inventory	1E6	kg
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	10.16	mm
	Building Wake Effect	None	
	Tank Head	0	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	No bund present	
	[Type of Bund Surface	Concrete]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Ou	itdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammabl	e		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	arameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC
Toxic Para	ameters		
	[Wind Dependent Exchange Rate	Case Specified]	

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Phast 6.7	DNI

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia		
Wind Speed:		3.73	m/s
Wind Speed at Height (Calculated)		2.10	m/s
Pasquill Stability:		C/D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	s
Stagnation data (data at upstream end for l	long pipe):		
- Pressure		3.01	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	
CALCULATED QUANTITIES			
Mass Flow of Air (Vent from Vapor Spac	e only)	n/a	
Mass Flowrate		8.95602E-001	kg/s
Release Duration		600.00	s
Orifice or pipe exit data (before atmosphe	eric expansion):		
- Pressure		1.01	bar
- Temperature		24.96	degC
- Vena Contracta Velocity (exit veloc	ity for pipe releases)	25.77	m/s
- Discharge Coefficient		0.60	
Final data (after atmospheric expansion):			
- Temperature		24.96	degC
- Liquid Mass Fraction		1.00	fraction
- Droplet Diameter		351.56	um
- Expanded Radius		0.00	m
- Velocity		25.77	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite		
Wind Speed:		2.78	m/s
Wind Speed at Height (Calculated)		1.45	m/s
Pasquill Stability:		D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for l	long pipe):		
- Pressure		3.01	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	

 $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008H $$$

CALCULATED QUANTITIES

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	8.95602E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.96	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	25.77	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.96	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	347.78	um
- Expanded Radius	0.00	m
- Velocity	25.77	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Pool Vaporization Results

Consequence Results

Path: \UTE Pampa r	ev_0_Hidrogenio\St	tudy\Carregamento\C	Cenário 008H	
			Dia	Noite
	Release Segment	1		
Release Duration		S	600	600
Liquid Rainout		fraction	0.960331	0.964746
Maximum Pool Radi	us	m	6.72114	6.73325
	Distan	ice to Concentration	n Results	
Path: \UTE Pampa r	ev_0_Hidrogenio\St	tudy\Carregamento\C	Cenário 008H	
	The height for use	er defined concentrat	ions is the user de	fined height 0 m
	All toxic results a	re reported at the tox	tic effect height 0	m
	All flammable res	sults are reported at t	he flammable effe	ct height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	5.84747	5.81356
LFL Frac (7000)	18.75	S	5.84747	5.81356
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazard		
Path: \UTE Pampa r	ev_0_Hidrogenio\St	tudy\Carregamento\C	Cenário 008H	
	Jet fire method us	sed: Cone model - DI	NV recommended	
			Dia	Noite
Jet Fire Status			Truncated	Truncated
Flame Direction			Horizontal	Horizontal
	Radia	tion Effects: Jet Fire	e Ellipse	
Path: \UTE Pampa r	ev_0_Hidrogenio\St	tudy\Carregamento\C	Cenário 008H	
	This table gives the	he distances to the sp	ecified radiation l	evels
	for each jet fire li	sted in the above haz	ard table	
			D.'	Distance (m)
Dediction T 1	2	1-11/1-2	Dia	Noite
Radiation Level	j 10.5	KW/m2	10./264	10.5455
Radiation Level	12.5	KW/m2	/.382/6	/.34100
Radiation Level	57.5 44	KW/m2	J.85//4 5 92774	0.00001 6.00601
Radiation Level	44	к W/1112	3.83774	0.00001

UTE Pampa rev_0_Hidrogenio

Study Folder:



	F	adiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008H	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire l	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008H	
			Dia	Noite
Early Pool Fire Sta	tus		Hazard	Hazard
	Rad	iation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	27.0136	26.7671
Radiation Level	12.5	kW/m2	18.3844	17.8612
Radiation Level	37.5	kW/m2	10.9617	10.6509
Radiation Level	44	kW/m2	10.0051	9.79966
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008H	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 008H Dia	Noite
Path: \UTE Pampa	rev_0_Hidroge 1s	nio\Study\Carregamer	nto∖Cenário 008H Dia Hazard	Noite Hazard
Path: \UTE Pampa	rev_0_Hidroge 15 Rac	nio\Study\Carregamer	nto\Cenário 008H Dia Hazard Pool Fire Ellipse	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge is Rac rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 008H Dia Hazard Pool Fire Ellipse nto\Cenário 008H	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge is Rac rev_0_Hidroge	enio\Study\Carregamer liation Effects: Late P enio\Study\Carregamer	nto\Cenário 008H Dia Hazard Pool Fire Ellipse nto\Cenário 008H	Noite Hazard Distance (m)
Path: \UTE Pampa Late Pool Fire State Path: \UTE Pampa	rev_0_Hidroge 15 Rac rev_0_Hidroge	enio\Study\Carregamer liation Effects: Late P enio\Study\Carregamer	nto\Cenário 008H Dia Hazard Pool Fire Ellipse nto\Cenário 008H Dia	Noite Hazard Distance (m) Noite
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level	rev_0_Hidroge is rev_0_Hidroge	enio\Study\Carregamer liation Effects: Late P enio\Study\Carregamer kW/m2	nto\Cenário 008H Dia Hazard Pool Fire Ellipse nto\Cenário 008H Dia 46.1182	Noite Hazard Distance (m) Noite 45.0075
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level Radiation Level	rev_0_Hidroge Is Rac rev_0_Hidroge 3 12.5	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer kW/m2 kW/m2	nto\Cenário 008H Dia Hazard Pool Fire Ellipse nto\Cenário 008H Dia 46.1182 26.4939	Noite Hazard Distance (m) Noite 45.0075 24.949
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level Radiation Level Radiation Level Radiation Level	rev_0_Hidroge Is Rac rev_0_Hidroge 3 12.5 37.5	nio\Study\Carregamer liation Effects: Late F nio\Study\Carregamer kW/m2 kW/m2 kW/m2	nto\Cenário 008H Dia Hazard Pool Fire Ellipse nto\Cenário 008H Dia 46.1182 26.4939 13.7633	Noite Hazard Distance (m) Noite 45.0075 24.949 13.695



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 008H

> Radiation Level (kW/m2) Noite

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008H

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

Dia

				Distance (m)
			Dia	Noite
Furthest Extent	7000	ppm	5.84747	5.81356
Furthest Extent	7000	ppm	5.84747	5.81356
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



SE CASE Name	Data	
CASE Ivanie.	Data	
Path: \U'	TE Pampa rev_0_Hidrogenio\Study\Carregame	nto\Cenário 008I
	User-Defin	ed Data
Material		
	Material Identifier	n-NONANE
	Program Specification	Padded Liquid
	Storage Pressure gauge	Pressure specified
	Temperature	2
	Mass Inventory	1E6
Sconario		
Stenario	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	10.16
	Building Wake Effect	None
	Tank Head	0
Location		
	[Elevation	1
	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	U Deep d compact faill
	Bund Failure Modeling	Bund cannot fail
Indoor/Out	tdoor	Onon air releasa
	Outdoor Release Direction	Down Impinging on the Ground
	Sudoor Recase Direction	Down - Implinging on the Ground
Flammable	Explosion Method	Multi Energy
	Laplosion Method	Cone Model
	set i ne iviculou	Colle Woder
Dispersion		NTO TO OTATION 1
	Late Ignition Location	No Ignition location
	Mass inventory of material to Disperse	1E0
Fireball Pa	rameters [Mass Modification Factor	21
	[Calculation method for fireball	DNV Recommended
	[TNO model flame temperature	1727
Toric De-	- store	
TOXIC Paral	[Wind Dependent Exchange Rate	Case Specified]

Time: 17:15:37

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Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

DISCHARGE DATA for Weather:

Wind Speed:

Path:



Phast 6.7

3.73 m/s m/s

> kg s

bar degC

> kg/s s

bar degC m/s

degC fraction um m m/s

m/s m/s

kg s

bar

Wind Speed at Height (Calculated)	2.10
Pasquill Stability:	C/D
USER-DEFINED QUANTITIES	
Material	n-NONANE
Scenario	Leak
Inventory	1,000,000.00
Fixed Duration	n/a
Stagnation data (data at upstream end for long pipe):	
- Pressure	3.01
- Temperature	25.00
- Fluid State	Non-saturated liquid
CALCULATED QUANTITIES	
Mass Flow of Air (Vent from Vapor Space only)	n/a
Mass Flowrate	8.95602E-001
Release Duration	600.00
Orifice or pipe exit data (before atmospheric expansion):	
- Pressure	1.01
- Temperature	24.96
- Vena Contracta Velocity (exit velocity for pipe releases)	25.77
- Discharge Coefficient	0.60
Final data (after atmospheric expansion):	
- Temperature	24.96
- Liquid Mass Fraction	1.00
- Droplet Diameter	351.56
- Expanded Radius	0.00
- Velocity	25.77
DISCHARGE DATA for Weather: Global Weathers\Noite	
Wind Speed:	2.78
Wind Speed at Height (Calculated)	1.45
Pasquill Stability:	D
USER-DEFINED QUANTITIES	
Material	n-NONANE
Scenario	Leak
Inventory	1,000,000.00
Fixed Duration	n/a
Stagnation data (data at upstream end for long pipe):	
- Pressure	3.01

\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008I

Global Weathers\Dia

- Temperature 25.00 degC - Fluid State Non-saturated liquid

CALCULATED QUANTITIES

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	8.95602E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.96	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	25.77	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.96	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	347.78	um
- Expanded Radius	0.00	m
- Velocity	25.77	m/s



Consequence Results

Pool Vaporization Results

Path: \UTE Pampa re	v_0_Hidrogenio\St	udy\Carregamento\Ce	enário 008I	
			Dia	Noite
	Release Segment	1		
Release Duration		S	600	600
Liquid Rainout		fraction	1	1
Maximum Pool Radiu	15	m	6.85695	6.85544
	Distan	ce to Concentration	Results	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\Ce	enário 008I	
	The height for use	r defined concentration	ons is the user def	ined height 0 m
	All toxic results an	re reported at the toxi	c effect height 0 n	n
	All flammable res	ults are reported at the	e flammable effec	t height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
• • • • • • • • • • • • • • • • • • •			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(nnm)	Avoraging Time			Usights (m) for shows distances
Concentration(ppm)	Averaging Time		Dia	Neite
UEL (56000)	18 75	c	0	0
UFL (7000)	18.75	s	0	0
LFL Frac (7000)	18.75	s	0	0
	10.70	5	0	•
		Jet Fire Hazard		
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\Ce	enário 008I	
	Jet fire method use	ed: Cone model - DN	V recommended	
			Dia	Noite
Jet Fire Status			No Hazard	No Hazard
Flame Direction			Along Ground	Along Ground
	E	arly Pool Fire Hazaı	rd	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\Ce	enário 008I	
			Dia	Noite
Early Pool Fire Status	5		Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio



	Radi	ation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 008I	
			Dia	Distance (m)
Dediction Level	2	1-W/m 2	Dia 21.2405	None 21.0457
Radiation Level	5 12 5	KW/m2	21.2495	21.0437
Radiation Level	12.3	KW/m2	12.3012	12.0508
Radiation Level	37.3 44	kW/m2	4.01289	3.86705
	Radia	ition Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 008I	
				Radiation Level (kW/m2)
			Dia	Noite
		Late Pool Fire H	Iazard	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Carregamer	nto\Cenário 008I	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Rad	iation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Carregamer	nto\Cenário 008I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	40.4234	39.3757
Radiation Level	12.5	kW/m2	20.4665	18.9992
Radiation Level	37.5	kW/m2	7.85695	7.85544
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 008I	
			Dia	Radiation Level (kW/m2) Noite
		Weather Cond	itions	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Carregamer	nto\Cenário 008I	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness	Length	mm	950.891	950.891
Surface Roughness	Parameter	1 0	0.17	0.17
Atmospheric Tempe	erature	degC	19.6	16.5
Surface Temperatur	e	degC	24.6	10.5
Relative Humidity		iraction	0.636	0.749



CASE Name:	Data	
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Carregamento\Ce	enário 008V
	User Defined D	ata
Material	User-Denneu D.	ata
Material	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	2
	Temperature	25
	Mass Inventory	1E6
Scenario		
	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	10.16
	Building Wake Effect	None
	Tank Head	0
Location		
	Elevation	1
	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	U Dem dia sono statisti
	Bund Failure Modeling	Bund cannot fail
Indoor/Out	door	On an air ralaaa
	Outdoor Release Direction	Vertical
Flammahla		
1 Iannaolt	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispersion		
-	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	1E6
Fireball Pa	rameters	
	[Mass Modification Factor	3]
	[Calculation method for fireball	DNV Recommended]
	[TNO model flame temperature	1727

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Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

DISCHARGE DATA for Weather:

Path:



Wind Speed: 3.73 m/s Wind Speed at Height (Calculated) 2.10 m/s Pasquill Stability: C/D **USER-DEFINED QUANTITIES** n-NONANE Material Scenario Leak Inventory 1,000,000.00 kg Fixed Duration n/a s Stagnation data (data at upstream end for long pipe): 3.01 bar - Pressure 25.00 degC - Temperature - Fluid State Non-saturated liquid **CALCULATED QUANTITIES** Mass Flow of Air (Vent from Vapor Space only) n/a 8.95602E-001 kg/s Mass Flowrate Release Duration 600.00 s Orifice or pipe exit data (before atmospheric expansion): 1.01 bar - Pressure - Temperature 24.96 degC - Vena Contracta Velocity (exit velocity for pipe releases) 25.77 m/s - Discharge Coefficient 0.60 Final data (after atmospheric expansion): - Temperature 24.96 degC 1.00 fraction - Liquid Mass Fraction - Droplet Diameter 351.56 um - Expanded Radius 0.00 m - Velocity 25.77 m/s Global Weathers\Noite **DISCHARGE DATA for Weather:** Wind Speed: 2.78 m/s Wind Speed at Height (Calculated) 1.45 m/s Pasquill Stability: D **USER-DEFINED QUANTITIES** Material n-NONANE Leak Scenario Inventory 1,000,000.00 kg Fixed Duration n/a s Stagnation data (data at upstream end for long pipe): - Pressure 3.01 bar - Temperature 25.00 degC

\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008V

Global Weathers\Dia

CALCULATED QUANTITIES

- Fluid State

Non-saturated liquid

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	8.95602E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.96	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	25.77	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.96	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	347.78	um
- Expanded Radius	0.00	m
- Velocity	25.77	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Pool Vaporization Results

Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\C	enário 008V		
	Palassa Sagmant	1	Dia	Noite	
Release Duration	Release Segment	s	600	600	
Liquid Rainout		fraction	0 784939	0.801883	
Elquid Rumout		nuction	0.701939	0.001005	
Maximum Pool Radiu	us	m	6.07608	6.13829	
	Distan	ce to Concentration	Results		
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\C	enário 008V		
	The height for use	r defined concentrati	ons is the user de	fined height 0 m	
	All toxic results a	re reported at the toxi	ic effect height 0 1	n	
	All flammable res	ults are reported at th	e flammable effe	ct height 0 m	
Concentration(ppm)	Averaging Time			Distance (m)	
			Dia	Noite	
UFL (56000)	18.75	S	No Hazard	No Hazard	
LFL (7000)	18.75	S	No Hazard	No Hazard	
LFL Frac (7000)	18.75	S	No Hazard	No Hazard	
Concentration(ppm)	Averaging Time			Heights (m) for above distances	
			Dia	Noite	
UFL (56000)	18.75	S	0	0	
LFL (7000)	18.75	S	0	0	
LFL Frac (7000)	18.75	S	0	0	
		Jet Fire Hazard			
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Carregamento\C	enário 008V		
Jet fire method used: Cone model - DNV recommended					
			Dia	Noite	
Jet Fire Status			Hazard	Hazard	
Flame Direction			Vertical	Vertical	
	Radiat	tion Effects: Jet Fire	Ellipse		
Path: \UTE Pampa re	ev 0 Hidrogenio\St	udy\Carregamento\C	enário 008V		
	This table gives th	e distances to the spe	ecified radiation lo	evels	
	for each jet fire lis	sted in the above haza	ard table		
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	19.7511	18.9994	
Radiation Level	12.5	kW/m2	10.9291	9.82497	
Radiation Level	37.5	kW/m2	6.74894	5.65513	
Radiation Level	44	kW/m2	6.24972	6.24972	



	ŀ	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008V	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire l	Hazard	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008V	
			Dia	Noite
Early Pool Fire St	atus		Hazard	Hazard
	Rad	liation Effects: Early	Pool Fire Ellipse	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008V	
Radiation Level Radiation Level Radiation Level Radiation Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 35.0253 26.9721 20.135 19.2131	Distance (m) Noite 32.5481 24.1896 17.454 16.6342
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pamp	oa rev_0_Hidrogo	enio\Study\Carregamer	nto\Cenário 008V	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	lazard	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008V	
Late Pool Fire Sta	itus		Dia Hazard	Noite Hazard
	Rad	diation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 008V	
			Dia	Distance (m) Noite
Radiation Level	3	kW/m2	53.7317	50.3329 32.0788
Radiation Level	37.5	к w/m2 kW/m2	22.4792	20.0929
Radiation Level	44	kW/m2	22.4792	20.0929



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008V

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 008V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 009A Base Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Carregamento\@	Cenário 009A	
	User-Defined l	Data	
Material	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vossol/Tonl	,		
vessei/ 1411	Release Type	Continuous	
Location			
	Elevation	1	m]
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Bund			
	Status of Bund	No bund present	
	[Type of Bund Surface	Concrete	
	Bund Height	0	m]
	Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	tdoor		
	Location of release	Open air release	
	Outdoor Release Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	15.47	m/s
	Droplet Diameter(1)	975.6	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.12	degC
	Release Rate(1)	19.84	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC

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Study Folder:	UTE Pampa rev	0 Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	

Toxic Para	neters		
	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A

		Dia	Noite
Release Segm	ent 1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.965236	0.969729
Release Segment 1 Cloud Segmen	nt 1		
Cloud Segment Duration	S	203.776	182.926
Pool Vaporization Rate	kg/s	0.112522	0.0525375
Total Vapor Flowrate	kg/s	0.80224	0.653113
Release Segment 1 Cloud Segmer	nt 2		
Cloud Segment Duration	S	78.4644	78.705
Pool Vaporization Rate	kg/s	0.290334	0.122526
Total Vapor Flowrate	kg/s	0.980052	0.723101
Release Segment 1 Cloud Segmer	nt 3		
Cloud Segment Duration	S	60.01	61.47
Pool Vaporization Rate	kg/s	0.385147	0.158156
Total Vapor Flowrate	kg/s	1.07487	0.758731
Release Segment 1 Cloud Segmer	nt 4		
Cloud Segment Duration	S	49.79	52.29
Pool Vaporization Rate	kg/s	0.462788	0.186586
Total Vapor Flowrate	kg/s	1.15251	0.787161
Release Segment 1 Cloud Segmer	nt 5		
Cloud Segment Duration	S	43.7256	45.885
Pool Vaporization Rate	kg/s	0.530406	0.210835
Total Vapor Flowrate	kg/s	1.22012	0.81141
Release Segment 1 Cloud Segmer	nt 6		
Cloud Segment Duration	S	74.9944	80.4844
Pool Vaporization Rate	kg/s	0.6181	0.241692
Total Vapor Flowrate	kg/s	1.30782	0.842267
Release Segment 1 Cloud Segmer	nt 7		
Cloud Segment Duration	S	89.24	98.24
Pool Vaporization Rate	kg/s	0.742223	0.284787
Total Vapor Flowrate	kg/s	1.43194	0.885362
Maximum Pool Radius	m	31.7778	31.7974



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A

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 flammable effect height 0 m

Averaging Time			Distance (m)
		Dia	Noite
18.75	S	No Hazard	No Hazard
18.75	S	14.9205	14.6966
18.75	S	14.9205	14.6966
Averaging Time			Heights (m) for above distances
		Dia	Noite
18.75	S	0	0
18.75	S	0	0
18.75	S	0	0
	Averaging Time 18.75 18.75 18.75 Averaging Time 18.75 18.75 18.75	Averaging Time 18.75 s 18.75 s 18.75 s Averaging Time 18.75 s 18.75 s	Averaging Time Dia 18.75 s No Hazard 18.75 s 14.9205 18.75 s 14.9205 Averaging Time Dia 18.75 s 0 18.75 s 0 18.75 s 0 18.75 s 0 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A

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

			Distance	
			Dia	Noite
Radiation Level	3	kW/m2	37.7094	35.0213
Radiation Level	12.5	kW/m2	20.5345	18.6713
Radiation Level	37.5	kW/m2	12.9785	8.45116
Radiation Level	44	kW/m2	11.5367	3.96713

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 009A

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio



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Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamei	nto\Cenario 009A	
			D.	Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	64.353	63.0724
Radiation Level	12.5	kW/m2	36.3477	34.9916
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 009A	
				Radiation Level (kW/m2
			Dia	Noite
		Late Pool Fire H	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 009A	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Rac	liation Effects: Late F	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 009A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	118.659	114.295
Radiation Level	12.5	kW/m2	50.9286	49.8847
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Rad	iation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamer	nto\Cenário 009A	
				Radiation Level (kW/m2



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A

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

Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 14.9205 14.9205	Distance (m) Noite 14.6966 14.6966
Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 0 0	Heights (m) for above distances Noite 0 0



Study Folder: UTE Pampa rev	v_0_Hidrogenio
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Explosion	Effects:	Late	Ignition	
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Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 009A		
	Explosion M Explosion I All distance	Model Used : Multi I Location Criterion: C es are measured from	Energy Cloud Front (LFL Fraction the Source	ion)	
	All flamma	ble results are report	ed at the flammable eff	fect height 0 m	
			Maximum Dis	Maximum Distance (m) at Overpressure Leve	
			Dia	Noite	
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	0.4	bar	No Hazard	No Hazard	
			Supplementar	y Data at 0.05 bar	
			Dia	Noite	
Supplied Flammal Used Flammable I	ble Mass Mass	kg	No Hazard	No Hazard	
Overpressure Rad	ius	m	0	0	
Distance to:					
- Ignition Source		m	No Hazard	No Hazard	
- Cloud Front/Cer	ntre	m	No Hazard	No Hazard	
- Explosion Centr	e	m	0	0	
			Supplementar	y Data at 0.1 bar	
			Dia	Noite	
Supplied Flammal	ble Mass	kg	No Hazard	No Hazard	
Used Flammable I	Mass				
Overpressure Rad	ius	m	0	0	
Distance to:					
- Ignition Source		m	No Hazard	No Hazard	
- Cloud Front/Cer	ntre	m	No Hazard	No Hazard	
- Explosion Cent	re	m	0	0	
			Supplementar	y Data at 0.3 bar	
			Dia	Noite	
Supplied Flammal	ble Mass	kg	No Hazard	No Hazard	
Used Flammable I	Mass		0	0	
Overpressure Rad	ius	m	0	0	
Distance to:			N. H		
- Ignition Source		m	No Hazard	No Hazard	
- Cloud Front/Cel	ntre	m	No Hazard	No Hazard	
- Explosion Centr	·e	m	0	0	
			Supplementar	Supplementary Data at 0.4 bar	
Supplied Flowmal	ale Mass	ka	Dia No Hozard	No Hazard	
Used Flammable 1	Mass	кд	no nazaid		
Overpressure Rad	ius	m	0	0	
Distance to:			-		
- Ignition Source		m	No Hazard	No Hazard	
- Cloud Front/Cer	ntre	m	No Hazard	No Hazard	

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Study Folder:	UTE Pampa rev 0 Hidrogenio
•	1 8

- Explosion Centre	m	0	0		
	Weather Conditions				
Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009A					
		Dia	Noite		
Wind Speed	m/s	3.73	2.78		
Pasquill Stability		C/D	D		
Surface Roughness Length	mm	950.891	950.891		
Surface Roughness Parameter		0.17	0.17		
Atmospheric Temperature	degC	19.6	16.5		
Surface Temperature	degC	24.6	16.5		
Relative Humidity	fraction	0.636	0.749		



Cenário 009H								
Base Case								
CASE Name:	Data							
Path: \UT	TE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenári	io 009H						
	User-Defined Data							
Material								
	Material Identifier	n-NONANE						
Scenario								
	Building Wake Effect	None						
Vessel/Tank								
	Release Type	Continuous						
Location								
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								
Dunu	Status of Bund	No bund present						
	Type of Bund Surface	Concrete]						
	[Bund Height	0	ml					
	[Bund Failure Modeling	Bund cannot fail]	·					
Indoor/Out	door							
indoor/Out	Location of release	Open air release						
	Outdoor Release Direction	Horizontal						
Flammable								
Tammabic	Explosion Method	Multi-Energy						
	Jet Fire Method	Cone Model						
Dispersion								
Dispersion	Number of Release Segments	1						
	Fluid Phase(1)	Liquid						
	Discharge Velocity(1)	15.47	m/s					
	Droplet Diameter(1)	975.6	um					
	Duration of Discharge(1)	600	S					
	Final Temperature(1)	25.12	degC					
	Release Rate(1)	19.84	kg/s					
	Pre-Dilution Air Rates(1)	0	kg/s					
	Late Ignition Location	No ignition location	11,9,0					
	Mass Inventory of material to Disperse	1E6	kg					
Firahall Day	ramaters							
r neban r al	[Mass Modification Factor	31						
	[Calculation method for fireball	DNV Recommended						
	[TNO model flame temperature	1727	degC1					

Toxic Parameters


Study Folder: UTE Pampa rev_0_Hidrogenio

[Wind Dep	endent Exchange Rate	Case Specified]	
[Building H	Exchange Rate	4	/hr]
[Tail Time		1800	s]
[Set average	ging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fra	action of toxic load for exposure time calcu	lation 0.05	fraction]
[Cut-off co	ncentration for exposure time calculations	0	fraction]
Multi Energy Explosior	n		
Use Uncon	ifined Strength	Do not use unconfined strength	
Use Fractio	ons	Use fractions	
Source 1 (S	Source in Use)	Yes	
Source 2 (S	Source in Use)	No	
Source 3 (S	Source in Use)	No	
Source 4 (S	Source in Use)	No	
Source 5 (S	Source in Use)	No	
Source 6 (S	Source in Use)	No	
Source 7 (S	Source in Use)	No	
Source 1 (S	Strength)	6	
Source 1 (F	Fraction)	1	fraction
Geometry			
Shape		Point	
Dimension	l	2D	
System		Absolute	
East(1)		0	m
North(1)		0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H

		Dia	Noite
Release Segment	1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.994211	0.99462
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	S	199.516	177.556
Pool Vaporization Rate	kg/s	0.123994	0.0594472
Total Vapor Flowrate	kg/s	0.238845	0.166185
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	S	79.3744	79.245
Pool Vaporization Rate	kg/s	0.313026	0.134445
Total Vapor Flowrate	kg/s	0.427877	0.241183
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	S	59.67	61.8219
Pool Vaporization Rate	kg/s	0.413709	0.172621
Total Vapor Flowrate	kg/s	0.52856	0.279358
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	S	50.5156	52.9031
Pool Vaporization Rate	kg/s	0.495819	0.20296
Total Vapor Flowrate	kg/s	0.61067	0.309698
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	S	43.5644	46.6769
Pool Vaporization Rate	kg/s	0.567349	0.228892
Total Vapor Flowrate	kg/s	0.6822	0.33563
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	S	75.8625	82.4381
Pool Vaporization Rate	kg/s	0.659943	0.262027
Total Vapor Flowrate	kg/s	0.774794	0.368764
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	S	91.4975	99.3594
Pool Vaporization Rate	kg/s	0.792486	0.307958
Total Vapor Flowrate	kg/s	0.907337	0.414695
Maximum Pool Radius	m	32.2459	32 2065
manifulli i OOI muuluo		52.2107	52.2005



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	6.25435	6.30205
LFL (7000)	18.75	S	10.9969	6.50105
LFL Frac (7000)	18.75	S	10.9969	6.50105
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H

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

			Distance	
			Dia	Noite
Radiation Level	3	kW/m2	18.753	18.8925
Radiation Level	12.5	kW/m2	13.1846	13.4333
Radiation Level	37.5	kW/m2	10.6264	10.8804
Radiation Level	44	kW/m2	10.3237	10.5715

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 009H

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H	

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard



	Radiation Effects: Early Pool Fire Ellipse				
Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H					
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	54.2057	53.1248	
Radiation Level	12.5	kW/m^2	25.7423	24.732	
Radiation Level	37.5	kW/m^2	Not Reached	Not Reached	
Radiation Level	44	kW/m2	Not Reached	Not Reached	
	Radi	ation Effects: Early Po	ool Fire Distance		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 009H		
			Dia	Radiation Level (kW/m2) Noite	
		Late Pool Fire H	azard		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 009H		
			Dia	Noite	
Late Pool Fire Statu	S		Hazard	Hazard	
	Rad	liation Effects: Late P	ool Fire Ellipse		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 009H		
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	109.351	105.071	
Radiation Level	12.5	kW/m2	40.9231	40.1515	
Radiation Level	37.5	kW/m2	Not Reached	Not Reached	
Radiation Level	44	kW/m2	Not Reached	Not Reached	
Radiation Effects: Late Pool Fire Distance					
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregamen	to\Cenário 009H		
			Dia	Radiation Level (kW/m2) Noite	



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H

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

Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 10.9969 10.9969	Distance (m) Noite 6.50105 6.50105
Furthest Extent	7000	ppm	Dia 0	Heights (m) for above distances Noite 0
Furthest Extent	7000	ppm	0	0

Study Folder:



		Explosion Effects:	Late Ignition
th: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregan	nento\Cenário 009H
	Explosion N	Model Used : Multi	Energy
	Explosion I	Location Criterion: C	Cloud Front (LFL Fraction)
	All distance	es are measured from	n the Source
	All flamma	ble results are report	ted at the flammable effect height 0 m
			Maximum Distance (m) at Overpressure Leve Dia
Overpressure	0.05	bar	32.7781
Overpressure	0.1	bar	22.2976
Overpressure	0.3	bar	14.8655
Overpressure	0.4	bar	13.5216
			Supplementary Data at 0.05 bar
			Dia
Supplied Flamma	ble Mass	kg	0.201676
Used Flammable	Mass		
Overpressure Rad	ius	m	22.7781
Distance to:			10
- Ignition Source		m	10
- Cloud Front/Cel	ntre	m	10
- Explosion Cenu	e	m	10
			Supplementary Data at 0.1 bar
			Dia
Supplied Flamma	ble Mass	kg	0.201676
Used Flammable	Mass		
Overpressure Rad	ius	m	12.2976
Distance to:			10
- Ignition Source		m	10
- Cloud Front/Cel	ntre	m	10
- Explosion Cenu	e	111	10
			Supplementary Data at 0.3 bar
			Dia
Supplied Flammal	ble Mass	kg	0.201676
Used Flammable	Mass		4.00550
Overpressure Rad	ius	m	4.86552
Distance to:			10
- Ignition Source	ntra	m	10
- Cloud Front/Cel	ntre	m	10
- Explosion Cenu	e	111	10
			Supplementary Data at 0.4 bar
~			Dia
Supplied Flammal	ble Mass	kg	0.201676
Used Flammable	Mass		2.5017
Overpressure Rad	ius	m	3.5216
Distance to:			10
- Ignition Source	ntra	m	10
- Cioua Front/Cel	nue	m	10

UTE Pampa rev_0_Hidrogenio

Atmospheric Temperature

Surface Temperature

Relative Humidity

Study Folder:

19.6

24.6

0.636

16.5

16.5

0.749

- Explosion Centre	m	10		
	Weather Con	ditions		
Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009H				
		Dia	Noite	
Wind Speed	m/s	3.73	2.78	
Pasquill Stability		C/D	D	
Surface Roughness Length	mm	950.891	950.891	
Surface Roughness Parameter		0.17	0.17	

degC

degC

fraction

UTE Pampa rev_0_Hidrogenio

Date: 28/04/2014



Cenário 009I **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009I **User-Defined Data** Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location [Elevation 1 m] Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund 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 Down - Impinging on the Ground Flammable Multi-Energy Explosion Method Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 15.47 m/s Droplet Diameter(1) 975.6 um Duration of Discharge(1) 600 s Final Temperature(1) 25.12 degC Release Rate(1) 19.84 kg/s Pre-Dilution Air Rates(1) 0 kg/sNo ignition location Late Ignition Location Mass Inventory of material to Disperse 1E6 kg **Fireball Parameters** [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC]

Toxic Parameters



[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time ca	lculation 0.05	fraction]
[Cut-off concentration for exposure time calculatio	ns 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



UTE Pampa rev_0_Hidrogenio **Study Folder:**

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009I

		Dia	Noite
Release Segmen	nt 1		
Release Duration	S	600	600
Liquid Rainout	fraction	1	1
Palassa Sagmant 1 Cloud Sagmant	1		
Cloud Segment Duration	r S	198 106	176 226
Pool Vaporization Rate	s ka/s	0 127176	0.0616294
Total Vapor Elowrate	kg/s	0.127177	0.0616299
Release Segment 1 Cloud Segment	2 Kg/5	0.12/1//	0.0010299
Cloud Segment Duration	5	79 1169	78 975
Pool Vaporization Rate	kg/s	0 318613	0 137958
Total Vapor Flowrate	kg/s	0.318614	0.137959
Release Segment 1 Cloud Segment	3	0.010011	0.157757
Cloud Segment Duration	S	60.4181	61.6394
Pool Vaporization Rate	kg/s	0.421034	0.176642
Total Vapor Flowrate	kg/s	0.421034	0.176643
Release Segment 1 Cloud Segment	4		
Cloud Segment Duration	S	50.4494	52.7606
Pool Vaporization Rate	kg/s	0.504694	0.207345
Total Vapor Flowrate	kg/s	0.504694	0.207346
Release Segment 1 Cloud Segment	5		
Cloud Segment Duration	S	44.55	89.43
Pool Vaporization Rate	kg/s	0.577801	0.244745
Total Vapor Flowrate	kg/s	0.577802	0.244745
Release Segment 1 Cloud Segment	6		
Cloud Segment Duration	S	75.8625	112.179
Pool Vaporization Rate	kg/s	0.672246	0.296708
Total Vapor Flowrate	kg/s	0.672247	0.296709
Release Segment 1 Cloud Segment	7		
Cloud Segment Duration	S	91.4975	28.79
Pool Vaporization Rate	kg/s	0.806263	0.332477
Total Vapor Flowrate	kg/s	0.806264	0.332477
Maximum Pool Radius	m	32.3379	32.2945



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009I

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 flammable effect height 0 m

n(ppm) A	Averaging Time			Distance (m)
			Dia	Noite
)00) 1	18.75	S	0	0
0) 1	18.75	S	0	0
000) 1	18.75	S	0	0
n(ppm) A	Averaging Time			Heights (m) for above distances
			Dia	Noite
)00) 1	18.75	S	0	0
0) 1	18.75	S	0	0
000) 1	18.75	S	0	0
	n(ppm) 4 000) 1 000) 1 0000) 1 0000) 1 0000) 1 0000) 1	n(ppm) Averaging Time 000) 18.75 00) 18.75 000) 18.75 000) 18.75 n(ppm) Averaging Time 000) 18.75 000) 18.75 000) 18.75 000) 18.75 000) 18.75 000) 18.75	Averaging Time 000) 18.75 s 00) 18.75 s 000) 18.75 s	Averaging Time Dia 000) 18.75 s 0 00) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0 n(ppm) Averaging Time Dia 000) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009I

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Along Ground	Along Ground

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009I

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

				Distance (m)
			Dia	Noite
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	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 009I

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009I

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard



Study Folder:	UTE Pampa rev_0_Hidrogenio
---------------	----------------------------

Radiation	Effects:	Early	Pool	Fire	Ellipse
-----------	----------	-------	------	------	---------

Path: \UTE Pampa	rev_0_Hidrogenic	Study\Carregament	o\Cenário 009I	
Radiation Level Radiation Level Radiation Level Radiation Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 47.7798 19.2313 Not Reached Not Reached	Distance (m) Noite 46.6469 18.1424 Not Reached Not Reached
	Radiatio	on Effects: Farly Po	ol Fire Distance	
Path: \UTE Pampa	rev 0 Hidrogenic	\\Study\Carregament	o\Cenário 009I	
(OTE Fullpur		(Study (Curregument		$\mathbf{D} = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2$
			Dia	Noite
		Late Pool Fire H	azard	
Path: \UTE Pampa	rev_0_Hidrogenic	Study\Carregament	o\Cenário 009I	
Late Pool Fire Status	5		Dia Hazard	Noite Hazard
	Radiat	tion Effects: Late Po	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrogenic	Study\Carregament	o\Cenário 009I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	103.089	98.7482
Radiation Level	12.5	kW/m2	34.5247	33.6501
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radiati	on Effects: Late Po	ol Fire Distance	
Path: \UTE Pampa	rev_0_Hidrogenic	\Study\Carregament	o\Cenário 009I	
			Dia	Radiation Level (kW/m2) Noite
		Weather Condit	ions	
Path: \UTE Pampa	rev_0_Hidrogenic	\Study\Carregament	o\Cenário 009I	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness I	Length	mm	950.891	950.891
Surface Roughness I	Parameter	1C	0.17	0.17
Atmospheric Tempe	rature	degC deaC	19.6	16.5
Surface Temperature	•	aegu	∠4.0	10.0
Relative Human		traction	0.636	0 749





