ISGAS ENERGIT MULTIUTILITIES S.p.A.

Sede Legale Via Italia n° 167 – 09100 Cagliari

L'Amministratore Delegato: Dott. Giuseppe Deroma

TERMINAL GNL NEL PORTO CANALE DI CAGLIARI
PROGETTO AUTORIZZATIVO

TERMINAL GNL NEL PORTO CANALE DI CAGLIARI
PROGETTO AUTORIZZATIVO

Progettazione

Società di ingegneria incaricata per la progettazione

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Progettista e responsabile per l'integrazione fra le varie prestazioni specialistiche

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ORDINE INGEGNERI
PROVINCIA DI CAGLIARI
N. 4255 Dott. Ing. Giuseppe DELITALA

Gruppo di lavoro COSIN S.r.l.

Geologia e geotecnica
Geol. Alberto Gorini

Opere Civili
Ing. Nicola Marras

Studio di impatto ambientale
Ing. Emanuela Corona

Fotosimulazioni
Arch. Daniele Nurra

Archeologia
Archeol. Anna Luisa Sanna

Consulenze specialistiche:

Rapporto preliminare di sicurezza
Società ICARO S.r.l.

Opere antincendio
Ing. Fortunato Gangemi

Opere Marittime
Ing. Giovanni Spissu

Opere Strutturali
Ing. Francesco Fiori

Studio di impatto Acustico
Ing. Antonio Dedoni

MODULO 3 - ANALISI DEL RISCHIO-ALLEGATO 3.4 - REPORT SIMULAZIONI SCENARI (PHAST)

7 - RAPPORTO PRELIMINARE DI SICUREZZA

NOME FILE
D_07_RI_33_ADR_R00

SCALA

CODICE ELAB. D 07 RI 33 ADR R00 **REV.** A

REV.	DESCRIZIONE	DATA	REDATTO	VERIFICATO	APPROVATO
A	PRIMA EMISSIONE	Maggio 2017	Cherici	Delitala	Delitala

Input Report

Workspace: 17129I_LNG_rev00

Top1_Rottura braccio carico_25 mm

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

braccio di carico

Pressure vessel

17129I_LNG_rev00\Top1_Rottura braccio carico_25 mm

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	1044,8	kg
		Volume inventory	2,58059	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	5	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	5	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	2,58059	m3
		Tank vapour volume	0	m3
		Tank liquid volume	2,58059	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest		ppm
		Averaging time for concentration of interest		
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak

Leak

17129I_LNG_rev00\Top1_Rottura braccio carico_25 mm\braccio di carico

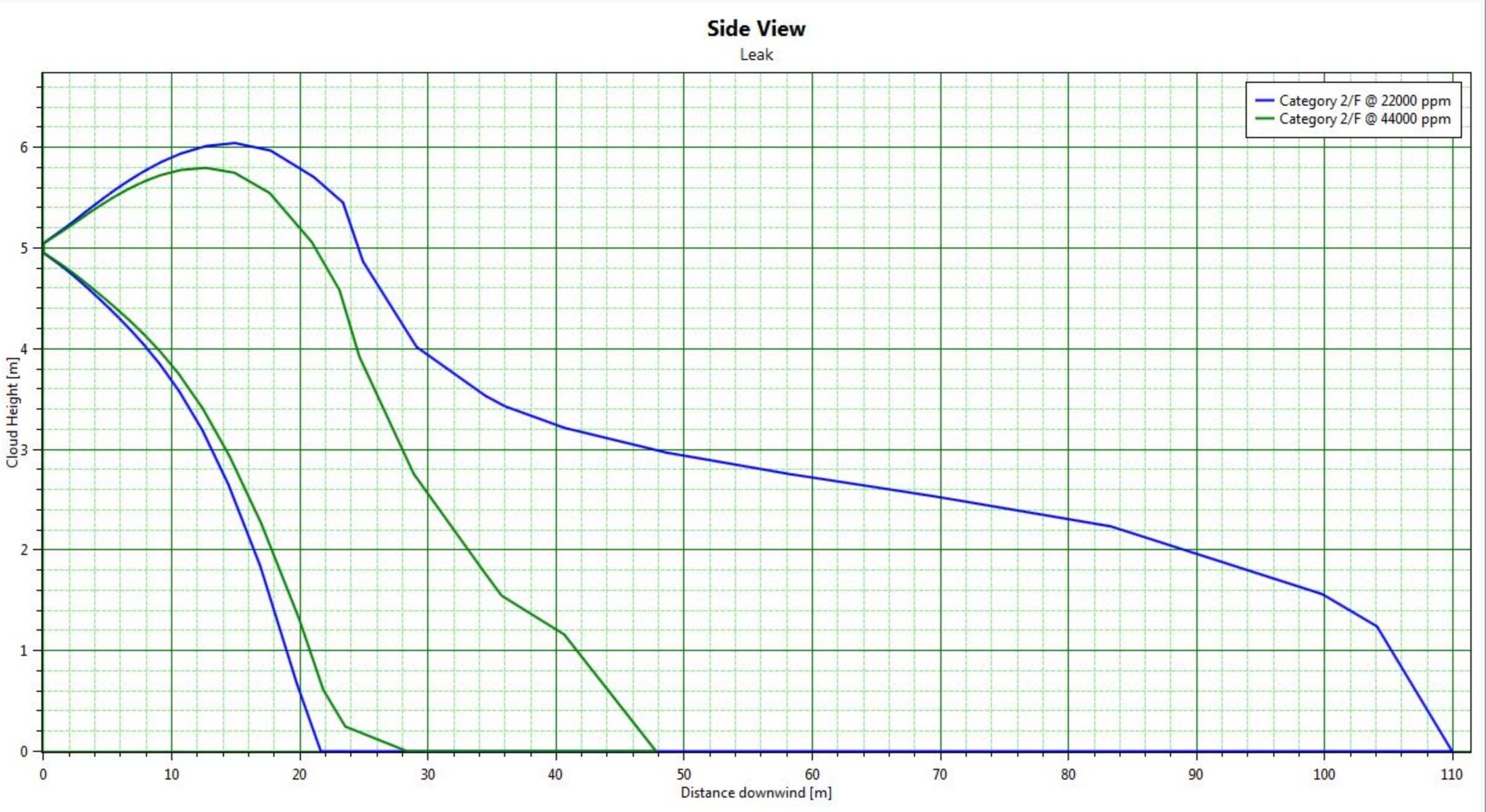
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	25	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	5	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest		ppm
		Averaging time for concentration of interest		
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

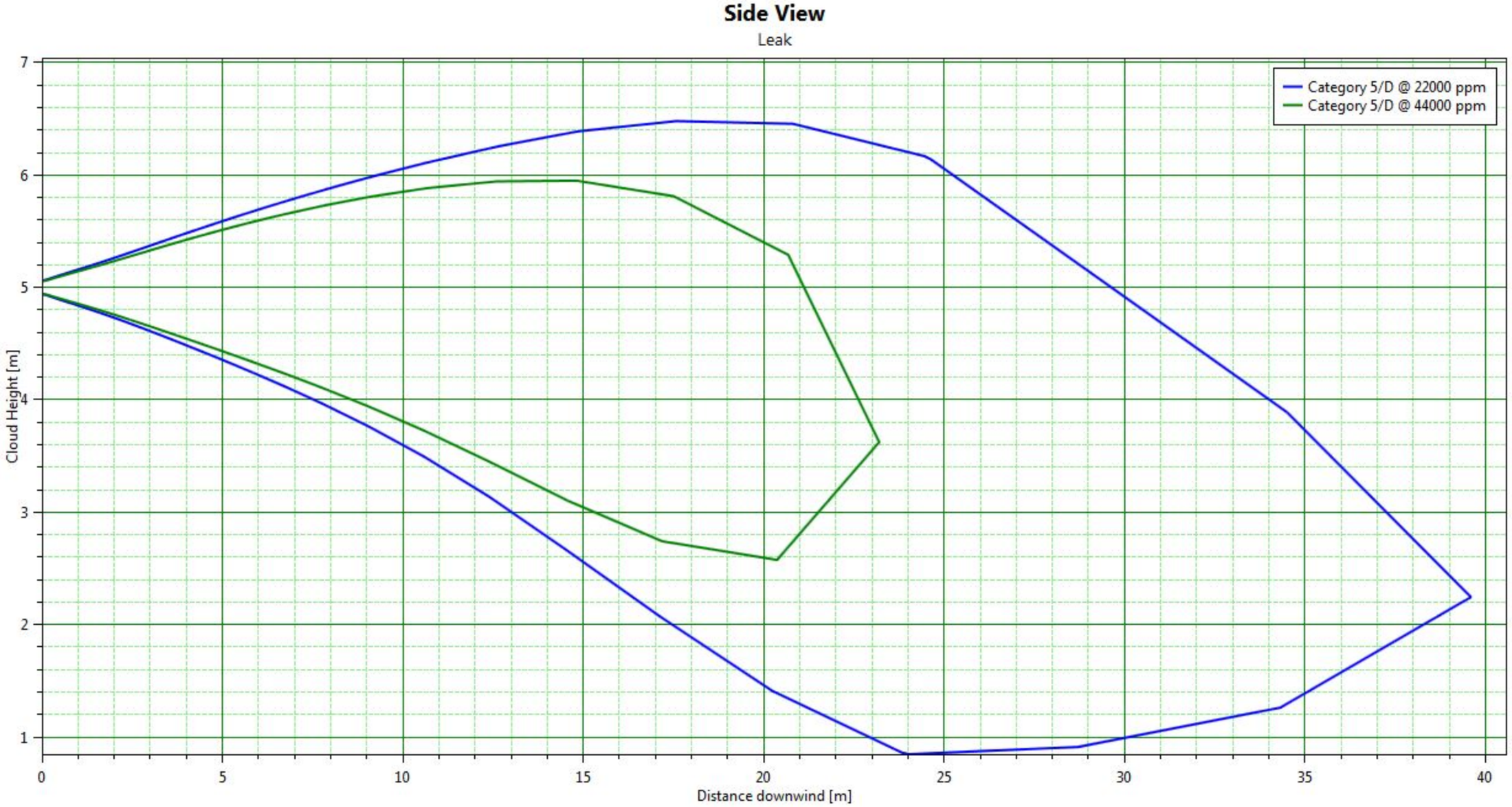
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