ário 009V			
ase Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 00	9V	
	User-Defined Data		
Material			
	Material Identifier	n-NONANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tank	Release Type	Continuous	
	Release Type	Continuous	
Location			
	Elevation	1	m]
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Use STEL averaging time	SIEL not selected	
	Suppry 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/Out	door		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammahla			
riammable	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	I I 1 - 11	
	Fluid Phase(1) Discharge Velocity(1)	Liquid	m
	Discharge velocity(1)	975.6	111/5
	Duration of Discharge(1)	600	s
	Final Temperature(1)	25.12	deg
	Release Rate(1)	19.84	kg/
	Pre-Dilution Air Rates(1)	0	kg/
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	ramators		
ritebali Pa	[Mass Modification Factor	31	
	[Calculation method for fireball	DNV Recommended]	
	• · · · · · · · · · · · · · · · · · · ·		

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[Wind Dependent Exchange Rate [Building Exchange Rate	Case Specified] 4	/hr]
	fall filme	1800 Use a fixed averaging time]	S
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009V

		Dia	Noite
Release Segn	nent 1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.95418	0.959411
Release Segment 1 Cloud Segme	ont 1		
Cloud Segment Duration	s s	204 49	184 281
Pool Vaporization Rate	s ka/s	0 109774	0.0508358
Total Vapor Elowrate	kg/s	1 01885	0.856127
Release Segment 1 Cloud Segme	$r_{z}/3$	1.01005	0.050127
Cloud Segment Duration	s s	78 5906	78 97
Pool Vanorization Rate	ka/s	0 284634	0 119496
Total Vapor Flowrate	kg/s	1 19371	0.924788
Release Segment 1 Cloud Segme	ent 3	1.17571	0.921700
Cloud Segment Duration	s s	59 1694	60 7494
Pool Vaporization Rate	kg/s	0 37741	0 154329
Total Vapor Flowrate	kg/s	1 28648	0.959621
Release Segment 1 Cloud Segme	ent 4	1.20010	0.909021
Cloud Segment Duration	S	49.79	51.3906
Pool Vaporization Rate	kg/s	0.453236	0.181859
Total Vapor Flowrate	kg/s	1.36231	0.98715
Release Segment 1 Cloud Segme	ent 5		
Cloud Segment Duration	S	43.7256	45.885
Pool Vaporization Rate	kg/s	0.519805	0.205481
Total Vapor Flowrate	kg/s	1.42888	1.01077
Release Segment 1 Cloud Segme	ent 6		
Cloud Segment Duration	S	74.9944	80.4844
Pool Vaporization Rate	kg/s	0.606172	0.235842
Total Vapor Flowrate	kg/s	1.51525	1.04113
Release Segment 1 Cloud Segme	ent 7		
Cloud Segment Duration	S	89.24	98.24
Pool Vaporization Rate	kg/s	0.728464	0.278273
Total Vapor Flowrate	kg/s	1.63754	1.08356
Maximum Pool Radius	m	31.5961	31.6268



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009V

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 flammable effect height 0 m

ion(ppm)	Averaging Time			Distance (m)
			Dia	Noite
6000)	18.75	S	No Hazard	No Hazard
000)	18.75	S	No Hazard	No Hazard
(7000)	18.75	S	No Hazard	No Hazard
ion(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
6000)	18.75	S	0	0
000)	18.75	S	0	0
(7000)	18.75	S	0	0
	ion(ppm) 6000) 7000) 7000) ion(ppm) 6000) 000) 7000)	ion(ppm) Averaging Time 6000) 18.75 000) 18.75 7000) 18.75 ion(ppm) Averaging Time 6000) 18.75 ion(ppm) Averaging Time 6000) 18.75 000) 18.75 000) 18.75 000) 18.75 (7000) 18.75	ion(ppm) Averaging Time 6000) 18.75 s 000) 18.75 s 7000) 18.75 s ion(ppm) Averaging Time 6000) 18.75 s 000) 18.75 s 000) 18.75 s 000) 18.75 s (7000) 18.75 s	ion(ppm) Averaging Time Dia 6000) 18.75 s No Hazard 000) 18.75 s No Hazard 7000) 18.75 s No Hazard ion(ppm) Averaging Time Dia 6000) 18.75 s O 000) 18.75 s 0 000) 18.75 s 0 7000) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009V

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Vertical	Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009V

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

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	41.1078	38.8
Radiation Level	12.5	kW/m2	22.6398	20.1771
Radiation Level	37.5	kW/m2	14.1787	12.4721
Radiation Level	44	kW/m2	13.2787	11.1356

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Carregamento\Cenário 009V

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 009V

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

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89	ĴÅ
.7	DNV

	Radi	ation Effects: Early]	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 009V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	59.6632	56.2813
Radiation Level	12.5	kW/m2	31.7825	28.3121
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radia	tion Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 009V	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire F	lazard	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 009V	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Radi	iation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 009V	
			Dia	Distance (m)
Radiation Level	3	kW/m2	113 643	107 202
Radiation Level	12.5	kW/m^2	46 1832	43 0239
Radiation Level	37.5	kW/m^2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radia	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 009V	
			Dia	Radiation Level (kW/mi Noite
		Weather Cond	itions	
Path: \UTE Pampa	rev_0_Hidroger	nio\Study\Carregamer	nto\Cenário 009V	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness	Length	mm	950.891	950.891
	Parameter		0.17	0.17
Surface Roughness				
Surface Roughness Atmospheric Tempe	erature	degC	19.6	16.5
Surface Roughness Atmospheric Tempe Surface Temperatur	erature e	degC degC	19.6 24.6	16.5 16.5



9,089	14
: 6.7	DNT

CASE Name:	Data		
	TE Pampa rev. 0. Hidrogenio\Study/Carrega	mento/Cenário 010	
1 atn. (0	TE Tampa rev_0_marogenio(study)Carrega		
	User-De	fined Data	
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Unpressurized (at atmospheric pressure)	
	Pressure Specification	Pressure not used	
	Temperature	25	¢
	Mass Inventory	8.572E5	ŀ
Scenario			
	Scenario Type	Catastrophic rupture	
	Phase to be Released	Liquid	
	Building Wake Effect	None	
	Tank Head	0	ľ
Location			
	Elevation	1	ľ
	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	400	1
	[Type of Bund Surface	Concrete]	
	Bund Height	1.5	1
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
	Location of release	Open air release	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	8.572E5	1
	Use Burst Pressure	No - Use release pressure for fireball	
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	(
Toxic Para	meters		
	[Wind Dependent Exchange Rate	Case Specified]	
	[Building Exchange Pate	4	

Study Folder:

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	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

UTE Pampa rev_0_Hidrogenio



Path:	\UTE Pampa rev_0_Hidrogenio\S	Study\Carregamento\Cenário 010	
DISCHA	ARGE DATA for Weather:	Global Weathers\Dia	
Wind Wind Pasq	l Speed: l Speed at Height (Calculated) uill Stability:	3.73 2.10 C/D	m/s m/s
USE	R-DEFINED QUANTITIES		
Mate Scen Inver Fixed	rial ario ntory 1 Duration	n-NONANE Catastrophic rupture 857,151.19 n/a	kg s
Stagı	nation data (data at upstream end for lor - Pressure - Temperature - Fluid State	ng pipe): 1.01 25.00 Liquid at atmospheric pressure	bar degC
CAL	CULATED QUANTITIES		
Mas Mas Rele	as Flow of Air (Vent from Vapor Space as Flowrate ease Duration	only) n/a n/a n/a	kg/s s
Orit	 Tee or pipe exit data (before atmospher) Pressure Temperature Vena Contracta Velocity (exit velocity) Discharge Coefficient 	ic expansion): n/a n/a for pipe releases) n/a n/a	bar degC m/s
Fina	Il data (after atmospheric expansion): - Temperature - Liquid Mass Fraction - Droplet Diameter - Expanded Radius - Velocity	25.00 1.00 10,000.00 n/a 0.00	degC fraction um m m/s
DISCHA	ARGE DATA for Weather:	Global Weathers\Noite	
Winc Winc Pasq	l Speed: l Speed at Height (Calculated) uill Stability:	2.78 1.45 D	m/s m/s
USE	R-DEFINED QUANTITIES		
Mate Scen Inver Fixed	rial ario ntory 1 Duration	n-NONANE Catastrophic rupture 857,151.19 n/a	kg s
Stagi	nation data (data at upstream end for lo - Pressure - Temperature - Fluid State	ng pipe): 1.01 25.00 Liquid at atmospheric pressure	bar degC

CALCULATED QUANTITIES



Study Folder:	UTE Pampa rev_0	_Hidrogenio
---------------	-----------------	-------------

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25.00	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	10,000.00	um
- Expanded Radius	n/a	m
- Velocity	0.00	m/s

Study Folder: UTE Pampa rev_0_Hidrogenio Phast 6.7

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Carregamento\Cenário 010

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

Liquio Initial Time	d Rainout Vapor Cloud Pool Left Behind	d	fraction kg	Dia 0.999979 17.9616	Noite 0.999981 15.881
Maxii	mum Pool Radiu	S Distance	m	11.2838	11.2838
		Distanc	to Concentration I	Kesults	
Path:	\UTE Pampa re	v_0_Hidrogenio\Stu	idy\Carregamento\Ce	nário 010	
		The height for user All toxic results are All flammable resu	defined concentration e reported at the toxic alts are reported at the	ons is the user defi e effect height 0 m e flammable effect	ined height 0 m n t height 0 m
Conce	entration(ppm)	Averaging Time			Distance (m)
	(FF)			Dia	Noite
UFL	(56000)	18.75	S	15.3342	15.2125
LFL	(7000)	18.75	S	15.4904	15.3687
LFL I	Frac (7000)	18.75	S	15.4904	15.3687
Conce	entration(ppm)	Averaging Time		D.	Heights (m) for above distances
LIFT	(5(000))	10.75		Dia	Noite
UFL	(56000)	18.75	S	0	0
LFL LFL I	(7000) Frac (7000)	18.75	s s	0	0
		L	ate Pool Fire Hazard	d	
Path:	\UTE Pampa re	v 0 Hidrogenio\Stu	ldy\Carregamento\Ce	mário 010	
		0		Dia	Noite
Late I	Pool Fire Status			Hazard	Hazard
		Radiation	Effects: Late Pool F	ire Ellipse	
Path:	\UTE Pampa re	v_0_Hidrogenio\Stu	udy\Carregamento\Ce	nário 010	
Radia Radia Radia Radia	tion Level tion Level tion Level tion Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 50.9599 19.0488 Not Reached Not Reached	Distance (m) Noite 49.4152 18.0973 Not Reached Not Reached



	Rad	iation Effects: Late	Pool Fire Distance	
Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 010	
			Dia	Radiation Level (kW/m2) Noite
		Fireball Ha	zard	
Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 010	
Fireball Flame Sta	atus		Dia No Hazard	Noite No Hazard
		Flash Fire En	ivelope	
Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 010	
	All flamma	ble results are reporte	ed at the flammable eff	fect height 0 m
Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 15.4904 15.4904	Distance (m) Noite 15.3687 15.3687
Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 0 0	Heights (m) for above distances Noite 0 0
	1	Explosion Effects: E	arly Explosion	
Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 010	
	Early Explo Explosion N	osions are assumed to Model Used : Multi E	be centered at the rele	ease location
Supplied Flamma	ble Mass	kg	Dia 857151	Noite 857151
			Distance (m) Dia	at Overpressure Levels Noite
Overpressure	0.05	bar	No Hazard	No Hazard
Overpressure	0.1	bar	No Hazard	No Hazard
Overpressure	0.3	bar	No Hazard	No Hazard
			Used Mass (k	g) at Overpressure Levels
Overnressure	0.05	har	No Hazard	No Hazard
Overpressure	0.00	bar	No Hazard	No Hazard

Overpressure

Overpressure

0.3

0.4

No Hazard

No Hazard

No Hazard

No Hazard

bar

bar



Study Folder: UTE Pampa rev_0_Hidrogenio

Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Carregam	ento\Cenário 010	
	Explosion M Explosion I All distance	Model Used : Multi I Location Criterion: C	Energy Cloud Front (LFL Fract	tion)
	All flamma	ble results are report	ed at the flammable ef	ffect height 0 m
			Maximum D	istance (m) at Overpressure Level
			Dia	Noite
Overpressure	0.05	bar	35.6835	35.6385
Overpressure	0.1	bar	23 8662	23 8419
Overpressure	0.3	bar	15.4861	15.4765
Overpressure	0.4	bar	13.9708	13.9638
			Supplementa	ry Data at 0.05 bar
			Dia	Noite
Supplied Flammab Used Flammable M	le Mass Iass	kg	0.289111	0.287594
Overpressure Radio Distance to:	15	m	25.6835	25.6385
- Ignition Source		m	10	10
- Cloud Front/Cen	tre	m	0.228535	0.19123
- Explosion Centre	•	m	10	10
			Supplementa	ry Data at 0.1 bar
			Dia	Noite
Supplied Flammab Used Flammable N	le Mass Iass	kg	0.289111	0.287594
Overpressure Radi	15	m	13.8662	13.8419
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Cen	tre	m	0.228535	0.19123
- Explosion Centre	•	m	10	10
			Supplementa	ry Data at 0.3 bar
			Dia	Noite
Supplied Flammab Used Flammable M	le Mass Iass	kg	0.289111	0.287594
Overpressure Radio Distance to:	18	m	5.48613	5.47652
- Ignition Source		m	10	10
- Cloud Front/Cen	tre	m	0.228535	0.19123
- Explosion Centre	•	m	10	10
			Supplementa	ry Data at 0.4 bar
	1.54	1		Noite
Supplied Flammab Used Flammable N	ie Mass Iass	kg	0.289111	0.28/594
Overpressure Radio Distance to:	18	m	3.97079	3.96383
- Ignition Source		m	10	10
- Cloud Front/Cen	tre	m	0.228535	0.19123



Study Folder:	UTE Pampa rev 0 Hidrogenio
Study Polaci.	01D1amparev_0_marogeme

- Explosion Centre	m	10	10
	Weather Cond	itions	
Path: \UTE Pampa rev_0_Hidroge	nio\Study\Carregamer	nto\Cenário 010	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name	e: Data	
Path• \`	UTE Pampa rev. 0. Hidrogenio\Study\Distribuição\Ce	nário 012A
	User-Defined D	ata
Material		
	Material Identifier	n-NONANE
	lype of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1.5
	Temperature	25
	Mass Inventory	TEC
Scenario		
	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	6.35
	Building Wake Effect	None
	Tank Head	С
Location		
	Elevation	1
	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
	[Bund Failure Modeling	Bund cannot fail
Indoor/O	utdoor	
	Location of release	Open air release
	Outdoor Release Angle	45
	Outdoor Release Direction	Angled from Horizontal
Flammab	le	
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispersio	n	
13001310	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	1E6
Fireball I	Parameters	
e.sun 1	[Mass Modification Factor	31
	[Calculation method for fireball	DNV Recommended
	TNO and del flower town and town	1707

Study Folder: UTE Pampa rev_0_Hidrogenio



[Wir	nd Dependent Exchange Rate	Case Specified]	
[Bui	lding Exchange Rate	4	/hr]
[Tail	l Time	1800	s]
[Set	averaging time equal to exposure time	Use a fixed averaging time]	
[Cut	-off fraction of toxic load for exposure time calcul	ation 0.05	fraction]
[Cut	-off concentration for exposure time calculations	0	fraction]
Multi Energy Ex	plosion		
Use	Unconfined Strength	Do not use unconfined strength	
Use	Fractions	Use fractions	
Sour	rce 1 (Source in Use)	Yes	
Sour	rce 2 (Source in Use)	No	
Sour	rce 3 (Source in Use)	No	
Sour	rce 4 (Source in Use)	No	
Sour	rce 5 (Source in Use)	No	
Sour	rce 6 (Source in Use)	No	
Sour	rce 7 (Source in Use)	No	
Sour	rce 1 (Strength)	6	
Sour	rce 1 (Fraction)	1	fraction
Geometry			
Shap	be	Point	
Dim	ension	2D	
Syst	em	Absolute	
East	(1)	0	m
Nort	th(1)	0	m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.02978E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expa	ansion):	
- Pressure	1.01	bar
- Temperature	24.97	degC
- Vena Contracta Velocity (exit velocity for pi	pe releases) 22.32	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	468.70	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	

 $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012A $$$

CALCULATED QUANTITIES

2,739,689 Phast 6.7

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.02978E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	22.32	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	463.66	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s



Pool Vaporization Results

Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012A				
			Dia	Noite			
	Release Segment	1					
Release Duration		S	600	600			
Liquid Rainout		fraction	0.901196	0.908294			
Maximum Pool Radii	18	m	3 78425	3 7988			
	Distan	ce to Concentration	Results				
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012A				
	The height for use	r defined concentrati	ons is the user det	fined height 0 m			
	All toxic results a	re reported at the tox	ic effect height 0 1	n			
	All flammable res	ults are reported at th	e flammable effe	ct height 0 m			
Concentration(ppm)	Averaging Time			Distance (m)			
			Dia	Noite			
UFL (56000)	18.75	S	No Hazard	No Hazard			
LFL (7000)	18.75	S	No Hazard	No Hazard			
LFL Frac (7000)	18.75	S	No Hazard	No Hazard			
Concentration(ppm)	Averaging Time			Heights (m) for above distances			
			Dia	Noite			
UFL (56000)	18.75	S	0	0			
LFL (7000)	18.75	S	0	0			
LFL Frac (7000)	18.75	S	0	0			
Jet Fire Hazard							
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012A				
Jet fire method used: Cone model - DNV recommended							
			Dia	Noite			
Jet Fire Status			Hazard	Hazard			
Flame Direction			Angled	Angled			
	Radiat	tion Effects: Jet Fire	Ellipse				
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012A				
	This table gives th	e distances to the spo	ecified radiation le	evels			
	for each jet fire lis	sted in the above haza	ard table				
			Dia	Distance (m)			
Dadiation Laval	2	1/W/m2	D1a 9 74725	NOILE 8 20702			
Radiation Level	5 12 5	к w/ш2 kW/m2	0./4/33 1/71601	0.39702 1 37706			
Radiation Level	37 5	kW/m^2	T./1071 Not Reached	Not Reached			
Radiation Level	44	kW/m^2	Not Reached	Not Reached			
	1 T	K W/1112	1 NOT INCOLLEG	The Reaction			

Study Folder:

UTE Pampa rev_0_Hidrogenio



	ŀ	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 012A	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 012A	
			Dia	Noite
Early Pool Fire Stat	us		Hazard	Hazard
	Rad	liation Effects: Early	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 012A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	24.1815	23.2654
Radiation Level	12.5	kW/m2	18.4435	17.3366
Radiation Level	37.5	kW/m2	13.7507	12.6906
Radiation Level	44	kW/m2	13.0847	12.0618
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 012A	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire I	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 012A	
			Dia	Noite
Late Pool Fire Statu	S		Hazard	Hazard
	Rad	diation Effects: Late I	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 012A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	40.2949	38.8623
Radiation Level	12.5	kW/m2	27.4741	25.6467
Radiation Level	37.5	kW/m2	15.6003	14.5717



Path: \UT	E Pampa rev_0	_Hidrogenio\S	Study\Distribui	ção\Cenário 012A
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Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name:	Data	
Path: \U	JTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cer	nário 012H
	User-Defined D	ata
Material		
	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1.5
	Temperature	25
	Mass Inventory	1E6
Scenario		
	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	6.35
	Building Wake Effect	None
	Тапк пеац	0
Location		
	Elevation	
	Use ERPG averaging time	ERPG not selected
	Use IDLH averaging time	IDLH not selected
	Use STEL averaging time Supply a user defined averaging time	STEL not supplied
	Suppry a user defined averaging time	Not supplied
Bund		
	Status of Bund Surface	No bund present
	Type of Bund Surface	Concrete
	Bund Failure Modeling	0 Bund cannot faill
		Bund cannot ran
Indoor/Ou	itdoor	On an air related
	Outdoor Palease Direction	Upen an release
	Suddor Release Direction	Horizontai
Flammabl	e Explosion Method	N.1.1. T.
	Explosion Method	Multi-Energy
	Jet File Method	Colle Model
Dispersion		NT 1 1 1
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	1E6
Fireball Pa	arameters	
	Mass Modification Factor	3]
	[Calculation method for fireball	DNV Recommended
	I NO model flame temperature	1727

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Phast 6.7	DNV

North(1)

	[Building Exchange Rate [Tail Time [Set averaging time equal to exposure time [Cut-off fraction of toxic load for exposure time calcul [Cut-off concentration for exposure time calculations	4 1800 Use a fixed averaging time] lation 0.05 0	/hr] s] fraction] fraction]
Multi Enorg	y Evplosion		
WIND LICE	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
-/	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Dia		
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.02978E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	22.32	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	468.70	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	

 $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012H }$

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.02978E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	22.32	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	463.66	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s


Consequence Results

Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\C	enário 012H	
				Dia	Noite
Dala	aga Duration	Release Segment		600	600
Kele	ase Duration		S Constitution	000	600
Liqu	lid Kalnout		Iraction	0.97075	0.972902
Max	timum Pool Radiu	us	m	3.92744	3.93166
		Dista	nce to Concentratio	n Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\C	enário 012H	
		The height for us	ser defined concentra	ations is the user d	efined height 0 m
		All toxic results a	are reported at the to	xic effect height 0	m
		All flammable re	esults are reported at	the flammable eff	ect height 0 m
Con	centration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL	. (56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	No Hazard	No Hazard
LFL	Frac (7000)	18.75	S	No Hazard	No Hazard
Con	centration(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL	. (56000)	18.75	S	0	0
LFL	(7000)	18.75	S	0	0
LFL	Frac (7000)	18.75	S	0	0
			Jet Fire Hazard	l	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\C	enário 012H	
		Jet fire method u	sed: Cone model - D	NV recommended	1
				Dia	Noite
Jet F	Fire Status			Hazard	Hazard
Flan	ne Direction			Horizontal	Horizontal
		Radia	ation Effects: Jet Fi	re Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\C	enário 012H	
		This table gives t	the distances to the s	pecified radiation	levels
		for each jet me n	isted in the above na		Distance (m)
				Dia	Noite
Rad	iation Level	3	kW/m2	5.5287	5.54429
Rad	iation Level	12.5	kW/m2	3.57109	3.59764
D 1	·	275	1 11/	27.5	NT (D 1 1
Rad	lation Level	37.3	KW/m2	37.5	Not Reached

UTE Pampa rev_0_Hidrogenio

Study Folder:

-



	Rac	liation Effects: Jet	Fire Distance	
Path: \UTE Pampa rev	v_0_Hidrogeni	o\Study\Distribuição	o\Cenário 012H	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa rev	v_0_Hidrogeni	o\Study\Distribuição	o\Cenário 012H	
			Dia	Noite
Early Pool Fire Status			Hazard	Hazard
	Radiat	ion Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa rev	v_0_Hidrogeni	o\Study\Distribuição	o\Cenário 012H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	18.9816	18.818
Radiation Level	12.5	kW/m2	13.0845	12.7376
Radiation Level	37.5	kW/m2	8.26484	7.97302
Radiation Level	44	kW/m2	7.57874	7.33107
	Radiati	on Effects: Early P	ool Fire Distance	
Path: \UTE Pampa rev	v_0_Hidrogeni	o\Study\Distribuição	o\Cenário 012H	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire F	lazard	
Path: \UTE Pampa rev	v_0_Hidrogeni	o\Study\Distribuição	o\Cenário 012H	
			Dia	Noite
Late Pool Fire Status			Hazard	Hazard
	Radia	tion Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa rev	v_0_Hidrogeni	o\Study\Distribuição	o\Cenário 012H	
				Distance (m)
			Dia	Noite
	2	kW/m2	35 3309	34 6106
Radiation Level	3	K ((/ 1112	55.5507	51.0100
Radiation Level Radiation Level	5 12.5	kW/m2	22.2062	21.1037
Radiation Level Radiation Level Radiation Level	3 12.5 37.5	kW/m2 kW/m2	22.2062 10.0397	21.1037 9.78134



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012H

Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 012I **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012I **User-Defined Data** Material Material Identifier n-NONANE Type of Vessel Padded Liquid Pressure Specification Pressure specified Storage Pressure - gauge 1.5 bar Temperature 25 degC Mass Inventory 1E6 kg Scenario Scenario Type Leak Liquid Phase to be Released Hole Diameter 6.35 mm Building Wake Effect None Tank Head 0 m Location [Elevation 1 m] Use ERPG averaging time ERPG not selected IDLH not selected Use IDLH averaging time 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 Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg **Fireball Parameters** [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC] **Toxic Parameters** [Wind Dependent Exchange Rate Case Specified]

Date:

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Phast 6.7	DNS

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia		
Wind Speed:		3.73	m/s
Wind Speed at Height (Calculated)		2.10	m/s
Pasquill Stability:		C/D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	s
Stagnation data (data at upstream end for long pip	e):		
- Pressure		2.51	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	
CALCULATED QUANTITIES			
Mass Flow of Air (Vent from Vapor Space only)		n/a	
Mass Flowrate		3 02978E-001	kø/s
Release Duration		600.00	s s
Orifice or pipe exit data (before atmospheric exp - Pressure	ansion):	1.01	bar
- Temperature		24.97	degC
- Vena Contracta Velocity (exit velocity for p	ipe releases)	22.32	m/s
- Discharge Coefficient		0.60	
Final data (after atmospheric expansion):			
- Temperature		24.97	degC
- Liquid Mass Fraction		1.00	fraction
- Droplet Diameter		468.70	um
- Expanded Radius		0.00	m
- Velocity		22.32	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite		
Wind Speed:		2.78	m/s
Wind Speed at Height (Calculated)		1.45	m/s
Pasquill Stability:		D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long pip	e):		
- Pressure		2.51	bar
- Temperature		25.00	degC

\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012I

CALCULATED QUANTITIES

- Fluid State

Non-saturated liquid

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	Study Folder:	UTE Pampa rev_0_Hidrogenio
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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.02978E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	22.32	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	463.66	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012I	
			Dia	Noite
	Release Segment	1		
Release Duration		S	600	600
Liquid Rainout		fraction	1	1
Movimum Dool Dodi	10		2 09545	2 08606
Maximum Foor Kaun	Distan	ce to Concentration	Results	5.98000
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012I	
	The height for use	er defined concentrati	ons is the user def	fined height 0 m
	All toxic results a	re reported at the toxi	ic effect height 0 n	n
	All flammable res	ults are reported at th	e flammable effec	ct height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
(FF)			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazard		
Path: \UTE Pampa re	ev 0 Hidrogenio\St	udy\Distribuição\Cer	nário 012I	
	Jet fire method us	ed: Cone model - DN	W recommended	
			Dia	Noite
Jet Fire Status			No Hazard	No Hazard
Flame Direction			Along Ground	Along Ground
	E	Carly Pool Fire Haza	rd	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012I	
			Dia	Noite
Early Pool Fire Status	5		Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

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	Radi	iation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidroge	nio\Study\Distribuição	Cenário 012I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	14.6792	14.597
Radiation Level	12.5	kW/m2	8.71263	8.45515
Radiation Level	37.5	kW/m2	3.84532	3.64014
Radiation Level	44	kW/m2	3.15082	2.99232
	Radia	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa r	ev_0_Hidroge	nio\Study\Distribuição	Cenário 012I	
				Radiation Level (kW/m2
			Dia	Noite
		Late Pool Fire H	lazard	
Path: \UTE Pampa r	ev_0_Hidroge	nio\Study\Distribuição	Cenário 012I	
			Dia	Noite
Late Pool Fire Status			Hazard	Hazard
		iation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidroge	nio\Study\Distribuiçao	Cenario 0121	
			D.	Distance (m)
Dell'ada de al	2	1 11/	Dia 21.1227	Noite
Radiation Level	3	KW/m2	31.1227	30.4658
Radiation Level	12.5	KW/m2	1/.8/13	10.8412
Radiation Level	37.5	KW/m2	5.56792	5.40857
Radiation Level	44	KW/m2	4.98545	4.98606
	Radi	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa r	ev_0_Hidroge	nio\Study\Distribuição	Cenário 012I	
				Radiation Level (kW/m
			Dia	Noite
		Weather Cond	itions	
Path: \UTE Pampa r	ev_0_Hidroge	nio\Study\Distribuição	Cenário 012I	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness L	ength	mm	950.891	950.891
Surface Roughness P	arameter		0.17	0.17
Atmospheric Temper	ature	degC	19.6	16.5
Surface Temperature		degC	24.6	16.5



CASE Na	ame: Data	
Dath•	UTE Pampa rev 0 Hidrogenio/Study/Distribui	ção/Cenário 012V
atıı.	(011) 1 ampa rev_0_111arogenio(study (Distribut	
	User-De	fined Data
Materi	al	
	Material Identifier	n-NONANE
	lype of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1.5
	Mass Inventory	166
~		
Scenar	10 Scenario Type	I eak
	Phase to be Released	Liquid
	Hole Diameter	6.35
	Building Wake Effect	None
	Tank Head	0
Locatio	on	
200000	Elevation	1
	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
	[Bund Failure Modeling	Bund cannot fail
Indoor	/Outdoor	
	Location of release	Open air release
	Outdoor Release Direction	Vertical
Flamm	nable	
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispers	sion	
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	1E6
Firebal	ll Parameters	
	Mass Modification Factor	31
	Calculation method for fireball	DNV Recommended
	TNO model flame temperature	1727
Tovia I	Parameters	
TOXIC I		

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Phast 6.7	DNV

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 cal	culation 0.05	fraction]
	[Cut-off concentration for exposure time calculation	ns 0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Phast 6.7

Path: \UTE Pampa rev_0_Hidrogenio\Stud	y\Distribuição\Cenário 012V	
DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long p	ipe):	
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquic	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only	r) n/a	L
Mass Flowrate	3.02978E-001	ka/s
Release Duration	600.00	S S
Orifice or nine evit data (before atmospheric ev	vansion).	
- Pressure	1 01	har
- Temperature	24 97	degC
- Vena Contracta Velocity (exit velocity for	nine releases) 22 32	m/s
- Discharge Coefficient	0.60	11,5
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	468.70	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long p	ipe):	
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

2,739,689 Phast 6.7

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.02978E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.97	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	22.32	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.97	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	463.66	um
- Expanded Radius	0.00	m
- Velocity	22.32	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Pool Vaporization Results

Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012V		
	Release Segment	1	Dia	Noite	
Release Duration		S	600	600	
Liquid Rainout		fraction	0.89152	0.897991	
Maximum Pool Radii	us Distan	m ce to Concentration	3.76386 Results	3.77718	
D-th. \UTE Demos					
Path: UTE Pampa fe	The first of the f			C 11 1 1 0	
	All toxic results an All flammable res	re reported at the toxi ults are reported at th	ons is the user defined on the series of the	n n ct height 0 m	
Concentration(ppm)	Averaging Time			Distance (m)	
			Dia	Noite	
UFL (56000)	18.75	S	No Hazard	No Hazard	
LFL (7000)	18.75	S	No Hazard	No Hazard	
LFL Frac (7000)	18.75	S	No Hazard	No Hazard	
Concentration(ppm)	Averaging Time			Heights (m) for above distances	
	10.55		Dia	Noite	
UFL (56000)	18.75	S	0	0	
LFL (7000)	18.75	S	0	0	
LFL Frac (7000)	18.75	S	0	0	
Jet Fire Hazard					
Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012V					
	Jet fire method us	ed: Cone model - DN	V recommended		
			Dia	Noite	
Jet Fire Status			Hazard	Hazard	
Flame Direction			Vertical	Vertical	
Radiation Effects: Jet Fire Ellipse					
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Distribuição\Cer	nário 012V		
	This table gives the for each jet fire list	the distances to the spectrum to the spectrum the above haza	ecified radiation le	evels	
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	8.59239	8.36204	
Radiation Level	12.5	kW/m2	4.74536	4.22977	
Radiation Level	37.5	kW/m2	2.58298	Not Reached	
Radiation Level	44	kW/m2	Not Reached	Not Reached	

UTE Pampa rev_0_Hidrogenio

Study Folder:

-



	R	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 012V	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 012V	
			Dia	Noite
Early Pool Fire Stat	us		Hazard	Hazard
	Rad	iation Effects: Early	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 012V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	23.4383	21.9225
Radiation Level	12.5	kW/m2	17.7231	16.0186
Radiation Level	37.5	kW/m2	13.05	11.3907
Radiation Level	44	kW/m2	12.3854	10.7659
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 012V	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	Iazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 012V	
			Dia	Noite
Late Pool Fire Statu	S		Hazard	Hazard
	Rac	liation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 012V	
				Distance (m)
			Dia	Noite
	3	kW/m2	39.5167	37.4867
Radiation Level				
Radiation Level	12.5	kW/m2	26.7396	24.3185
Radiation Level Radiation Level Radiation Level	12.5 37.5	kW/m2 kW/m2	26.7396 14.9096	24.3185 13.2642



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev	_0_Hidrogenio\Study\Distribuição\Cenário 01	2V
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Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 012V $$$

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Nar	ne: Data		
CASE Nai	nc. Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Ce	enário 013A	
	User-Defined	Data	
Materia		NOMANE	
	Material Identifier	n-NONANE	
Scenari	o Building Wake Effect	None	
¥7 1/7			
Vessel/ I	Release Type	Continuous	
Locatio	n		
	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 Dural	No hourd annount	
	Status of Dund Surface	No build present	
	[Pund Height	Concrete	
	[Bund Failure Modeling	Bund cannot fail]	п
Indoor/	Outdoor		
	Location of release	Open air release	
	Outdoor Release Angle	45	d
	Outdoor Release Direction	Angled from Horizontal	
Flamma	able		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispers	ion		
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	13.39	n
	Droplet Diameter(1)	1301	u
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.09	d
	Release Rate(1)	6.94	k
	Pre-Dilution Air Rates(1)	0	k
	Late Ignition Location Mass Inventory of material to Disperse	No ignition location 1E6	k
F ' ' ''			
Fireball	Parameters	21	
	Iniass mounication racioi	5 DNW Pasammandad	
	TNO model flame temperature		٦
	I INO model name temperature	1/2/	a

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Study Folder:	UTE Pampa rev	0 Hidrogenio
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North(1)

Toxic Parai	neters		
	[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 calcu	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013A

		Dia	Noite
Release Segment	1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.975924	0.977759
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	S	200.931	181.576
Pool Vaporization Rate	kg/s	0.0424156	0.0200911
Total Vapor Flowrate	kg/s	0.209503	0.174445
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	S	78.795	79.2469
Pool Vaporization Rate	kg/s	0.107826	0.0463351
Total Vapor Flowrate	kg/s	0.274913	0.200689
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	S	59.755	61.38
Pool Vaporization Rate	kg/s	0.142641	0.0597758
Total Vapor Flowrate	kg/s	0.309728	0.21413
Release Segment 1 Cloud Segment 4	Ļ		
Cloud Segment Duration	S	50.5819	52.22
Pool Vaporization Rate	kg/s	0.171131	0.070439
Total Vapor Flowrate	kg/s	0.338218	0.224793
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	S	43.6181	45.8275
Pool Vaporization Rate	kg/s	0.195915	0.0795289
Total Vapor Flowrate	kg/s	0.363002	0.233883
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	S	75.95	80.3906
Pool Vaporization Rate	kg/s	0.227943	0.0910909
Total Vapor Flowrate	kg/s	0.39503	0.245445
Release Segment 1 Cloud Segment 7	,		
Cloud Segment Duration	S	90.3694	99.3594
Pool Vaporization Rate	kg/s	0.273358	0.107341
Total Vapor Flowrate	kg/s	0.440445	0.261695
Maximum Pool Radius	m	18.8854	18.8795



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013A

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	10.4012
LFL Frac (7000)	18.75	S	No Hazard	10.4012
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013A

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013A

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

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	19.6919	18.801
Radiation Level	12.5	kW/m2	10.9421	10.0757
Radiation Level	37.5	kW/m2	6.60158	Not Reached
Radiation Level	44	kW/m2	4.66073	Not Reached