Audit Number	92412
Averaging time	Flammable (18,75 s)
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	119,26 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00

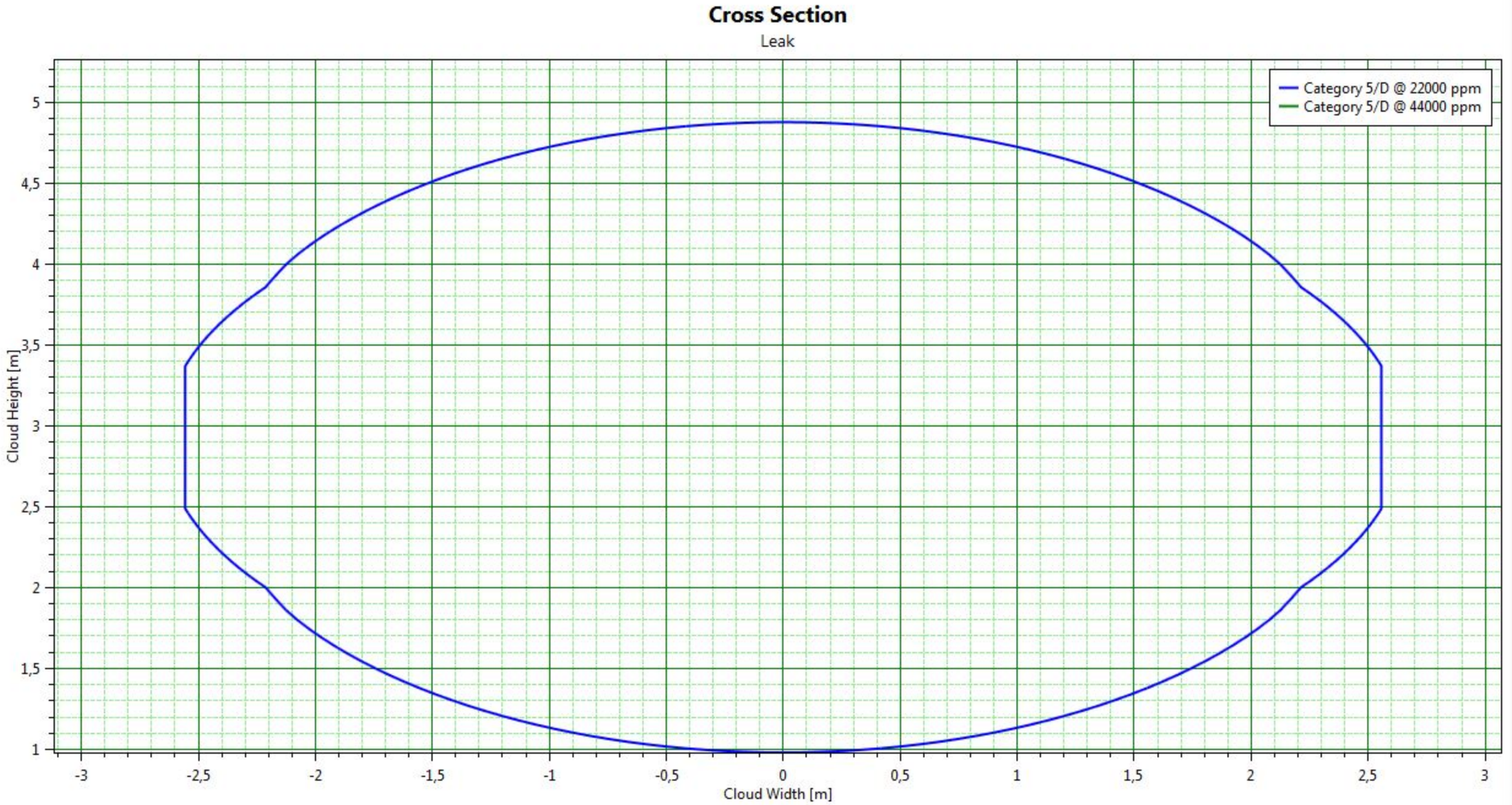


Audit Number	92412
Averaging time	Flammable (18,75 s)
Downwind Distance	50 m
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	119,26 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00

Audit Number	92412
Averaging time	Flammable (18,75 s)
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	15,9687 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	92412
Averaging time	Flammable (18,75 s)
Downwind Distance	30 m
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	12,2265 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top2_Rottura braccio carico ATC_25 mm

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

braccio di carico

Pressure vessel

17129I_LNG_rev00\Top2_Rottura braccio carico ATC_25 mm

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	1044,8	kg
		Volume inventory	2,58059	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	5	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	2,58059	m3
		Tank vapour volume	0	m3
		Tank liquid volume	2,58059	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest		ppm
		Averaging time for concentration of interest		
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak

Leak

17129I_LNG_rev00\Top2_Rottura braccio carico ATC_25 mm\braccio di carico

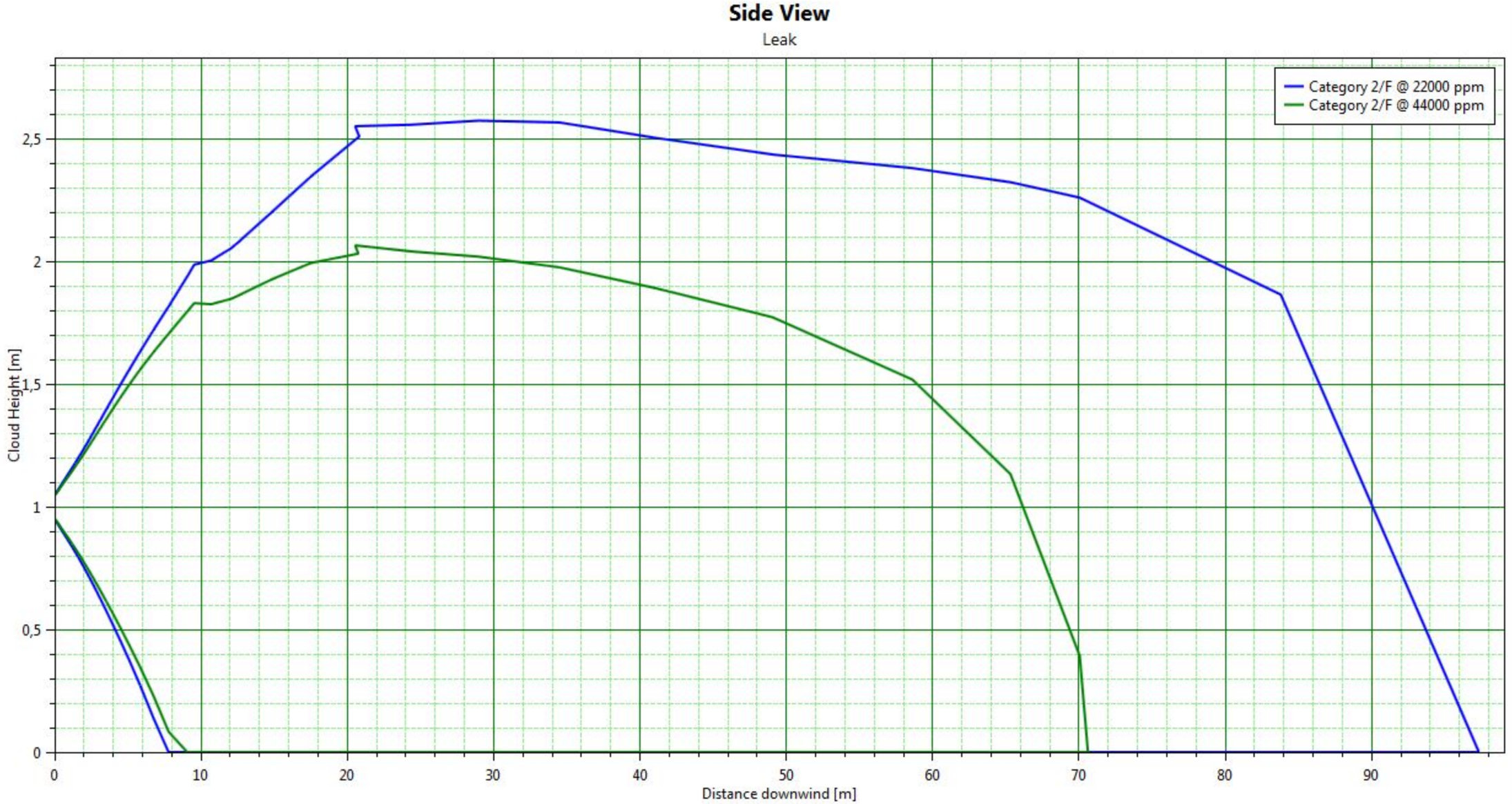
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	25	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest		ppm
		Averaging time for concentration of interest		
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

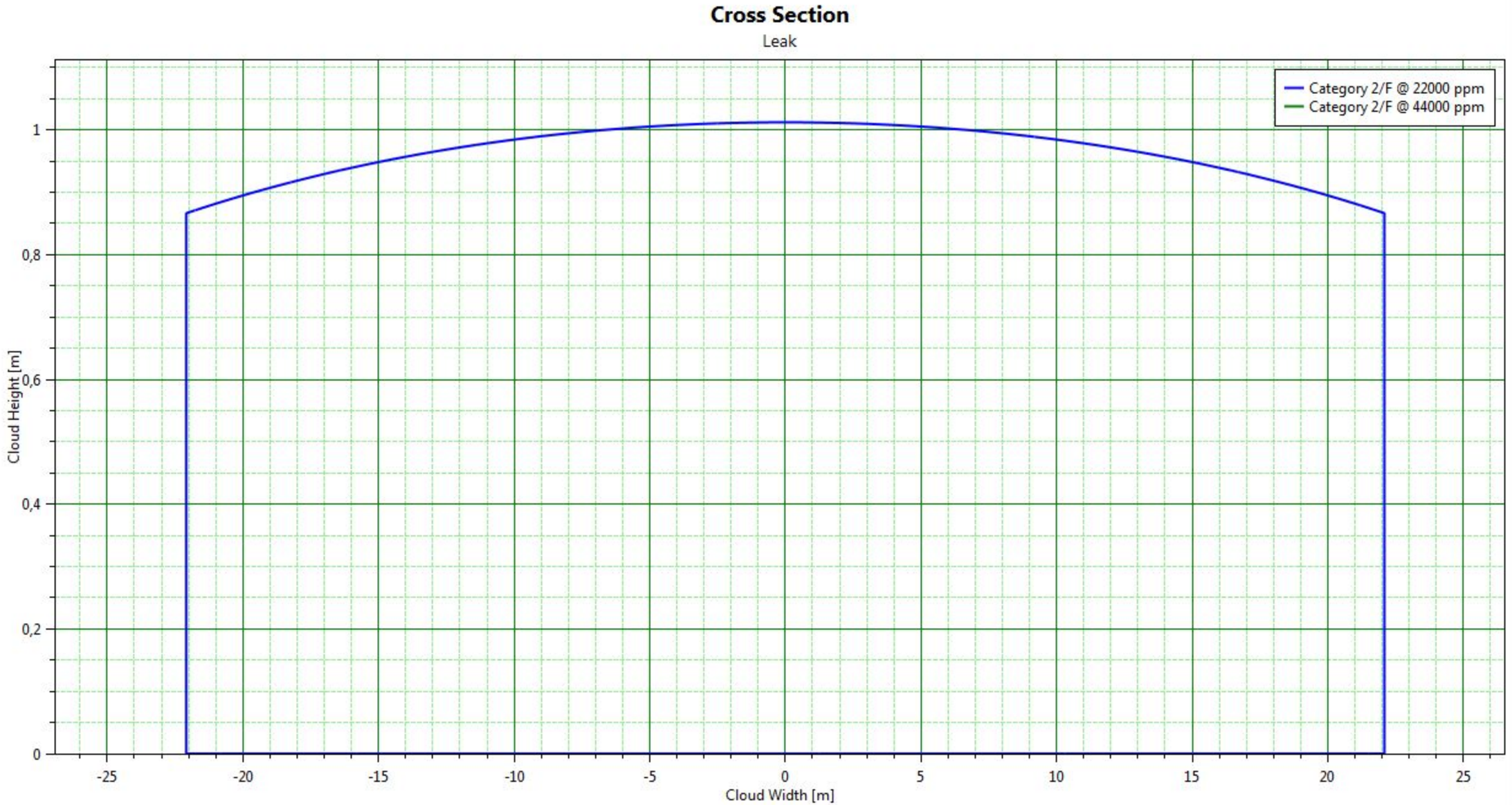
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

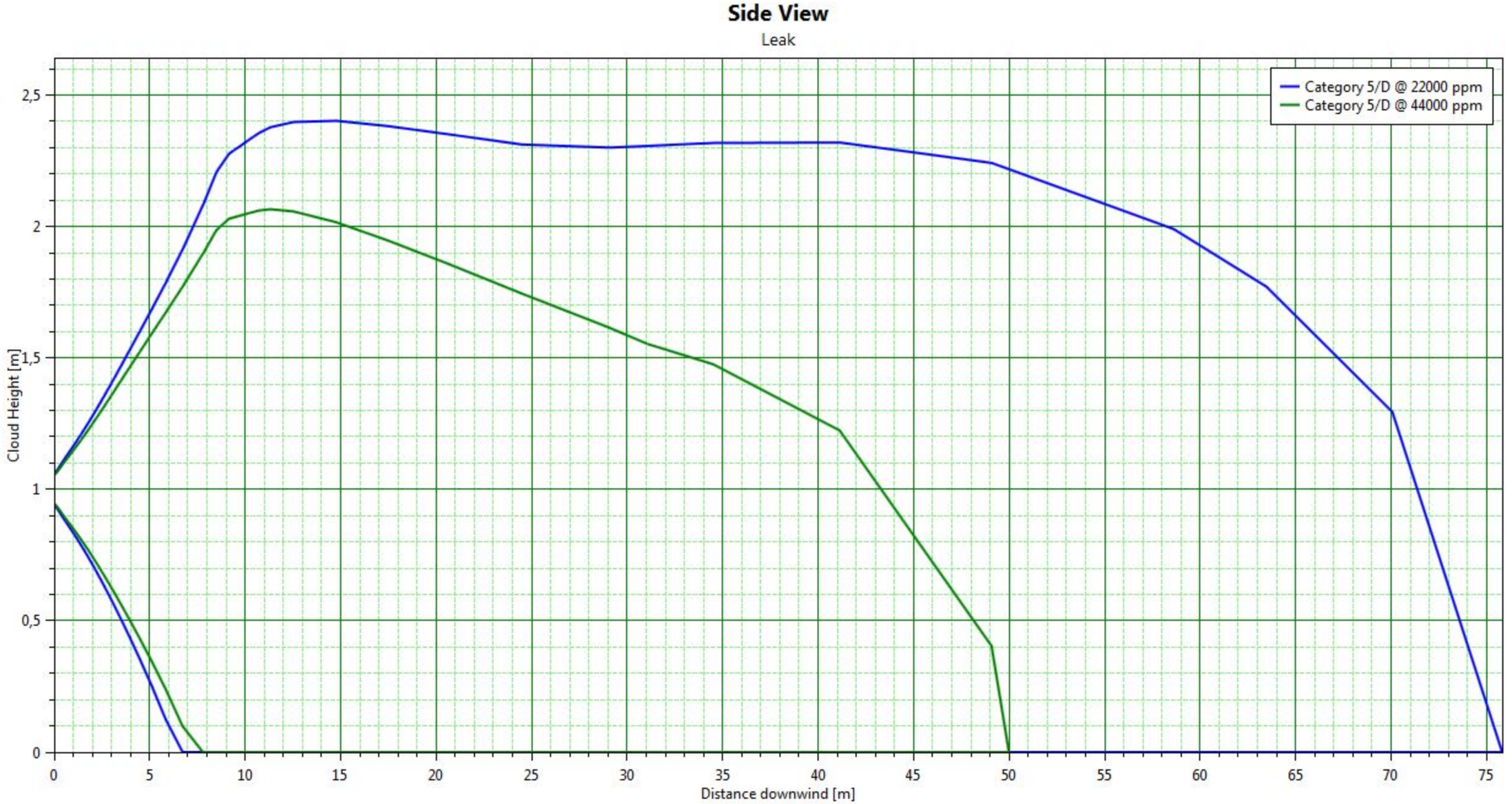
Audit Number	92412
Averaging time	Flammable (18,75 s)
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	91,526 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