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 013A

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013A

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

2,739,689 Phast 6.7

	Rad	iation Effects: Early P	ool Fire Ellipse		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	Cenário 013A		
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	49.6727	48.528	
Radiation Level	12.5	kW/m2	32.6519	30.9723	
Radiation Level	37.5	kW/m2	18.977	18.8002	
Radiation Level	44	kW/m2	18.977	18.8002	
	Radi	ation Effects: Early Po	ool Fire Distance		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	Cenário 013A		
				Radiation Level (kW/m2)	
			Dia	Noite	
		Lata Daal Fina H	arand		
		Late Pool Fire H	azaru		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	Cenário 013A		
			Dia	Noite	
Late Pool Fire Statu	S	Hazard	Hazard		
	Rad	liation Effects: Late P	ool Fire Ellipse		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	Cenário 013A		
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	81.0973	78.1043	
Radiation Level	12.5	kW/m2	34.3145	33.4166	
Radiation Level	37.5	kW/m2	Not Reached	Not Reached	
Radiation Level	44	kW/m2	Not Reached	Not Reached	
	Radi	iation Effects: Late Po	ol Fire Distance		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	Cenário 013A		
	Radiation Level (kW/m2)DiaNoite				



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013A

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

				Distance (m)
			Noite	
Furthest Extent	7000	ppm	10.4012	
Furthest Extent	7000	ppm	10.4012	
				Heights (m) for above distances
			Noite	fielding (iii) for above distances
Furthest Extent	7000	nnm	0	
Furthest Extent	7000	nnm	Õ	
I utilest Extent	/000	ppm	U	



		Explosion Effects:	Late Ignition
Path: \UTE Pan	npa rev_0_Hidroge	enio\Study\Distribui	ção\Cenário 013A
	Explosion N	Model Used : Multi I	Energy
	Explosion I	Location Criterion: C	Cloud Front (LFL Fraction)
	All distance	es are measured from	the Source
	All flamma	ble results are report	ted at the flammable effect height 0 m
			Maximum Distance (m) at Overpressure Level
			Noite
Overpressure	0.05	bar	No Hazard
Overpressure	0.1	bar	No Hazard
Overpressure	0.3	bar	No Hazard
Overpressure	0.4	bar	No Hazard
			Supplementary Data at 0.05 bar
			Noite
Supplied Flamm	able Mass	kg	No Hazard
Used Flammable	e Mass		
Overpressure Ra	adius	m	0
Distance to:			
- Ignition Sourc	e	m	No Hazard
- Cloud Front/C	Centre	m	No Hazard
- Explosion Cer	ntre	m	0
			Supplementary Data at 0.1 bar
			Noite
Supplied Flamm	able Mass	kg	No Hazard
Used Flammable	e Mass		
Overpressure Ra	adius	m	0
Distance to:			
- Ignition Sourc	e	m	No Hazard
- Cloud Front/C	Centre	m	No Hazard
- Explosion Cer	ntre	m	0
			Supplementary Date at 0.2 her
			Noite
Sumplied Flower	able Meas	l.a	Nolle
Supplied Flammahl		ĸg	No mazaru
			0
Distance to:	ulus	111	0
Distance to:			No Hozord
- Ignition Sourc	lontro		No Hazard
- Cloud Front/C		111 m	no nazaru
- Explosion Cer	ine	m	U
			Supplementary Data at 0.4 bar
			Noite
Supplied Flamm	able Mass	kg	No Hazard
Used Flammable	e Mass		
Overpressure Ra	ndius	m	0
Distance to:			
- Ignition Sourc	e	m	No Hazard
- Cloud Front/C	entre	m	No Hazard

UTE Pampa rev_0_Hidrogenio **Study Folder:**

28/04/2014

Date:

- Explosion Centre

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Study Folder:	UTE Pampa rev_0_Hidrogenio

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	Weather Conditions				
Path:	\UTE Pampa rev_0_Hidrogen	nio\Study\Distribuição	Study\Distribuição\Cenário 013A		
			Dia	Noite	
Wind Speed		m/s	3.73	2.78	
Pasquill Stability			C/D	D	
Surface Roughness Length		mm	950.891	950.891	
Surface Roughness Parameter			0.17	0.17	
Atmospheric Temperature		degC	19.6	16.5	
Surf	ace Temperature	degC	24.6	16.5	
Rela	tive Humidity	fraction	0.636	0.749	

m



Cenário 013H			
Base Case			
CASE Name	e: Data		
Path:	UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenái	rio 013H	
	User-Defined Dat	ta	
Material	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vessel/Ta	nk		
	Release Type	Continuous	
Location		,]
	Elevation Use ERPG averaging time	I FRPG not selected	m
	Use IDLH averaging time	IDI H 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/O	utdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammab	le		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersio	n Na la an la G		
	Number of Release Segments	1 1 · · · 1	
	Fluid Phase(1)		
	Discharge velocity(1)	13.39	m/s
	Droplet Diameter(1)	1301	um
	Einal Tomporatura(1)	25.00	s dagC
	Palazza Pata(1)	6.04	lege
	$Pre_Dilution Air Rates(1)$	0.94	kg/s
	Late Ignition Location	No ignition location	кд/ 5
	Mass Inventory of material to Disperse	1E6	kg
Fireball F	Parameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H

			Dia	Noite
	Release Segment 1	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.995199	0.995429
Release Segment 1	Cloud Segment 1			
Cloud Segment Durati	ion	S	197.403	176.89
Pool Vaporization Rate	e	kg/s	0.0455335	0.0220738
Total Vapor Flowrate		kg/s	0.0788518	0.0537989
Release Segment 1	Cloud Segment 2			
Cloud Segment Durati	on	S	79.82	79.11
Pool Vaporization Rate	e	kg/s	0.113801	0.0495627
Total Vapor Flowrate		kg/s	0.14712	0.0812878
Release Segment 1	Cloud Segment 3			
Cloud Segment Durati	ion	S	60.4181	61.7306
Pool Vaporization Rate	e	kg/s	0.15045	0.0636577
Total Vapor Flowrate		kg/s	0.183769	0.0953828
Release Segment 1	Cloud Segment 4			
Cloud Segment Durati	ion	S	50.4494	52.8319
Pool Vaporization Rate	e	kg/s	0.180146	0.0748659
Total Vapor Flowrate		kg/s	0.213464	0.106591
Release Segment 1	Cloud Segment 5			
Cloud Segment Durati	ion	S	44.55	46.6181
Pool Vaporization Rate	e	kg/s	0.206033	0.0844486
Total Vapor Flowrate		kg/s	0.239352	0.116174
Release Segment 1	Cloud Segment 6			
Cloud Segment Durati	ion	S	75.8625	82.3419
Pool Vaporization Rate	e	kg/s	0.239393	0.0966964
Total Vapor Flowrate		kg/s	0.272712	0.128422
Release Segment 1	Cloud Segment 7			
Cloud Segment Durati	ion	S	91.4975	100.477
Pool Vaporization Rate	e	kg/s	0.286597	0.113791
Total Vapor Flowrate		kg/s	0.319915	0.145516
Maximum Pool Radiu	S	m	19.0682	19.0507



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H

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 flammable effect height 0 m

Concentra	ation(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL ((56000)	18.75	S	5.07826	5.11555
LFL (7000)	18.75	S	5.14389	5.19778
LFL Frac	(7000)	18.75	S	5.14389	5.19778
Concentra	ation(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL ((56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac	(7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H

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

			Distance	
			Dia	Noite
Radiation Level	3	kW/m2	10.6136	10.8354
Radiation Level	12.5	kW/m2	7.40146	7.64275
Radiation Level	37.5	kW/m2	6.03103	6.36126
Radiation Level	44	kW/m2	6.03103	6.36126

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 013H

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H

Hazard



Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H				
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	42.8403	41.9436
Radiation Level	12.5	kW/m2	25.692	24.2716
Radiation Level	37.5	kW/m2	12.0326	12.1247
Radiation Level	44	kW/m2	12.0326	12.1247
	Radia	ation Effects: Early Po	ool Fire Distance	
Path: \UTE Pampa r	rev_0_Hidroge	nio\Study\Distribuição	Cenário 013H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	azard	
Path: \UTE Pampa r	rev_0_Hidroge	nio\Study\Distribuição	Cenário 013H	
			Dia	Noite
Late Pool Fire Status	\$		Hazard	Hazard
	Rad	liation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa r	rev_0_Hidroge	nio\Study\Distribuição	Cenário 013H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	74.5509	71.7795
Radiation Level	12.5	kW/m2	27.4805	26.8047
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Late Po	ol Fire Distance	
Path: \UTE Pampa I	ev_0_Hidroge	nio\Study\Distribuição	Cenário 013H	
				Radiation Level (kW/m2)

Radiation Effects: Early Pool Fire Ellipse

Dia

/m2) (| Noite



Study Folder: UTE Pampa rev_0_Hidrogenio

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 013H

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

				Distance (m)
			Dia	Noite
Furthest Extent	7000	ppm	5.14389	5.19778
Furthest Extent	7000	ppm	5.14389	5.19778
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 013I **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I **User-Defined Data** Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location [Elevation 1 m] Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund 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 Down - Impinging on the Ground Flammable Multi-Energy Explosion Method Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 13.39 m/s Droplet Diameter(1) 1301 um Duration of Discharge(1) 600 s Final Temperature(1) 25.09 degC Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/sNo ignition location Late Ignition Location Mass Inventory of material to Disperse 1E6 kg **Fireball Parameters** [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC]

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I

		Dia	Noite
Release Seg	ment 1		
Release Duration	S	600	600
Liquid Rainout	fraction	1	1
Release Segment I Cloud Segm	ient I	101 - 01	1
Cloud Segment Duration	S	196.701	175.563
Pool Vaporization Rate	kg/s	0.0466171	0.022738
Total Vapor Flowrate	kg/s	0.0466172	0.0227382
Release Segment 1 Cloud Segm	ient 2		
Cloud Segment Duration	S	79.69	79.6381
Pool Vaporization Rate	kg/s	0.115718	0.0506739
Total Vapor Flowrate	kg/s	0.115718	0.050674
Release Segment 1 Cloud Segm	ient 3		
Cloud Segment Duration	S	60.3319	61.6394
Pool Vaporization Rate	kg/s	0.152718	0.0650012
Total Vapor Flowrate	kg/s	0.152718	0.0650014
Release Segment 1 Cloud Segm	ent 4		
Cloud Segment Duration	S	50.3831	52.7606
Pool Vaporization Rate	kg/s	0.182675	0.0763264
Total Vapor Flowrate	kg/s	0.182675	0.0763265
Release Segment 1 Cloud Segm	ient 5		
Cloud Segment Duration	S	44.495	46.5594
Pool Vaporization Rate	kg/s	0.208778	0.0860025
Total Vapor Flowrate	kg/s	0.208779	0.0860027
Release Segment 1 Cloud Segm	ent 6		
Cloud Segment Duration	S	76.9019	82.2456
Pool Vaporization Rate	kg/s	0.242723	0.0983626
Total Vapor Flowrate	kg/s	0.242723	0.0983628
Release Segment 1 Cloud Segm	ent 7		
Cloud Segment Duration	S	91.4975	101.594
Pool Vaporization Rate	kg/s	0.290641	0.115719
Total Vapor Flowrate	kg/s	0.290641	0.115719
Maximum Pool Radius	m	19.1132	19.0947

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Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I

Jet fire method used: Cone model - DNV recommended

Jet Fire Status Flame Direction		Dia No Hazard Along Ground	Noite No Hazard Along Ground		
			Early Pool Fire Haza	rd	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição\Cer	iário 013I	
Early Pool Fire Status			Dia Hazard	Noite Hazard	
		Rad	iation Effects: Early Pool	Fire Ellipse	
Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I					
					Distance (m)
				Dia	Noite
Radia	ation Level	3	kW/m2	37.6912	36.7377
Radia	ation Level	12.5	kW/m2	20.5111	19.0357
Radia	ation Level	37.5	kW/m2	6.856	6.89567
Radia	ation Level	44	kW/m2	6.856	6.89567
		Radi	ation Effects: Early Pool F	ire Distance	

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I

Radiation Level (kW/m2) Noite

Dia

Study Folder:



		Late Pool Fire H	lazard		
Path: \UTE Pampa	LUTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I				
			Dia	Noite	
Late Pool Fire Status			Hazard	Hazard	
	Rac	liation Effects: Late P	ool Fire Ellipse		
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	Cenário 013I		
				Distance (m)	
			Dia	Noite	
Radiation Level	3	kW/m2	69.4722	66.6409	
Radiation Level	12.5	kW/m2	22.3342	21.6001	
Radiation Level	37.5	kW/m2	Not Reached	Not Reached	
Radiation Level	44	kW/m2	Not Reached	Not Reached	
	Radi	iation Effects: Late Po	ol Fire Distance		
Path: \UTE Pampa	rev 0 Hidroge	enio\Study\Distribuicão	Cenário 013I		

UTE Pampa rev_0_Hidrogenio

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	69.4722	66.6409
Radiation Level	12.5	kW/m2	22.3342	21.6001
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cena rio 0131

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013I

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 013V **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013V **User-Defined Data** Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location [Elevation 1 m] Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund 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 Vertical Flammable Multi-Energy Explosion Method Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 13.39 m/s Droplet Diameter(1) 1301 um Duration of Discharge(1) 600 s Final Temperature(1) 25.09 degC Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/sNo ignition location Late Ignition Location Mass Inventory of material to Disperse 1E6 kg **Fireball Parameters** [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC]

Toxic Parameters


[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time ca	lculation 0.05	fraction]
[Cut-off concentration for exposure time calculatio	ns 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013V

		Dia	Noite
Releas	e Segment 1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.969631	0.971738
Release Segment 1 Cloud	Segment 1		
Cloud Segment Duration	S	201.64	182.25
Pool Vaporization Rate	kg/s	0.041633	0.0195392
Total Vapor Flowrate	kg/s	0.252396	0.215679
Release Segment 1 Cloud	Segment 2		
Cloud Segment Duration	S	78.9225	78.5725
Pool Vaporization Rate	kg/s	0.106343	0.0453213
Total Vapor Flowrate	kg/s	0.317106	0.241461
Release Segment 1 Cloud	Segment 3		
Cloud Segment Duration	S	59.84	61.38
Pool Vaporization Rate	kg/s	0.140835	0.058525
Total Vapor Flowrate	kg/s	0.351598	0.254665
Release Segment 1 Cloud	Segment 4		
Cloud Segment Duration	S	49.66	52.22
Pool Vaporization Rate	kg/s	0.168818	0.0690628
Total Vapor Flowrate	kg/s	0.379582	0.265203
Release Segment 1 Cloud	Segment 5		
Cloud Segment Duration	S	43.6181	45.8275
Pool Vaporization Rate	kg/s	0.193114	0.0780514
Total Vapor Flowrate	kg/s	0.403878	0.274191
Release Segment 1 Cloud	Segment 6		
Cloud Segment Duration	S	75.95	80.3906
Pool Vaporization Rate	kg/s	0.22483	0.0894909
Total Vapor Flowrate	kg/s	0.435594	0.285631
Release Segment 1 Cloud	Segment 7		
Cloud Segment Duration	S	90.3694	99.3594
Pool Vaporization Rate	kg/s	0.269817	0.105577
Total Vapor Flowrate	kg/s	0.480581	0.301717
Maximum Pool Radius	m	18.825	18.8209



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013V

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013V

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Vertical	Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	20.8138	20.1612
Radiation Level	12.5	kW/m2	11.7126	10.5225
Radiation Level	37.5	kW/m2	7.31285	6.13497
Radiation Level	44	kW/m2	6.78973	4.9366

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 013V

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 013V

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

	Radiatio	n Effects: Early Poo	l Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 013V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	47.4579	44.9915
Radiation Level	12.5	kW/m2	30.4787	27.4754
Radiation Level	37.5	kW/m2	16.7994	15.2952
Radiation Level	44	kW/m2	16.7994	15.2952
	Radiation	Effects: Early Pool	Fire Distance	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 013V	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire Haza	ard	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 013V	
			Dia	Noite
Late Pool Fire Status	5		Hazard	Hazard
	Radiatio	n Effects: Late Pool	Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 013V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	78.788	74.4794
Radiation Level	12.5	kW/m2	32.0986	29.8832
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radiation	Effects: Late Pool	Fire Distance	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 013V	
			Dia	Radiation Level (kW/m2) Noite
		Weather Condition	ns	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 013V	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness I	Length	mm	950.891	950.891
Surface Roughness I	Parameter		0.17	0.17
Atmospheric Temper	rature	degC	19.6	16.5
Surface Temperature		degC	24.6	16.5
Relative Humidity		fraction	0.636	0.749



CASE Nama	Dete	
CASE Maille.	Data	
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Distribuição\Cer	nário 015A
	User-Defined D	Data
Material		
	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	8
	Temperature	25
	Mass Inventory	166
Scenario		
	Scenario Type	Leak
	Phase to be Released	Liquic
	Hole Diameter	6.35
	Building Wake Effect	None
	Tank Head	(
Location		
	Elevation	1
	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	(
	[Bund Failure Modeling	Bund cannot fail
Indoor/Out	tdoor	
	Location of release	Open air release
	Outdoor Release Angle	45
	Outdoor Release Direction	Angled from Horizonta
Flammable	,	
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Mode
Dispersion		
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	186
Fireball Pa	rameters	
	[Mass Modification Factor	3
	[Calculation method for fireball	DNV Recommended



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Phast 6.7

Path: \UTE Pampa rev_0_Hidrogenio\Study	y\Distribuição\Cenário 015A	
DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pi	pe):	
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquic	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only) n/a	
Mass Elevinate	6 005025 001	lia/a
Mass Flowlate Release Duration	6.99392E-001	kg/s
Release Duration	000.00	5
Orifice or pipe exit data (before atmospheric ex	pansion):	
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for	pipe releases) 51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pi	pe):	
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquic	

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Distance to Concentration Results

Consequence Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015A

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015A

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Angled	Angled
	Dia Hazard Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015A

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

			Distance (
			Dia	Noite
Radiation Level	3	kW/m2	22.2516	22.4603
Radiation Level	12.5	kW/m2	12.6795	12.212
Radiation Level	37.5	kW/m2	8.07668	7.36617
Radiation Level	44	kW/m2	7.44295	5.79744

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015A

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name:	Data	
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Distribuição\Cer	nário 015H
	User-Defined D	lata
Material	User-Defined D	ata
muteriur	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	8
	Temperature	25
	Mass Inventory	1E6
Scenario		
	Scenario Type	Leak
	Phase to be Released	Liquid
	Hole Diameter	6.35
	Building Wake Effect	None
	Tank Head	0
Location		
	Elevation	1
	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	D in Language Call
	Bund Failure Modeling	Bund cannot fall
Indoor/Ou	tdoor	
	Location of release	Open air release
	Outdoor Release Direction	Horizontai
Flammabl	e Europagian Mathad	N 6 1/ T.
	Explosion Method	Multi-Energy
	Jet File Method	Cone Model
Dispersion	Tete Invition Terration	Na invition la sation
	Late Ignition Location	INO Ignition location
	Mass Inventory of material to Disperse	IEO
Fireball Pa	irameters	
	Mass Modification Factor	
	Calculation method for fireball	DNV Recommended
	i no model name temperature	1/2/

Study Folder:

2,739,689	Ĵ.Å
Phast 6.7	DNI

	[Building Exchange Rate		4
	[Tail Time		1800
	[Set averaging time equal to exposure time	Use a fixed ave	eraging time]
	[Cut-off fraction of toxic load for exposure time of	alculation	0.05
	[Cut-off concentration for exposure time calculat	ons	0
Multi En	nergy Explosion		
	Use Unconfined Strength	Do not use unconf	ined strength
	Use Fractions	1	Use fractions
	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)		6
	Source 1 (Fraction)		1

UTE Pampa rev_0_Hidrogenio

Shape	Point
Dimension	2D
System	Absolute
East(1)	0 m
North(1)	0 m

DISCHARGE DATA for Weather:

Wind Speed:

Path:



Phast 6.7

3.73 m/s

Wind	Speed at Height (Calculated)	2.10	m/s
Pasqu	ill Stability:	C/D	
USEF	R-DEFINED QUANTITIES		
Mater	ial	n-NONANE	
Scena	rio	Leak	
Inven	tory	1,000,000.00	kg
Fixed	Duration	n/a	S
Stagna	ation data (data at upstream end for long pipe):		
	- Pressure	9.01	bar
	- Temperature	25.00	degC
	- Fluid State	Non-saturated liquid	
CALO	CULATED QUANTITIES		
Mass	s Flow of Air (Vent from Vapor Space only)	n/a	
Mass	s Flowrate	6.99592E-001	kg/s
Rele	ase Duration	600.00	s
Orifi	ice or pipe exit data (before atmospheric expansion):		
-	Pressure	1.01	bar
-	Temperature	24.85	degC
-	Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
-	Discharge Coefficient	0.60	
Final	l data (after atmospheric expansion):		
-	Temperature	24.85	degC
-	Liquid Mass Fraction	1.00	fraction
-	Droplet Diameter	87.98	um
-	Expanded Radius	0.00	m
-	Velocity	51.54	m/s
DISCHA	RGE DATA for Weather: Global Weathers\N	loite	
Wind	Speed:	2.78	m/s
Wind	Speed at Height (Calculated)	1.45	m/s
Pasqu	ill Stability:	D	
USEF	R-DEFINED QUANTITIES		
Mater	ial	n-NONANE	
Scena	rio	Leak	
Inven	tory	1,000,000.00	kg
Fixed	Duration	n/a	S

\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015H

Global Weathers\Dia

Stagnation data (data at upstream end for long pipe):

9.01 bar - Pressure - Temperature 25.00 degC - Fluid State Non-saturated liquid

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s



Pool Vaporization Results

Consequence Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 015H	
		Delegse Segment	+ 1	Dia	Noite
Rele	ease Duration	Kelease Segment	c c	600	600
Lia	uid Rainout		fraction	0 56822	0 703459
Liqu	na Ramout		inaction	0.30822	0.703+37
Max	ximum Pool Radii	us	m	4.56734	5.08083
		Dista	nce to Concentration	n Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 015H	
		The height for us	ser defined concentrat	tions is the user de	efined height 0 m
		All toxic results	are reported at the toy	xic effect height 0	m
		All flammable re	esults are reported at t	he flammable effe	ect height 0 m
Con	centration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	. (7000)	18.75	S	No Hazard	No Hazard
LFL	Frac (7000)	18.75	S	No Hazard	No Hazard
Con	centration(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL	(56000)	18.75	S	0	0
LFL	. (7000)	18.75	S	0	0
LFL	Frac (7000)	18.75	S	0	0
			Jet Fire Hazard		
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 015H	
		Jet fire method u	sed: Cone model - D	NV recommended	l
				Dia	Noite
Jet I	Fire Status			Truncated	Truncated
Flan	ne Direction			Horizontal	Horizontal
		Radia	ation Effects: Jet Fir	e Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	Study\Distribuição\Ce	enário 015H	
		This table gives t	the distances to the sp	becified radiation	levels
		for each jet fire l	isted in the above haz	zard table	
					Distance (m)
				Dia	Noite
Rad	ation Level	3	kW/m2	24.6111	23.9695
Rad	ation Level	12.5	kW/m2	16.9523	16.7799
Rad	ation Level	57.5	kW/m^2	13.539	13.5468
Kad	lation Level	44	KW/M2	13.14/9	13.1099

Study Folder:

UTE Pampa rev_0_Hidrogenio



	F	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 015H	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 015H	
			Dia	Noite
Early Pool Fire Stat	us		Hazard	Hazard
	Rad	liation Effects: Early	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 015H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	30.5099	29.7866
Radiation Level	12.5	kW/m2	23.9258	22.4658
Radiation Level	37.5	kW/m2	18.5479	16.6983
Radiation Level	44	kW/m2	17.7217	15.8961
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 015H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire I	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 015H	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Rad	liation Effects: Late I	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuiçã	o\Cenário 015H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	47.7807	46.8707
Radiation Level	12.5	kW/m2	33.3202	30.9187
Radiation Level	37.5	kW/m2	19.9244	18.5986
			10.0011	



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015H

Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ise Case	D (
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Distribuiçã	o/Cenário 015I	
	User-Defin	red Data	
Material			
	Material Identifier	n-NONANE	
	lype of Vessel	Padded Liquid	
	Storage Pressure gauge	Plessure specified	ŀ
	Temperature	25	d
	Mass Inventory	1E6	k
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	6.35	r
	Building Wake Effect	None	
	Tank Head	0	r
Location			
	Elevation		r
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH 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	r
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	tdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Down - Impinging on the Ground	
Flammable		Mth	
	Explosion Method	Multi-Energy	
	Jet File Method	Colle Model	
Dispersion			
	Late Ignition Location	No ignition location	1
	Mass Inventory of material to Disperse	1E6	k
Fireball Pa	rameters [Mass Modification Factor	21	
	Calculation method for fireball	DNV Recommended	
	[TNO model flame temperature	1727	(
Toxic Para	meters		
**	[Wind Dependent Exchange Rate	Case Specified]	

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Phast 6.7	DNS

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe)	:	
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6 99592F-001	ko/s
Release Duration	600.00	s s
Orifice or pipe exit data (before atmospheric expan	ision).	
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pip	e releases) 51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe)	:	
- Pressure	9.01	bar
- Temperature	25.00	degC

\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015I

CALCULATED QUANTITIES

- Fluid State

Non-saturated liquid

Date: 28/04/2014

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s



Consequence Results

Pool Vaporization Results

Path: \UTE Pan	npa rev_0_Hidroge	nio\Study\Distribuiçã	o\Cenário 015I	
			Dia	Noite
	Release Seg	ment 1		
Release Duration	n	S	600	600
Liquid Rainout		fraction	1	1
Maximum Pool	Radius	m	6.05939	6.05855
	I	Distance to Concentra	ation Results	
Path: \UTE Pam	npa rev_0_Hidroge	nio\Study\Distribuiçã	o\Cenário 015I	
	The height f	or user defined conce	ntrations is the user de	fined height 0 m
	All toxic res	sults are reported at th	e toxic effect height 0	m
	All flammat	ole results are reported	at the flammable effe	ct height 0 m
Concentration(p	pm) Averaging T	ĩme		Distance (m)
	, 55		Dia	Noite
UFL (56000)) 18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000) 18.75	S	0	0
Concentration(p	pm) Averaging T	ime		Heights (m) for above distances
			Dia	Noite
UFL (56000)) 18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000) 18.75	S	0	0
		Jet Fire Haz	ard	
Path: \UTE Pam	npa rev_0_Hidroge	nio\Study\Distribuiçã	o\Cenário 015I	
	Jet fire meth	nod used: Cone model	- DNV recommended	
			Dia	Noite
Jet Fire Status			No Hazard	No Hazard
Flame Direction			Along Ground	Along Ground
		Early Pool Fire	Hazard	
Path: \UTE Par	npa rev_0_Hidroge	nio\Study\Distribuiçã	o\Cenário 015I	
			Dia	Noite
Early Pool Fire S	Status		Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

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	Rad	liation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 015I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	19.5905	19.4256
Radiation Level	12.5	kW/m2	11.5508	11.1425
Radiation Level	37.5	kW/m2	4.72591	4.47013
Radiation Level	44	kW/m2	3.83332	3.65241
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 015I	
			Dia	Radiation Level (kW/m2 Noite
		Late Pool Fire H	lazard	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 015I	
			Dia	Noite
Late Pool Fire Sta	itus		Hazard	Hazard
	Rad	liation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 015I	
			D.	Distance (m)
Dell'adian I and	2	1 11/	Dia	
Radiation Level	3	KW/m2	38.2811	37.1691
Radiation Level	12.5	KW/m2	20.6231	19.1042
Radiation Level	37.5 44	kW/m2 kW/m2	7.05939	7.05855
	Radi	iation Effects: Late Po	ool Fire Distance	
Path: \UTE Pam	a rev 0 Hidroge	enio\Studv\Distribuicão	o\Cenário 015I	
				Radiation Level (kW/m2
			Dia	Noite
		Weather Cond	itions	
Path: \UTE Pamp	oa rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 015I	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughnes	ss Length	mm	950.891	950.891
Surface Roughnes	ss Parameter		0.17	0.17
Atmospheric Tem	perature	degC	19.6	16.5
	ure	deg()	74.6	16.5
Surface Temperat	uit	uege	24.0	10.5



enário 015V			
Base Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015	V	
	User-Defined Data		
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	8	bar
	Mass Inventory	25 1E6	kg
. ·			
Scenario	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	6.35	mm
	Building Wake Effect	None	
	Tank Head	0	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	No bund present	
	[Type of Bund Surface	Concrete]	
	[Bund Height	0	m]
	Bund Failure Modeling	Bund cannot fail]	
Indoor/Ou	tdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammable	2		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion	• · · • · · · · ·	.	
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	IE6	kg
Fireball Pa	irameters		
	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	1. 0
	11NO model flame temperature	1/2/	degC
Toxic Para	meters	O	
	wind Dependent Exchange Kate	Case Specified	

Т

[Wind Dependent Exchange Rate

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Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 cal	culation 0.05	fraction]
	[Cut-off concentration for exposure time calculation	ns 0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

DISCHARGE DATA for Weather:

Path:



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Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	9.01	bar
- Temperature	25.00	degC

\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015V

Global Weathers\Dia

CALCULATED QUANTITIES

- Fluid State

Non-saturated liquid



Study Folder:	UTE Pampa rev	0	Hidrogenio
			_ 0

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015V

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015V

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Vertical	Vertical
	Dia Hazard Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	21.0417	21.0011
Radiation Level	12.5	kW/m2	11.4258	10.8408
Radiation Level	37.5	kW/m2	6.98868	6.12723
Radiation Level	44	kW/m2	6.46265	5.08977

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015V

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 015V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 016A **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016A **User-Defined Data** Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location [Elevation 1 m] Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund 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 Angle 45 deg Outdoor Release Direction Angled from Horizontal Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 243.4 um 600 s Duration of Discharge(1) Final Temperature(1) 25.48 degC 6.94 kg/s Release Rate(1) Pre-Dilution Air Rates(1) 0 kg/sLate Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg **Fireball Parameters** [Mass Modification Factor 31 [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC]

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Study Folder:	UTE Pampa rev	0 Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	

North(1)

Toxic Parar	neters		
	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016A

		Dia	Noite
Release Segment	1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.59733	0.702591
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	S	203.063	
Pool Vaporization Rate	kg/s	0.0252125	
Total Vapor Flowrate	kg/s	2.81974	2.06402
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	S	78.3381	
Pool Vaporization Rate	kg/s	0.0649644	
Total Vapor Flowrate	kg/s	2.85949	
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	S	59.925	
Pool Vaporization Rate	kg/s	0.0860711	
Total Vapor Flowrate	kg/s	2.8806	
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	S	49.725	
Pool Vaporization Rate	kg/s	0.103268	
Total Vapor Flowrate	kg/s	2.8978	
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	S	43.6719	
Pool Vaporization Rate	kg/s	0.118187	
Total Vapor Flowrate	kg/s	2.91271	
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	S	74.9081	
Pool Vaporization Rate	kg/s	0.137459	
Total Vapor Flowrate	kg/s	2.93199	
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	S	90.3694	
Pool Vaporization Rate	kg/s	0.16482	
Total Vapor Flowrate	kg/s	2.95935	
Maximum Pool Radius	m	14.7724	16.0015



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016A

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 flammable effect height 0 m

Concentration(pp	m) Averaging T	ime		Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(pp	m) Averaging T	ime		Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016A

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016A

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

			Distance (m)	
			Dia	Noite
Radiation Level	3	kW/m2	65.2496	62.4364
Radiation Level	12.5	kW/m2	35.0649	33.1946
Radiation Level	37.5	kW/m2	22.3871	20.5912
Radiation Level	44	kW/m2	20.4755	18.0321

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016A

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016A

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

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	Radi	ation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Distribuição	Cenário 016A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	70.652	65.71
Radiation Level	12.5	kW/m2	56.2773	50.0479
Radiation Level	37.5	kW/m2	42.9376	37.7413
Radiation Level	44	kW/m2	42.9098	37.7413
	Radia	tion Effects: Early P	ool Fire Distance	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Distribuição	Cenário 016A	
				Radiation Level (kW/m2)
			Dia	Noite
		Late Pool Fire F	lazard	
Path: \UTE Pamp	a rev 0 Hidroge	nio\Study\Distribuição	Cenário 016A	
		,,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,	Dia	Noite
Lata Daol Fira Sta	tuc		Dia Unzard	Hozard
Late Pool File Sta	lus		паzаго	паzаго
	Rad	iation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Distribuição	Cenário 016A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	96.3508	91.3191
Radiation Level	12.5	kW/m2	57.0393	51.2945
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Distribuição	Cenário 016A	
			Dia	Radiation Level (kW/m2) Noite
		Weather Cond	itions	
Path: \UTE Pamp	a rev_0_Hidroge	nio\Study\Distribuição	Cenário 016A	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughnes	s Length	mm	950.891	950.891
Surface Roughnes	s Parameter		0.17	0.17
Atmospheric Tem	perature	degC	19.6	16.5
Surface Temperatu	ure	degC	24.6	16.5
Relative Humidity	7	fraction	0.636	0.749



Cenário 016H			
Base Case			
CASE Nar	ne: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenán	rio 016H	
	User-Defined Dat	ta	
Materia			
	Material Identifier	n-NONANE	
Scenari	0		
	Building Wake Effect	None	
Vessel/T	ank		
1000011	Release Type	Continuous	
т.,			
Locatio	n [Elevation	1	ml
	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			
Dunu	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	
Flamma	able		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispers	ion		
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	30.94	m/s
	Droplet Diameter(1)	243.4	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.48	degC
	Release Rate(1)	6.94	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball	Parameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters



	[Wind Dependent Exchange Rate	Case Specified]	
	[Building Exchange Rate	4	/hr]
	[Tail Time	1800	s]
	[Set averaging time equal to exposure time	Use a fixed averaging time]	
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m


Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016H

		Dia	Noite
Release Segment	1		
Release Duration	S	600	600
Liquid Rainout	fraction	0.957155	0.963418
Release Segment 1 Cloud Segment 1			
Cloud Segment Duration	S	201.64	182.25
Pool Vaporization Rate	kg/s	0.0410014	0.0193738
Total Vapor Flowrate	kg/s	0.338348	0.273251
Release Segment 1 Cloud Segment 2			
Cloud Segment Duration	S	78.9225	78.5725
Pool Vaporization Rate	kg/s	0.104816	0.0449423
Total Vapor Flowrate	kg/s	0.402163	0.298819
Release Segment 1 Cloud Segment 3			
Cloud Segment Duration	S	59.84	61.38
Pool Vaporization Rate	kg/s	0.138845	0.0580377
Total Vapor Flowrate	kg/s	0.436192	0.311915
Release Segment 1 Cloud Segment 4			
Cloud Segment Duration	S	49.66	52.22
Pool Vaporization Rate	kg/s	0.166455	0.0684893
Total Vapor Flowrate	kg/s	0.463801	0.322366
Release Segment 1 Cloud Segment 5			
Cloud Segment Duration	S	43.6181	45.8275
Pool Vaporization Rate	kg/s	0.190427	0.0774044
Total Vapor Flowrate	kg/s	0.487773	0.331281
Release Segment 1 Cloud Segment 6			
Cloud Segment Duration	S	75.95	80.3906
Pool Vaporization Rate	kg/s	0.221721	0.0887505
Total Vapor Flowrate	kg/s	0.519067	0.342627
Release Segment 1 Cloud Segment 7			
Cloud Segment Duration	S	90.3694	99.3594
Pool Vaporization Rate	kg/s	0.26611	0.104706
Total Vapor Flowrate	kg/s	0.563457	0.358582
Maximum Pool Radius	m	18.7035	18.7402



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016H

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 flammable effect height 0 m

on(ppm)	Averaging Time			Distance (m)
			Dia	Noite
(000	18.75	S	No Hazard	No Hazard
)()(18.75	S	10.3795	10.2763
000)	18.75	S	10.3795	10.2763
on(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
(000	18.75	S	0	0
)()(18.75	S	0	0
(000)	18.75	S	0	0
	n(ppm))00))0) 000) n(ppm))00) 000) 000)	n(ppm) Averaging Time 000) 18.75 00) 18.75 000) 18.75 n(ppm) Averaging Time 000) 18.75 000) 18.75 000) 18.75 000) 18.75 000) 18.75 000) 18.75 000) 18.75	n(ppm) Averaging Time)00) 18.75 s)0) 18.75 s 000) 18.75 s n(ppm) Averaging Time)00) 18.75 s)0) 18.75 s 00) 18.75 s 00) 18.75 s	n(ppm) Averaging Time Dia 000) 18.75 s No Hazard 00) 18.75 s 10.3795 000) 18.75 s 10.3795 n(ppm) Averaging Time Dia 000) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0 000) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Truncated	Truncated
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016H