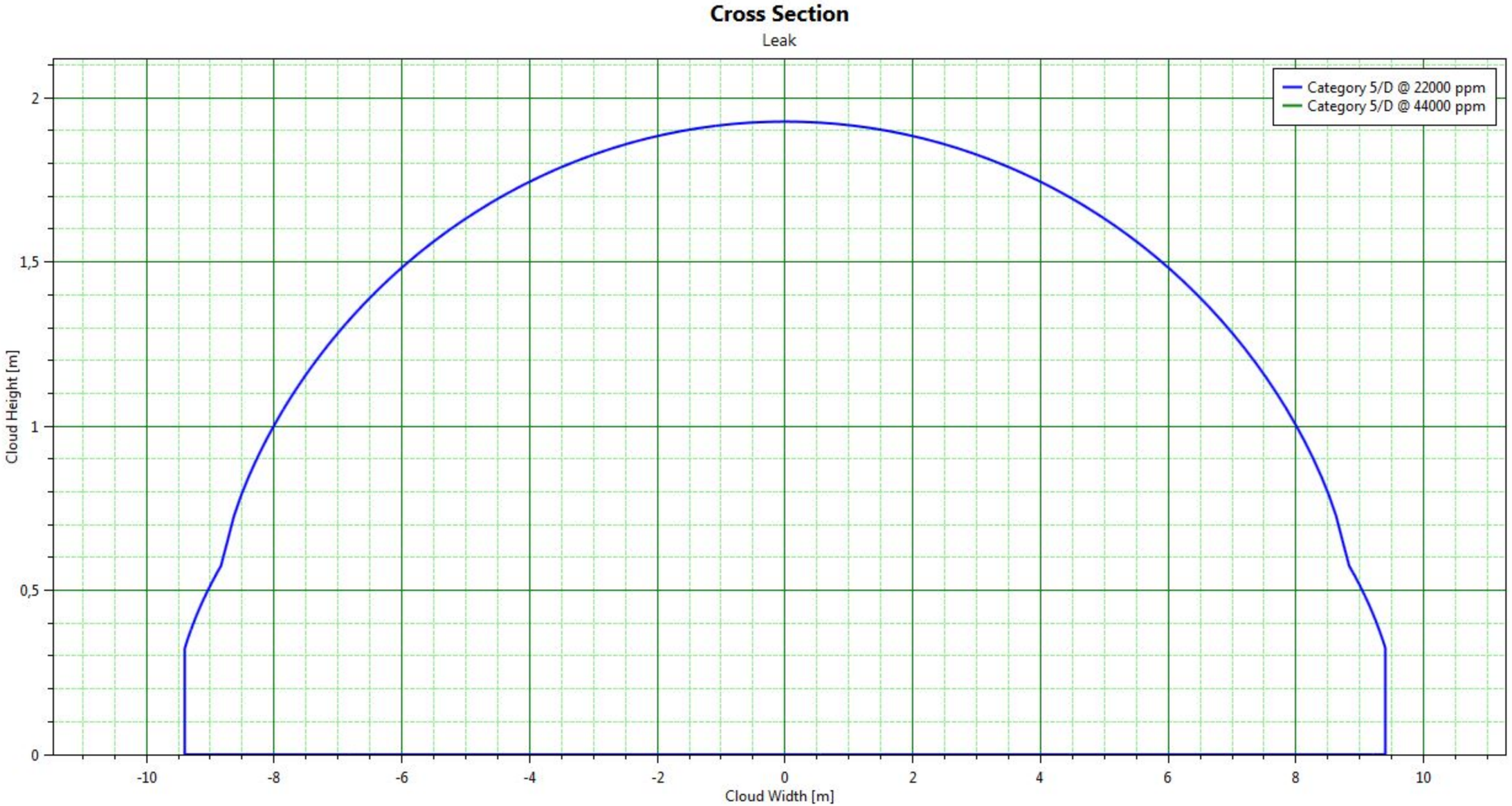
Audit Number	92412
Averaging time	Flammable (18,75 s)
Downwind Distance	90 m
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	91,526 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	92412
Averaging time	Flammable (18,75 s)
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	18,8366 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	92412
Averaging time	Flammable (18,75 s)
Downwind Distance	60 m
Equipment	braccio di carico
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	18,8366 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top3_tubazione banchina_cricca

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_up

Pressure vessel

17129I_LNG_rev00\Top3_tubazione banchina_cricca

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	167,169	kg
		Volume inventory	0,412895	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	5	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Isentropic	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	0,412895	m3
		Tank vapour volume	0	m3
		Tank liquid volume	0,412895	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak

Leak

17129I_LNG_rev00\Top3_tubazione banchina_cricca\pipe_up

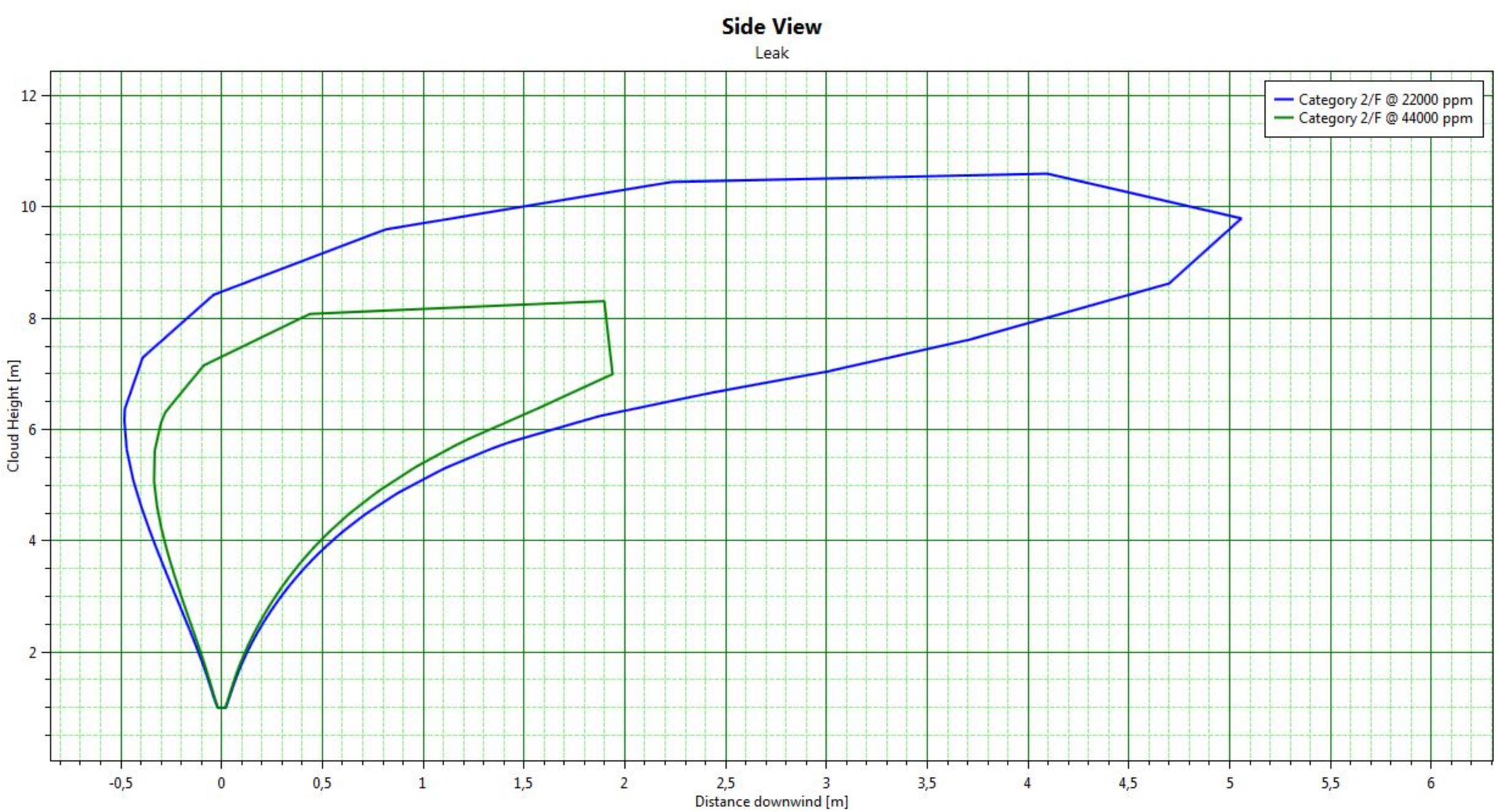
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	10	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Vertical	
		Outdoor release angle	90	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	22000	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	

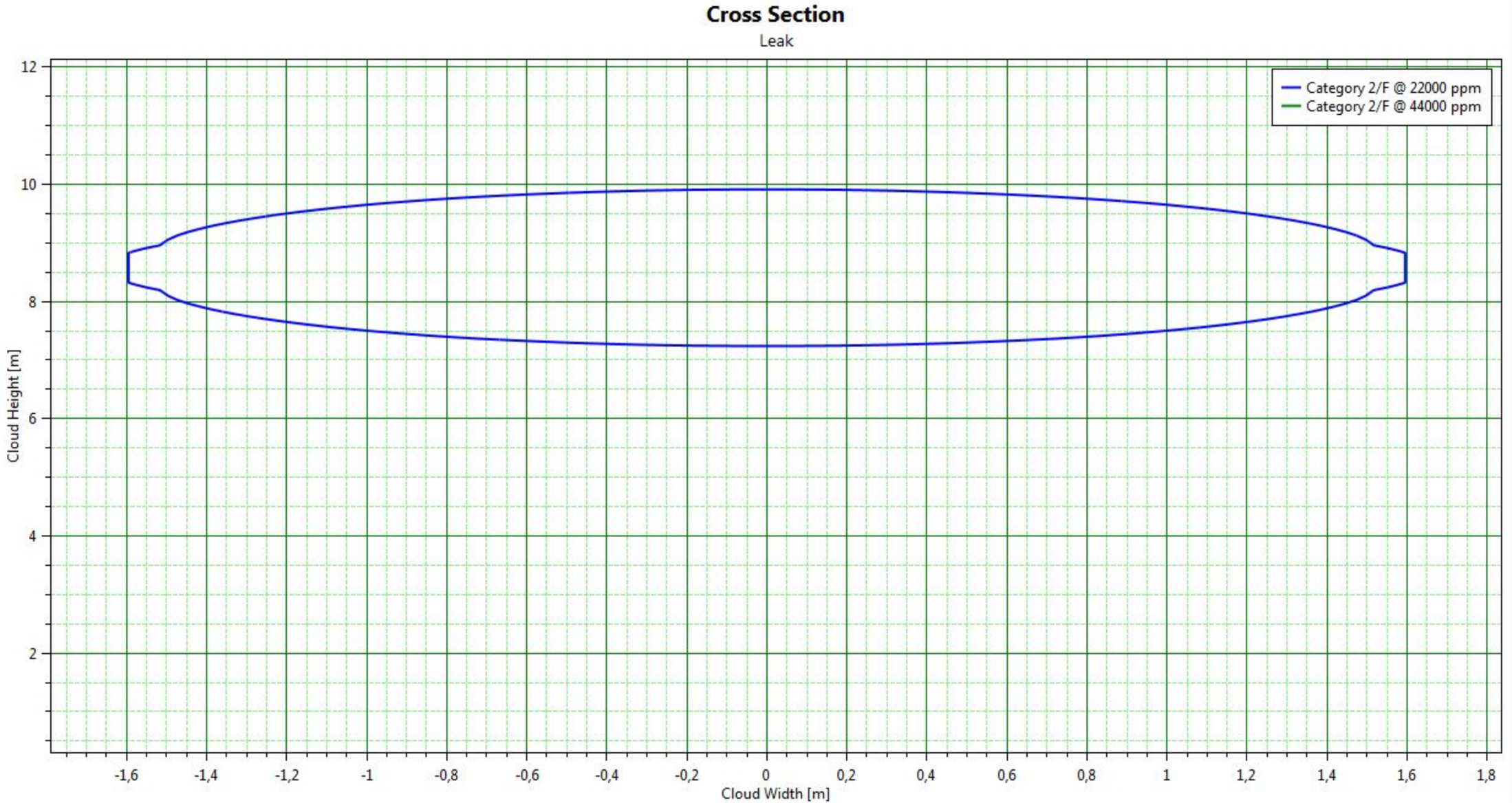
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	

		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

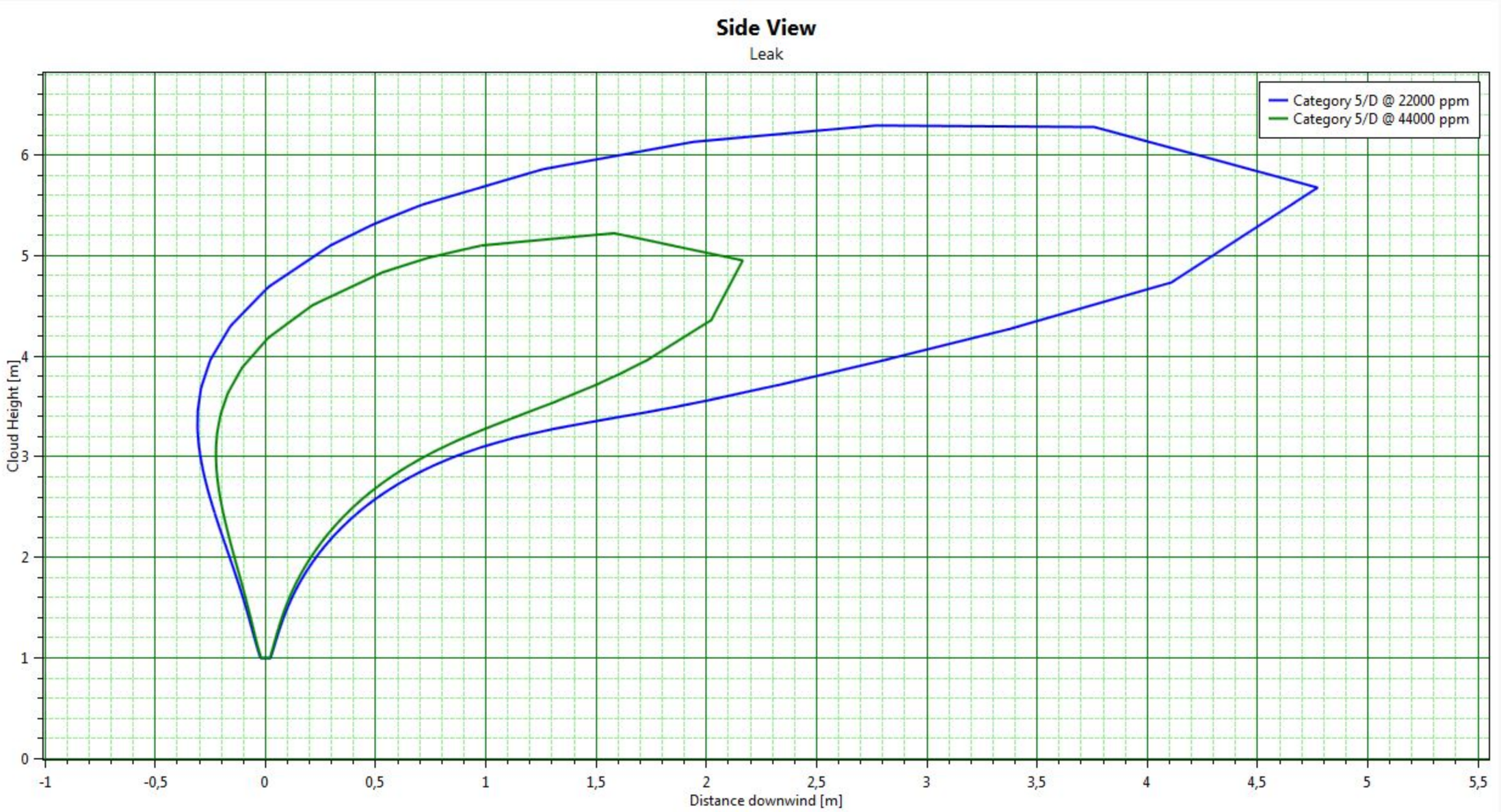
Audit Number	92413
Averaging time	Flammable (18,75 s)
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	6,54279 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



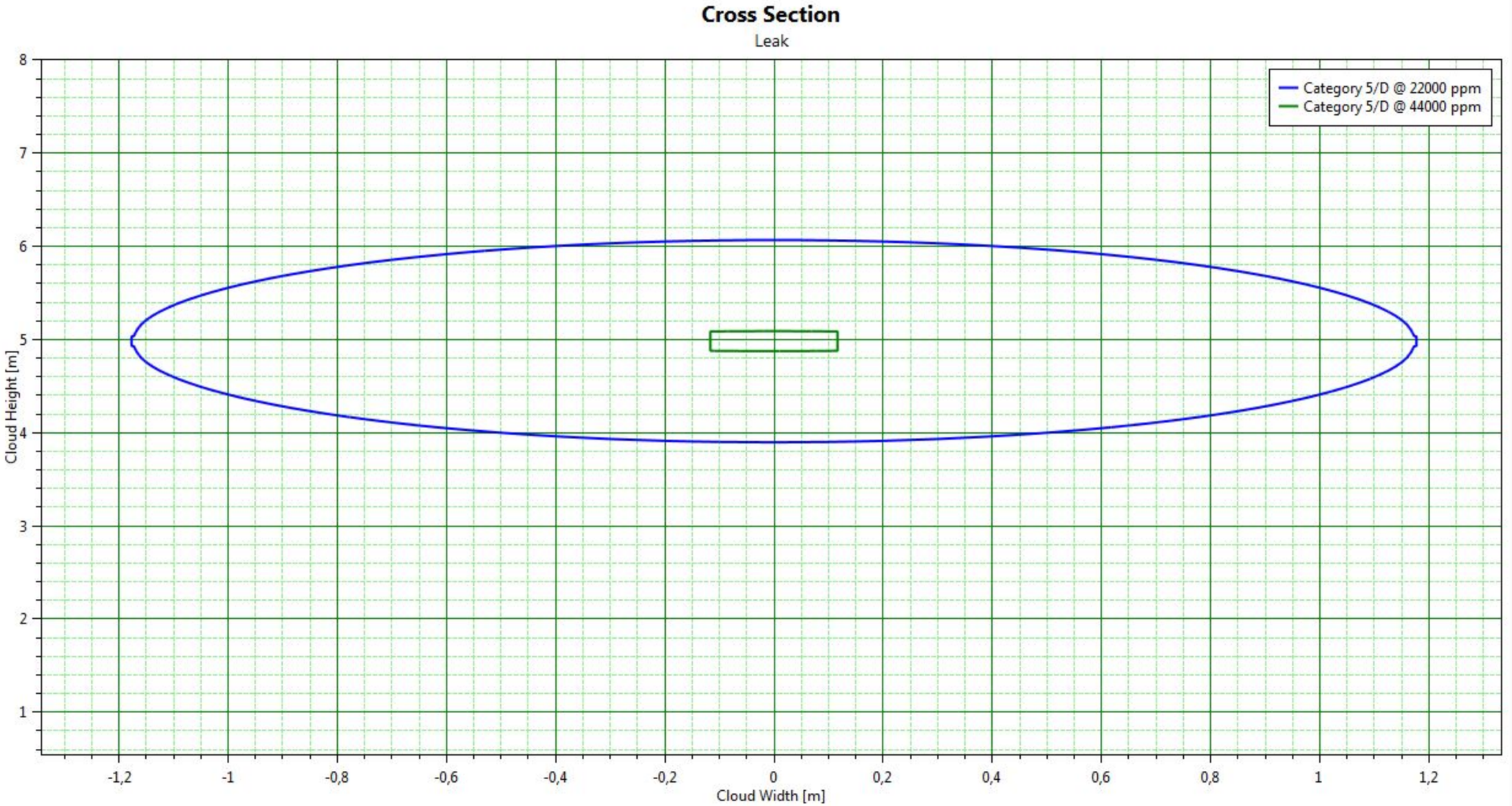
Audit Number	92413
Averaging time	Flammable (18,75 s)
Downwind Distance	2,2895 m
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	6,54279 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	92413
Averaging time	Flammable (18,75 s)
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	2,83021 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	92413
Averaging time	Flammable (18,75 s)
Downwind Distance	2,2326 m
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	2,83021 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top4_tubazione banchina_cricca