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	28.4635	27.3835
Radiation Level	12.5	kW/m2	19.6981	19.219
Radiation Level	37.5	kW/m2	15.7778	15.523
Radiation Level	44	kW/m2	15.3256	15.0863

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016H

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016H

Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio

	Rad	iation Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 016H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	47.8539	46.8772
Radiation Level	12.5	kW/m2	30.9571	29.416
Radiation Level	37.5	kW/m2	17.2698	17.2248
Radiation Level	44	kW/m2	17.2698	17.2248
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 016H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire F	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 016H	
			Dia	Noite
Late Pool Fire Stat	us		Hazard	Hazard
	Rac	liation Effects: Late F	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 016H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	78.9936	76.2441
Radiation Level	12.5	kW/m2	32.4957	31.7675
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	iation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição	o\Cenário 016H	
			Dia	Radiation Level (kW/m2) Noite



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016H

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

Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 10.3795 10.3795	Distance (m) Noite 10.2763 10.2763
Furthest Extent Furthest Extent	7000 7000	ppm ppm	Dia 0 0	Heights (m) for above distances Noite 0 0



Study Folder: UTE Pampa rev_0_Hidrogenio

Path:	\UTE Pampa r	ev_0_Hidrog	enio\Study\Distribuiç	ão\Cenário 016H	
		Explosion Explosion	Model Used : Multi E Location Criterion: C	Cnergy loud Front (LFL Frac	tion)
		All distanc	es are measured from	the Source	
		All flamma	able results are reported	ed at the flammable ef	ffect height 0 m
				Maximum D	istance (m) at Overpressure Level
				Dia	Noite
Over	pressure	0.05	bar	30.7244	28.4263
Over	pressure	0.1	bar	21.1888	19.9481
Over	pressure	0.3	bar	14.4268	13.936
Over	pressure	0.4	bar	13.2041	12.8488
				Supplementa	ry Data at 0.05 bar
				Dia	Noite
Supp Used	lied Flammable Flammable Ma	Mass	kg	0.151897	0.106762
Over	pressure Radius	55	m	20.7244	18.4263
Dista	ince to:			_0.,	10.1200
- Igr	ition Source		m	10	10
- Cle	oud Front/Centre	e	m	10	10
- Ex	plosion Centre		m	10	10
				Supplementa	ry Data at 0.1 bar
				Dia	Noite
Supp Used	lied Flammable Flammable Ma	Mass ss	kg	0.151897	0.106762
Over	pressure Radius		m	11.1888	9.9481
Dista	ince to:				
- Igr	nition Source		m	10	10
- Cle	oud Front/Centre	e	m	10	10
- Ex	plosion Centre		m	10	10
				Supplementa	ry Data at 0.3 bar
				Dia	Noite
Supp Used	lied Flammable Flammable Ma	Mass ss	kg	0.151897	0.106762
Over	pressure Radius		m	4.42685	3.93595
Dista	ince to:				
- Igr	nition Source		m	10	10
- Cle	oud Front/Centre	e	m	10	10
- Ex	plosion Centre		m	10	10
				Supplementa	ry Data at 0.4 bar
				Dia	Noite
Supp Used	lied Flammable Flammable Ma	Mass ss	kg	0.151897	0.106762
Over	pressure Radius		m	3.20409	2.84879
Dista	ince to:				
- Igr	nition Source		m	10	10
- Clo	oud Front/Centre	e	m	10	10



Study Folder:	UTE Pampa rev 0	Hidrogenio
Study I bluch.		inai ogenio

	Phast 6.
10	

m	10	10
Weather Cond	itions	
tudy\Distribuiçã	o\Cenário 016H	
	Dia	Noite
m/s	3.73	2.78
	C/D	D
mm	950.891	950.891
	0.17	0.17
degC	19.6	16.5
degC	24.6	16.5
fraction	0.636	0.749
	m Weather Cond tudy\Distribuição m/s mm degC degC fraction	m 10 Weather Conditions tudy\Distribuição\Cenário 016H M/s 3.73 C/D mm 950.891 0.17 degC 19.6 degC 24.6 fraction 0.636





Cenário 016I			
Base Case			
CASE Nan	ne: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Distribuiça	io\Cenário 016I	
	User-Defin	ned Data	
Materia	1		
	Material Identifier	n-NONANE	
Scenario			
Scenaria	Building Wake Effect	None	
Vessel/T	ank Dalaase Terre	Continuous	
	Release Type	Continuous	
Location	n		
	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		
Indoor/	Location of release	Open air release	
	Outdoor Release Direction	Down - Impinging on the Ground	
Flamma	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersi	on		
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	30.94	m/s
	Droplet Diameter(1)	243.4	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.48	degC
	Release Rate(1)	6.94	kg/s
	Pre-Dilution Air Kates(1)		kg/s
	Late Ignition Location	No ignition location	ka
	mass inventory of material to Disperse	IEo	кд
Fireball	Parameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016I

		Dia	Noite
Release Segmen	t 1		
Release Duration	S	600	600
Liquid Rainout	fraction	1	1
Release Segment 1 Cloud Segment	1		
Cloud Segment Duration	S	196.701	175.563
Pool Vaporization Rate	kg/s	0.0469235	0.022915
Total Vapor Flowrate	kg/s	0.0469237	0.0229152
Release Segment 1 Cloud Segment 2	2		
Cloud Segment Duration	S	79.69	78.84
Pool Vaporization Rate	kg/s	0.116239	0.050866
Total Vapor Flowrate	kg/s	0.11624	0.0508661
Release Segment 1 Cloud Segment 3	3		
Cloud Segment Duration	S	60.3319	61.5481
Pool Vaporization Rate	kg/s	0.153311	0.0651356
Total Vapor Flowrate	kg/s	0.153311	0.0651357
Release Segment 1 Cloud Segment 4	4		
Cloud Segment Duration	S	50.3831	52.6894
Pool Vaporization Rate	kg/s	0.183318	0.0764675
Total Vapor Flowrate	kg/s	0.183318	0.0764677
Release Segment 1 Cloud Segment 3	5		
Cloud Segment Duration	S	44.495	47.52
Pool Vaporization Rate	kg/s	0.20946	0.0862472
Total Vapor Flowrate	kg/s	0.20946	0.0862474
Release Segment 1 Cloud Segment 0	6		
Cloud Segment Duration	S	76.9019	82.2456
Pool Vaporization Rate	kg/s	0.24345	0.0987178
Total Vapor Flowrate	kg/s	0.24345	0.0987179
Release Segment 1 Cloud Segment 7	7		
Cloud Segment Duration	S	91.4975	101.594
Pool Vaporization Rate	kg/s	0.291425	0.116095
Total Vapor Flowrate	kg/s	0.291425	0.116095
Maximum Pool Radius	m	19.1128	19.0948

2,739,689 Phast 6.7

Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016I

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016I

Jet fire method used: Cone model - DNV recommended

Jet Fi Flam	re Status e Direction			Dia No Hazard Along Ground	Noite No Hazard Along Ground
			Early Pool Fire Ha	zard	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição\C	Cenário 016I	
				Dia	Noite
Early	Pool Fire Stat	us		Hazard	Hazard
		Rad	liation Effects: Early Po	ol Fire Ellipse	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Distribuição\C	Cenário 016I	
					Distance (m)
				Dia	Noite
Radia	ation Level	3	kW/m2	37.6912	36.7377
Radia	ation Level	12.5	kW/m2	20.5111	19.0357
Radia	ation Level	37.5	kW/m2	6.856	6.89567
Radia	ation Level	44	kW/m2	6.856	6.89567

Radiation Effects: Early Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016I

Radiation Level (kW/m2) Noite

Dia

Study Folder:

Path:

Path:

Noite

Hazard



Late Pool Fire Hazard \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016I Dia Late Pool Fire Status Hazard **Radiation Effects: Late Pool Fire Ellipse** \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016I

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	69.4714	66.6411
Radiation Level	12.5	kW/m2	22.3363	21.6001
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016I

UTE Pampa rev_0_Hidrogenio

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016I

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749

Date: 28/04/2014





CASE Data Path: 'UTE Pampa rev_0_Hidrogenio'Study/Distribuição/Cenário 016V' User-Defined Data Material n.NONANE Scenario n.NONANE Scenario None Building Wake Effect None Vessel/Tank Release Type Continuous ERPG not selected Use ERPG averaging time ERPG not selected Use ERPG averaging time STEL not selected Use STEL averaging time STEL not selected Use STEL averaging time Concrete] Bund Faiture Modeling Not bund present [Trype of Bund Surface Concrete] [Bund Faiture Modeling Bund cannot fail Indoor/Outdoor Location of release Location of release Direction Vertical Flammable Explosion Method Explosion Method Multi-Energy Dispersion Initernergy (Cone Mode) Number of Release Segments 1 Flaid Temperature(1) 23.4 un Dispersion Statis Not present Number of Release Segments 1 Flaid Tempera	iário 016V			
Park: UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V User-Defined Data Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location I m] Use ERPG averaging time ERPG not selected Use BDL H averaging time IDL H not selected Use STEL averaging time STEL not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund Itype of Bund Surface Concrete] Bund Height 0 m] Indoor/Outdoor Location of release Outdoor Release Direction Vertical Flammable Explosion Method Dispersion Number of Release Segments 1 Fluid Phase(1) 12434 um Duration of Discharge(1) 600 s Final Temperature(1) 2434 um Duration of Discharge(1) 600 s Final Temperature(1) 2548 dg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg/s	ase Case CASE Name:	Data		
User-Defined Data Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location Image: Im	Path: \U	TE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 0	16V	
Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location Imilian Im		User-Defined Data		
Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location Iml Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use IDLH averaging time STEL not selected Use Status of Bund Not suppled Bund No bund present [Type of Bund Surface Concrete] [Bund Height 0 ml [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Outdoor Release Direction Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Dispersion 1 Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/s Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/s Itemperature(1) 25.48 degC Fireball Parameters 1E6 kg Fireball Parameters 1E6 kg	Material			
Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location Image: I		Material Identifier	n-NONANE	
Building Wake Effect None Vessel/Tank Release Type Continuous Location 1 m] Use ERPG averaging time ERPG not selected Use EDLH averaging time 1 m] Use ERPG averaging time Use EXPG averaging time STEL not selected Use STEL averaging time Not supplied Bund Status of Bund No bund present (Type of Bund Surface (Bund Height) 0 m] Bund Failure Modeling Bund cannot fail] 0 m] Indoor/Outdoor Location of release Outdoor Release Direction Open air release Flammable Explosion Method Multi-Energy Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Displate Direction 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 0.94 kg/s Late Ignition Location No signition location No ignition location 0 kg/s Droplet Diameter(1) Ass Inventory of material to Disperse 1E6 kg Fireshall Parameters [Mass Modification Factor 3 [Calculation method for fireball [TNO model Tame temperature 137 degC	Scenario		N	
Vessel/Tank Release Type Continuous Location [Elevation 1 m] Use ERPG averaging time ERPG not selected m] Use DLH averaging time DLH not selected m] Use STEL averaging time DLH not selected supply a user defined averaging time Not supplied Bund Status of Bund No bund present Concretel m] [Bund Height 0 m] m] Bund Status of Bund Surface Concretel m] [Bund Failure Modeling Bund cannot fail] m] Indoor/Outoor Location of release Open air release outdoor Release Direction Location of release Opticate Cone Model m] Dispersion Multi-Energy Cone Model m] Discharge Velocity(1) 243.4 um Discharge Velocity(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 6.94 kp/s Pre-Dilution Air Rates(1) 0 6.94 Mass Inventory of mat		Building Wake Effect	None	
Release Type Continuous Location 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 No bund present [Type of Bund Surface Concrretel [Bund Height 0 m] [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Vertical Vertical Flammable Explosion Method Multi-Energy Location of release Segments 1 Liquid Dispersion Liquid Liquid Number of Release Segments 1 Liquid Final Temperature(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 0 kg/s Pre-Dilution Air Rates(1) 0 kg/s Ideas Inventory of material to Disperse IE6 kg Fireball Parameters I	Vessel/Tank	4		
Location Image: Ima		Release Type	Continuous	
[Elevation 1 m] Use ERPG averaging time ERPG not selected Use DLH averaging time IDLH not selected Supply a user defined averaging time STEL not selected Bund No bund present [Type of Bund Surface Concretel [Bund Height 0 m] [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Liquid 30.94 Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 dgg/ Release Rate(1) 0 kg/s Pre-Dilution Air Rates(1) 0 kg/s Mass Inventory of material to Disperse 1E6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball] DNV Recommended]	Location			
Use ERPG averaging time IDLH not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund Concrete [Bund Height 0 m] [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 600 s Final Temperature(1) 600 s Final Temperature(1) 600 s Final Temperature(1) 6494 kg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse 16 kg		[Elevation	1	m]
Ose IDLH averaging time STEL not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund No bund present [Type of Bund Surface Concrete] [Bund Height 0 m] [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Location of release Direction Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Dispersion Number of Release Segments Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Duration of Discharge(1) 600 s Final Temperature(1) 25.48 Release Rate(1) 0 Mass Inventory of material to Disperse 1E6 Fireball Parameters 1 [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Use ERPG averaging time	ERPG not selected	
Supply a user defined averaging time STEL hor selected Bund Not supplied Bund [Type of Bund Surface Concrete] [Bund Height 0 m] [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Open air release Outdoor Release Direction Vertical Flammable Multi-Energy Explosion Method Cone Model Dispersion Cone Model No bund present 1 Flaid Phase(1) Liquid Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 0 kg/s Release Rate(1) 0 kg/s Mass Inventory of material to Disperse IE6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC		Use STEL averaging time	STEL not selected	
Bund No bund present [Type of Bund Surface Concrete] [Bund Height 0 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Excation of release Location of release Open air release Outdoor Release Direction Vertical Flammable Multi-Energy Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Gelease Rate(1) 6.94 Mass Inventory of material to Disperse 16 Kass Inventory of material to Disperse 16 Kass Modification Factor 3] [Calculation method for fireball DNV Recommended] [Two model flame temperature 1727		Supply a user defined averaging time	Not supplied	
Status of Bund Status 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 Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 0 kg/s Pre-Dilution Air Rates(1) 0 kg/s Pre-Dilution Air Rates(1) 0 kg/s Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball [TNO model flame temperature 1727 degC	Rund			
[Type of Bund Surface Concrete] [Bund Height 0 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Description Location of release Open air release Outdoor Release Direction Vertical Flammable Explosion Method Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 600 Stinal Temperature(1) 6.94 Release Rate(1) 0 Pre-Dilution Air Rates(1) 0 Mass Inventory of material to Disperse 1E6 Kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727	Dullu	Status of Bund	No bund present	
Bund Height 0 m] Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Multi-Energy Jet Fire Method Dispersion 1 Liquid Number of Release Segments 1 Liquid Discharge Velocity(1) 30.94 m/s Dorplet Diameter(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 0 kg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse IMass Modification Factor 3 [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC		[Type of Bund Surface	Concrete]	
Indoor/Outdoor Bund cannot fail] Location of release Open air release Outdoor Release Direction Vertical Flammable Explosion Method Location of Release Segments 1 Fluid Phase(1) Liquid Dispersion 1 Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Discharge Velocity(1) 30.94 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 6.94 Pre-Dilution Air Rates(1) 0 Mass Inventory of material to Disperse 16 Fireball Parmeters 1 [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		[Bund Height	0	m]
Indoor/Outdoor Location of release Open air release Outdoor Release Direction Vertical Flammable Explosion Method Multi-Energy Jet Fire Method Multi-Energy Jet Fire Method Dispersion 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 m/s Droplet Diameter(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location m Mass Inventory of material to Disperse 1E6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball] DNV Recommended] [TNO model flame temperature 1727 degC		[Bund Failure Modeling	Bund cannot fail]	
Location of release Outdoor Release Direction Open air release Vertical Flammable Kexplosion Method Multi-Energy Cone Model Dispersion Mumber of Release Segments 1 Fluid Phase(1) Liquid Number of Release Segments 1 Dispersion I Second Sec	Indoor/Out	door		
Outdoor Release Direction Vertical Flammable Multi-Energy Explosion Method Multi-Energy Jet Fire Method Multi-Energy Dispersion 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Release Rate(1) 6.94 Release Rate(1) 0 Mass Inventory of material to Disperse 1E6 Kg 1 Fireball Parameters 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Location of release	Open air release	
Flammable Multi-Energy Lexplosion Method Multi-Energy Jet Fire Method Cone Model Dispersion 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 6.94 Pre-Dilution Air Rates(1) 0 Mass Inventory of material to Disperse 1E6 Kg IE6 Fireball Parameters [Mass Modification Factor [Mass Modification Factor 3] [TNO model flame temperature DNV Recommended]		Outdoor Release Direction	Vertical	
Explosion MethodMulti-Energy Cone ModelDispersionINumber of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Mr/sDroplet Diameter(1)Quration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)6.94Kg/s0Pre-Dilution Air Rates(1)0Mass Inventory of material to Disperse1E6Kg1Fireball Parameters[Mass Modification Factor[Mass Modification Factor3][TNO model flame temperature1727degCMass Inventory of material1DNV Recommended][TNO model flame temperature1727	Flammable			
Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Discharge Velocity(1) Discharge Velocity(1) Duration of Discharge(1) Cone Model Number of Release Segments Final Temperature(1) Cone Model No ignition Sector Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Mass Modification Factor [Mass Modification Factor [TNO model flame temperature]] Dispersion Cone Model Cone Model Cone Mo		Explosion Method	Multi-Energy	
Dispersion1Number of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Droplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)6.94kg/s6.94Pre-Dilution Air Rates(1)0kg/s1Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters1[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727degC		Jet Fire Method	Cone Model	
Number of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94m/sDroplet Diameter(1)Duration of Discharge(1)600sFinal Temperature(1)Release Rate(1)6.94kg/sPre-Dilution Air Rates(1)Late Ignition LocationNo ignition locationMass Inventory of material to Disperse16Fireball Parameters3][Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727degC	Dispersion			
Fluid Phase(1)LiquidDischarge Velocity(1)30.94 m/sDroplet Diameter(1)243.4 umDuration of Discharge(1)600 sFinal Temperature(1)25.48 degCRelease Rate(1)6.94 kg/sPre-Dilution Air Rates(1)0 kg/sLate Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6 kgFireball Parameters3][Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727 degC		Number of Release Segments	1	
Discharge Velocity(1)30.94 m/sDroplet Diameter(1)243.4 umDuration of Discharge(1)600 sFinal Temperature(1)25.48 degCRelease Rate(1)6.94 kg/sPre-Dilution Air Rates(1)0 kg/sLate Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6 kgFireball Parameters[Mass Modification Factor[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727 degC		Fluid Phase(1)	Liquid	
Droplet Diameter(1) 243.4 um Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature		Discharge Velocity(1)	30.94	m/s
Duration of Discharge(1) 600 s Final Temperature(1) 25.48 degC Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC		Droplet Diameter(1)	243.4	um
Final Temperature(1) 25.48 degc Release Rate(1) 6.94 kg/s Pre-Dilution Air Rates(1) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degc		Duration of Discharge(1)	600	s
Fireball Parameters 0 kg/s [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Final Temperature(1)	25.48	degC
Inter-Dilution Air Rates(T) 0 kg/s Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 kg Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC		Release Rate(1) Pre Dilution Air Pates(1)	0.94	kg/s
Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC		Late Ignition Location	No ignition location	к <u>р</u> / S
Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC		Mass Inventory of material to Disperse	1E6	kg
[Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 degC	Firehall Pa	rameters		
[Calculation method for fireballDNV Recommended][TNO model flame temperature1727 degC	i neban i a	[Mass Modification Factor	31	
[TNO model flame temperature 1727 degC		[Calculation method for fireball	DNV Recommended]	
		[TNO model flame temperature	1727	degC

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V $$$

			Dia	Noite
R	elease Segment 1			
Release Duration		S	600	600
Liquid Rainout		fraction	0.46736	0.591797
Release Segment 1 C	loud Segment 1			
Cloud Segment Duration	1	S	202.351	
Pool Vaporization Rate		kg/s	0.0198924	
Total Vapor Flowrate		kg/s	3.71642	2.83293
Release Segment 1 C	cloud Segment 2			
Cloud Segment Duration	1	S	79.05	
Pool Vaporization Rate		kg/s	0.0512368	
Total Vapor Flowrate		kg/s	3.74776	
Release Segment 1 C	Cloud Segment 3			
Cloud Segment Duration	1	S	59.925	
Pool Vaporization Rate		kg/s	0.0678928	
Total Vapor Flowrate		kg/s	3.76442	
Release Segment 1 C	loud Segment 4			
Cloud Segment Duration	1	S	49.725	
Pool Vaporization Rate		kg/s	0.081369	
Total Vapor Flowrate		kg/s	3.77789	
Release Segment 1 C	loud Segment 5			
Cloud Segment Duration	1	S	43.6719	
Pool Vaporization Rate		kg/s	0.0930442	
Total Vapor Flowrate		kg/s	3.78957	
Release Segment 1 C	loud Segment 6			
Cloud Segment Duration	1	S	74.9081	
Pool Vaporization Rate		kg/s	0.108106	
Total Vapor Flowrate		kg/s	3.80463	
Release Segment 1 C	loud Segment 7			
Cloud Segment Duration	1	S	90.3694	
Pool Vaporization Rate		kg/s	0.129456	
Total Vapor Flowrate		kg/s	3.82598	
Maximum Pool Radius		m	13.0647	14.6852



Study Folder: UTE Pampa rev_0_Hidrogenio

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V

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 flammable effect height 0 m

ion(ppm)	Averaging Time			Distance (m)
			Dia	Noite
6000)	18.75	S	No Hazard	No Hazard
000)	18.75	S	No Hazard	No Hazard
(7000)	18.75	S	No Hazard	No Hazard
ion(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
6000)	18.75	S	0	0
000)	18.75	S	0	0
(7000)	18.75	S	0	0
	ion(ppm) 6000) 7000) 7000) ion(ppm) 6000) 000) 7000)	ion(ppm) Averaging Time 6000) 18.75 000) 18.75 7000) 18.75 ion(ppm) Averaging Time 6000) 18.75 ion(ppm) Averaging Time 6000) 18.75 000) 18.75 000) 18.75 000) 18.75 (7000) 18.75	ion(ppm) Averaging Time 6000) 18.75 s 000) 18.75 s 7000) 18.75 s ion(ppm) Averaging Time 6000) 18.75 s 000) 18.75 s 000) 18.75 s 000) 18.75 s (7000) 18.75 s	ion(ppm) Averaging Time Dia 6000) 18.75 s No Hazard 000) 18.75 s No Hazard 7000) 18.75 s No Hazard ion(ppm) Averaging Time Dia 6000) 18.75 s O 000) 18.75 s 0 000) 18.75 s 0 7000) 18.75 s 0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Vertical	Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	57.6527	60.8896
Radiation Level	12.5	kW/m2	30.7505	31.5159
Radiation Level	37.5	kW/m2	19.2917	19.2682
Radiation Level	44	kW/m2	17.8603	17.3658

Radiation Effects: Jet Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016V

Radiation Level (kW/m2) Noite

Early Pool Fire Hazard

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V

	2.4	10110
Early Pool Fire Status	Hazard	Hazard
Early Pool Fire Status	Hazard	Ha

Radiation Level

Radiation Level

Radiation Level

Radiation Level

Study Folder:

Path:

Path:

	Unique Audit	Number:	2,739,689
rev_0_Hidrogenio			Phast 6.7
Radiation Effects: Early I	Pool Fire Ellipse		
idrogenio\Study\Distribuição	Cenário 016V		
		Distanc	e (m)
	Dia	Noite	
kW/m2	71.2669	62.0303	3
kW/m2	57.9775	47.2249)
kW/m2	45.6932	35.0347	7
kW/m2	45.0732	35.0347	7
Radiation Effects: Early P	ool Fire Distance		
idrogenio\Study\Distribuição	Cenário 016V		
		Radiati	on Level (kW/m2)
	Dia	Noite	(,

Late Pool Fire Hazard

Path:	h: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V				
		Dia	Noite		
Late	Pool Fire Status	Hazard	Hazard		

Radiation Effects: Late Pool Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016V

UTE Pampa rev 0 Hidrogenio

3

12.5

37.5

44

\UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016V

\UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	95.0871	86.112
Radiation Level	12.5	kW/m2	59.0868	48.3917
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Distribuição\Cenário 016V

> Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev 0 Hidrogenio\Study\Distribuição\Cenário 016V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Na	me: Data		
Dath	UTE Domno roy O Hid	rogenia/Study/Determa/Confinia 0184	
ratn:	\UTE Panipa lev_0_fild	Togenio/Study/Retorno/Cenario 018A	
		User-Defined Data	
Bund			
	Status of Bund	No bund present	
	Type of Bund Surfa	ace Concrete	
	Bund Height	0	m
	Bund Failure Mode	eling Bund cannot fail	
Indoor	/Outdoor		
	Location of release	Open air release	
	Outdoor Release An	ngle 45	deg
	Outdoor Release Di	rection Angled from Horizontal	
Flamn	able		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Disner	sion		
Disper	Late Ignition Locati	on No ignition location	
	Mass Inventory of n	naterial to Disperse 1E6	kg
E . 1	1 D (
Fireda	I Parameters	Factor 21	
	[Calculation method	for fireball DNV Recommended]	
	[TNO model flame	temperature 1727	degC
.			
Toxic	arameters	reheren Dete	
	wind Dependent E	Case Specified	/1]
	Building Exchange	Kale 4	/nr
	[Sat averaging time	aqual to exposure time. Use a fixed everying time.	5]
	[Set averaging time	toxic lead for exposure time calculation 0.05	froat
	[Cut-off concentrati	on for exposure time calculations 0	fract
Multi	Unergy Explosion	ength Do not use unconfined strength	
	Use Fractions	Use fractions	
	Source 1 (Source in	Use ifactions	
	Source 2 (Source in	Use) Yes	
	Source 2 (Source in	Use) No	
	Source A (Source in	Use) No	
	Source 5 (Source in	Use) No	
	Source 6 (Source in	Use) No	
	Source 7 (Source in	NO Ilse)	
	Source 1 (Strength)	(50) NO	
	Source 1 (Surength) Source 1 (Fraction)	1	fract
c			
Geome	try Shape	Point	
	Shape	Tollit	

Study Folder:

	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m
Мя	aterial		
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	8	bar
	Temperature	25	degC
	Mass Inventory	1E6	kg
Sce	enario		
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	6.35	mm
	Building Wake Effect	None	
	Tank Head	0	m
Lo	cation		
	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	
	Supply a user aerinea averaging time	i tot supplied	

UTE Pampa rev_0_Hidrogenio

Path:



Study Folder: UTE Pampa rev_0_Hidrogenio

\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018A

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expa	ansion):	
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pi	pe releases) 51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	s

Stagnation data (data at upstream end for long pipe):

 - Pressure
 9.01 bar

 - Temperature
 25.00 degC

 - Fluid State
 Non-saturated liquid

CALCULATED QUANTITIES



Study Folder:	UTE Pampa rev	0	Hidrogenio
			_ 0

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Study Folder:



Phast 6.7

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018A

UTE Pampa rev 0 Hidrogenio

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018A

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 018A

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

			Distance	
			Dia	Noite
Radiation Level	3	kW/m2	22.2516	22.4603
Radiation Level	12.5	kW/m2	12.6795	12.212
Radiation Level	37.5	kW/m2	8.07668	7.36617
Radiation Level	44	kW/m2	7.44295	5.79744

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018A

> Radiation Level (kW/m2) Noite

Study Folder: UTE Pampa rev_0_Hidrogenio

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name	: Data	
Path: \U	JTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário	018H
	User-Defined D	ata
Material		
	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	8
	Temperature	25
	Mass Inventory	1E6
Scenario		
	Scenario Type	Leak
	Phase to be Keleased	Liquid
	Hole Diameter Duilding Waka Effect	0.33 None
	Tank Head	None (
.		
Location	[Flevation	1
	Use FRPG averaging time	FRPG 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
	[Bund Failure Modeling	Bund cannot fail
Indoor/O	ıtdoor	
	Location of release	Open air release
	Outdoor Release Direction	Horizontal
Flammab	le	
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispersion		NT 1 1 1
	Late Ignition Location	INO Ignition location
	Mass Inventory of material to Disperse	IEC
Fireball P	arameters	21
	Iviass Mounication Factor	JNNV Decommon J-1
	[TNO model flame temperature	1727

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Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Study Folder: UTE Pampa rev_0_Hidrogenio

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018H

DISCHARGE DATA for Weather:	Global Weathers\Dia		
Wind Speed:		3.73	m/s
Wind Speed at Height (Calculated)		2.10	m/s
Pasquill Stability:		C/D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for lor	ng pipe):		
- Pressure		9.01	bar
- Temperature		25.00	degC
- Fluid State		Non-saturated liquid	
CALCULATED QUANTITIES			
Mass Flow of Air (Vent from Vapor Space of	only)	n/a	
Mass Flowrate		6.99592E-001	kg/s
Release Duration		600.00	S
Orifice or pipe exit data (before atmospheri	c expansion):		
- Pressure		1.01	bar
- Temperature		24.85	degC
- Vena Contracta Velocity (exit velocity	for pipe releases)	51.54	m/s
- Discharge Coefficient		0.60	
Final data (after atmospheric expansion):			
- Temperature		24.85	degC
- Liquid Mass Fraction		1.00	fraction
- Droplet Diameter		87.98	um
- Expanded Radius		0.00	m
- velocity		51.54	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite		
Wind Speed:		2.78	m/s
Wind Speed at Height (Calculated)		1.45	m/s
Pasquill Stability:		D	
USER-DEFINED QUANTITIES			
Material		n-NONANE	
Scenario		Leak	
Inventory		1,000,000.00	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for lor	ng pipe):		
- Pressure		9.01	bar
- Temperature Fluid State		25.00	degC
- Fluid State		inon-saturated liquid	

CALCULATED QUANTITIES



Study Folder:	UTE Pampa rev	0	Hidrogenio
			_ 0

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Study Folder:



Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Ce	enário 018H	
				Dia	Noite
		Release Segment	1		
Rele	ase Duration		S	600	600
Liqu	id Rainout		fraction	0.56822	0.703459
Max	imum Pool Radii	us	m	4.56734	5.08083
		Dista	nce to Concentra	ation Results	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Ce	mário 018H	
		The height for us All toxic results All flammable re	er defined conce are reported at th sults are reported	ntrations is the user d e toxic effect height (l at the flammable eff	lefined height 0 m) m fect height 0 m
Cond	centration(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL	(7000)	18.75	S	No Hazard	No Hazard
LFL	Frac (7000)	18.75	S	No Hazard	No Hazard
Cone	centration(ppm)	Averaging Time		Dia	Heights (m) for above distances
UFL	(56000)	18 75	S	0	0
LFL	(7000)	18.75	5	0	0
LFL	Frac (7000)	18.75	s	0	0
			Jet Fire Haz	ard	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Ce	mário 018H	
		Jet fire method u	sed: Cone model	- DNV recommende	d
				Dia	Noite
Jet F	ire Status			Truncated	Truncated
Flam	ne Direction			Horizontal	Horizontal
		Radia	tion Effects: Jet	t Fire Ellipse	
Path:	\UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Ce	enário 018H	
		This table gives t	he distances to the	ne specified radiation	levels
		for each jet fire li	isted in the above	e hazard table	
					Distance (m)

				Distance (II
			Dia	Noite
Radiation Level	3	kW/m2	24.6111	23.9695
Radiation Level	12.5	kW/m2	16.9523	16.7799
Radiation Level	37.5	kW/m2	13.539	13.5468
Radiation Level	44	kW/m2	13.1479	13.1699

Study Folder:



	I	Radiation Effects: Jet 1	Fire Distance	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Cer	nário 018H	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire I	Iazard	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Cer	nário 018H	
Early Pool Fire Sta	tus		Dia Hazard	Noite Hazard
	Rad	liation Effects: Early I	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Cer	nário 018H	
Radiation Level Radiation Level Radiation Level Radiation Level	3 12.5 37.5 44	kW/m2 kW/m2 kW/m2 kW/m2	Dia 30.5099 23.9258 18.5479 17.7217	Distance (m) Noite 29.7866 22.4658 16.6983 15.8961
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Cer	nário 018H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	lazard	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Cer	nário 018H	
Late Pool Fire Stat	us		Dia Hazard	Noite Hazard
	Ra	diation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Cer	nário 018H	
Radiation Level Radiation Level	3 12.5	kW/m2 kW/m2	Dia 47.7807 33.3202	Distance (m) Noite 46.8707 30.9187
Radiation Level	37.3 44	к w/m2 kW/m2	19.9244	18.5986

UTE Pampa rev_0_Hidrogenio



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018H

Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\\Study\\Retorno\\Cenário 018H$

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 018	I		
Base Case			
CASE N	ame: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Retorno\	Cenário 018I	
	User-De	fined Data	
Mater	ial		
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	8	bar
	Mass Inventory	25 1E6	degC kg
S			
Scena	rio Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	6 35	mm
	Building Wake Effect	None	
	Tank Head	0	m
Locati	ion		
	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	
Indoo	r/Outdoor	Quere d'autorité	
	Location of release	Open air felease	
	Outdoor Release Direction	Down - Impinging on the Ground	
Flamr	nable		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Disper	rsion		
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireba	all Parameters		
	Mass Modification Factor	3]	
	Calculation method for fireball	DNV Recommended]	1 07
	INO model flame temperature	1727	degC]
Toxic	Parameters		
	wind Dependent Exchange Rate	Case Specified	

Study Folder:

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/hr] s]

fraction] fraction]

fraction

	[Building Exchange Rate	4
	[Tail Time	1800
	[Set averaging time equal to exposure time	Use a fixed averaging time
	[Cut-off fraction of toxic load for exposure time calcu	lation 0.05
	[Cut-off concentration for exposure time calculations	C
Multi Ener	gy Explosion	
	Use Unconfined Strength	Do not use unconfined strength
	Use Fractions	Use fractions
	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)	6
	Source 1 (Fraction)	1
Geometry		
	Change	Dein

UTE Pampa rev_0_Hidrogenio

Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0 m	
North(1)	0 m	



Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018I

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a :	s
Stagnation data (data at upstream end for long pipe)	r.	
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expan	ision):	
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pip	be releases) 51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a :	S
Stagnation data (data at upstream end for long pipe)	r.	
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s



Study Folder: UTE Pampa rev_0_Hidrogenio

Pool Vaporization Results

Path: \UTE Pampa re	v_0_Hidrogenio\Stu	udy\Retorno\Cenário	018I	
			Dia	Noite
	Release Segment 1			
Release Duration		S	600	600
Liquid Rainout		fraction	1	1
Maximum Pool Radiu	IS	m	6.05939	6.05855
	Distanc	e to Concentration	Results	
Path: \UTE Pampa re	v_0_Hidrogenio\Stu	udy\Retorno\Cenário	018I	
	The height for user All toxic results ar All flammable resu	r defined concentration e reported at the toxic alts are reported at the	ons is the user defi c effect height 0 m e flammable effec	ined height 0 m 1 t height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time		Dia	Heights (m) for above distances Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazard		
Path: \UTE Pampa re	v_0_Hidrogenio\Stu	udy\Retorno\Cenário	0181	
	Jet fire method use	ed: Cone model - DN	V recommended	

DiaNoiteJet Fire StatusNo HazardNo HazardFlame DirectionAlong GroundAlong Ground

Early Pool Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018I

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

UTE Pampa rev_0_Hidrogenio

Study Folder:



	Radiation Effect	s: Early Pool Fire Ellips	e
Path: \UTE Pampa rev	v_0_Hidrogenio\Study\Re	etorno\Cenário 018I	
			Distance (m)
		Dia	Noite
Radiation Level	3 kW/1	m2 19.5905	19.4256
Radiation Level	12.5 kW/1	m2 11.5508	11.1425
Radiation Level	37.5 kW/1	m2 4.72591	4.47013
Radiation Level	44 kW/r	m2 3.83332	3.65241
	Radiation Effects	: Early Pool Fire Distan	ce
Path: \UTE Pampa rev	v_0_Hidrogenio\Study\Re	etorno\Cenário 018I	
			Radiation Level (kW/m2
		Dia	Noite
	Late Po	ool Fire Hazard	
Path: \UTE Pampa rev	v_0_Hidrogenio\Study\Re	etorno\Cenário 018I	
		Dia	Noite
Late Pool Fire Status		Hazard	Hazard
	Radiation Effect	ts: Late Pool Fire Ellipse	e
Path: \UTE Pampa rev	v_0_Hidrogenio\Study\Re	etorno\Cenário 018I	
			Distance (m)
		Dia	Noite
Radiation Level	3 kW/1	m2 38.2811	37.1691
Radiation Level	12.5 kW/1	m2 20.6231	19.1042
Radiation Level	37.5 kW/1	m2 7.05939	7.05855
Radiation Level	44 kW/n	m2 7.05939	7.05855
	Radiation Effects	s: Late Pool Fire Distance	ce
Path: \UTE Pampa rev	v_0_Hidrogenio\Study\Re	etorno\Cenário 018I	
		Dia	Radiation Level (kW/m2 Noite
	Weath	er Conditions	
Path: \UTE Pampa rev	v_0_Hidrogenio\Study\Re	etorno\Cenário 018I	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Le	ngth mm	950.891	950.891
Surface Roughness Par	rameter	0.17	0.17
Atmospheric Temperat	ture degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
	C /	0.626	0.740



se Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 01	8V	
	User-Defined Data	a	
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	8	
	Iemperature Mass Inventory	25 1E6	1
Scenario	Scenario Tune	Leok	
	Phase to be Released	Liquid	
	Hole Diameter	6 35	1
	Building Wake Effect	None	
	Tank Head	0	1
Location			
Location	Elevation	1	1
	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	1
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Ou	tdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammabl	e		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	1
Fireball Pa	arameters		
	Mass Modification Factor	3]	
	Calculation method for fireball	DNV Recommended]	
	TNO model flame temperature	1727	(
Toxic Para	imeters		
	Wind Dependent Exchange Rate	Case Specified]	
Study Folder:

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	[Building Exchange Rate		4
	[Tail Time		1800
	[Set averaging time equal to exposure time	Use a fixed	averaging time]
	[Cut-off fraction of toxic load for exposure time of	alculation	0.05
	[Cut-off concentration for exposure time calculat	ons	0
Multi E	nergy Explosion		
	Use Unconfined Strength	Do not use unc	onfined strength
	Use Fractions		Use fractions
	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)		6
	Source 1 (Fraction)		1

UTE Pampa rev_0_Hidrogenio

Shape	Point
Dimension	2D
System	Absolute
East(1)	0 m
North(1)	0 m



Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018V

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.	73 m/s
Wind Speed at Height (Calculated)	2.	0 m/s
Pasquill Stability:	C	D
USER-DEFINED QUANTITIES		
Material	n-NONAN	Е
Scenario	Le	ık
Inventory	1,000,000.0	0 kg
Fixed Duration	г	/a s
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	9.)1 bar
- Temperature	25.	00 degC
- Fluid State	Non-saturated liqu	id
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	г	/a
Mass Flowrate	6.99592E-0)1 kg/s
Release Duration	600.)0 s
Orifice or pipe exit data (before atmospheric expa	nsion):	
- Pressure	1.)1 bar
- Temperature	24.	35 degC
- Vena Contracta Velocity (exit velocity for pi	pe releases) 51.	54 m/s
- Discharge Coefficient	0.	50
Final data (after atmospheric expansion):		
- Temperature	24.	35 degC
- Liquid Mass Fraction	1.	00 fraction
- Droplet Diameter	87.	98 um
- Expanded Radius	0.0	0 m
- Velocity	51.	94 m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.	78 m/s
Wind Speed at Height (Calculated)	1.4	5 m/s
Pasquill Stability:		D
USER-DEFINED QUANTITIES		
Material	n-NONAN	Е
Scenario	Le	ık
Inventory	1,000,000.0	0 kg
Fixed Duration	Г	/a s
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	9.)1 bar
- Temperature	25.	0 degC
- Fluid State	Non-saturated liqu	id

CALCULATED QUANTITIES

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Study Folder:



Phast 6.7

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018V

UTE Pampa rev 0 Hidrogenio

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018V

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Vertical	Vertical
	Dia Hazard Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 018V

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

			Distance (n	
			Dia	Noite
Radiation Level	3	kW/m2	21.0417	21.0011
Radiation Level	12.5	kW/m2	11.4258	10.8408
Radiation Level	37.5	kW/m2	6.98868	6.12723
Radiation Level	44	kW/m2	6.46265	5.08977

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018V

> Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 018V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 019A Base Case			
CASE Name	e: Data		
Path:	UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019A		
	User-Defined Data		
Material	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vessel/Ta	nk Release Type	Continuous	
Location			
	Elevation	1	m]
	Use ERPG averaging time	ERPG not selected	
	Use IDLH averaging time	IDLH not selected	
	Supply a user defined averaging time	Not supplied	
		i i i i i i i i i i i i i i i i i i i	
Bund			
	Status of Bund	No bund present	
	Type of Bund Surface	Concrete]
	Bund Height Bund Failure Modeling	0 Bund cannot faill	m
Indoor/O	utdoor		
	Location of release	Open air release	
	Outdoor Release Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	
Flammab	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersio	n		
Dispersio	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	30.94	m/s
	Droplet Diameter(1)	243.4	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.48	degC
	Release Rate(1)	0.99	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball I	Parameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

2,739,689 Phast 6.7

Study Folder:	UTE Pampa rev	0 Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	

North(1)

Toxic Parai	neters		
	[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 calcu	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Pool Vaporization Results

Path: \UTE Pampa re	v_0_Hidrogenio\Stu	dy\Retorno\Cenário	019A	
			Dia	Noite
	Release Segment 1			
Release Duration		S	600	600
Liquid Rainout		fraction	0.604182	0.663977
Maximum Pool Radiu	S	m	5.60404	5.87244
	Distanc	e to Concentration l	Results	
Path: \UTE Pampa re	v_0_Hidrogenio\Stu	dy\Retorno\Cenário	019A	
	The height for user All toxic results are All flammable resu	defined concentration e reported at the toxic ilts are reported at the	ons is the user defi c effect height 0 m e flammable effec	ined height 0 m 1 t height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazard		
Path: \UTE Pampa re	v_0_Hidrogenio\Stu	dy\Retorno\Cenário	019A	
	Jet fire method use	d: Cone model - DN	V recommended	

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Angled	Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019A

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

			Dia	Distance (m) Noite
Radiation Level	3	kW/m2	26.5605	26.5688
Radiation Level	12.5	kW/m2	14.6294	14.1519
Radiation Level	37.5	kW/m2	9.23099	9.23099
Radiation Level	44	kW/m2	8.2149	Not Reached

Study Folder:

UTE Pampa rev_0_Hidrogenio



	F	Radiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019A	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019A	
			Dia	Noite
Early Pool Fire State	us		Hazard	Hazard
	Rad	iation Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	42.6996	39.5939
Radiation Level	12.5	kW/m2	35.0865	31.4881
Radiation Level	37.5	kW/m2	28.6908	24.9737
Radiation Level	44	kW/m2	27.828	24.1739
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019A	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire I	Iazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019A	
			Dia	Noite
Late Pool Fire Statu	S		Hazard	Hazard
	Rac	liation Effects: Late I	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	61.0445	57.238
Radiation Level	12.5	kW/m2	44.4213	39.5876
Radiation Level				
Radiation Level	37.5	kW/m2	30.7163	27.4359



Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019A

Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 019H			
Base Case			
CASE Nat	me: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019H	ł	
	User-Defined Data		
Materia	al Material Identifier	n-NONANE	
Scenari	0		
	Building Wake Effect	None	
Vessel/T	Fank		
	Release Type	Continuous	
Locatio	n (Election	1	
	Elevation	FRPG not selected	m
	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 Bund Failure Modeling	0 Bund cannot fail]	m
Indeen	Outloor		
Indoor/	Location of release	Onen air release	
	Outdoor Release Direction	Horizontal	
Flamm	able		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispers	ion		
	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	,
	Discharge Velocity(1)	30.94	m/s
	Droplet Diameter(1)	243.4	um
	Einal Temperature(1)	25.48	s degC
	Release Rate(1)	23.48	kg/s
	Pre-Dilution Air Rates(1)	0.57	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Firebal	l Parameters		
	[Mass Modification Factor	3]	
	Calculation method for fireball	DNV Recommended]	1 ~
	TNO model flame temperature	1727	degC]

Toxic Parameters



	[Wind Dependent Exchange Rate [Building Exchange Rate	Case Specified] 4	/hr]
	fall filme	1800 Use a fixed averaging time]	S
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Consequence Results

Pool Vaporization Results

Path: \UTE Pampa r	ev_0_Hidrogenic	Study\Retorno\Ce	nário 019H	
			Dia	Noite
	Release Segme	ent 1		
Release Duration		S	600	600
Liquid Rainout		fraction	0.930255	0.94228
Maximum Pool Radi	us	m	6.95553	6.99639
	Dis	tance to Concentra	tion Results	
Path: \UTE Pampa r	ev_0_Hidrogenic	>\Study\Retorno\Ce	nário 019H	
	The height for	user defined concer	ntrations is the user d	efined height 0 m
	All toxic result	ts are reported at the	e toxic effect height () m
	All flammable	results are reported	at the flammable eff	ect height 0 m
Concentration(ppm)	Averaging Tim	1A		Distance (m)
Concentration(ppin)	Twendging Thi		Dia	Noite
UFL (56000)	18 75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	6 91056	6 87061
LFL Frac (7000)	18.75	S	6.91056	6.87061
Concentration(ppm)	Averaging Tim	ie		Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Haz	ard	
Path: \UTE Pampa r	ev_0_Hidrogenic)\Study\Retorno\Ce	nário 019H	
	Jet fire method	l used: Cone model	- DNV recommende	d
			Dia	Noite
Jet Fire Status			Truncated	Truncated
Flame Direction			Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019H

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

			Distance (m)
		Dia	Noite
3	kW/m2	14.5278	13.7795
12.5	kW/m2	10.055	9.6609
37.5	kW/m2	7.9659	7.69999
44	kW/m2	7.71698	7.47158
	3 12.5 37.5 44	3 kW/m2 12.5 kW/m2 37.5 kW/m2 44 kW/m2	Dia3kW/m214.527812.5kW/m210.05537.5kW/m27.965944kW/m27.71698

Study Folder:

UTE Pampa rev_0_Hidrogenio



	r	adiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 019H	
			Dia	Radiation Level (kW/m2 Noite
		Early Pool Fire l	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019H	
			Dia	Noite
Early Pool Fire Sta	tus		Hazard	Hazard
	Rad	iation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	28.8387	28.484
Radiation Level	12.5	kW/m2	20.0073	19.3439
Radiation Level	37.5	kW/m2	12.4074	11.8979
Radiation Level	44	kW/m2	11.4488	11.0332
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019H	
				Radiation Level (kW/m2)
			Dia	Noite
		Late Pool Fire F	Dia Iazard	Noite
Path: \UTE Pampa	rev_0_Hidroge	Late Pool Fire F	Dia Iazard nário 019H	Noite
Path: \UTE Pampa	rev_0_Hidroge	Late Pool Fire F nio\Study\Retorno\Ce	Dia Iazard nário 019H Dia	Noite
Path: \UTE Pampa Late Pool Fire State	rev_0_Hidroge	Late Pool Fire F mio\Study\Retorno\Ce	Dia Iazard nário 019H Dia Hazard	Noite Noite Hazard
Path: \UTE Pampa Late Pool Fire State	rev_0_Hidroge us Rac	Late Pool Fire F mio\Study\Retorno\Ce liation Effects: Late P	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse	Noite Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge us rev_0_Hidroge	Late Pool Fire F mio\Study\Retorno\Ce liation Effects: Late F mio\Study\Retorno\Ce	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse nário 019H	Noite Noite Hazard
Path: \UTE Pampa Late Pool Fire State Path: \UTE Pampa	rev_0_Hidroge us rev_0_Hidroge	Late Pool Fire F enio\Study\Retorno\Ce liation Effects: Late F enio\Study\Retorno\Ce	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse nário 019H	Noite Noite Hazard Distance (m)
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	rev_0_Hidroge us rev_0_Hidroge	Late Pool Fire H mio\Study\Retorno\Ce liation Effects: Late P mio\Study\Retorno\Ce	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse nário 019H Dia	Noite Noite Hazard Distance (m) Noite
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level	a rev_0_Hidroge us rev_0_Hidroge 3	Late Pool Fire F enio\Study\Retorno\Ce liation Effects: Late F enio\Study\Retorno\Ce kW/m2	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse nário 019H Dia 48.0668	Noite Noite Hazard Distance (m) Noite 46.9089
Path: \UTE Pampa Late Pool Fire State Path: \UTE Pampa Radiation Level Radiation Level	a rev_0_Hidroge us rev_0_Hidroge 3 12.5	Late Pool Fire F enio\Study\Retorno\Ce liation Effects: Late F enio\Study\Retorno\Ce kW/m2 kW/m2	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse nário 019H Dia 48.0668 27.8241	Noite Noite Hazard Distance (m) Noite 46.9089 26.1446
Path: \UTE Pampa Late Pool Fire State Path: \UTE Pampa Radiation Level Radiation Level Radiation Level Radiation Level	rev_0_Hidroge us rev_0_Hidroge 3 12.5 37.5	Late Pool Fire F enio\Study\Retorno\Ce liation Effects: Late F enio\Study\Retorno\Ce kW/m2 kW/m2 kW/m2	Dia Iazard nário 019H Dia Hazard Pool Fire Ellipse nário 019H Dia 48.0668 27.8241 15.3515	Noite Noite Hazard Distance (m) Noite 46.9089 26.1446 15.1595



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Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 019H

Dia

Radiation Level (kW/m2) Noite

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019H

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

				Distance (m)
			Dia	Noite
Furthest Extent	7000	ppm	6.91056	6.87061
Furthest Extent	7000	ppm	6.91056	6.87061
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0

Weather Conditions

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019H $$$

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 019I Base Case CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Retorno\Co	enário 019I	
	User-Defii	ned Data	
Material		NONANT	
	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vessel/Tan	k Release Type	Continuous	
Location			
	Elevation	EPDC not selected	m
	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 Dund connet faill	m]
	Bund Failure Modeling	Bung cannot fail	
Indoor/Ou	tdoor	Or en ein releven	
	Outdoor Release Direction	Down - Impinging on the Ground	
F 1 11			
Flammable	e Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
D			
Dispersion	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	30.94	m/s
	Droplet Diameter(1)	243.4	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.48	degC
	Release Rate(1)	0.99	kg/s
	Pre-Dilution Air Rates(1)	U No ignition location	kg/s
	Mass Inventory of material to Disperse	1E6	kg
Fireball Pa	irameters		
	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Date:



	[Wind Dependent Exchange Rate [Building Exchange Rate	Case Specified] 4	/hr]
	fall filme	1800 Use a fixed averaging time]	S
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Consequence Results Pool Vaporization Results

Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Ce	enário 019I	
			Dia	Noite
	Release Segment	1		
Release Duration		S	600	600
Liquid Rainout		fraction	1	1
Maximum Pool Radi	us	m	7.20958	7.2079
	Distar	ice to Concentra	ation Results	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Ce	enário 019I	
	The height for use All toxic results a All flammable res	er defined conce are reported at th sults are reported	ntrations is the user e toxic effect height l at the flammable ef	defined height 0 m 0 m ffect height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Haz	ard	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Ce	enário 019I	
	Jet fire method us	sed: Cone model	- DNV recommende	ed
			Dia	Noite
Jet Fire Status			No Hazard	No Hazard

Along Ground Along Ground

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019I

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Flame Direction

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	Radi	ation Effects: Early	Pool Fire Ellipse	
h: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	enário 019I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	21.9485	21.7264
Radiation Level	12.5	kW/m2	12.8996	12.4039
Radiation Level	37.5	kW/m2	5.05339	4.80815
Radiation Level	44	kW/m2	4.08141	3.92699
	Radia	tion Effects: Early I	Pool Fire Distance	
h: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	enário 019I	
			Dia	Radiation Level (k Noite
		Late Pool Fire 1	Hazard	
h: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	enário 019I	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Rad	iation Effects: Late	Pool Fire Ellipse	
h: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	enário 019I	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	41.2974	40.2979
Radiation Level	12.5	kW/m2	20.2892	18.9233
Radiation Level	37.5	kW/m2	8.20958	8.2079
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radi	ation Effects: Late P	ool Fire Distance	
h: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	enário 019I	
			Dia	Radiation Level (k Noite
		Weather Cond	litions	
h: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	enário 019I	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness	Length	mm	950.891	950.891
Surface Roughness	Parameter	1.0	0.1/	0.1/

Path:

Path:

W/m2)

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cená	rev_0_Hidrogenio\Study\Retorno\Cenário 019I		
		Dia	Ν	

Late Pool Fire Status	Hazard	Hazard

Path: ١U

				Distance (III)
			Dia	Noite
Radiation Level	3	kW/m2	41.2974	40.2979
Radiation Level	12.5	kW/m2	20.2892	18.9233
Radiation Level	37.5	kW/m2	8.20958	8.2079
Radiation Level	44	kW/m2	Not Reached	Not Reached

Path: ١U

(W/m2)

Path: ١U

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 019V			
Base Case			
CASE Nan	ne: Data		
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019V		
	User-Defined Data		
Materia			
	Material Identifier	n-NONANE	
Scenario)		
	Building Wake Effect	None	
¥1/T	1		
vessei/1	Release Type	Continuous	
Location			
	Elevation	EBBC not colorted	m
	Use IDLH averaging time	IDI H not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
	Supply a user aerinea averaging time	100 Suppriou	
Bund			
	Status of Bund	No bund present	
	Type of Bund Surface	Concrete	
	Bund Height	U Double connect faill	m
	Bund Fanule Modeling	Bund cannot fan	
Indoor/O	Dutdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flamma	ble		
Гашпа	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersi	on Number of Dalace Community	1	
	Number of Release Segments	l Liquid	
	Fiuld Fildse(1) Discharge Velocity(1)	20 04	m/s
	Dronlet Diameter(1)	243.4	111/5 11m
	Duration of Discharge(1)	600	s
	Final Temperature(1)	25.48	degC
	Release Rate(1)	0.99	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	kg
Fireball	Paramatars		
Fileball	[Mass Modification Factor	31	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]

Toxic Parameters



	[Wind Dependent Exchange Rate [Building Exchange Rate	Case Specified] 4	/hr]
	fall filme	1800 Use a fixed averaging time]	S
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

Study Folder:



Pool Vaporization Results

Path: \UTE Pampa re	ev_0_Hidrogenio\Stu	udy\Retorno\Cenário	019V	
			Dia	Noite
	Release Segment 1	l		
Release Duration		S	600	600
Liquid Rainout		fraction	0.53173	0.596305
Maximum Dool Dadiy	10		5 75686	5 56400
Maximum Foor Kault	Distance	e to Concentration	Results	5.50499
Path: \UTE Pampa re	ev_0_Hidrogenio\Stu	udy\Retorno\Cenário	019V	
	The height for user	r defined concentration	ons is the user def	ined height 0 m
	All toxic results ar	e reported at the toxi	c effect height 0 n	1
	All flammable resu	ults are reported at th	e flammable effec	t height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
(FF)			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazard		
Path: \UTE Pampa re	ev_0_Hidrogenio\Stu	udy\Retorno\Cenário	019V	
	Jet fire method use	ed: Cone model - DN	V recommended	
			Dia	Noite
Jet Fire Status			Hazard	Hazard
Flame Direction			Vertical	Vertical
	D. I. (·	EII.	

Radiation Effects: Jet Fire Ellipse

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	25.3561	25.3036
Radiation Level	12.5	kW/m2	13.9065	13.1242
Radiation Level	37.5	kW/m2	8.61086	7.8302
Radiation Level	44	kW/m2	8.01845	6.78719

Study Folder:

UTE Pampa rev_0_Hidrogenio



	N	aulation Effects, Jet	File Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019V	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire l	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019V	
			Dia	Noite
Early Pool Fire Stat	us		Hazard	Hazard
	Rad	iation Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019V	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	43.1874	38.419
Radiation Level	12.5	kW/m2	35.9089	30.6124
Radiation Level	37.5	kW/m2	29.9214	24.3802
Radiation Level	44	kW/m2	28.9848	23.5949
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019V	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire F	lazard	
	rev_0_Hidroge	nio\Study\Retorno\Ce	nário 019V	
Path: \UTE Pampa			Dia	
Path: \UTE Pampa			Diu	Noite
Path: \UTE Pampa	IS		Hazard	Noite Hazard
Path: \UTE Pampa	is Rad	liation Effects: Late F	Hazard Pool Fire Ellipse	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	is Rad rev_0_Hidroge	liation Effects: Late F	Hazard Pool Fire Ellipse nário 019V	Noite Hazard
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	is Rad rev_0_Hidroge	liation Effects: Late F nio\Study\Retorno\Ce	Hazard Pool Fire Ellipse nário 019V	Noite Hazard Distance (m)
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa	is Rad rev_0_Hidroge	liation Effects: Late F nio\Study\Retorno\Ce	Hazard Pool Fire Ellipse nário 019V Dia	Noite Hazard Distance (m) Noite
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level	is Rad rev_0_Hidroge 3	l iation Effects: Late F nio\Study\Retorno\Ce kW/m2	Hazard Pool Fire Ellipse nário 019V Dia 61.2188	Noite Hazard Distance (m) Noite 55.8707
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level Radiation Level	Rad rev_0_Hidroge 3 12.5	liation Effects: Late F nio\Study\Retorno\Ce kW/m2 kW/m2	Hazard Pool Fire Ellipse nário 019V Dia 61.2188 45.3335	Noite Hazard Distance (m) Noite 55.8707 38.8893
Path: \UTE Pampa Late Pool Fire Statu Path: \UTE Pampa Radiation Level Radiation Level Radiation Level	Rad rev_0_Hidroge 3 12.5 37.5	liation Effects: Late F nio\Study\Retorno\Ce kW/m2 kW/m2 kW/m2	Pool Fire Ellipse nário 019V Dia 61.2188 45.3335 31.6463	Noite Hazard Distance (m) Noite 55.8707 38.8893 26.6224



Dia

Path:	\UTE Pampa rev	0	Hidrogenio\Study\Retorno\Cenário 019V
		~	

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 019V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ário 021A			
ase Case	. D./		
CASE Name	: Data		
Path: \U	UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021A		
	User-Defined Data		
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Padded Liquid	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	8	t
	I emperature Mass Inventory	25 1F6	1
	iviass inventory	TEO	1
Scenario	Compris Trans	Lash	
	Scenario Type Dhasa ta ha Dalaasad	Leak	
	Hala Diamatar	Liquid 6.25	
	Puilding Weles Effect	0.55 None	1
	Tank Head	0	1
Location	Elevation	1	
	Use EDDC averaging time	EPPG not selected	1
	Use IDI H averaging time	IDI H not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
D 1			
Bund	Status of Pund	No hund procent	
	Status of Bund Surface	Concrete]	
	[Bund Height	Concrete	
	Bund Failure Modeling	Bund cannot fail]	1
Indoor/O	utdoor Location of release	Open air release	
	Outdoor Palesse Angle	Open an release	
	Outdoor Release Direction	Angled from Horizontal	
Flammab	Ie Evaluation Method	Multi Enorm	
	Laplosion Method	Cone Model	
		Colle Model	
Dispersion		NL teachte 1 at	
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	1
Fireball P	arameters		
	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	TNO model flame temperature	1727	(
Toxic Par	ameters		



[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 cal	lculation 0.05	fraction]
[Cut-off concentration for exposure time calculation	ns 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



· __ 0

Path:	\UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 021A

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	3.73 2.10 C/D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	n-NONANE Leak 1,000,000.00 n/a	kg s
Stagnation data (data at upstream end for long pip - Pressure - Temperature - Fluid State CALCULATED QUANTITIES	9.01 25.00 Non-saturated liquid	bar degC
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate Release Duration	6.99592E-001 600.00	kg/s s
Orifice or pipe exit data (before atmospheric exp - Pressure - Temperature - Vena Contracta Velocity (exit velocity for p - Discharge Coefficient	ansion): 1.01 24.85 bipe releases) 51.54 0.60	bar degC m/s
Final data (after atmospheric expansion): - Temperature - Liquid Mass Fraction - Droplet Diameter - Expanded Radius - Velocity	24.85 1.00 87.98 0.00 51.54	degC fraction um m m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	2.78 1.45 D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	n-NONANE Leak 1,000,000.00 n/a	kg s
Stagnation data (data at upstream end for long pip - Pressure - Temperature - Fluid State	e): 9.01 25.00 Non-saturated liquid	bar degC

CALCULATED QUANTITIES

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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Study Folder:



Phast 6.7

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021A

UTE Pampa rev 0 Hidrogenio

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021A

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Angled	Angled
	Dia Hazard Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 021A

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	22.2516	22.4603
Radiation Level	12.5	kW/m2	12.6795	12.212
Radiation Level	37.5	kW/m2	8.07668	7.36617
Radiation Level	44	kW/m2	7.44295	5.79744

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021A

> Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name	Data	
CASE Name:	Data	
Path: \U	FE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 02	21H
	User-Defined Dat	a
Material		
	Material Identifier	n-NONANE
	Type of Vessel	Padded Liquid
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	8
	I emperature Mass Inventory	25 1E6
	wass inventory	120
Scenario	о. · т	T 1
	Scenario Type Dhose to be Deleased	
	r nase to be Keleased Hole Diameter	
	Ruilding Wake Effect	0.33 None
	Tank Head	0
Location	Flevation	1
	Lice EPPG averaging time	I EPDC not selected
	Use IDI H averaging time	IDI H not selected
	Use STEL averaging time	STEL not selected
	Supply a user defined averaging time	Not supplied
Bund	Status of Dury 1	Na hund anna ant
	Status of Bund	No bund present
	Dund Height	Concrete
	Bund Failure Modeling	U Bund cannot fail
	Build Fahure Wodening	Duna cannot ran
Indoor/Out	door	Onen ein relege
	Outdoor Release Direction	Horizontal
	Suddoi Release Direction	11011201141
Flammable	Explosion Method	Multi Energy
	Let Fire Method	Cone Model
Dispersion	Late Lenitian Landian	NT- ::ti 1ti
	Law Ignition Location Mass Inventory of material to Disporse	NO IGHILION IOCATION
	Mass inventory of material to Disperse	
Fireball Pa	rameters	
	Mass Modification Factor	3
	Calculation method for fireball	DNV Kecommended
	11NO model name temperature	1/2/
Toxic Para	neters	
	[Wind Dependent Exchange Rate	Case Specified]

2,739,689	Ĵ.Å
Phast 6.7	DNS

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Study Folder: UTE Pampa rev_0_Hidrogenio

\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021H

DISCHARGE DATA for Weather: Global Weathers\Dia		
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	3.73 2.10 C/D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	n-NONANE Leak 1,000,000.00 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	9.01 25.00 Non-saturated liquid	bar degC
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only) Mass Flowrate Release Duration	n/a 6.99592E-001 600.00	kg/s s
Orifice or pipe exit data (before atmospheric expansion): - Pressure - Temperature - Vena Contracta Velocity (exit velocity for pipe releases) - Discharge Coefficient	1.01 24.85 51.54 0.60	bar degC m/s
 Final data (after atmospheric expansion): Temperature Liquid Mass Fraction Droplet Diameter Expanded Radius Velocity 	24.85 1.00 87.98 0.00 51.54	degC fraction um m m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	2.78 1.45 D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	n-NONANE Leak 1,000,000.00 n/a	kg s

Stagnation data (data at upstream end for long pipe):

 - Pressure
 9.01 bar

 - Temperature
 25.00 degC

 - Fluid State
 Non-saturated liquid

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s



Pool Vaporization Results

Path:	\UTE Pampa re	ev_0_Hidrogenio\Stu	udy\Retorno\Cenário	021H					
				Dia	Noite				
		Release Segment 1							
Release Duration			S	600	600				
Liquid Rainout			fraction	0.56822	0.703459				
Maximum Pool Radius			m	4.56734	5.08083				
Distanc			ce to Concentration	Results					
Path:	\UTE Pampa re	ev_0_Hidrogenio\Stu	udy\Retorno\Cenário	021H					
		The height for user	r defined concentratio	ons is the user def	ined height 0 m				
		All toxic results ar	e reported at the toxic	c effect height 0 n	1				
		All flammable resu	ults are reported at the	e flammable effec	t height 0 m				
Conc	centration(ppm)	Averaging Time			Distance (m)				
cont	(ppin)	Theraping Time		Dia	Noite				
UFL	(56000)	18.75	S	No Hazard	No Hazard				
LFL	(7000)	18.75	S	No Hazard	No Hazard				
LFL	Frac (7000)	18.75	S	No Hazard	No Hazard				
G		л : т [.]			TT 14 () C 1 1' 4				
Conc	centration(ppm)	Averaging Time		Dia	Heights (m) for above distances				
LIFI	(56000)	10 75	2	Dia	None 0				
UFL	(3000)	18.73	S	0	0				
LFL	(7000)	18.75	S	0	0				
LIL	11ac (7000)	10.75	3	0	0				
			Jet Fire Hazard						
Path:	\UTE Pampa re	ev_0_Hidrogenio\Stu	udy\Retorno\Cenário	021H					
Jet fire method used: Cone model - DNV recommended									
				Dia	Noite				
Jet Fire Status				Truncated	Truncated				
Flam	e Direction			Horizontal	Horizontal				
		Radiat	ion Effects: Jet Fire	Ellipse					
Path:	\UTE Pampa re	ev 0 Hidrogenio\Stu	ıdy\Retorno\Cenário	021H					
	This table gives the distances to the specified radiation levels								
for each jet fire listed in the above hazard table									
		for each jet me na			Distance (m)				
				Dia	Noite				
Radiation Level		3	kW/m2	24.6111	23.9695				
Radiation Level		12.5	kW/m2	16.9523	16.7799				
Radiation Level		37.5	kW/m2	13.539	13.5468				
Radiation Level		44	kW/m2	13.1479	13.1699				

Study Folder:

UTE Pampa rev_0_Hidrogenio



	I	Radiation Effects: Jet 1	Fire Distance	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Ce	nário 021H	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire I	Hazard	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Ce	nário 021H	
			Dia	Noite
Early Pool Fire Stat	us		Hazard	Hazard
	Rad	liation Effects: Early I	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Ce	nário 021H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	30.5099	29.7866
Radiation Level	12.5	kW/m2	23.9258	22.4658
Radiation Level	37.5	kW/m2	18.5479	16.6983
Radiation Level	44	kW/m2	17.7217	15.8961
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Ce	nário 021H	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire H	Iazard	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Ce	nário 021H	
			Dia	Noite
Late Pool Fire Status			Hazard	Hazard
	Ra	diation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrog	enio\Study\Retorno\Ce	nário 021H	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	47.7807	46.8707
Radiation Level	10.5	1 11/ 2	22 2202	20.0107
Radiation Level	12.5	kW/m2	33.3202	30.9187
Radiation Level Radiation Level	12.5 37.5	kW/m2 kW/m2	33.3202 19.9244	30.9187 18.5986


Radiation Effects: Late Pool Fire Distance

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021H

Dia

Radiation Level (kW/m2) Noite

Weather Conditions

Path: $\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\\Study\\Retorno\\Cenário 021H$

	Dia	Noite
m/s	3.73	2.78
	C/D	D
mm	950.891	950.891
	0.17	0.17
degC	19.6	16.5
degC	24.6	16.5
fraction	0.636	0.749
	n/s nm legC legC îraction	Dia Dia 3.73 C/D nm 950.891 0.17 degC 19.6 degC 24.6 fraction 0.636