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_up

Pressure vessel

17129I_LNG_rev00\Top4_tubazione banchina_cricca

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	167,169	kg
		Volume inventory	0,412895	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	5	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Isentropic	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	0,412895	m3
		Tank vapour volume	0	m3
		Tank liquid volume	0,412895	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak

Leak

17129I_LNG_rev00\Top4_tubazione banchina_cricca\pipe_up

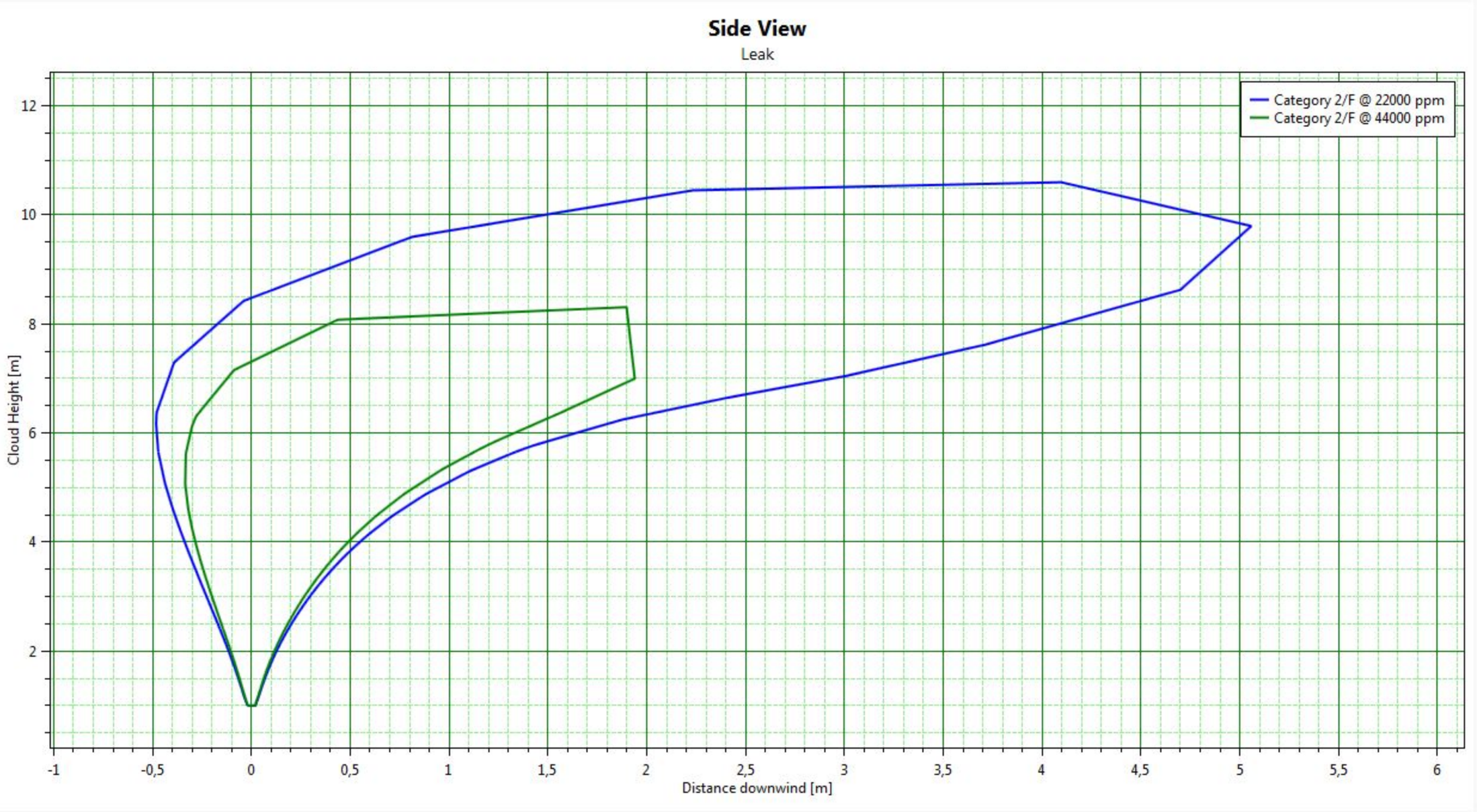
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	10	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Vertical	
		Outdoor release angle	90	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	22000	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	

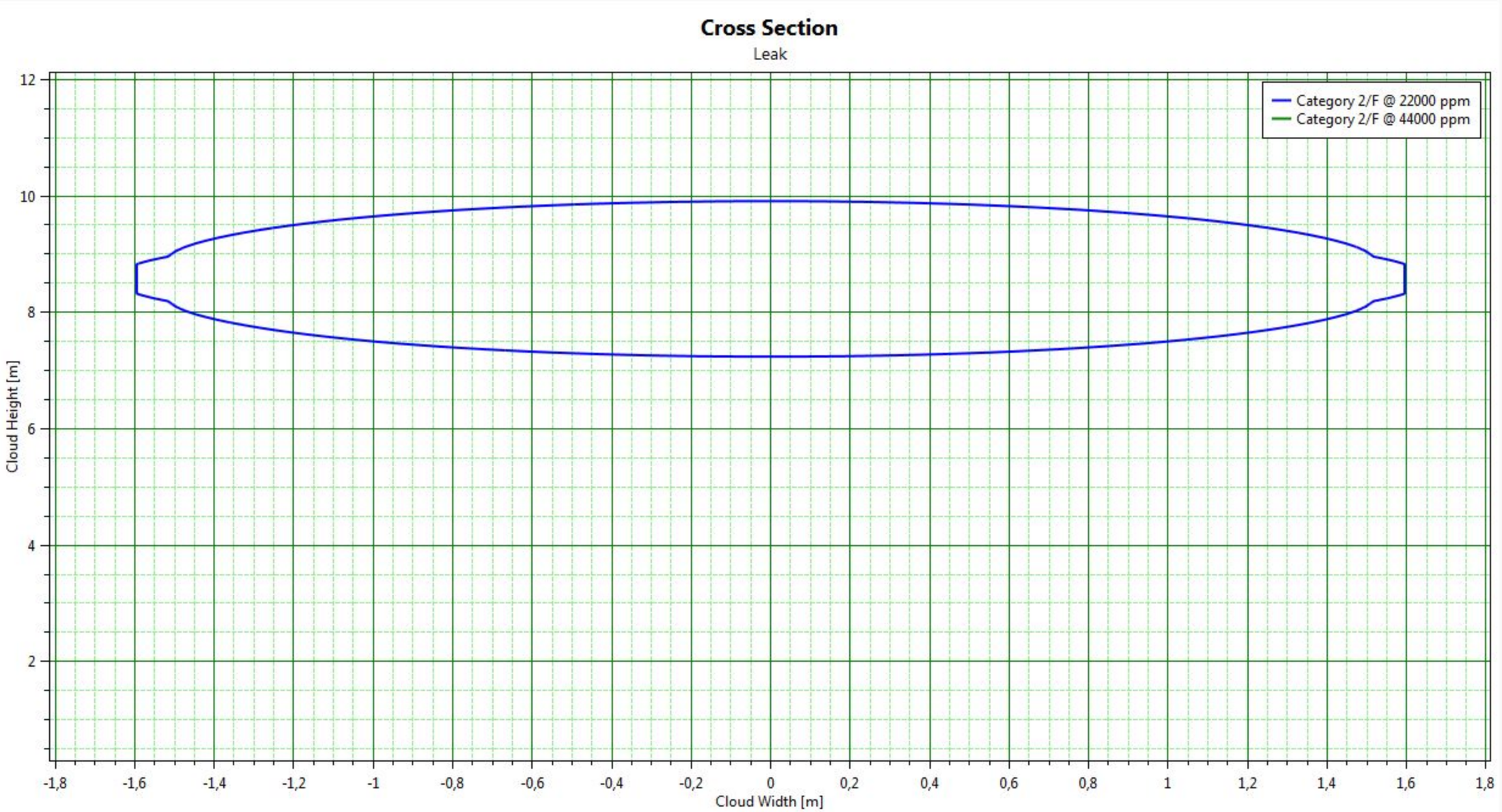
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	