CASE Name: Data Path: 'UTE Pampa rev_0_Hidrogenio/Study/Retorno/Cenário 0211 Material User-Defined Data Material Material Identifier n-NON Type of Vessel Padded L Pressure Specification Pressure specification Storage Pressure - gauge Temperature Mass Inventory Mass Inventory Scenario Pressure Specification Building Wake Effect Interval Hole Diameter Building Wake Effect Interval Building Wake Effect Interval Interval Location EERPG averaging time EERPG not sele Use BDLH averaging time STEL not sele Stele averaging time Use STEL averaging time STEL not sele Concording Use STEL averaging time Concording No bund pro I'Nope of Bund Surface Concording Concording IBund Failure Modeling Bund cannot	e Case		
Parth: UTE Pampa rev_0_Hidrogenio/Study/Retormo/Cenário 0211 User-Defined Data Material Material Identifier N-NON Type of Vessel Pressure Specification Pressure Specification Pressure Specification Temperature Mass Inventory Scenario Scenario Scenario Scenario Ecevation Elevation El	CASE Name	e: Data	
User-Defined Data Material Material Identifier n-NON Type of Vessel Padded L Pressure Specification Pressure specification Storage Pressure - gauge Temperature Mass Inventory Mass Inventory Scenario Scenario Type Phase to be Released L Hole Diameter Building Wake Effect D Building Wake Effect D D Tank Head Stereng averaging time EERPG averaging time STEL not set Use ERFG averaging time STEL not set Stereng averaging time STEL not set Use DIAL averaging time STEL not set Stereng averaging time STEL not set Use DIAL averaging time STEL not set Stereng averaging time STEL not set Bund Height Bund cannot Condot Stereng averaging time Stereng avera	Path: \	UTE Pampa rev_0_Hidrogenio\Study\Retorno\Ce	nário 0211
Material Material Identifier n-NON Type of Vessel Padded L Pressure Specification Pressure specification Storage Pressure - gauge Temperature Mass Inventory Scenario Scenario Scenario Type Phase to be Released L Hole Diameter Building Wake Effect Building Wake Effect D Tank Head IDLH averaging time Location [Elevation Use TDLH averaging time ERPG not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund No bund pr [Type of Bund Surface Conce [Bund Height Bund cannot Indoor/Out/our Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Fireball Parameters [Mass Inventory of material to Disperse No ignition loc [Indoor/Out/our Late Ignition Location No ignition loc [Indoor Release Inventory of material to Disperse No ignition loc Fireball Parameters [Mass Inventory of material to Disp		User-Defin	ed Data
Material Identifier n-NON Type of Vessel Padded L Pressure Specification Pressure spec Storage Pressure - gauge Temperature Mass Inventory Scenario Scenario Type Phase to be Released L Hole Diameter Building Wake Effect 1 Tank Head Location [Elevation Use ERPG averaging time Use FRPG averaging time Use STEL averaging time Status of Bund Status of Bund No bund pr [Type of Bund Surface Supply a user defined averaging time Location frelease Open air re Outdoor Release Direction Flammable Explosion Method Dispersion Late Ignition Location Mass Inventory of material to Disperse [Mass Modification Factor [Calculation method for fireball DNV Recommer	Material		
Ivpe of Vessel Padded L Pressure Specification Pressure specification Storage Pressure - gauge Temperature Mass Inventory Scenario Scenario Scenario Type Phase to be Released L Hole Diameter Building Wake Effect Building Wake Effect It Tank Head IDLH not sele Use ERPG averaging time ERPG not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund pro [Type of Bund Surface Conc [Bund Height Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Striction Factor ICAculation method for fireball		Material Identifier	n-NONANE
Pressure Specification Pressure spec Storage Pressure - gauge Temperature Mass Inventory Scenario Scenario Type Phase to be Released L Hole Diameter Building Wake Effect 1 Tank Head Location [Elevation Use ERPG averaging time ERPG not sele Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund pro [Type of Bund Surface Conc [Bund Height [Bund Failure Modeling Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location Motion Indoor Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer		Type of Vessel	Padded Liquid
Storage Pressure - gauge Temperature Mass Inventory Scenario Type Phase to be Released Hole Diameter Building Wake Effect Tank Head Location [Elevation Use ERPG averaging time Use STEL averaging time Use STEL averaging time Use STEL averaging time Status of Bund Status of Bund Status of Bund Indoor/Outdoor Location of release Open air re Outdoor Release Direction Flammable Explosion Method Dispersion Late Ignition Location Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer		Pressure Specification	Pressure specified
Scenario Mass Inventory Scenario Building Wake Effect I Tank Head Location [Elevation Use ERPG averaging time ERPG not sele Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund Conc [Bund Height [Bund Failure Modeling Bund cannot Indoor/Outdoor Location Flammable Explosion Method Multi-Er Jet Fire Method Multi-Er Status Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer		Storage Pressure - gauge	8
Scenario Scenario Type Phase to be Released L Hole Diameter Building Wake Effect I Tank Head I Location [Elevation] ERPG averaging time ERPG not sele Use ERPG averaging time IDLH not sele Use STEL averaging time STEL not sele Use STEL averaging time STEL not sele Use STEL averaging time Not sup Bund Status of Bund No bund pre Concert [Bund Height] [Bund Failure Modeling] Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Dispersion Late Ignition Location No ignition loe Mass Inventory of material to Disperse Status Modification Factor IDNV Recommer		Mass Inventory	25 1E6
Scenario Type Phase to be Released L Hole Diameter Building Wake Effect 1 Tank Head Location [Elevation Use ERPG averaging time ERPG not sele Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund Surface Conc [Bund Height Ibund Failure Modeling Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer	Sconario		
Phase to be Released L Hole Diameter Building Wake Effect 1 Tank Head Location [Elevation Use ERPG averaging time ERPG not sele Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund pro- [Type of Bund Surface Conce [Bund Height] [Bund Failure Modeling Bund cannot Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball] DNV Recommer	Scenario	Scenario Type	Leak
Hole Diameter Building Wake Effect Tank Head Location [Elevation Use ERPG averaging time Use IDLH averaging time Use STEL averaging time Supply a user defined averaging time Status of Bund (Type of Bund Surface (Bund Height (Bund Failure Modeling) Location of release Outdoor Release Direction Flammable Explosion Method Dispersion Late Ignition Location Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball]		Phase to be Released	Liquid
Building Wake Effect Image: Tank Head Location [Elevation Image: Use ERPG averaging time ERPG not sele Use ERPG averaging time IDLH not sele Use STEL averaging time IDLH not sele Use STEL averaging time STEL not sele Status of Bund Not sup Bund Status of Bund No bund print [Type of Bund Surface Concert [Bund Failure Modeling Bund cannot Indoor/Outtor Location of release Open air re Outdoor Release Direction Down - Impinging on the Green of the selection Multi-Err Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse No ignition loc Fireball Parameters [Mass Modification Factor DNV Recommeter		Hole Diameter	6.35
Tank Head Location I Elevation Use ERPG averaging time ERPG not sele Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund print [Type of Bund Surface Concert [Bund Failure Modeling Bund cannot Indoor/Outtor Location of release Open air release Outdoor Release Direction Down - Impinging on the Grade of the fire Method Multi-Errector of the fire Method Dispersion Late Ignition Location material to Disperse No ignition loce Fireball Parameters [Mass Modification Factor Down Recommeter		Building Wake Effect	None
Location [Elevation ERPG overaging time ERPG not sele Use ERPG averaging time IDLH not sele IDLH not sele Use STEL averaging time STEL not sele STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund processor [Bund Height] Bund cannot [Bund Failure Modeling Bund cannot Indoor/Outlor Open air re Outdoor Release Direction Open air re Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Multi-Er Cone M Dispersion Late Ignition Location Mass Inventory of material to Disperse No ignition loc Mass Inventory of material to Disperse		Tank Head	0
[Elevation ERPG averaging time ERPG not sele Use ERPG averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund program [Type of Bund Surface Conc [Bund Height Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Mass Modification Factor INO Supprese	Location		
Use ERPG averaging time ERPG not sele Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund pre- [Type of Bund Surface Conce [Bund Height] [Bund Failure Modeling Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gre Flammable Explosion Method Multi-Err Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball] DNV Recommer		Elevation	1
Use IDLH averaging time IDLH not sele Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund pri (Type of Bund Surface Conc (Bund Height (Bund Failure Modeling Bund cannot Indoor/Outdoor Location of release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball] DNV Recommer		Use ERPG averaging time	ERPG not selected
Use STEL averaging time STEL not sele Supply a user defined averaging time Not sup Bund Status of Bund No bund pressent for the selection of		Use IDLH averaging time	IDLH not selected
Supply a user defined averaging time Not sup Bund Status of Bund No bund proprint [Type of Bund Surface Concerns [Bund Height Bund cannot [Bund Failure Modeling Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommeter		Use STEL averaging time	STEL not selected
Bund Status of Bund No bund program [Type of Bund Surface Cond [Bund Height] Bund cannot [Bund Failure Modeling Bund cannot Indoor/OutJor Cocation of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Mo ignition loc Mo ignition loc Fireball Parmeters [Mass Modification Factor] DNV Recommer		Supply a user defined averaging time	Not supplied
Status of Bund No bund pro- [Type of Bund Surface Conce [Bund Height [Bund Failure Modeling Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recomment	Bund		
I type of Bund Surface Conc [Bund Height [Bund Failure Modeling Bund Cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Dispersion Late Ignition Location Mass Inventory of material to Disperse No ignition loc Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer		Status of Bund	No bund present
Bund Height [Bund Failure Modeling Bund cannot Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Multi-Er Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Mass Modification Factor [Calculation method for fireball DNV Recomment		Type of Bund Surface	Concrete
Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recomment		Bund Height	0 D = 1
Indoor/Outdoor Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Multi-Er Jet Fire Method Multi-Er Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parmeters Mass Modification Factor [Mass Modification Factor Colulation method for fireball DNV Recomment		Bund Failure Modeling	Bund cannot fail
Location of release Open air re Outdoor Release Direction Down - Impinging on the Gr Flammable Explosion Method Jet Fire Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location Mass Inventory of material to Disperse No ignition loc Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recomment	Indoor/O	utdoor	
Flammable Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Mass Modification Factor [Calculation method for fireball DNV Recommer		Location of release	Open air release
Flammable Explosion Method Multi-Er Jet Fire Method Multi-Er Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse No ignition loc Fireball Parmeters [Mass Modification Factor DNV Recomment		Outdoor Release Direction	Down - Impinging on the Ground
Explosion Method Multi-Er Jet Fire Method Cone M Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Signification Factor Image: Cone M Fireball Parameters Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Dispersion Dispersion No ignition loc Mass Inventory of material to Disperse Image: Cone M Image: Cone M Fireball Parameters Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M Image: Cone M	Flammab	le Explosion Method	M. 14: F
Dispersion Late Ignition Location Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball]		Laplosion method	Cone Model
Dispersion Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer		Jet I ne Menod	Cone Widder
Late Ignition Location No ignition loc Mass Inventory of material to Disperse Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recomment DNV Recomment	Dispersio	n Turtuk Tuk	
Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recommer		Late Ignition Location	No ignition location
Fireball Parameters [Mass Modification Factor [Calculation method for fireball DNV Recomment		Mass Inventory of material to Disperse	IEO
[Calculation method for fireball DNV Recommer	Fireball P	Parameters	21
Teaculation method for medan DNV Recommen		[Calculation method for fireball	J DNV Recommended
[TNO model flame temperature		[TNO model flame temperature	1727
Toxic Parameters	Toxic Par	ameters	
[Wind Dependent Exchange Rate Case Speci	IUAIC I dI	[Wind Dependent Exchange Rate	Case Specified]

Time:

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Phast 6.7	DNS

Study Folder:	UTE Pampa rev_	0	_Hidrogenio
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North(1)

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m



Study Folder: UTE Pampa rev_0_Hidrogenio

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 0211

DISCHARGE DATA for Weather: Global Weathers\Dia		
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):	~ ^ ^	1
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s



UTE Pampa rev_0_Hidrogenio **Study Folder:**

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 0211				
			Dia	Noite
	Release Segment 1			
Release Duration		S	600	600
Liquid Rainout		fraction	1	1
Maximum Pool Radiu	IS	m	6.05939	6.05855
	Distanc	e to Concentration	Results	
Path: \UTE Pampa re	v_0_Hidrogenio\Stu	dy\Retorno\Cenário	0211	
	The height for user All toxic results are All flammable resu	defined concentration e reported at the toxic llts are reported at the	ons is the user defi c effect height 0 m e flammable effec	ined height 0 m 1 t height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
	5 5		Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazard		
Path: \UTE Pampa re	v_0_Hidrogenio\Stu	dy\Retorno\Cenário	021I	

Jet fire method used: Cone model - DNV recommended

D-41.		Pool Fire Hazard	
Flan	ne Direction	Along Ground	Along Ground
Jet I	Fire Status	No Hazard	No Hazard
		Dia	Noite

Dia

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

Study Folder:

UTE Pampa rev_0_Hidrogenio



	Radi	ation Effects: Early l	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Retorno\Ce	nário 0211	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	19.5905	19.4256
Radiation Level	12.5	kW/m2	11.5508	11.1425
Radiation Level	37.5	kW/m2	4.72591	4.47013
Radiation Level	44	KW/m2	3.83332	3.65241
	Radia	tion Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Retorno\Ce	nário 021I	
				Radiation Level (kW/m2)
			Dia	Noite
		Late Pool Fire H	Iazard	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Retorno\Ce	nário 0211	
			Dia	Noite
Late Pool Fire State	15		Hazard	Hazard
	Rad	iation Effects: Late P	ool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Retorno\Ce	nário 0211	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	38.2811	37.1691
Radiation Level	12.5	kW/m2	20.6231	19.1042
Radiation Level	37.5	kW/m2	7.05939	7.05855
Radiation Level	44	kW/m2	7.05939	7.05855
	Radia	ation Effects: Late Po	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Retorno\Ce	nário 0211	
			Dia	Radiation Level (kW/m2) Noite
		Weather Cond	itions	
Path: \UTE Pampa	rev_0_Hidrogen	nio\Study\Retorno\Ce	nário 0211	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability			C/D	D
Surface Roughness	Length	mm	950.891	950.891
Surface Roughness	Parameter	. ~	0.17	0.17
Atmospheric Temp	erature	degC	19.6	16.5
Surface Temperatur	re	degC	24.6	16.5
Relative Humidity		iraction	0.636	0.749



ise Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário	021V	
	User-Defined Da	ita	
Material			
	Material Identifier	n-NONANE	
	Type of vessel	Padded Liquid	
	Storage Pressure gauge	Plessure specified	
	Temperature	o 25	
	Mass Inventory	1E6	
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Liquid	
	Hole Diameter	6.35	
	Building Wake Effect	None	
	Tank Head	0	
Location			
	Elevation	1	
	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	
	Bund Failure Modeling	Bund cannot fail	
Indoor/Ou	tdoor		
	Outdoor Bologo Direction	Open air release	
	Outdoor Release Direction	vertical	
Flammabl	e Explosion Method	Multi Engur	
	Laplosion Method	Cone Model	
	Jet File Method	Cone woder	
Dispersion	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1E6	
Fireball Pa	arameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	
Toxic Para	meters		
	[Wind Dependent Exchange Rate	Case Specified]	

Study Folder:

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/hr] s]

fraction] fraction]

fraction

	[Building Exchange Rate	4
	[Tail Time	1800
	[Set averaging time equal to exposure time	Use a fixed averaging time
	[Cut-off fraction of toxic load for exposure time cal	culation 0.05
	[Cut-off concentration for exposure time calculation	ns O
Multi En	ergy Explosion	
	Use Unconfined Strength	Do not use unconfined strength
	Use Fractions	Use fractions
	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)	Nc
	Source 1 (Strength)	6
	Source 1 (Fraction)	1

UTE Pampa rev_0_Hidrogenio

Shape	Point
Dimension	2D
System	Absolute
East(1)	0 m
North(1)	0 m



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Di	a	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	9.01	bar
- Temperature	25.00	degC
- Fluid State	Non-saturated liquid	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.98	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s
DISCHARGE DATA for Weather: Global Weathers\No	bite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	n-NONANE	
Scenario	Leak	
Inventory	1,000,000.00	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):	~ ~ .	
- Pressure	9.01	bar
- Temperature	25.00	aegC
- Fluid State	Non-saturated liquid	

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	6.99592E-001	kg/s
Release Duration	600.00	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.01	bar
- Temperature	24.85	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	51.54	m/s
- Discharge Coefficient	0.60	
Final data (after atmospheric expansion):		
- Temperature	24.85	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	87.03	um
- Expanded Radius	0.00	m
- Velocity	51.54	m/s

Study Folder:



Phast 6.7

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021V

UTE Pampa rev 0 Hidrogenio

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021V

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Vertical	Vertical
	Dia Hazard Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 021V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	21.0417	21.0011
Radiation Level	12.5	kW/m2	11.4258	10.8408
Radiation Level	37.5	kW/m2	6.98868	6.12723
Radiation Level	44	kW/m2	6.46265	5.08977

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021V

> Radiation Level (kW/m2) Noite

Study Folder:	UTE Pampa rev_	0_Hidrogenio
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Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 021V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749

Cenário 022A



Base Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Retorno\Cenáric	022A	
	User-Defined D	Data	
Geometry			
	East(1)	0	m
	North(1)	0	m
Material			
	Material Identifier	n-NONANE	
G			
Scenario	Building Wake Effect	None	
Vessel/Tan	k		
	Release Type	Continuous	
Location			
Locution	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			
Dullu	Status of Bund	No bund present	
	[Type of Bund Surface	Concrete]	
	[Bund Height	0	m]
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Ou	tdoor		
	Location of release	Open air release	
	Outdoor Release Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	.,
Flammahl	٥		
1 1411111401	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
1213001 31011	Number of Release Segments	1	
	Fluid Phase(1)	Liquid	
	Discharge Velocity(1)	30.94	m/s
	Droplet Diameter(1)	243.4	um
	Duration of Discharge(1)	600	S
	Final Temperature(1)	25.48	degC
	Release Rate(1)	0.99	kg/s
	Pre-Dilution Air Rates(1)	0	kg/s
	Late Ignition Location	No ignition location	

Fireball Parameters

Mass Inventory of material to Disperse

1E6 kg



Study Folder:	UTE Pampa rev) Hidrogenio
	· · · · · · · · · · · · · · · · · · ·	

Phast 6.7

	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Paran	neters		
	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
-/	Shape	Point	
	Dimension	2D	
	System	Absolute	

Study Folder:



UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Release Segment I Release Durations fraction600 600 0.604182000 0.663977Maximum Pool Radiusm5.604045.87244Maximum Pool Radiusm5.604045.87244Maximum Pool Radiusm5.604045.87244Distance to Concentration UsersPoster UTE Pampa re-0_Hidrogenio/Study/Retorno/CenárioDistance of Concentration Study Retorno/CenárioDistance of Concentration Study Retorno/CenárioDistance molecontration Study Retorno/CenárioDistance results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m No HazardConcentration(ppm)Averaging TimeDistance (m) No HazardUFL (56000)18.75sNo HazardConcentration(ppm)Averaging TimeHeights (m) or above distances No HazardUFL (7000)18.75s0LFL (700	Path: \U	JTE Pampa re	ev_0_Hidrogenio\\$	Study\Retorno\Ce	enário 022A	
Release Equination s 600 600 Initiation if action 0.604182 0.663977 Maximum Pool Radius m 5.60404 5.87244 Distance to Concentration Results Same to Concentration Results Same to Concentration Results Path: 'UTE Pampa rev_0_Hidrogenio/Study/Retorno/Cenário U2A 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 toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m Noite UFL (5000) 18.75 s Noi Hazard UFL (5000) 18.75 s No Hazard Noite UFL (56000) 18.75 s 0 0 O UFL (56000) 18.75 s 0 0 O LFL Frac (7000) 18.75 s 0 0 O LFL frac (7000) 18.75 s 0 0 D					Dia	Noite
Release Duration s 600 600 Liquid Rainout fraction 0.604182 0.663977 Maximum Pool Radius m 5.60404 5.87244 Maximum Pool Radius m 5.60404 5.87244 Distance to Concentration Results Results 5.87244 Path: ////TE Pampa rev_0_Hidrogenio/Study/Retorno/Cenário U22A 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 toxic results are reported at the toxic effect height 0 m All toxic results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m UFL (56000) 18.75 s No Hazard UFL (7000) 18.75 s No Hazard UFL (7000) 18.75 s No Hazard UFL (56000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0			Release Segmen	t 1		
Liquid Rainout fraction 0.604182 0.663977 Maximum Pool Radius not not concentration Results Path: UTE Pampa rev_0_Hidrogenio/Study/Retorno/Cenário 022A The height for user defined concentrations is the user defined height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the toxic effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m IFL (56000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Heights (m) for above distances Dia Noite UFL (56000) 18.75 s 0 0 0 LFL (7000) 18.75 s 0 0 0 LFL frac (7000) 18.75 s 0 0 0 LFL frac (7000) 18.75 s 0 0 0 LFL frac to come model - DNV recommended Jet Fire Status Fire method used: Cone model - DNV recommended Jet Fire Status Flame Direction Flame Direction Hazard Angled Angled Angled Angled Angled Angled Heights (JTE Pampa rev_0_Hidrogenio/Study/Retorno/Cenário 022A This table gives the distances to the specified ratiotion levels Flame Direction Fire Lilegoen the above hazard table	Release	Duration		S	600	600
Maximum Pool Radiusn5.60405.87244Distance to Concentration ResultsParts:UTE Pampare v_0_Hidrogenio/Study/Retorno/Cenário 022AThe height for user defined concentrations is the user defined height 0 mAll flammable results are reported at the toxic effect height 0 mConcentration(ppm)Averaging TimeDistance (m)UFL(56000)18.75sNo HazardUFL(7000)18.75sNo HazardNo HazardConcentration(ppm)Averaging TimeHeights (m) for above distancesUFL(7000)18.75s00UFL(56000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00UFL(7000)18.75s00Jet Fire Colspan="2">Jet F	Liquid I	Rainout		fraction	0.604182	0.663977
Path: 'UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A 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 flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m Market of Concentration(ppm) Averaging Time Dia Noite UFL (56000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Heights (m) for above distances Dia Noite UFL (56000) 18.75 s 0 0 0 LFL (7000) 18.75 s 0 0 0 LFL frac (7000) 18.75 s 0 LFL frac (7	Maximu	ım Pool Radiı	us	m	5.60404	5.87244
Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A 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 flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m Concentration(ppm) Averaging Time UFL (56000) 18.75 s No Hazard No Hazard LFL (7000) 18.75 s No Hazard No Hazard LFL (7000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Heights (m) for above distances Dia Noite Dia Noite UFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0			Dista	nce to Concentra	ation Results	
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 flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m All flammable results are reported at the flammable effect height 0 m Concentration(ppm) Averaging Time Distance (m) UFL (56000) 18.75 s No Hazard LFL (7000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Heights (m) for above distances Concentration(ppm) Averaging Time Heights (m) for above distances UFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL frac (7000) 18.75 mathter is th	Path: \U	JTE Pampa re	ev_0_Hidrogenio\S	Study\Retorno\Ce	enário 022A	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			The height for us All toxic results All flammable re	ser defined conce are reported at th esults are reported	ntrations is the user d e toxic effect height (d at the flammable eff	lefined height 0 m) m fect height 0 m
Dia Noite UFL (56000) 18.75 s No Hazard No Hazard LFL (7000) 18.75 s No Hazard No Hazard LFL Frac (7000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Heights (m) for above distances Dia Noite UFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 Jet Fire Status If the method used: Cone model - DNV recommended Hazard Hazard Jet Fire Status Ha	Concent	tration(ppm)	Averaging Time			Distance (m)
UFL (56000) 18.75 s No Hazard No Hazard LFL (7000) 18.75 s No Hazard No Hazard LFL Frac (7000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Heights (m) for above distances Dia Noite UFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 LFL Frac (7000) 18.75 s 0 Dia Noite Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet Fire Status Hazard Hazard Flame Direction Dia Noite Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table					Dia	Noite
LFL (7000) 18.75 s No Hazard No Hazard LFL Frac (7000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Dia Noite UFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 Hazard Noite Jet Fire Hazard Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet Fire Status Flame Direction Dia Noite Hazard Hazard Angled Angled Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	UFL	(56000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000) 18.75 s No Hazard No Hazard Concentration(ppm) Averaging Time Dia Noite UFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL frac (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 LFT Frac (7000) 18.75 s 0 0 LFT Fre Hazard Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet Fire Status Hazard Flame Direction Angled Angled Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A It fire status Hazard Flame Direction It fire tellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	LFL	(7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)Averaging TimeHeights (m) for above distancesUFL (56000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 Jet Fire HazardPath: $UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário U22AJet fire method used: Cone model - DNV recommendedJet fire statusFlame DirectionDiaNoiteHazardAngledAngledAngledAngledAngledAngledThis table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table$	LFL Fra	ac (7000)	18.75	S	No Hazard	No Hazard
UFL (5600) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 Jet Fire Hazard Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet Fire Status Flame Direction Direction Direction Direction Angled Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	Concent	tration(ppm)	Averaging Time		Dia	Heights (m) for above distances
OFL (50000) 18.75 s 0 0 LFL (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 Jet Fire Hazard Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet Fire Status Flame Direction Dia Noite Hazard Hazard Hazard Angled Angled Angled Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	UFI	(56000)	18 75	s	0	0
LFL Frac (7000) 18.75 s 0 0 LFL Frac (7000) 18.75 s 0 0 Jet Fire Hazard Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Dia Noite Hazard Hazard Flame Direction Hazard Angled Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	LFL	(7000)	18.75	S	0	0
Jet Fire Hazard Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet fire Status Jet Fire Status Dia Noite Flame Direction Hazard Hazard Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	LFL Fra	(7000) ac (7000)	18.75	s	0	0
Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A Jet fire method used: Cone model - DNV recommended Jet Fire Status Dia Flame Direction Hazard Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table				Jet Fire Haz	ard	
Jet fire method used: Cone model - DNV recommended Dia Noite Jet Fire Status Hazard Flame Direction Hazard Angled Angled Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	Path: \U	JTE Pampa re	ev_0_Hidrogenio\S	Study\Retorno\Ce	enário 022A	
Jet Fire Status Dia Noite Hazard Hazard Angled Angled Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table			Jet fire method u	ised: Cone model	- DNV recommende	d
Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	Jet Fire Flame I	Status Direction			Dia Hazard Angled	Noite Hazard Angled
Radiation Effects: Jet Fire Ellipse Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table						
Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table			Radi	ation Effects: Je	t Fire Ellipse	
This table gives the distances to the specified radiation levels for each jet fire listed in the above hazard table	Path: \(JTE Pampa re	ev_0_Hidrogenio\S	Study\Retorno\Ce	enário 022A	
for each jet fire listed in the above hazard table			This table gives	the distances to the	he specified radiation	levels
Distance (m)			ioi each jet life l	isted in the above	e nazalu table	Distance (m)

			Dia	Noite
Radiation Level	3	kW/m2	26.5605	26.5688
Radiation Level	12.5	kW/m2	14.6294	14.1519
Radiation Level	37.5	kW/m2	9.23099	9.23099
Radiation Level	44	kW/m2	8.2149	Not Reached

Study Folder:

UTE Pampa rev_0_Hidrogenio



	R	adiation Effects: Jet	Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022A	
			Dia	Radiation Level (kW/m2) Noite
		Early Pool Fire	Hazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022A	
			Dia	Noite
Early Pool Fire Stat	us		Hazard	Hazard
	Rad	iation Effects: Early 1	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022A	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	42.6996	39.5939
Radiation Level	12.5	kW/m2	35.0865	31.4881
Radiation Level	37.5	kW/m2	28.6908	24.9737
Radiation Level	44	kW/m2	27.828	24.1739
	Radi	ation Effects: Early P	ool Fire Distance	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022A	
			Dia	Radiation Level (kW/m2) Noite
		Late Pool Fire F	lazard	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022A	
			Dia	Noite
Late Pool Fire Statu	IS		Hazard	Hazard
	Rac	liation Effects: Late F	Pool Fire Ellipse	
Path: \UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022A	
				Distance (m)
			Dia	Noite
	3	kW/m2	61.0445	57.238
Radiation Level				
Radiation Level	12.5	kW/m2	44.4213	39.5876
Radiation Level Radiation Level Radiation Level	12.5 37.5	kW/m2 kW/m2	44.4213 30.7163	39.5876 27.4359



Radiation Effects: Late Pool Fire Distance

Path:	\UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A
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Radiation Level (kW/m2) Noite

Weather Conditions

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ário 022H Ise Case			
CASE Nama			
CASE Name:	Data		
Path: \U	FE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022	H	
	User-Defined Data		
Material	Material Identifier	n-NONANE	
Scenario	Building Wake Effect	None	
Vessel/Tank	,		
	Release Type	Continuous	
Location			
	Elevation	EDDC not colored	r
	Use IDLH averaging time	IDI H 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 Den daarmat faill	ľ
	Bund Failure Modeling	Bund cannot fall	
Indoor/Out	door		
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Number of Release Segments	I T 1. 14	
	Fluid Phase(1)		
	Discharge velocity(1)	30.94	I
	Duration of Discharge(1)	243.4	د د
	Final Temperature(1)	25.48	с С
	Release Rate(1)	0.99	1
	Pre-Dilution Air Rates(1)	0.59	1
	Late Ignition Location	No ignition location	-
	Mass Inventory of material to Disperse	1E6	ŀ
Fireball Pa	rameters		
	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended	
	I INO model flame temperature	1727	d

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[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 calcul	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	y Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Cena	ário 022H	
			Dia	Noite
	Release Segment	1		
Release Duration		S	600	600
Liquid Rainout		fraction	0.930255	0.94228
Maximum Pool Radiu	18	m	6.95553	6.99639
	Dista	nce to Concentrat	ion Results	
Path: \UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Cen	ário 022H	
	The height for us All toxic results a All flammable re	er defined concent are reported at the sults are reported a	rations is the user of toxic effect height (at the flammable eff	lefined height 0 m) m fect height 0 m
Concentration(nnm)	Averaging Time			Distance (m)
concentration(ppin)	Twendging Time		Dia	Noite
UFL (56000)	18.75	s	No Hazard	No Hazard
LFL (7000)	18.75	s	6.91056	6.87061
LFL Frac (7000)	18.75	S	6.91056	6.87061
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Hazaı	·d	
Path: \UTE Pampa re	ev_0_Hidrogenio\S	tudy\Retorno\Cena	ário 022H	
	Jet fire method us	sed: Cone model -	DNV recommende	d
			Dia	Noite
Jet Fire Status			Truncated	Truncated
Flame Direction			Horizontal	Horizontal
	Radia	tion Effects: Jet I	Fire Ellipse	
Path: \UTE Pampa re	ev 0 Hidrogenio\S	tudy\Retorno\Cena	ário 022H	

$\label{eq:linear} $$ UTE Pampa rev_0_Hidrogenio\Study\\Retorno\Cenário 022H$

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	14.5278	13.7795
Radiation Level	12.5	kW/m2	10.055	9.6609
Radiation Level	37.5	kW/m2	7.9659	7.69999
Radiation Level	44	kW/m2	7.71698	7.47158



		F	Radiation Effects: Jet 1	Fire Distance	
Path: \UT	E Pampa	rev_0_Hidroge	enio\Study\Retorno\Cer	nário 022H	
				Dia	Radiation Level (kW/m2) Noite
			Early Pool Fire I	Hazard	
Path: \UT	E Pampa	rev_0_Hidroge	enio\Study\Retorno\Cer	nário 022H	
				Dia	Noite
Early Pool	Fire Stat	us		Hazard	Hazard
		Rad	liation Effects: Early I	Pool Fire Ellipse	
Path: \UT	E Pampa	rev_0_Hidroge	enio\Study\Retorno\Cer	nário 022H	
Radiation I Radiation I Radiation I Radiation I	Level Level Level	3 12.5 37.5 44 Radi	kW/m2 kW/m2 kW/m2 kW/m2 ation Effects: Early Pe	Dia 28.8387 20.0073 12.4074 11.4488 ool Fire Distance	Distance (m) Noite 28.484 19.3439 11.8979 11.0332
Path: \UT	E Pampa	rev_0_Hidroge	enio\Study\Retorno\Cer	nário 022H	
				Dia	Radiation Level (kW/m2) Noite
			Late Pool Fire H	lazard	
Path: \UT	E Pampa	rev_0_Hidroge	enio\Study\Retorno\Cer	nário 022H	
Late Pool I	Fire Statu	IS		Dia Hazard	Noite Hazard
		Rad	diation Effects: Late P	ool Fire Ellipse	
Path: \UT	E Pampa	rev_0_Hidroge	enio\Study\Retorno\Cer	nário 022H	
Radiation 1 Radiation 1 Radiation 1	Level Level	3 12.5 37.5	kW/m2 kW/m2 kW/m2	Dia 48.0668 27.8241 15.3515	Distance (m) Noite 46.9089 26.1446 15.1595
Radiation 1	Level	44	kW/m2	Not Reached	Not Reached

Path:

Path:



Radiation Effects: Late Pool Fire Distance \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 022H Radiation Level (kW/m2) Dia Noite Flash Fire Envelope \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022H All flammable results are reported at the flammable effect height 0 m

				Distance (m)
			Dia	Noite
Furthest Extent	7000	ppm	6.91056	6.87061
Furthest Extent	7000	ppm	6.91056	6.87061
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0
Furthest Extent Furthest Extent	7000 7000	ppm ppm	0 0	0 0

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name: Data Path: UTE Pampa rev_0_Hidrogenio/Study/Retorno/Cenário 0221 Material User-Defined Data Material n.NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location IEvation 1 Use ERPG averaging time ERPG not selected Use IDLH averaging time STEL not selected Use IDLH averaging time STEL not selected Use supplied Not supplied Band Status of Band No band present Concrete] Bund Height 0 No supplied Bund cannot fail] Indoor/Ottoor Location of release Open air release Open air release Outdoor Release Direction Down - Impinging on the Ground Action Cone Model] Indoor/Ottoor Explosion Method Multi-Energy Cone Model] Dispersion Indumbro of Release Segments 1 Liquid Dispersion Indumbro of Release Segments 1 Liquid Dispersion Indumbro of Release Regents 1 Liquid Disphare Velocity(1) 3034	ário 0221 1se Case			
Part: UTE Panya rev_0_Hidrogenio/Study/Retorno/Centrio 0221 User-Defined Data Material nevONANE Scenario nevonane Vessel/Tank ne Release Type Continuous Location 1 Iseu Status of Band No bund present Type of Bund Surface No bund present Type of Bund Surface No bund present Indoor/Nettor No dudo release Date of release Direction Down - Impinging on the Group Discharge Velocity(1) 2044 Duration of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 2044 Discharge Velocity(1) 2044 Discharge (1) 0.00	CASE Name:	Data		
Material Interiol Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location [Elevation 1 1 Use ERPG averaging time ERPG not selected 1 Use STFL averaging time ERPG not selected 1 Use STFL averaging time STFL not selected Not supplied Bund Status of Bund No bund present Concretel [Bund Failure Modeling Bund cannot fail 0 Bund Failure Modeling Bund cannot fail 0 Flammable Explosion Method Multi-Energy Concretein Down - Impinging on the Ground 0 Jose Faile Explosion Method Multi-Energy Outdoor Release Segments 1 1 Fluid Phase(1) Coation 30.94 Discharge Velociv(1) 30.94 30.94 Discharge Velociv(1) 30.94 30.94 Discharge (1) Coation 30.94 Discharge (1) Coation 30.94 Discharge (1) Coation 0.90	Path: \U	TE Pampa rev_0_Hidrogenio\Study\Retorno\Ce	enário 022I	
Material Material Identifier n-NONANE Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location [Elevation 1 [Elevation ERPG overaging time ERPG on selected Use ERPG averaging time ERPG not selected Use STEL averaging time STEL not selected Use STEL averaging time STEL not selected Not supplied Bund Status of Bund No bund present Concrrete] [Bund Failure Modeling Bund cannot fail] Bund cannot fail] Indoor/Out/out/out/out/out/out/out/out/out/out/o		User-Defin	ned Data	
Scenario Building Wake Effect None Vessel/Tank Release Type Continuous Location Elevation 1 Use ERPG averaging time ERPG not selected 1 Use ERPG averaging time ERPG not selected 1 Use ERPG averaging time ENPG not selected 1 Use ERPG averaging time ENPG not selected 1 Supply a user defined averaging time Not bund selected 1 Bund Status of Bund No bund present [Type of Bund Surface Concrete] [Bund Failure Modeling Bund cannot fail 0 1 Indoor/Outcloor Bund ease Direction Doen ari release 0 [Bund Failure Modeling Bund ease Adveraging time Multi-Energy Dator Release Segments 1 1 1 [Mumber of Release Segments 1 1 1 [Piid Phase(1) 23.4 23.4 23.44 Droplet Diameter(1) 23.44 23.44 23.44 Discharge Velocity(1) 30.94 30.94 30.94 Discharge Velocity(1) 30.94 30.94 <td>Material</td> <td>Material Identifier</td> <td>n-NONANE</td> <td></td>	Material	Material Identifier	n-NONANE	
Vessel/Tank Release Type Continuous Location 1 Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use IDLH averaging time STEL averaging time Supply a user defined averaging time Not supplied Bund Status of Bund No bund present [Type of Bund Surface Concrete] [Bund Height 0 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Cocation of release Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Dispersion Multi-Energy Lot Fire Method Multi-Energy Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0.09 Pre-Dilution Air Rates(1) 0 Lat Ignition Location No ignition location Mass Inventory of material to Disperse 16 Fireball Parameters [Mass Modification Factor 3]	Scenario	Building Wake Effect	None	
Release Type Continuous Location 1 Ise RPG 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 No bund present [Type of Bund Surface Concrete] [Bund Height 0 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Orplet Diameter(1) 223.44 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0 0 Lat Ignition Location No ignition location Mass Inventory of material to Disperse IE IE IE Fireball Parameters [Mass M	Vessel/Tan	k		
LocationI[Elevation1Use ERPG averaging timeERPG not selectedUse IDLH averaging timeDLH not selectedSupply a user defined averaging timeSTEL not selectedBundStatus of BundNo bund present[Type of Bund SurfaceConcrete][Bund Height0[Bund Failure ModelingBund cannot fail]Indoor/OutdoorLocation of releaseOutdoor Release DirectionDopen air releaseOutdoor Release DirectionMulti-EnergyJet Fire MethodMulti-EnergyJet Fire MethodCone ModelDispersion1Number of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Dorolet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0.99Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to DisperseIE6Fireball Parameters[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Release Type	Continuous	
[Elevation 1 Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Supply a user defined averaging time STEL not selected Bund No bund present [Type of Bund Surface Concrete] [Bund Height 0 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion 1 Liquid Number of Release Segments 1 1 Final Temperature(1) 243.4 0.4 Duration of Discharge(1) 600 600 Final Temperature(1) 25.48 8 Release Rate(1) 0 0 Late Ignition Location No ignition location 0 Late Ignition Location No ignition location 16 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] <t< td=""><td>Location</td><td></td><td></td><td></td></t<>	Location			
Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Supply a user defined 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 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Elevation	1	m]
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 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Multi-Energy Jet Fire Method Multi-Energy Joscharge Velocity(1) 30.94 Dispersion 1 Release Regents 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Calculation method for fireball <td< td=""><td></td><td>Use ERPG averaging time</td><td>ERPG not selected</td><td></td></td<>		Use ERPG averaging time	ERPG not selected	
Ose 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 [Bund Failure Modeling Bund cannot fail] Indoor/Outdoor Explosion of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 600 Final Temperature(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 125.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 126 166 Fireball Parameters [Mass Modification Factor 31 [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727 172 172		Use IDLH averaging time	IDLH not selected	
Bund Status of Bund Surface No bund present [Type of Bund Surface Concrete] [Bund Height 0 [Bund Failure Modeling Bund cannot fail] Indoor/Outtor Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Multi-Energy Explosion Method Multi-Energy Jet Fire Method Multi-Energy Jet Fire Method Cone Model Dispersion 1 Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parmeters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Supply a user defined averaging time	Not supplied	
Status of BundNo bund present[Type of Bund SurfaceConcrete][Bund Height0[Bund Failure ModelingBund cannot fail]Indoor/OutdoorLocation of releaseOpen air releaseOutdoor Release DirectionDown - Impinging on the GroundFlammableMulti-EnergyExplosion MethodMulti-EnergyJet Fire MethodCone ModelDispersion1Number of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Dorplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0.99Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727	Bund			
[Type of Bund SurfaceConcretel[Bund Height0[Bund Failure ModelingBund cannot fail]Indoor/OutdoorLocation of releaseOpen air releaseOutdoor Release DirectionDown - Impinging on the GroundFlammableExplosion MethodMulti-EnergyJet Fire MethodCone ModelDispersionNumber of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Droplet Diameter(1)243.4Duration of Discharge(1)6000Final Temperature(1)25.48Release Rate(1)0.99Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Status of Bund	No bund present	
Bund Height 0 IBund Failure Modeling Bund cannot fail Indoor/Outdoor Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Explosion Method Multi-Energy Jet Fire Method Multi-Energy Jet Fire Method Dispersion Number of Release Segments 1 Fluid Phase(1) Liquid Joscharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0 Quartion of Discharge(1) 0 0.99 99 Pre-Dilution Air Rates(1) 0 1 1 Late Ignition Location No ignition location No ignition location Mass Inventory of material to Disperse 1E6 1 1 Fireball Parameters [Mass Modification Factor 3] 3 1 [Calculation method for fireball DNV Recommended] 1 1 [TNO model flame temperature 1727 1 1		[Type of Bund Surface	Concrete]	-
Indoor/Outdoor Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Flammable Multi-Energy Explosion Method Multi-Energy Jet Fire Method Multi-Energy Dispersion Cone Model Number of Release Segments 1 Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Par=meters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] DNV Recommended] [TNO model flame temperature 1727		Bund Height	0 Bund cannot fail]	m]
Location of release Outdoor Release DirectionOpen air release Down - Impinging on the GroundFlammable Explosion Method Jet Fire MethodMulti-Energy Cone ModelDispersionNumber of Release Segments1 Liquid Discharge Velocity(1)Duration of Discharge(1)600 Final Temperature(1)243.4 0.99 0.99 Pre-Dilution Air Rates(1)Fireball Par-meters [Mass Modification Factor [Calculation method for fireball [TNO model flame temperature]Novel and the properties	Indoor/Ou	tdoor		
Outdoor Release DirectionDown - Impinging on the GroundFlammableExplosion MethodMulti-Energy Jet Fire MethodDispersionNumber of Release Segments1Fluid Phase(1)Liquid Discharge Velocity(1)30.94Dorplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0Late Ignition Location Mass Inventory of material to DisperseNo ignition location BigerseFireball Parameters[Mass Modification Factor3] DNV Recommended] TNO model flame temperature3]		Location of release	Open air release	
FlammableKaplosion MethodMulti-Energy Cone ModelDispersion1Number of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Droplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0.99Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Outdoor Release Direction	Down - Impinging on the Ground	
Explosion MethodMulti-Energy Cone ModelDispersionIFluid Phase(1)Liquid Discharge Velocity(1)Droplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition location Mass Inventory of material to DisperseFireball Parameters[Mass Modification Factor3] DNV Recommended] [TNO model flame temperature31	Flammabl	e		
Jet Fire MethodCone ModelDispersion1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Droplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Explosion Method	Multi-Energy	
DispersionNumber of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Droplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0.99Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Jet Fire Method	Cone Model	
Number of Release Segments1Fluid Phase(1)LiquidDischarge Velocity(1)30.94Droplet Diameter(1)243.4Duration of Discharge(1)600Final Temperature(1)25.48Release Rate(1)0.99Pre-Dilution Air Rates(1)0Late Ignition LocationNo ignition locationMass Inventory of material to Disperse1E6Fireball Parameters31[Mass Modification Factor31[Calculation method for fireballDNV Recommended][TNO model flame temperature1727	Dispersion	1		
Fluid Phase(1) Liquid Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Number of Release Segments	1	
Discharge Velocity(1) 30.94 Droplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature		Fluid Phase(1)		/
Dioplet Diameter(1) 243.4 Duration of Discharge(1) 600 Final Temperature(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature		Discharge velocity(1) Dronlat Diamatar(1)	30.94	m/s
Final Temperature(1) 25.48 Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature		Displet Diameter(1) Duration of Discharge(1)	243:4	s
Release Rate(1) 0.99 Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Final Temperature(1)	25.48	s deg(
Pre-Dilution Air Rates(1) 0 Late Ignition Location No ignition location Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Release Rate(1)	0.99	kg/s
Late Ignition Location Mass Inventory of material to DisperseNo ignition location 1E6Fireball Parameters1[Mass Modification Factor3][Calculation method for fireball [TNO model flame temperatureDNV Recommended][T27		Pre-Dilution Air Rates(1)	0	kg/s
Mass Inventory of material to Disperse 1E6 Fireball Parameters [Mass Modification Factor 3] [Calculation method for fireball DNV Recommended] [TNO model flame temperature 1727		Late Ignition Location	No ignition location	• •
Fireball Parameters3][Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Mass Inventory of material to Disperse	1E6	kg
[Mass Modification Factor3][Calculation method for fireballDNV Recommended][TNO model flame temperature1727	Fireball Pa	arameters		
[Calculation method for fireballDNV Recommended][TNO model flame temperature1727		Mass Modification Factor	3]	
1727		[Calculation method for fireball	DNV Recommended	1. 0
		INO model flame temperature	1727	degC

Toxic Parameters



[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time ca	lculation 0.05	fraction]
[Cut-off concentration for exposure time calculatio	ns 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



Study Folder: UTE Pampa rev_0_Hidrogenio

Consequence Results Pool Vaporization Results

Path: \UT	E Pampa re	ev_0_Hidrogenio\Stu	ıdy\Retorno\Cenário	0221	
				Dia	Noite
		Release Segment 1			
Release D	uration		S	600	600
Liquid Ra	inout		fraction	1	1
Martin	D. 1 D. 1			7 20059	7 2070
Maximum	Pool Kadit	Distanc	m e to Concentration 1	7.20958 Results	1.2079
Path: \UT	E Pampa re	ev 0 Hidrogenio\Stu	ıdv\Retorno\Cenário	0221	
			1. 6 1		
		The height for user	defined concentration	ons is the user defi	ined height 0 m
		All toxic results ar	e reported at the toxic	c effect height 0 m	
		All flammable rest	ins are reported at the	e flammable effec	t neight 0 m
Concentra	tion(ppm)	Averaging Time			Distance (m)
				Dia	Noite
UFL (:	56000)	18.75	S	0	0
LFL (7	7000)	18.75	S	0	0
LFL Frac	(7000)	18.75	S	0	0
Concentra	tion(ppm)	Averaging Time			Heights (m) for above distances
				Dia	Noite
UFL (:	56000)	18.75	S	0	0
LFL (7	7000)	18.75	S	0	0
LFL Frac	(7000)	18.75	S	0	0
			Jet Fire Hazard		
Path: \UT	E Pampa re	ev_0_Hidrogenio\Stu	ıdy\Retorno\Cenário	0221	
		Jet fire method use	d: Cone model - DN	V recommended	
				Dia	Noite
Jet Fire St	atus			No Hazard	No Hazard
Flame Dir	ection			Along Ground	Along Ground
				Stound	
		Б			

Early Pool Fire Hazard

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 0221

	Dia	Noite
Early Pool Fire Status	Hazard	Hazard

UTE Pampa rev_0_Hidrogenio

Study Folder:

2,739,689 Phast 6.7

	Radiation	Effects: Early Pool I	Fire Ellipse	
Path: \UTE Pampa re	v 0 Hidrogenio\St	udy\Retorno\Cenário	022I	
-		-	Dia	Distance (m) Noite
Radiation Level	3	kW/m2	21.9485	21.7264
Radiation Level	12.5	kW/m2	12.8996	12.4039
Radiation Level	37.5	kW/m2	5.05339	4.80815
Radiation Level	44	kW/m2	4.08141	3.92699
	Radiation I	Effects: Early Pool F	ire Distance	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Retorno\Cenário	022I	
			Dia	Radiation Level (kW/m2) Noite
	1	Late Pool Fire Hazar	d	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Retorno\Cenário	0221	
			Dia	Noite
Late Pool Fire Status			Hazard	Hazard
	Radiation	Effects: Late Pool F	ire Ellipse	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Retorno\Cenário	0221	
				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	41.2974	40.2979
Radiation Level	12.5	kW/m2	20.2892	18.9233
Radiation Level	37.5	kW/m2	8.20958	8.2079
Radiation Level	44	kW/m2	Not Reached	Not Reached
	Radiation	Effects: Late Pool Fi	re Distance	
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Retorno\Cenário	0221	
			Dia	Radiation Level (kW/m2) Noite
		Weather Conditions		
Path: \UTE Pampa re	ev_0_Hidrogenio\St	udy\Retorno\Cenário	0221	
			Dia	Noite
Wind Speed		m/s	3.73	2.78
Pasquill Stability	.1		C/D	D 050.001
Surface Roughness Le	ength	mm	950.891	950.891
Atmospheric Terrer	arameter	dagC	U.1/ 10.6	0.1/
Aunospheric Tempera	uure	degC	19.0	10.5
Relative Humidity		fraction	2 4 .0 0.636	0 749
relative fituilituity		naction	0.050	0.772





ário 022V			
ise Case			
CASE Name:	Data		
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 0	22V	
	User-Defined Da	ta	
Material	Material Identifier	n-NONANE	
Scenario			
	Building Wake Effect	None	
Vessel/Tanl		~ .	
	Release Type	Continuous	
Location	Elevation	1	
	Use FRPG averaging time	I ERPG not selected	1
	Use IDL H 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	ľ
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion		1	
	Number of Release Segments	L T. 1	
	Fluid Phase(1)		
	Discharge verochy(1)	30.94 243 4	1
	Duration of Discharge(1)	243.4	נ ג
	Final Temperature(1)	25.48	с С
	Release Rate(1)	0.99	1
	Pre-Dilution Air Rates(1)	0	1
	Late Ignition Location	No ignition location	-
	Mass Inventory of material to Disperse	1E6	ŀ
Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	d

Toxic Parameters

Study Folder: UTE Pampa rev_0_Hidrogenio



	[Wind Dependent Exchange Rate [Building Exchange Rate	Case Specified] 4	/hr]
	fall filme	1800 Use a fixed averaging time]	S
	[Cut-off fraction of toxic load for exposure time calcul	lation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

Study Folder:



Consequence Results

Pool Vaporization Results

UTE Pampa rev_0_Hidrogenio

Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Cer	nário 022V	
			Dia	Noite
	Release Segment	: 1		
Release Duration		S	600	600
Liquid Rainout		fraction	0.53173	0.596305
Maximum Pool Radi	us	m	5.25686	5.56499
	Dista	nce to Concentra	tion Results	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Cer	nário 022V	
	The height for us	er defined concen	trations is the user d	efined height 0 m
	All toxic results a	are reported at the	toxic effect height () m
	All flammable re	sults are reported	at the flammable eff	ect height 0 m
Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	No Hazard	No Hazard
LFL (7000)	18.75	S	No Hazard	No Hazard
LFL Frac (7000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0
		Jet Fire Haza	rd	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Cer	nário 022V	
	Jet fire method u	sed: Cone model -	- DNV recommende	d
			Dia	Noite
Jet Fire Status			Hazard	Hazard
Flame Direction			Vertical	Vertical
	Radia	ation Effects: Jet	Fire Ellipse	
Path: \UTE Pampa r	ev_0_Hidrogenio\S	tudy\Retorno\Cer	nário 022V	
	This table gives t	he distances to the	e specified radiation	levels
	for each jet fire li	isted in the above	hazard table	
				Distance (m)

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	25.3561	25.3036
Radiation Level	12.5	kW/m2	13.9065	13.1242
Radiation Level	37.5	kW/m2	8.61086	7.8302
Radiation Level	44	kW/m2	8.01845	6.78719



		F	adiation Effects: Jet	Fire Distance	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022V	
				Dia	Radiation Level (kW/m2) Noite
			Early Pool Fire	Hazard	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022V	
				Dia	Noite
Earl	y Pool Fire Stat	tus		Hazard	Hazard
		Rad	iation Effects: Early	Pool Fire Ellipse	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022V	
					Distance (m)
				Dia	Noite
Radi	iation Level	3	kW/m2	43.1874	38.419
Radi	iation Level	12.5	kW/m2	35.9089	30.6124
Radi	iation Level	37.5	kW/m2	29.9214	24.3802
Radi	iation Level	44	kW/m2	28.9848	23.5949
		Radi	ation Effects: Early P	ool Fire Distance	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022V	
				Dia	Radiation Level (kW/m2) Noite
			Late Pool Fire I	lazard	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022V	
				Dia	Noite
Late	Pool Fire Statu	15		Hazard	Hazard
		Rac	liation Effects: Late F	Pool Fire Ellipse	
Path:	\UTE Pampa	rev_0_Hidroge	enio\Study\Retorno\Ce	nário 022V	
					Distance (m)
				Dia	Noite

UTE Pampa rev_0_Hidrogenio

			Dia	Noite
Radiation Level	3	kW/m2	61.2188	55.8707
Radiation Level	12.5	kW/m2	45.3335	38.8893
Radiation Level	37.5	kW/m2	31.6463	26.6224
Radiation Level	44	kW/m2	31.6463	26.6224



Radiation Effects: Late Pool Fire Distance

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022V

Radiation Level (kW/m2) Noite

Weather Conditions

Dia

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 022V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Nama	Data		
Path: \l	TE Pampa rev_0_Hidrogenio\Study\Retorno	Cenário 023	
	User-De	fined Data	
Material			
	Material Identifier	n-NONANE	
	Type of Vessel	Unpressurized (at atmospheric pressure)	
	Pressure Specification	Pressure not used	
	Temperature	25	(
	Mass Inventory	1429]
Scenario			
	Scenario Type	Catastrophic rupture	
	Phase to be Released	Liquid	
	Building Wake Effect	None	
	Tank Head	0	1
Location			
	Elevation	1	1
	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	2	1
	[Type of Bund Surface	Concrete]	
	Bund Height	0.5	1
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Oi	itdoor		
	Location of release	Open air release	
Flammahl			
Fiammao	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
515001 5101	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	1429	1
	Use Burst Pressure	No - Use release pressure for fireball	-
Fireball D	aramators		
r nebali P	[Mass Modification Factor	31	
	[Calculation method for fireball	DNV Recommended	
	[TNO model flame temperature	1727	(
Tovia Dom	ameters		
IUXIC Para	[Wind Dependent Exchange Rate	Case Specified]	
	[Duilding Evolution Data	Λ	/

Study Folder:

2,739,689 Phast 6.7

[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 calc	culation 0.05	fraction]
[Cut-off concentration for exposure time calculation	s 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

UTE Pampa rev_0_Hidrogenio



Study Folder: UTE Pampa rev_0_Hidrogenio

Path:	\UTE Pampa rev_0_Hidrogenio\Study	Retorno\Cenário 023	
DISCHA	RGE DATA for Weather:	Global Weathers\Dia	
Wind Wind Pasqu	Speed: Speed at Height (Calculated) sill Stability:	3.73 2.10 C/D	m/s m/s
USEI	R-DEFINED QUANTITIES		
Mate: Scena Inven Fixed	rial ario Itory I Duration	n-NONANE Catastrophic rupture 1,428.59 n/a	kg s
Stagn	ation data (data at upstream end for long pip - Pressure - Temperature - Fluid State	e): 1.01 25.00 Liquid at atmospheric pressure	bar degC
CAL	CULATED QUANTITIES		
Mas Mas Rele	s Flow of Air (Vent from Vapor Space only) s Flowrate ease Duration	n/a n/a n/a	kg/s s
Orif	ice or pipe exit data (before atmospheric exp - Pressure - Temperature - Vena Contracta Velocity (exit velocity for p - Discharge Coefficient	ansion): n/a n/a ipe releases) n/a n/a n/a	bar degC m/s
Fina	I data (after atmospheric expansion): - Temperature - Liquid Mass Fraction - Droplet Diameter - Expanded Radius - Velocity	25.00 1.00 10,000.00 n/a 0.00	degC fraction um m/s
DISCHA	ARGE DATA for Weather:	Global Weathers\Noite	
Wind Wind Pasqu	Speed: Speed at Height (Calculated) iill Stability:	2.78 1.45 D	m/s m/s
USEI	R-DEFINED QUANTITIES		
Mater Scena Inven Fixed	rial ario Itory I Duration	n-NONANE Catastrophic rupture 1,428.59 n/a	kg s
Stagn	ation data (data at upstream end for long pip - Pressure - Temperature - Fluid State	e): 1.01 25.00 Liquid at atmospheric pressure	bar degC

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s
- Discharge Coefficient	n/a	
Final data (after atmospheric expansion):		
- Temperature	25.00	degC
- Liquid Mass Fraction	1.00	fraction
- Droplet Diameter	10,000.00	um
- Expanded Radius	n/a	m
- Velocity	0.00	m/s


Phast 6.7

Consequence Results

Pool Vaporization Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 023

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

		Dia	Noite				
Liquid Rainout	fraction	0.999834	0.99991				
Initial Vapor Cloud	kg	0.237006	0.128755				
Time Pool Left Behind	S	7.16114					
Cloud Segment 1	Cloud Segment 1						
Cloud Segment Duration	S	91.2025					
Pool Vaporization Rate	kg/s	0.081628					
Cloud Segment 2							
Cloud Segment Duration	S	196.948					
Pool Vaporization Rate	kg/s	0.113576					
Cloud Segment 3							
Cloud Segment Duration	S	311.849					
Pool Vaporization Rate	kg/s	0.141755					
Maximum Pool Radius	m	11.2828	0.797885				
Distance to Concentration Results							

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 023

> 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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (56000)	18.75	S	2.84199	1.76871
LFL (7000)	18.75	S	2.8674	1.78849
LFL Frac (7000)	18.75	S	2.8674	1.78849
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (56000)	18.75	S	0	0
LFL (7000)	18.75	S	0	0
LFL Frac (7000)	18.75	S	0	0

Late Pool Fire Hazard

Path: \UTE Pampa rev 0 Hidrogenio\Study\Retorno\Cenário 023

	Dia	Noite
Late Pool Fire Status	Hazard	Hazard



	Study Folder:	UTE Pampa rev_0_Hidrogenio
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Radiation Effects: Late Pool Fire Ellipse	Radiation	Effects:	Late Pool	Fire Ellips
---	-----------	-----------------	-----------	-------------

Path: \UTE Par	mpa rev_0_Hidroge	nio\Study\Retorno\Ce	enário 023	
				Distance (m)
			Dia	Noite
Radiation Leve	1 3	kW/m2	50.9576	10.664
Radiation Leve	1 12.5	kW/m2	19.0486	6.22956
Radiation Leve	1 37.5	kW/m2	Not Reached	2.75532
Radiation Leve	1 44	kW/m2	Not Reached	2.26001
	Radi	ation Effects: Late P	ool Fire Distance	
Path: \UTE Par	mpa rev_0_Hidroge	nio\Study\Retorno\Ce	enário 023	
				Radiation Level (kW/m2)
			Dia	Noite
			_	
		Fireball Haz	zard	
Path: \UTE Par	mpa rev_0_Hidroge	nio\Study\Retorno\Ce	enário 023	
			Dia	Noite
Fireball Flame	Status		No Hazard	No Hazard
		Flash Fire Env	velope	
Path: \UTE Par	mpa rev_0_Hidroge	nio\Study\Retorno\Ce	enário 023	
	All flammat	ole results are reported	d at the flammable effe	ect height 0 m
				Distance (m)
			Dia	Noite
Furthest Extent	7000	ppm	2.8674	1.78849
Furthest Extent	7000	ppm	2.8674	1.78849
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	7000	ppm	0	0
Furthest Extent	7000	ppm	0	0



UTE Pampa rev_0_Hidrogenio **Study Folder:**

Explosion Effects: Early Explosion

Path:	\UTE Pampa rev	v_0_Hidrogenio\Stu	dy\Retorno\Cenário	023	
		Early Explosions a Explosion Model U	re assumed to be cen Jsed : Multi Energy	tered at the releas	e location
G				Dia	Noite
Supp	lied Flammable N	Aass	kg	1428.59	1428.59
				Distance (m) at	Overpressure Levels
				Dia	Noite
Over	pressure	0.05	bar	No Hazard	No Hazard
Over	pressure	0.1	bar	No Hazard	No Hazard
Over	pressure	0.3	bar	No Hazard	No Hazard
Over	pressure	0.4	bar	No Hazard	No Hazard
				Used Mass (kg)	at Overpressure Levels
				Dia	Noite
Over	pressure	0.05	bar	No Hazard	No Hazard
Over	pressure	0.1	bar	No Hazard	No Hazard
Over	pressure	0.3	bar	No Hazard	No Hazard
Over	pressure	0.4	bar	No Hazard	No Hazard

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Retorno\Cenário 023

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ário 024A			
ase Case			
CASE Nam	e: Data		
Path:	UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cen	ário 024A	
	User-Defined I	Data	
Material			
	Material Identifier	HYDROGEN	
	Type of Vessel	Pressurized Gas	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	168	bar
	Volume Inventory	25 75	aeg
	volume inventory	15	mo
Scenario		т1	
	Scenario Type	Leak	
	Phase to be Released	vapor	
	Building Wake Effect	23 None	
	g		
Location	Flavation	1	ml
	Use EPDG averaging time	EPDG not selected	1111
	Use IDLH averaging time	IDI H not selected	
	Use STEL averaging time	STEL not selected	
	Supply a user defined averaging time	Not supplied	
Dund			
Dullu	Status of Bund	No hund present	
	Type of Bund Surface	Concrete	
	[Bund Height	0	ml
	[Bund Failure Modeling	Bund cannot fail]	
In de costo			
Indoor/O	Location of release	Onen air release	
	Outdoor Release Angle	45 Open an Telease	dea
	Outdoor Release Direction	Angled from Horizontal	чед
Flammat	De Explosion Method	Multi-Fnergy	
	Jet Fire Method	Cone Model	
D 1 1			
Dispersio	n Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	920.1	kg
Finchall	Davamatavs		
r iredall I	[Mass Modification Factor	21	
	[Calculation method for fireball	DNV Recommended	
	[TNO model flame temperature	1727	deg
Toxic Pai	rameters [Wind Dependent Exchange Rate]	Case Specified]	
	1	Cuse Specifica	

2,739,689	Ĵ.Å
Phast 6.7	DNV

Study Folder:	UTE Pampa rev_0_Hidrogenio
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North(1)

	[Building Exchange Rate [Tail Time [Set averaging time equal to exposure time [Cut-off fraction of toxic load for exposure time calcul [Cut-off concentration for exposure time calculations	4 1800 Use a fixed averaging time] ation 0.05 0	/hr] s] fraction] fraction]
Multi Enorg	ny Evolosion		
WITHIN PURCH	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
-	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m

0 m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Dia		
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Leak	
Inventory	920.14	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe):		
- Pressure	169.01	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	•
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	4.31347E+000	kg/s
Release Duration	213.32	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	85.97	bar
- Temperature	-28.06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,285.81	m/s
- Discharge Coefficient	0.86	
Final data (after atmospheric expansion):		
- Temperature	25.08	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.18	m
- Velocity	500.00	m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Leak	
Inventory	920.14	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	169.01	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024A

CALCULATED QUANTITIES



Study Folder:	UTE Pampa rev	0	Hidrogenio
	· · · · · · · ·		

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	4.31347E+000	kg/s
Release Duration	213.32	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	85.97	bar
- Temperature	-28.06	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,285.81	m/s
- Discharge Coefficient	0.86	
Final data (after atmospheric expansion):		
- Temperature	25.08	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.18	m
- Velocity	500.00	m/s



Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024A

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024A

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Angled	Angled
	Dia Hazard Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 024A

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	52.6302	52.853
Radiation Level	12.5	kW/m2	26.6972	22.776
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024A

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 024H			
Base Case			
CASE Name	:: Data		
Path: \	UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenár	io 024H	
	User-Defined Da	ta	
Material			
	Material Identifier	HYDROGEN	
	Type of Vessel	Pressurized Gas	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	3.5	bar
	Temperature	25	degC
	Mass Inventory	27.44	kg
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Vapor	
	Hole Diameter	25	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/O	utdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Horizontal	
Flammab	le		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersio	n		
	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	27.44	kg
Fireball P	Parameters		
	[Mass Modification Factor	31	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Par	ameters		
	[Wind Dependent Exchange Rate	Case Specified]	
	[Building Exchange Rate	4	/hr]

Study Folder:

2,739,689 Phast 6.7

	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

UTE Pampa rev_0_Hidrogenio

Path:

Path:	\UTE Pampa rev_0_Hidrogenio\S	tudy\Hidrogênio\Cenário 024H		
DISCH	ARGE DATA for Weather:	Global Weathers\Dia		
Win	id Speed:		3.73	m/s
Win	d Speed at Height (Calculated)		2.10	m/s
Pase	quill Stability:		C/D	
USI	ER-DEFINED QUANTITIES			
Mat	erial		HYDROGEN	
Sce	nario		Leak	
Inve	entory		27.44	kg
Fixe	ed Duration		n/a	S
Stag	gnation data (data at upstream end for lon	ng pipe):		
	- Pressure		4.51	bar
	- Temperature		25.00	degC
	- Fluid State		Pressurized gas	
CA	LCULATED QUANTITIES			
Ma	ass Flow of Air (Vent from Vapor Space of	only)	n/a	
Ma	ass Flowrate		1 14028E-001	kø/s
Re	lease Duration		240.64	s
Or	ifice or pipe exit data (before atmospheri	c expansion):		
	- Pressure	1 /	2.37	bar
	- Temperature		-25.90	degC
	- Vena Contracta Velocity (exit velocity	for pipe releases)	1,203.22	m/s
	- Discharge Coefficient		0.83	
Fir	nal data (after atmospheric expansion):			
	- Temperature		16.41	degC
	- Liquid Mass Fraction		0.00	fraction
	- Droplet Diameter		0.00	um
	- Expanded Radius		0.03	m
	- Velocity		500.00	m/s
DISCH	ARGE DATA for Weather:	Global Weathers\Noite		
Win	d Speed:		2.78	m/s
Win	d Speed at Height (Calculated)		1.45	m/s
Pase	quill Stability:		D	
USI	ER-DEFINED QUANTITIES			
Mat	erial		HYDROGEN	
Sce	nario		Leak	
Inve	entory		27.44	kg
Fixe	ed Duration		n/a	S
Stag	gnation data (data at upstream end for lon	ng pipe):		
	- Pressure		4.51	bar
	- Iemperature		25.00	degC
	- Fluid State		Pressurized gas	

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Study Folder:	UTE Pampa rev_	_0	_Hidrogenio
•			

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.14028E-001	kg/s
Release Duration	240.64	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	2.37	bar
- Temperature	-25.90	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,203.22	m/s
- Discharge Coefficient	0.83	
Final data (after atmospheric expansion):		
- Temperature	16.41	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024H

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Horizontal	Horizontal

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024H

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	9.80941	9.5996
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024H

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name	D-4-	
CASE Name:	Data	
Path: \U'	TE Pampa rev_0_Hidrogenio\Study\Hidrogênio	Cenário 024I
	User-Defin	ed Data
Material		
	Material Identifier	HYDROGEN
	Type of Vessel	Pressurized Gas
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	3.5
	Temperature	25
	Mass Inventory	27.44
Scenario		
	Scenario Type	Leak
	Phase to be Released	Vapor
	Hole Diameter	25
	Building Wake Effect	None
Location		
	Elevation	
	Use ERPG averaging time	ERPG not selected
	Use IDLH averaging time	IDLH not selected
	Use STEL averaging time	SIEL not selected
	Supply a user defined averaging time	Not supplied
Bund		
	Status of Bund	No bund present
	Type of Bund Surface	Concrete
	Bund Height	
	Bund Failure Modeling	Bund cannot fail
Indoor/Out	idoor	
	Location of release	Open air release
	Outdoor Release Direction	Down - Impinging on the Ground
Flammable		
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispersion		
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	27.44
Fireball Pa	rameters	
	Mass Modification Factor	3]
	[Calculation method for fireball	DNV Recommended]
	[TNO model flame temperature	1727
Toxic Para	meters	
	[Wind Dependent Exchange Rate	Case Specified]
	[Building Exchange Rate	4

Study Folder:

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	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

UTE Pampa rev_0_Hidrogenio

Path:



tudy Folder: UTE Pampa rev_0_Hidrogenio

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024I

DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Leak	
Inventory	27.44	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pip	e):	
- Pressure	4.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1 14028E-001	kø/s
Release Duration	240.64	s
Orifice or pipe exit data (before atmospheric exp	ansion):	
- Pressure	2.37	bar
- Temperature	-25.90	degC
- Vena Contracta Velocity (exit velocity for p	bipe releases) 1,203.22	m/s
- Discharge Coefficient	0.83	
Final data (after atmospheric expansion):		
- Temperature	16.41	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Leak	
Inventory	27.44	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pip	e):	
- Pressure	4.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES

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Study Folder:	UTE Pampa rev 0 Hidrogenio
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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.14028E-001	kg/s
Release Duration	240.64	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	2.37	bar
- Temperature	-25.90	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,203.22	m/s
- Discharge Coefficient	0.83	
Final data (after atmospheric expansion):		
- Temperature	16.41	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s



Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024I

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	0.749736	0.719968
LFL (40000)	18.75	S	15.3	13.4415
LFL Frac (40000)	18.75	S	15.3	13.4415
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024I

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Along Ground	Along Ground

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 024I

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	4.54811	4.46522
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogenio\Cenário 024I

Radiation Level (kW/m2) Noite



Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024I

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

	10000		Dia	Distance (m) Noite
Furthest Extent	40000	ppm	15.3	13.4415
Furthest Extent	40000	ppm	15.3	13.4415
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	40000	ppm	0	0
Furthest Extent	40000	ppm	0	0



Study Folder: UTE Pampa rev_0_Hidrogenio

Explosion Effects: Late Ig

Path: \UTE Pam	pa rev_0_Hidroge	enio\Study\Hidrogên	io\Cenário 024I			
	Explosion M Explosion I	Model Used : Multi E Location Criterion: C	Energy Cloud Front (LFL Fract	tion)		
	All distance	All distances are measured from the Source				
	All flamma	fect height 0 m				
			Maximum Di	istance (m) at Overpressure Level		
			Dia	Noite		
Overpressure	0.05	bar	47.7734	50.8742		
Overpressure	0.1	bar	30.3933	32.0674		
Overpressure	0.3	bar	18.0686	18.7309		
Overpressure	0.4	bar	15.8399	16.3193		
			Supplementa	ry Data at 0.05 bar		
			Dia	Noite		
Supplied Flammable	able Mass	kg	0.339816	0.430561		
Overpressure Ra	dius	m	37 7734	40 8742		
Distance to:	uius		57.7751	10.0712		
- Ignition Source	2	m	10	10		
- Cloud Front/Ce	entre	m	10	10		
- Explosion Cen	tre	m	10	10		
			Supplementa	ry Data at 0.1 bar		
			Dia	Noite		
Supplied Flamma Used Flammable	able Mass Mass	kg	0.339816	0.430561		
Overpressure Rae	dius	m	20.3933	22.0674		
Distance to:						
- Ignition Source	e	m	10	10		
- Cloud Front/Ce	entre	m	10	10		
- Explosion Cen	tre	m	10	10		
			Supplementa	ry Data at 0.3 bar		
			Dia	Noite		
Supplied Flamma	able Mass	kg	0.339816	0.430561		
Used Flammable	Mass					
Overpressure Ra	dius	m	8.06859	8.73095		
Distance to:						
- Ignition Source	2	m	10	10		
- Cloud Front/Ce	entre	m	10	10		
- Explosion Cen	tre	m	10	10		
			Supplementa	ry Data at 0.4 bar		
0 1 1 1 1	11.14		Dia	Noite		
Supplied Flamma Used Flammable	able Mass Mass	kg	0.339816	0.430561		
Overpressure Rae	dius	m	5.83994	6.31934		
Distance to:						
- Ignition Source	e	m	10	10		
- Cloud Front/Ce	entre	m	10	10		



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- Explosion Centre	m	10	10
	Weather Cond	itions	
Path: \UTE Pampa rev_0_Hidrogen	io\Study\Hidrogênio	Cenário 024I	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 024V			
Base Case			
CASE Name	: Data		
Dath: \I	ITE Dampa ray 0. Hidroganio/Study/Hidrogânio/Canái	rio 0.24 V	
	TE Pampa lev_0_marogenio\Study\marogenio\Cenar	110 024 v	
	User-Defined Da	ita	
Material			
	Material Identifier	HYDROGEN	
	lype of Vessel	Pressurized Gas	
	Pressure Specification	Pressure specified	1
	Storage Pressure - gauge	3.5	bar
	lemperature	25	degC
	Mass Inventory	27.44	kg
Scenario			
	Scenario Type	Leak	
	Phase to be Released	Vapor	
	Hole Diameter	25	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/O	utdoor		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammah	الم		
Tammao	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Disponsion			
Dispersion	Late Ignition Location	No ignition location	
	Mass Inventory of material to Disperse	27.44	kg
Fireball P	arameters		
	Mass Modification Factor	3	
	Calculation method for fireball	DNV Recommended	1
	I NO model flame temperature	1727	degC]
Toxic Par	ameters		
	[Wind Dependent Exchange Rate	Case Specified]	
	[Building Exchange Rate	4	/hr]

Study Folder:

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	[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 calcu	lation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

UTE Pampa rev_0_Hidrogenio

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Dia		
Wind Speed: Wind Speed at Height (Calculated)	3.73 2.10	m/s m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Leak	
Inventory	27.44	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	4.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.14028E-001	kg/s
Release Duration	240.64	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	2.37	bar
- Temperature	-25.90	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,203.22	m/s
- Discharge Coefficient	0.83	
Final data (after atmospheric expansion):		
- Temperature	16.41	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Leak	
Inventory	27.44	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe):		
- Pressure	4.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024V

CALCULATED QUANTITIES

2,739,689 Phast 6.7

	Study Folder:	UTE Pampa rev_0_Hidrogenio
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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.14028E-001	kg/s
Release Duration	240.64	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	2.37	bar
- Temperature	-25.90	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,203.22	m/s
- Discharge Coefficient	0.83	
Final data (after atmospheric expansion):		
- Temperature	16.41	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024V

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024V

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Vertical	Vertical
	Dia Hazard Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 024V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	5.82257	5.05178
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024V

Radiation Level (kW/m2) Noite

Study Folder:	UTE Pampa rev_0_Hidrogenic
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Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 024V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ar10 025			
ase Case			
CASE Nam	e: Data		
Path:	UTE Pampa rev_0_Hidrogenio\Study\Hidrogên	io\Cenário 025	
	User-Def	ined Data	
Material			
	Material Identifier	HYDROGEN	
	Type of Vessel	Pressurized Gas	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	168	bar
	Temperature	25	degC
	Mass Inventory	920.1	kg
Scenario			
	Scenario Type	Catastrophic rupture	
	Phase to be Released	Vapor	
	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/O	Putdoor		
	Location of release	Open air release	
Flammab	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersio	n		
	Late Ignition Location	No ignition location	1.
	Mass Inventory of material to Disperse	920.1	кg
	Use Burst Pressure	No - Use release pressure for fireball	
Fireball l	Parameters	21	
	INIASS MODIFICATION Factor	3]	
	Calculation method for fireball	DNV Recommended	1. 07
	INO model flame temperature	1727	degC
Toxic Par	rameters		
	Wind Dependent Exchange Rate	Case Specified]	
	Building Exchange Kate	4	/hr
	1 all 1 ime	1800	S



Study Folder:	UTE Pampa rev_0_Hidrogenio
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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 calc	culation 0.05	fraction]
[Cut-off concentration for exposure time calculation	s 0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m



T hast 0.