		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

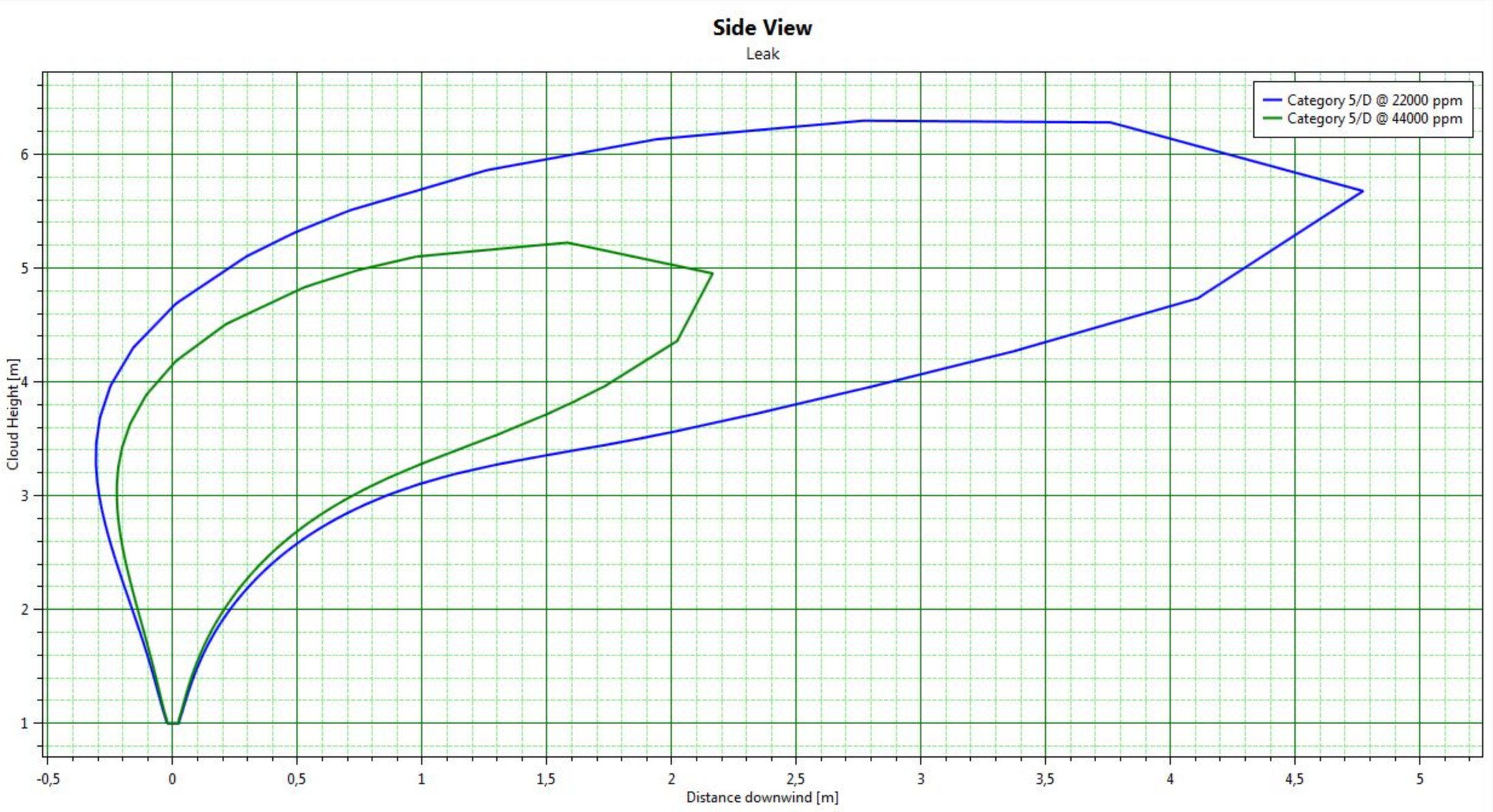
Audit Number	92414
Averaging time	Flammable (18,75 s)
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	4,69519 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



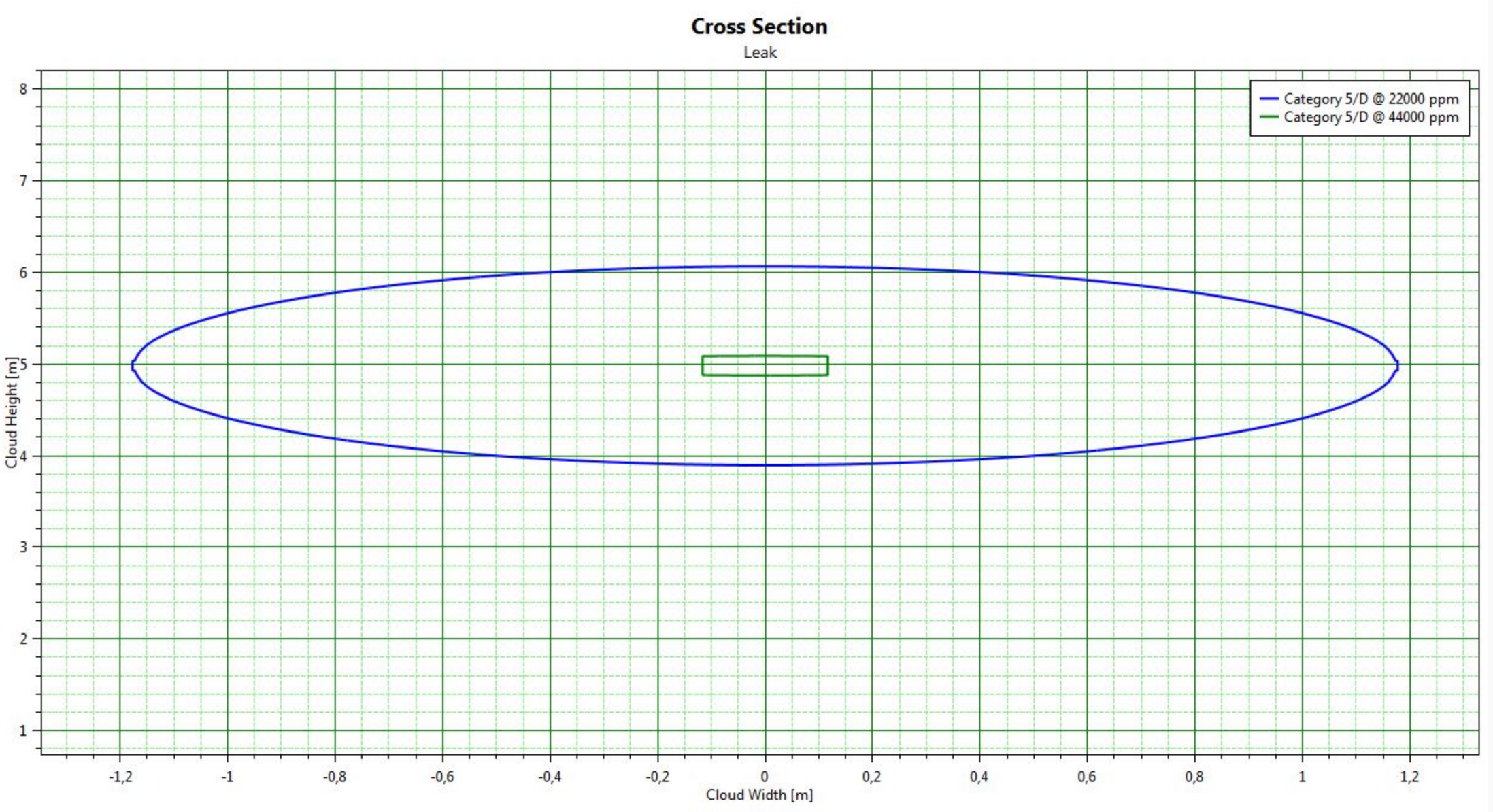
Audit Number	92414
Averaging time	Flammable (18,75 s)
Downwind Distance	2,2895 m
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	4,69519 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	92414
Averaging time	Flammable (18,75 s)
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	2,83021 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	92414
Averaging time	Flammable (18,75 s)
Downwind Distance	2,2326 m
Equipment	pipe_up
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	2,83021 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top5_Rilascio serbatoio_5mm

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe

Pressure vessel

17129I_LNG_rev00\Top5_Rilascio serbatoio_5mm

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	41,4	kg
		Volume inventory	0,102255	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	5	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Isentropic	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	0,102255	m3
		Tank vapour volume	0	m3
		Tank liquid volume	0,102255	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak

Leak

17129I_LNG_rev00\Top5_Rilascio serbatoio_5mm\pipe

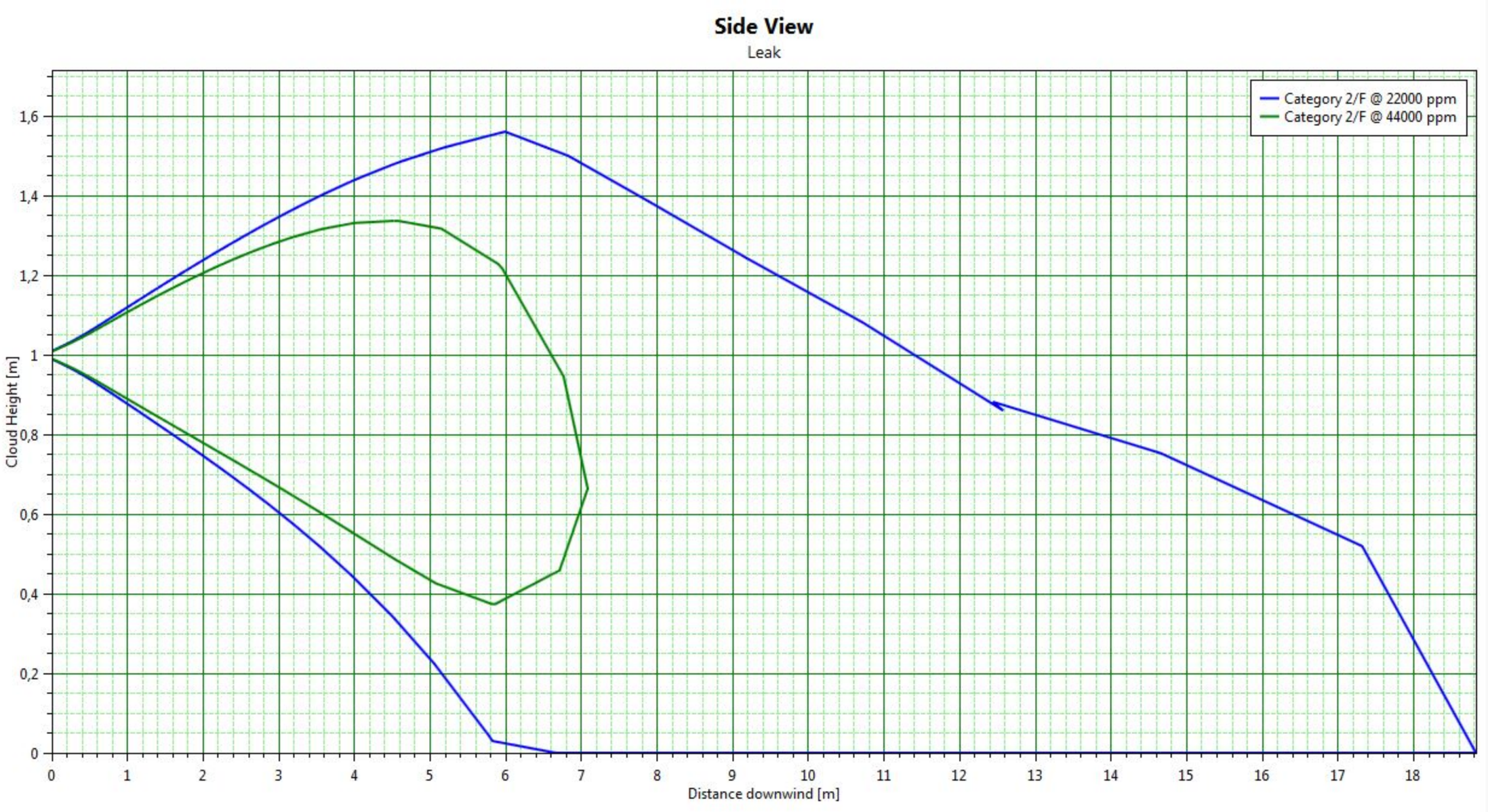
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	5	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	22000	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