Path:	\UTE Pampa rev_0_Hidrogenio\Stud	dy\Hidrogênio\Cenário 025		
DISCH	ARGE DATA for Weather:	Global Weathers\Dia		
Wir	nd Speed:		3.73	m/s
Wir	nd Speed at Height (Calculated)		2.10	m/s
Pase	quill Stability:		C/D	
USI	ER-DEFINED QUANTITIES			
Mat	terial		HYDROGEN	
Sce	nario		Catastrophic rupture	
Inve	entory		920.14	kg
Fixe	ed Duration		n/a	S
Stag	gnation data (data at upstream end for long p	pipe):		
	- Pressure		169.01	bar
	- Temperature		25.00	degC
	- Fluid State		Pressurized gas	
CA	LCULATED QUANTITIES			
Ma	ass Flow of Air (Vent from Vapor Space only	y)	n/a	
Ma	ass Flowrate		n/a	kg/s
Re	lease Duration		n/a	s
Or	ifice or pipe exit data (before atmospheric e	expansion):		
	- Pressure	• /	n/a	bar
	- Temperature		n/a	degC
	- Vena Contracta Velocity (exit velocity fo	r pipe releases)	n/a	m/s
	- Discharge Coefficient		n/a	
Fir	nal data (after atmospheric expansion):			
	- Temperature		-208.49	degC
	- Liquid Mass Fraction		0.00	fraction
	- Droplet Diameter		0.00	um
	- Expanded Radius		n/a	m
	- Velocity		500.00	m/s
DISCH	ARGE DATA for Weather:	Global Weathers\Noite		
Wir	nd Speed:		2.78	m/s
Wir	nd Speed at Height (Calculated)		1.45	m/s
Pas	quill Stability:		D	
USI	ER-DEFINED QUANTITIES			
Mat	terial		HYDROGEN	
Sce	nario		Catastrophic rupture	
Inve	entory		920.14	kg
Fixe	ed Duration		n/a	S
Stag	gnation data (data at upstream end for long j	pipe):		
	- Pressure		169.01	bar
	- Temperature		25.00	degC
	- Fluid State		Pressurized gas	

CALCULATED QUANTITIES

n/a



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	n/a	kg/s
Release Duration	n/a	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	n/a	bar
- Temperature	n/a	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	n/a	m/s

Fin

- Discharge Coefficient

al data (after atmospheric expansion):		
- Temperature	-208.49	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	n/a	m
- Velocity	500.00	m/s

Study Folder:



Phast 6.7

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 025

UTE Pampa rev 0 Hidrogenio

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	4.80052	4.82036
LFL (40000)	18.75	S	42.9006	39.3439
LFL Frac (40000)	18.75	S	42.9006	39.3439
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Fireball Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 025

	Dia	Noite
Fireball Flame Status	Hazard	Hazard

Radiation Effects: Fireball Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 025

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	263.792	264.092
Radiation Level	12.5	kW/m2	125.694	125.831
Radiation Level	37.5	kW/m2	58.2393	58.3283
Radiation Level	44	kW/m2	49.3164	49.4042

Radiation Effects: Fireball Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 025

> Radiation Level (kW/m2) Noite



Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 025

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

				Distance (m)
			Dia	Noite
Furthest Extent	40000	ppm	42.9006	39.3439
Furthest Extent	40000	ppm	42.9006	39.3439
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	40000	ppm	0	0
Furthest Extent	40000	ppm	0	0

Explosion Effects: Early Explosion

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 025

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

			Dia	Noite	
Supplied Flammable Mass		kg	920.138	920.138	
			Distance (m	at Overpressure Levels	
			Dia	Noite	
Overpressure	0.05	bar	526.489	526.489	
Overpressure	0.1	bar	284.244	284.244	
Overpressure	0.3	bar	112.461	112.461	
Overpressure	0.4	bar	81.3975	81.3975	
			Used Mass (kg) at Overpressure Leve		els
			Dia	Noite	
Overpressure	0.05	bar	920.138	920.138	
Overpressure	0.1	bar	920.138	920.138	
Overpressure	0.3	bar	920.138	920.138	
Overpressure	0.4	bar	920.138	920.138	

Path:



Study Folder: UTE Pampa rev_0_Hidrogenio

Explosion	Effects:	Late	Ignition
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Path: \UTE Pampa	a rev_0_Hidroge	enio\Study\Hidrogên	io\Cenário 025			
	Explosion M Explosion I All distance	Model Used : Multi E Location Criterion: C	Energy Youd Front (LFL Frac o the Source	tion)		
	All flamma	ble results are report	ed at the flammable et	ffect height 0 m		
			Maximum Distance (m) at Overpress			
			Dia	Noite		
Overpressure	0.05	bar	520.137	520.59		
Overpressure	0.1	bar	294.162	294.142		
Overpressure	0.3	bar	134.515	134.508		
Overpressure	0.4	bar	105.647	105.641		
			Supplementa	ry Data at 0.05 bar		
			Dia	Noite		
Supplied Flammab Used Flammable N	le Mass Iass	kg	788.773	790.922		
Overpressure Radi	us	m	500.137	500.59		
Ignition Source		m	20	20		
- Ignition Source	tre	m	20	0 111996		
- Explosion Centre	8	m	20	20		
			Supplementa	ry Data at 0 1 bar		
			Dia	Noite		
Supplied Flammab Used Flammable N	le Mass Jass	kg	738.569	738.404		
Overpressure Radi	us	m	264.162	264.142		
Distance to:						
- Ignition Source		m	30	30		
- Cloud Front/Cen	tre	m	1.53221	1.2256		
- Explosion Centre		m	30	30		
			Supplementa	Supplementary Data at 0.3 bar		
			Dia	Noite		
Supplied Flammab Used Flammable N	le Mass Iass	kg	738.569	738.404		
Overpressure Radi	us	m	104.515	104.508		
Distance to:						
- Ignition Source		m	30	30		
- Cloud Front/Cen	tre	m	1.53221	1.2256		
- Explosion Centre	e	m	30	30		
			Supplementa	ry Data at 0.4 bar		
			Dia	Noite		
Supplied Flammab Used Flammable N	le Mass Iass	kg	738.569	738.404		
Overpressure Radi	us	m	75.6468	75.6412		
Distance to:			2.0	20		
- Ignition Source		m	30	30		
 Cloud Front/Cen 	tre	m	1.53221	1.2256		


Study Foldor:	UTE Pompo roy (Hidrogonio
Study Folder:	UTE Pampa rev_0	-Hidrogenio

- Explosion Centre	m	30	30
	Weather Condi	tions	
Path: \UTE Pampa rev_0_Hidroge	nio\Study\Hidrogênio\	Cenário 025	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



ario 026A			
se Case			
CASE Nar	ne: Data		
Path	\UTE Pampa rev 0 Hidrogenio\Study\Hidrogenio	Cenário 026A	
1 atn.	(0 TE Tampa Tev_0_Therogeno(Study (Therogeno)		
	User-Defin	ed Data	
Materia	1		
	Material Identifier	HYDROGEN	
	Type of Vessel	Pressurized Gas	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	2.5	bar
	Temperature	25	deg
	Volume Inventory	75	m3
Scenario)		
	Scenario Type	Line rupture	
	Phase to be Released	Vapor	
	Building Wake Effect	None	
	Specify Pump Head	No pump head supplied	
	Number of Excess Flow Valves	0	
	Number of Non-Return Valves	0	
	Number of Shut-Off Valves	0	
Pipe			
	Internal Diameter	28	mm
	Line length	1	m
Location	n		
	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 Angle	45	deg
	Outdoor Release Direction	Angled from Horizontal	
Flamma	ble		
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersi	on		
Dispersi	on Late Ignition Location	No ignition location	



Fireball Parameters		
[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]
Toxic Parameters		
[Wind Dependent Exchange Rate	Case Specified]	
[Building Exchange Rate	4	/hr]
[Tail Time	1800	s]
[Set averaging time equal to exposure time	Use a fixed averaging time]	
[Cut-off fraction of toxic load for exposure time calcu	ulation 0.05	fraction]
[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry		
Shape	Point	
Dimension	2D	
System	Absolute	
East(1)	0	m
North(1)	0	m

Path:



Phast 6.7

DISCHARGE DATA for Weather:	Global Weathers\Dia		
Wind Speed:		3.73	m/s
Wind Speed at Height (Calculated)		2.10	m/s
Pasquill Stability:		C/D	
USER-DEFINED QUANTITIES			
Material		HYDROGEN	
Scenario		Line rupture	
Inventory		21.37	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long p	ipe):		
- Pressure		3.51	bar
- Temperature		25.00	degC
- Fluid State		Pressurized gas	
CALCULATED QUANTITIES			
Mass Flow of Air (Vent from Vapor Space only	1)	n/a	
Mass Flowrate		1.09448E-001	kg/s
Release Duration		195.29	s
Orifice or pipe exit data (before atmospheric ex	xpansion):		
- Pressure		1.56	bar
- Temperature		-13.75	degC
- Vena Contracta Velocity (exit velocity for	r pipe releases)	1,221.93	m/s
- Discharge Coefficient		1.00	
Final data (after atmospheric expansion):			
- Temperature		29.99	degC
- Liquid Mass Fraction		0.00	fraction
- Droplet Diameter		0.00	um
- Expanded Radius		0.03	m
- Velocity		500.00	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite		
Wind Speed:		2.78	m/s
Wind Speed at Height (Calculated)		1.45	m/s
Pasquill Stability:		D	
USER-DEFINED QUANTITIES			
Material		HYDROGEN	
Scenario		Line rupture	
Inventory		21.37	kg
Fixed Duration		n/a	S
Stagnation data (data at upstream end for long p	ipe):	a	
- Pressure		3.51	bar daaC
- Temperature		25.00	degC
- Fluid State		r ressurized gas	

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026A

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.09448E-001	kg/s
Release Duration	195.29	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.56	bar
- Temperature	-13.75	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,221.93	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	29.99	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026A

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026A

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Angled	Angled
	Dia Hazard Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026A

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	8.90796	9.00572
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026A

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



Cenário 026H **Base Case** CASE Name: Data Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026H **User-Defined Data** Material HYDROGEN Material Identifier Type of Vessel Pressurized Gas Pressure Specification Pressure specified Storage Pressure - gauge 2.5 bar Temperature 25 degC Volume Inventory 75 m3 Scenario Scenario Type Line rupture Vapor Phase to be Released Building Wake Effect None Specify Pump Head No pump head supplied Number of Excess Flow Valves 0 Number of Non-Return Valves 0 Number of Shut-Off Valves 0 Pipe Internal Diameter 28 mm Line length 1 m Location [Elevation 1 m] Use ERPG averaging time ERPG not selected Use IDLH averaging time IDLH not selected Use STEL averaging time STEL not selected Supply a user defined averaging time Not supplied Bund Status of Bund 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 Impingement Flammable Explosion Method Multi-Energy Jet Fire Method Cone Model Dispersion Late Ignition Location No ignition location Mass Inventory of material to Disperse 21.37 kg **Fireball Parameters**



[Mass Modification Factor	3]	
[Calculation method for fireball	DNV Recommended]	
[TNO model flame temperature	1727	degC]
Toxic Parameters	Case Specified]	
wind Dependent Exchange Rate	Case Specified	/11
Building Exchange Rate	4	/nrj
	1800	S
Set averaging time equal to exposure time	Use a fixed averaging time	с. (°)
Cut-off fraction of toxic load for exposure time of	calculation 0.05	fraction
Cut-off concentration for exposure time calculat	ions 0	fraction
Multi Energy Explosion		
Use Unconfined Strength	Do not use unconfined strength	
Use Fractions	Use fractions	
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)	6	
Source 1 (Fraction)	1	fraction
Geometry	Doint	
Dimension	Point	
Dimension	2D	
System	Absolute	
EaSI(1)	0	m
North(1)	0	m



Phast 6.7

Path: \UTE Pampa rev_0_Hidrogenio\Study	\Hidrogênio\Cenário 026H	
DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Line rupture	
Inventory	21.37	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pip	be):	
- Pressure	3.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.09448E-001	kg/s
Release Duration	195.29	S
Orifice or pipe exit data (before atmospheric exp	pansion):	
- Pressure	1.56	bar
- Temperature	-13.75	degC
- Vena Contracta Velocity (exit velocity for p	pipe releases) 1,221.93	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	29.99	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Line rupture	
Inventory	21.37	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pip	be):	
- Pressure	3.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.09448E-001	kg/s
Release Duration	195.29	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.56	bar
- Temperature	-13.75	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,221.93	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	29.99	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026H

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Impinged	Impinged

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 026H

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	4.42489	4.34483
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026H

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749

Cenário 026I **Base Case** CASE Name:

Path:

Material

Scenario

Pipe

Location

Bund

Temperature

Line length

[Elevation

[Bund Height

Late Ignition Location



Phast 6.7 Data \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026I **User-Defined Data** Material Identifier HYDROGEN Type of Vessel Pressurized Gas Pressure Specification Pressure specified Storage Pressure - gauge 2.5 bar 25 degC Volume Inventory 75 m3 Scenario Type Line rupture Phase to be Released Vapor Building Wake Effect None Specify Pump Head No pump head supplied Number of Excess Flow Valves 0 Number of Non-Return Valves 0 Number of Shut-Off Valves 0 Internal Diameter 28 mm 1 m 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 Status of Bund No bund present [Type of Bund Surface Concrete] 0 m] [Bund Failure Modeling Bund cannot fail] Location of release Open air release Outdoor Release Direction Down - Impinging on the Ground Explosion Method Multi-Energy Jet Fire Method Cone Model

> No ignition location 21.37 kg

Mass Inventory of material to Disperse

Indoor/Outdoor

Flammable

Dispersion

Fireball Parameters



Study Folder:	UTE Pampa rev	0	Hidrogenio
Study I bluell	or i i i i i i i i i i i i i i i i i i i	-`-	Senio

Phast 6.7

	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parar	neters		
	[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 calcul	ation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weathers\Dia		
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	3.73 2.10 C/D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	HYDROGEN Line rupture 21.37 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	3.51 25.00 Pressurized gas	bar degC
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only) Mass Flowrate	n/a 1.09448E-001	kg/s
Orifice or pipe exit data (before atmospheric expansion): - Pressure - Temperature - Vena Contracta Velocity (exit velocity for pipe releases) - Discharge Coefficient	1.56 -13.75 1,221.93 1.00	bar degC m/s
 Final data (after atmospheric expansion): Temperature Liquid Mass Fraction Droplet Diameter Expanded Radius Velocity 	29.99 0.00 0.00 0.03 500.00	degC fraction um m m/s
DISCHARGE DATA for Weather: Global Weathers\Noite		
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	2.78 1.45 D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	HYDROGEN Line rupture 21.37 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	3.51 25.00 Pressurized gas	bar degC

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026I

CALCULATED QUANTITIES



Study Folder: UTE Pampa rev_0_Hidrogenio

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.09448E-001	kg/s
Release Duration	195.29	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.56	bar
- Temperature	-13.75	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,221.93	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	29.99	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026I

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	0.718677	0.690235
LFL (40000)	18.75	S	14.9016	13.0477
LFL Frac (40000)	18.75	S	14.9016	13.0477
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026I

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Along Ground	Along Ground

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026I

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	4.42489	4.34483
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogenio\Cenário 026I

Radiation Level (kW/m2) Noite



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026I

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

				Distance (m)
			Dia	Noite
Furthest Extent	40000	ppm	14.9016	13.0477
Furthest Extent	40000	ppm	14.9016	13.0477
				Heights (m) for above distances
			Dia	Noite
Furthest Extent	40000	ppm	0	0
Furthest Extent	40000	ppm	0	0



Study Folder: UTE Pampa rev_0_Hidrogenio

Explosion	Effects:	Late	Ignition
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Path: \UTE Pamp	a rev_0_Hidroge	enio\Study\Hidrogên	io\Cenário 026I	
	Explosion M	Model Used : Multi I	Energy	
	Explosion I	Location Criterion: C	Cloud Front (LFL Fract	tion)
	All distance	es are measured from	n the Source	
	All flamma	ble results are report	ed at the flammable ef	ffect height 0 m
			Maximum D	istance (m) at Overpressure Level
			Dia	Noite
Overpressure	0.05	bar	47.1415	50.1223
Overpressure	0.1	bar	30.0522	31.6615
Overpressure	0.3	bar	17.9336	18.5703
Overpressure	0.4	bar	15.7422	16.2031
			Supplementa	ry Data at 0.05 bar
			Dia	Noite
Supplied Flammable	ole Mass	kg	0.323046	0.407234
Overpressure Padi	viass	m	37 1/15	40 1223
Distance to:	lus	111	57.1415	40.1223
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
- Explosion Centr	re	m	10	10
			Supplementa	ry Data at 0.1 bar
			Dia	Noite
Supplied Flammable	ole Mass	kg	0.323046	0.407234
Overpressure Radi		m	20.0522	21 6615
Distance to:	145	111	20.0322	21.0013
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
- Explosion Centr	e	m	10	10
·				
			Supplementa	ry Data at 0.3 bar
			Dia	Noite
Supplied Flammat	ole Mass	kg	0.323046	0.407234
Used Flammable N	Mass			
Overpressure Radi	ius	m	7.93361	8.57033
Distance to:				
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
- Explosion Centr	e	m	10	10
			Supplementa	ry Data at 0.4 bar
C	la Masa	1-7		Noite
Supplied Flammat	Mass	Кg	0.323046	0.40/234
Overpressure Padi	v1055	m	5 71771	6 20309
Distance to:	105	111	5.74224	0.20303
- Ignition Source		m	10	10
- Cloud Front/Cer	ntre	m	10	10
			10	- •

Path:

Surface Temperature

Relative Humidity



Study Folder:	UTE Pamna rev ()	Hidrogenio
Study Folder.		_mulogemo

- Explosion Centre	m	10	10
	Weather Con	ditions	
h: \UTE Pampa rev_0_Hidroger	nio\Study\Hidrogêni	o\Cenário 026I	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5

degC

fraction

24.6

0.636

16.5

0.749



se Case		
CASE Name:	Data	
Path: \U	TE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário	o 026V
	User-Defined Data	a
Material		
101uter iui	Material Identifier	HYDROGEN
	Type of Vessel	Pressurized Gas
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	2.5
	Temperature	25
	Volume Inventory	75
Scenario		
	Scenario Type	Line rupture
	Phase to be Released	Vapor
	Building Wake Effect	None
	Specify Pump Head	No pump head supplied
	Number of Excess Flow Valves	0
	Number of Non-Return Valves	0
	Number of Shut-Off Valves	0
Pipe		
	Internal Diameter	28
	Line length	1
Location		
	Elevation	1
	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
	Bund Failure Modeling	Bund cannot fail
Indoor/Ou	tdoor	
	Location of release	Open air release
	Outdoor Release Direction	Vertical
Flammable	e Evelopien Mathad	
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispersion	Lota Ignition Logation	No imition location
	Late Ignition Location	ino ignition location
	Mana Incontant of the initial Di	A1 47



	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parar	neters		
	[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 calcul	ation 0.05	fraction
	[Cut-off concentration for exposure time calculations	0	fraction
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Phast 6.7

rath:	\01E Pampa lev_0_Hidrogenio\Study\i	Hdrogenio Cenario 026 v		
DISC	HARGE DATA for Weather:	Global Weathers\Dia		
v	Vind Speed:		3.73	m/s
V	Vind Speed at Height (Calculated)		2.10	m/s
F	asquill Stability:		C/D	
τ	JSER-DEFINED QUANTITIES			
Ν	Iaterial	НҮ	DROGEN	
S	cenario	L	ine rupture	
Ι	nventory		21.37	kg
F	ixed Duration		n/a	S
S	tagnation data (data at upstream end for long pipe):		
	- Pressure		3.51	bar
	- Temperature		25.00	degC
	- Fluid State	Pres	surized gas	
(CALCULATED QUANTITIES			
	Mass Flow of Air (Vent from Vapor Space only)		n/a	
	Mass Flowrate	1.0	9448E-001	kg/s
	Release Duration		195.29	S
	Orifice or pipe exit data (before atmospheric expa	nsion):		
	- Pressure		1.56	bar
	- Temperature		-13.75	degC
	- Vena Contracta Velocity (exit velocity for pi	pe releases)	1,221.93	m/s
	- Discharge Coefficient		1.00	
	Final data (after atmospheric expansion):			
	- Temperature		29.99	degC
	- Liquid Mass Fraction		0.00	fraction
	- Droplet Diameter		0.00	um
	- Expanded Radius		0.03	m
	- Velocity		500.00	m/s
DISC	HARGE DATA for Weather:	Global Weathers\Noite		
V	Vind Speed:		2.78	m/s
V	Vind Speed at Height (Calculated)		1.45	m/s
F	asquill Stability:		D	
τ	JSER-DEFINED QUANTITIES			
Ν	faterial	НҮ	DROGEN	
S	cenario	L	ine rupture	
Ι	nventory		21.37	kg
F	ixed Duration		n/a	S
S	tagnation data (data at upstream end for long pipe):		
	- Pressure		3.51	bar
	- Temperature		25.00	degC
	- Fluid State	Pres	surized gas	

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogenio\Cenário 026V Path:

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Study Folder:	UTE Pampa rev	0	Hidrogenio
			_ 0

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	1.09448E-001	kg/s
Release Duration	195.29	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.56	bar
- Temperature	-13.75	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,221.93	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	29.99	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.03	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026V

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026V

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Vertical	Vertical
	Dia Hazard Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 026V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	5.67352	4.90786
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026V

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 026V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



e Case		
CASE Nam	ie: Data	
Path:	\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Ce	enário 027A
	User-Defined	Data
Material	1	2
	Material Identifier	HYDROGEN
	Type of Vessel	Pressurized Gas
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1.5
	Temperature	25
	Volume Inventory	75
Scenario		
	Scenario Type	Line rupture
	Phase to be Released	Vapor
	Building Wake Effect	None
	Specify Pump Head	No pump head supplied
	Number of Excess Flow Valves	0
	Number of Non-Return Valves	0
	Number of Shut-Off Valves	0
Pipe		
	Internal Diameter	57
	Line length	I
Location		1
	Elevation	
	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 Dural	Na hund meanet
	Status of Bund Surface	No build present
	[Dund Height	Concrete
	Bund Feilure Medeling	U Dund connet fail
	Bund Fanure Modering	Bund cannot fan
Indoor/O	Dutdoor	Onen air release
	Outdoor Delege Angle	Open air release
	Outdoor Release Angle	45
	Outdoor Release Direction	Angled from Horizontal
Flamma	ble Explosion Mathed	M.,14: D.,
	Explosion Method	
	Jet FIFe Method	Cone Model
Dispersi	on	
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	153



Fireball Pa	rameters		
	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Para	meters		
	[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 calcu	ulation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Ener	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Phast 6.7

Path: \UTE Pampa rev_0_Hidrogenio\Study\	Hidrogênio\Cenário 027A	
DISCHARGE DATA for Weather:	Global Weathers\Dia	
Wind Speed:	3.73	m/s
Wind Speed at Height (Calculated)	2.10	m/s
Pasquill Stability:	C/D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Line rupture	
Inventory	15.30	kg
Fixed Duration	n/a	s
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.11597E-001	kg/s
Release Duration	49.11	S
Orifice or pipe exit data (before atmospheric expa	nsion):	
- Pressure	1.21	bar
- Temperature	-5.86	degC
- Vena Contracta Velocity (exit velocity for pi	pe releases) 1,112.64	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	28.86	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.05	m
- Velocity	500.00	m/s
DISCHARGE DATA for Weather:	Global Weathers\Noite	
Wind Speed:	2.78	m/s
Wind Speed at Height (Calculated)	1.45	m/s
Pasquill Stability:	D	
USER-DEFINED QUANTITIES		
Material	HYDROGEN	
Scenario	Line rupture	
Inventory	15.30	kg
Fixed Duration	n/a	S
Stagnation data (data at upstream end for long pipe	e):	
- Pressure	2.51	bar
- Temperature	25.00	degC
- Fluid State	Pressurized gas	

CALCULATED QUANTITIES

2,739,689 Phast 6.7

	Study Folder:	UTE Pampa rev_0_Hidrogenio
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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.11597E-001	kg/s
Release Duration	49.11	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.21	bar
- Temperature	-5.86	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,112.64	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	28.86	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.05	m
- Velocity	500.00	m/s



Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027A

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027A

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Angled	Angled
	Dia Hazard Angled

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev 0 Hidrogenio\Study\Hidrogênio\Cenário 027A

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	14.8629	15.0645
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027A

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027A

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



e Case		
CASE Name:	Data	
Path: \U'	TE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Co	enário 027H
	User-Defined	Data
Material		
	Material Identifier	HYDROGEN
	Type of Vessel	Pressurized Gas
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1.5
	I emperature Volume Inventory	25
	volume inventory	13
Scenario	Seconomic Trance	Line muture
	Phase to be Released	
	Building Wake Effect	None
	Specify Pump Head	No pump head supplied
	Number of Excess Flow Valves	(
	Number of Non-Return Valves	0
	Number of Shut-Off Valves	C
Pine		
1.00	Internal Diameter	57
	Line length	1
Location		
	Elevation	1
	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	(
	Bund Failure Modeling	Bund cannot fail
Indoor/Out	door	
	Location of release	Open air release
	Outdoor Release Direction	Horizontal Impingement
Flammable		
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Mode
Dispersion		
	Late Ignition Location	No ignition location
	Mass Inventory of material to Disperse	15.3



Study Folder:	UTE Pampa rev() Hidrogenio
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Phast 6.7

	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parar	neters		
	[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 calcul	ation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Phast 6.7

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidr	ogênio\Cenário 027H	
DISCHARGE DATA for Weather: Glo	oal Weathers\Dia	
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	3.73 2.10 C/D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	HYDROGEN Line rupture 15.30 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	2.51 25.00 Pressurized gas	bar degC
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only) Mass Flowrate Release Duration	n/a 3.11597E-001 49.11	kg/s s
Orifice or pipe exit data (before atmospheric expansion - Pressure - Temperature - Vena Contracta Velocity (exit velocity for pipe re - Discharge Coefficient	1): 1.21 -5.86 leases) 1,112.64 1.00	bar degC m/s
Final data (after atmospheric expansion): - Temperature - Liquid Mass Fraction - Droplet Diameter - Expanded Radius - Velocity	28.86 0.00 0.00 0.05 500.00	degC fraction um m m/s
DISCHARGE DATA for Weather: Glo	oal Weathers\Noite	
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	2.78 1.45 D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	HYDROGEN Line rupture 15.30 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	2.51 25.00 Pressurized gas	bar degC

CALCULATED QUANTITIES
2,739,689 Phast 6.7

	Study Folder:	UTE Pampa rev_0_Hidrogenio
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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.11597E-001	kg/s
Release Duration	49.11	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.21	bar
- Temperature	-5.86	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,112.64	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	28.86	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.05	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027H

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	4.86289	No Hazard
LFL Frac (40000)	18.75	S	4.86289	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027H

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Impinged	Impinged

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027H

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	9.08565	9.21281
Radiation Level	12.5	kW/m2	5.2342	4.97432
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027H

Radiation Level (kW/m2) Noite



Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027H

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

				Distance (m)
			Dia	
Furthest Extent	40000	ppm	4.86289	
Furthest Extent	40000	ppm	4.86289	
				Heights (m) for above distances
			Dia	
Furthest Extent	40000	ppm	0	
Furthest Extent	40000	ppm	0	

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogenio\Cenário 027H

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749



CASE Name:	Data	
Path: \U	ГЕ Pampa rev_0_Hidrogenio\Study\Hidrogê	nio\Cenário 027I
	User-De	fined Data
Material		
	Material Identifier	HYDROGEN
	Type of Vessel	Pressurized Gas
	Pressure Specification	Pressure specified
	Storage Pressure - gauge	1.5
	I emperature Volume Inventory	25 75
Scenario	Scenario Type	Line runture
	Phase to be Released	Vanor
	Building Wake Effect	None
	Specify Pump Head	No pump head supplied
	Number of Excess Flow Valves	0
	Number of Non-Return Valves	C
	Number of Shut-Off Valves	C
Pipe		
-	Internal Diameter	57
	Line length	1
Location		
	Elevation	1
	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	
	Bund Failure Modeling	Bund cannot fail
Indoor/Out	door	
	Location of release	Open air release
	Outdoor Release Direction	Down - Impinging on the Ground
Flammable		
	Explosion Method	Multi-Energy
	Jet Fire Method	Cone Model
Dispersion	• . • •.• • .•	
	Late Ignition Location	No ignition location



Study Folder:	UTE Pampa rev	0	Hidrogenio
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Phast 6.7

	Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parar	neters		
	[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 calcul	ation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	gy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m

Path:



Phast 6.7

DISCHARGE DATA for Weather: Global Weather	ers\Dia	
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	3.73 2.10 C/D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	HYDROGEN Line rupture 15.30 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	2.51 25.00 Pressurized gas	bar degC
CALCULATED QUANTITIES		
Mass Flow of Air (Vent from Vapor Space only) Mass Flowrate Release Duration	n/a 3.11597E-001 49.11	kg/s
Orifice or pipe exit data (before atmospheric expansion): - Pressure - Temperature - Vena Contracta Velocity (exit velocity for pipe releases) - Discharge Coefficient	1.21 -5.86 1,112.64 1.00	bar degC m/s
 Final data (after atmospheric expansion): Temperature Liquid Mass Fraction Droplet Diameter Expanded Radius Velocity 	28.86 0.00 0.00 0.05 500.00	degC fraction um m/s
DISCHARGE DATA for Weather: Global Weather	ers\Noite	
Wind Speed: Wind Speed at Height (Calculated) Pasquill Stability:	2.78 1.45 D	m/s m/s
USER-DEFINED QUANTITIES		
Material Scenario Inventory Fixed Duration	HYDROGEN Line rupture 15.30 n/a	kg s
Stagnation data (data at upstream end for long pipe): - Pressure - Temperature - Fluid State	2.51 25.00 Pressurized gas	bar degC

\UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027I

CALCULATED QUANTITIES

2,739,689 Phast 6.7

	Study Folder:	UTE Pampa rev_0_Hidrogenio
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Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.11597E-001	kg/s
Release Duration	49.11	S
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.21	bar
- Temperature	-5.86	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,112.64	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	28.86	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.05	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 0271

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	1.08474	1.02486
LFL (40000)	18.75	S	22.0807	3.05827
LFL Frac (40000)	18.75	S	22.0807	3.05827
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027I

Jet fire method used: Cone model - DNV recommended

	Dia	Noite
Jet Fire Status	Hazard	Hazard
Flame Direction	Along Ground	Along Ground

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027I

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	9.08565	9.21281
Radiation Level	12.5	kW/m2	5.2342	4.97432
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogenio\Cenário 027I

Radiation Level (kW/m2) Noite

2,739,689 Phast 6.7

Study Folder: UTE Pampa rev_0_Hidrogenio

Flash Fire Envelope

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 0271

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

Furthest Extent Furthest Extent	40000 40000	ppm ppm	Dia 22.0807 22.0807	Distance (m) Noite 3.05827 3.05827
Furthest Extent Furthest Extent	40000 40000	ppm ppm	Dia 0 0	Heights (m) for above distances Noite 0 0



UTE Pampa rev_0_Hidrogenio **Study Folder:**

Path: \UTE Pampa	a rev_0_Hidroge	enio\Study\Hidrogên	io/Cenário 027I
	Explosion N	Model Used : Multi I	Energy
	Explosion I	Location Criterion: C	Cloud Front (LFL Fraction)
	All distance	es are measured from	n the Source
	All flamma	ble results are report	ed at the flammable effect height 0 m
			Maximum Distance (m) at Overpressure Level
			Dia
Overpressure	0.05	bar	80.4834
Overpressure	0.1	bar	52.6541
Overpressure	0.3	bar	32.9196
Overpressure	0.4	bar	29.351
			Supplementary Data at 0.05 bar
			Dia
Supplied Flammable	le Mass	kg	1.39506
Overpressure Redi	/1855		60 4824
Distance to:	us	III	00.4854
- Ignition Source		m	20
- Cloud Front/Cen	tre	m	20
- Explosion Centre	e	m	20
			Supplementary Data at 0.1 bar
			Dia
Supplied Flammab	le Mass	kg	1.39506
Used Flammable N	Aass		
Overpressure Radi	us	m	32.6541
Distance to:			
- Ignition Source		m	20
- Cloud Front/Cen	tre	m	20
- Explosion Centre	e	m	20
			Supplementary Data at 0.3 bar
			Dia
Supplied Flammab	le Mass	kg	1.39506
Used Flammable N	Aass		
Overpressure Radi	us	m	12.9196
Distance to:			
- Ignition Source		m	20
- Cloud Front/Cen	tre	m	20
- Explosion Centre	e	m	20
			Supplementary Data at 0.4 bar
a 41 ·			Dia
Supplied Flammab	le Mass	kg	1.39506
Used Flammable N	Aass		
Overpressure Radi	us	m	9.351
Distance to:			•
- Ignition Source		m	20
 Cloud Front/Cen 	tre	m	20

Explosion Effects: Late Ignition

Surface Temperature

Relative Humidity

Study Folder:

- Explosion Centre	m	20	
	Weather Condit	ions	
Path: \UTE Pampa rev_0_H	Hidrogenio\Study\Hidrogênio\@	Cenário 027I	
		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Paramet	ter	0.17	0.17
Atmospheric Temperature	degC	19.6	16.5

degC

fraction

24.6

0.636

16.5

0.749

UTE Pampa rev_0_Hidrogenio



ase Case			
CASE Name:	Data		
Path: \U7	'E Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cen	ário 027V	
	User-Defined E	Data	
Material			
	Material Identifier	HYDROGEN	
	Type of Vessel	Pressurized Gas	
	Pressure Specification	Pressure specified	
	Storage Pressure - gauge	1.5	b
	Temperature	25	d
	Volume Inventory	75	n
Scenario			
	Scenario Type	Line rupture	
	Phase to be Released	Vapor	
	Building Wake Effect	None	
	Specify Pump Head	No pump head supplied	
	Number of Excess Flow Valves	0	
	Number of Non-Return Valves	0	
	Number of Shut-Off Valves	0	
Pipe			
	Internal Diameter	57	n
	Line length	1	n
Location			
	Elevation	1	n
	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	n
	[Bund Failure Modeling	Bund cannot fail]	
Indoor/Out	door		
	Location of release	Open air release	
	Outdoor Release Direction	Vertical	
Flammable			
	Explosion Method	Multi-Energy	
	Jet Fire Method	Cone Model	
Dispersion			
	Late Ignition Location	No ignition location	



	[Mass Modification Factor	3]	
	[Calculation method for fireball	DNV Recommended]	
	[TNO model flame temperature	1727	degC]
Toxic Parar	neters		
	[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 calcul	ation 0.05	fraction]
	[Cut-off concentration for exposure time calculations	0	fraction]
Multi Energ	zy Explosion		
	Use Unconfined Strength	Do not use unconfined strength	
	Use Fractions	Use fractions	
	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)	6	
	Source 1 (Fraction)	1	fraction
Geometry			
	Shape	Point	
	Dimension	2D	
	System	Absolute	
	East(1)	0	m
	North(1)	0	m



Phast 6.7

Path: \UTE Par	mpa rev_0_Hidrogenio\Study	y\Hidrogênio\Cenário 027V		
DISCHARGE DA	ATA for Weather:	Global Weathers\Dia		
Wind Speed:			3.73	m/s
Wind Speed at H	leight (Calculated)		2.10	m/s
Pasquill Stability	y:		C/D	
USER-DEFINE	D QUANTITIES			
Material			HYDROGEN	
Scenario			Line rupture	
Inventory			15.30	kg
Fixed Duration			n/a	S
Stagnation data ((data at upstream end for long pi	pe):		
- Pressure	e		2.51	bar
- Temper	ature		25.00	degC
- Fluid St	tate		Pressurized gas	
CALCULATED) QUANTITIES			
Mass Flow of A	Air (Vent from Vapor Space only))	n/a	
Mass Flowrate			3.11597E-001	kg/s
Release Duration	on		49.11	s
Orifice or pipe	exit data (before atmospheric ex	pansion):		
- Pressure		. /	1.21	bar
- Temperatu	ure		-5.86	degC
- Vena Con	tracta Velocity (exit velocity for	pipe releases)	1,112.64	m/s
- Discharge	Coefficient		1.00	
Final data (after	r atmospheric expansion):			
- Temperatu	ure		28.86	degC
- Liquid Ma	ass Fraction		0.00	fraction
- Droplet D	viameter		0.00	um
- Expanded	Radius		0.05	m
- Velocity			500.00	m/s
DISCHARGE DA	ATA for Weather:	Global Weathers\Noite		
Wind Speed:			2.78	m/s
Wind Speed at H	leight (Calculated)		1.45	m/s
Pasquill Stability	y:		D	
USER-DEFINE	D QUANTITIES			
Material			HYDROGEN	
Scenario			Line rupture	
Inventory			15.30	kg
Fixed Duration			n/a	S
Stagnation data ((data at upstream end for long pi	pe):		
- Pressure	e		2.51	bar
- Temper	ature		25.00	degC
- Fluid St	tate		Pressurized gas	

CALCULATED QUANTITIES

2,739,689 Phast 6.7

Mass Flow of Air (Vent from Vapor Space only)	n/a	
Mass Flowrate	3.11597E-001	kg/s
Release Duration	49.11	s
Orifice or pipe exit data (before atmospheric expansion):		
- Pressure	1.21	bar
- Temperature	-5.86	degC
- Vena Contracta Velocity (exit velocity for pipe releases)	1,112.64	m/s
- Discharge Coefficient	1.00	
Final data (after atmospheric expansion):		
- Temperature	28.86	degC
- Liquid Mass Fraction	0.00	fraction
- Droplet Diameter	0.00	um
- Expanded Radius	0.05	m
- Velocity	500.00	m/s

Consequence Results

Distance to Concentration Results

 Path:
 \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027V

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 flammable effect height 0 m

Concentration(ppm)	Averaging Time			Distance (m)
			Dia	Noite
UFL (750000)	18.75	S	No Hazard	No Hazard
LFL (40000)	18.75	S	No Hazard	No Hazard
LFL Frac (40000)	18.75	S	No Hazard	No Hazard
Concentration(ppm)	Averaging Time			Heights (m) for above distances
			Dia	Noite
UFL (750000)	18.75	S	0	0
LFL (40000)	18.75	S	0	0
LFL Frac (40000)	18.75	S	0	0

Jet Fire Hazard

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027V

Jet fire method used: Cone model - DNV recommended

Dia	Noite
Hazard	Hazard
Vertical	Vertical
	Dia Hazard Vertical

Radiation Effects: Jet Fire Ellipse

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027V

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

				Distance (m)
			Dia	Noite
Radiation Level	3	kW/m2	10.3837	9.28684
Radiation Level	12.5	kW/m2	Not Reached	Not Reached
Radiation Level	37.5	kW/m2	Not Reached	Not Reached
Radiation Level	44	kW/m2	Not Reached	Not Reached

Radiation Effects: Jet Fire Distance

Dia

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027V

Radiation Level (kW/m2) Noite

Weather Conditions

Path: \UTE Pampa rev_0_Hidrogenio\Study\Hidrogênio\Cenário 027V

		Dia	Noite
Wind Speed	m/s	3.73	2.78
Pasquill Stability		C/D	D
Surface Roughness Length	mm	950.891	950.891
Surface Roughness Parameter		0.17	0.17
Atmospheric Temperature	degC	19.6	16.5
Surface Temperature	degC	24.6	16.5
Relative Humidity	fraction	0.636	0.749