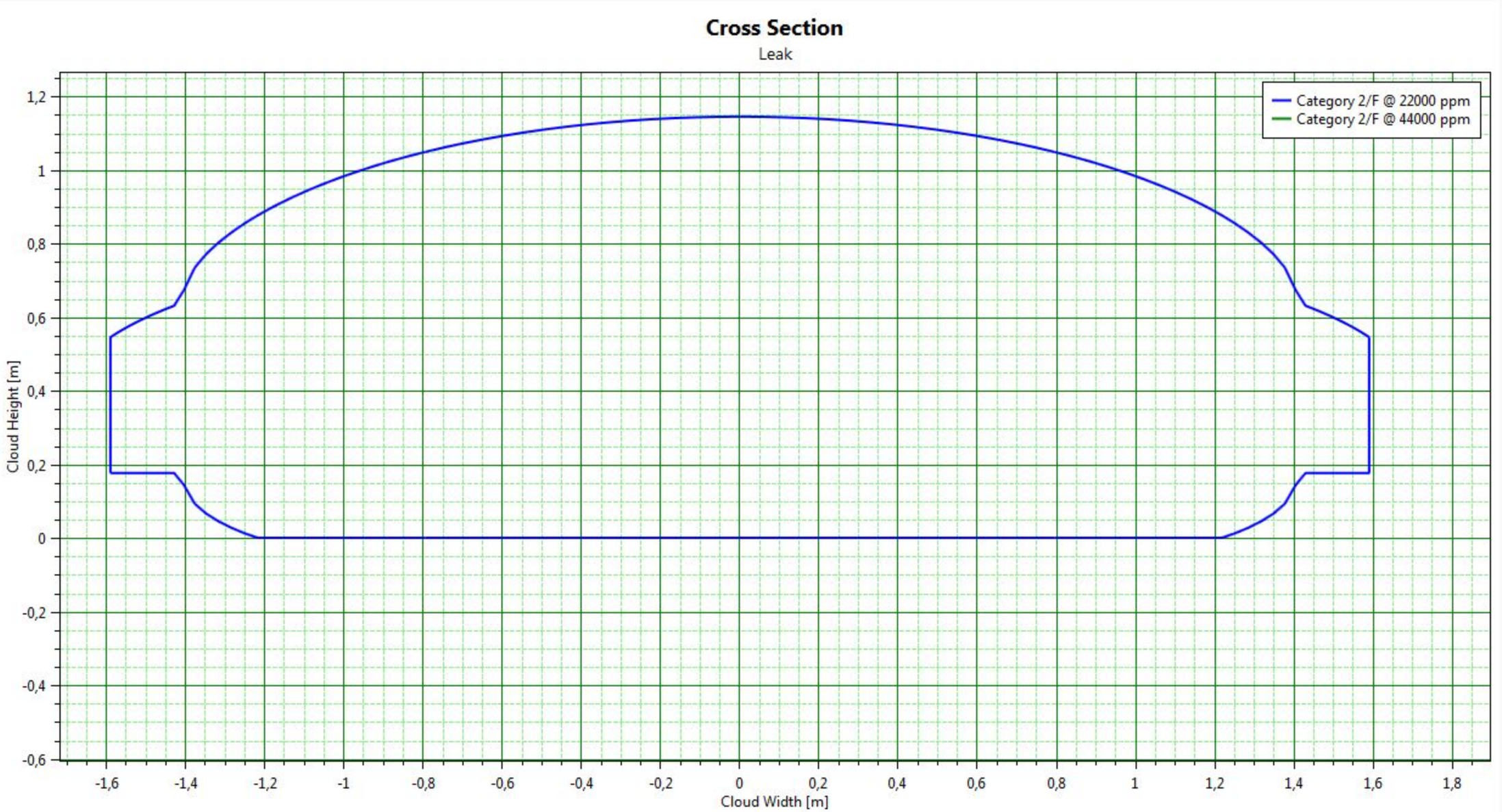
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

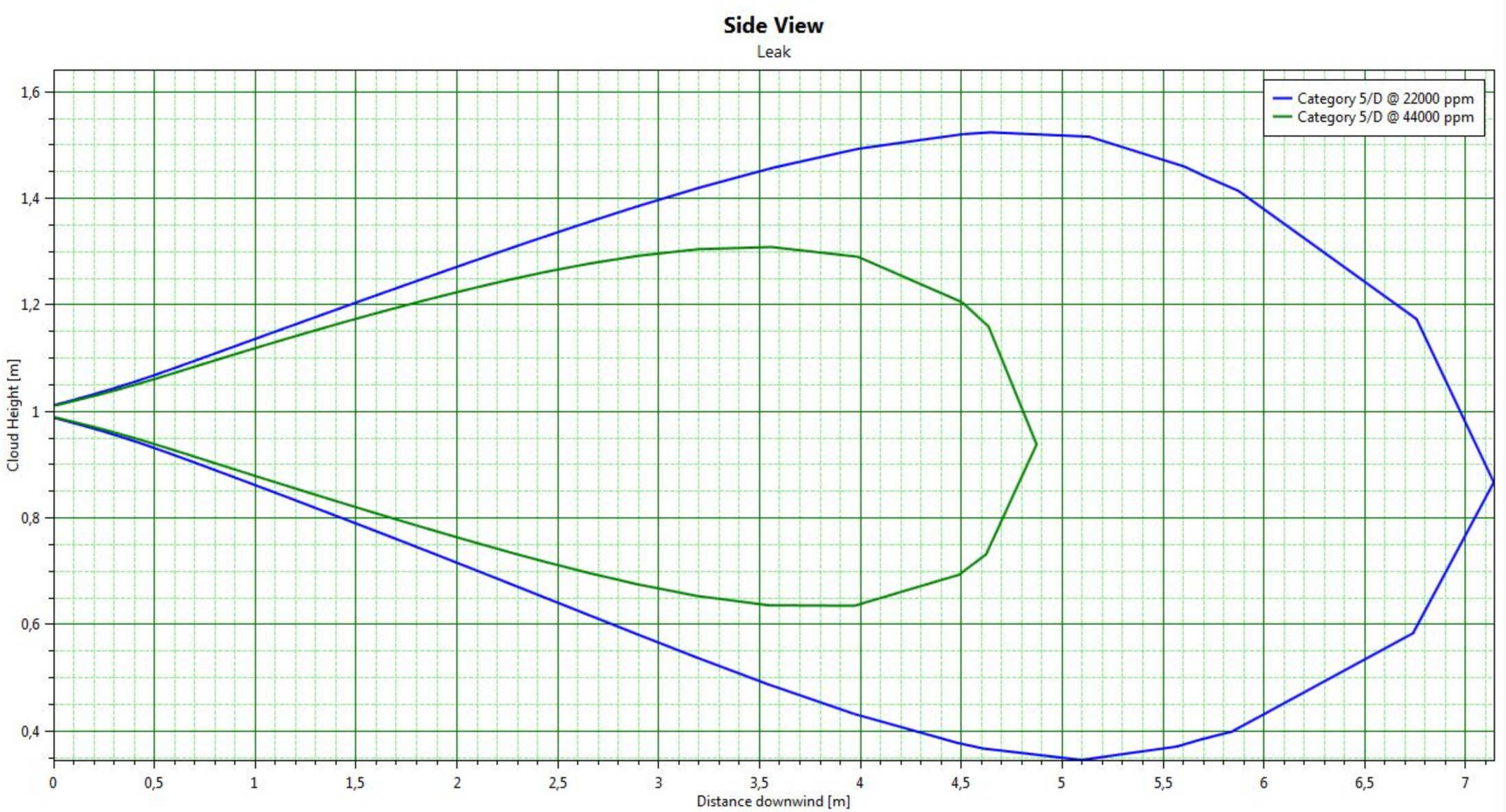
Audit Number	92415
Averaging time	Flammable (18,75 s)
Equipment	pipe
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	12,5046 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



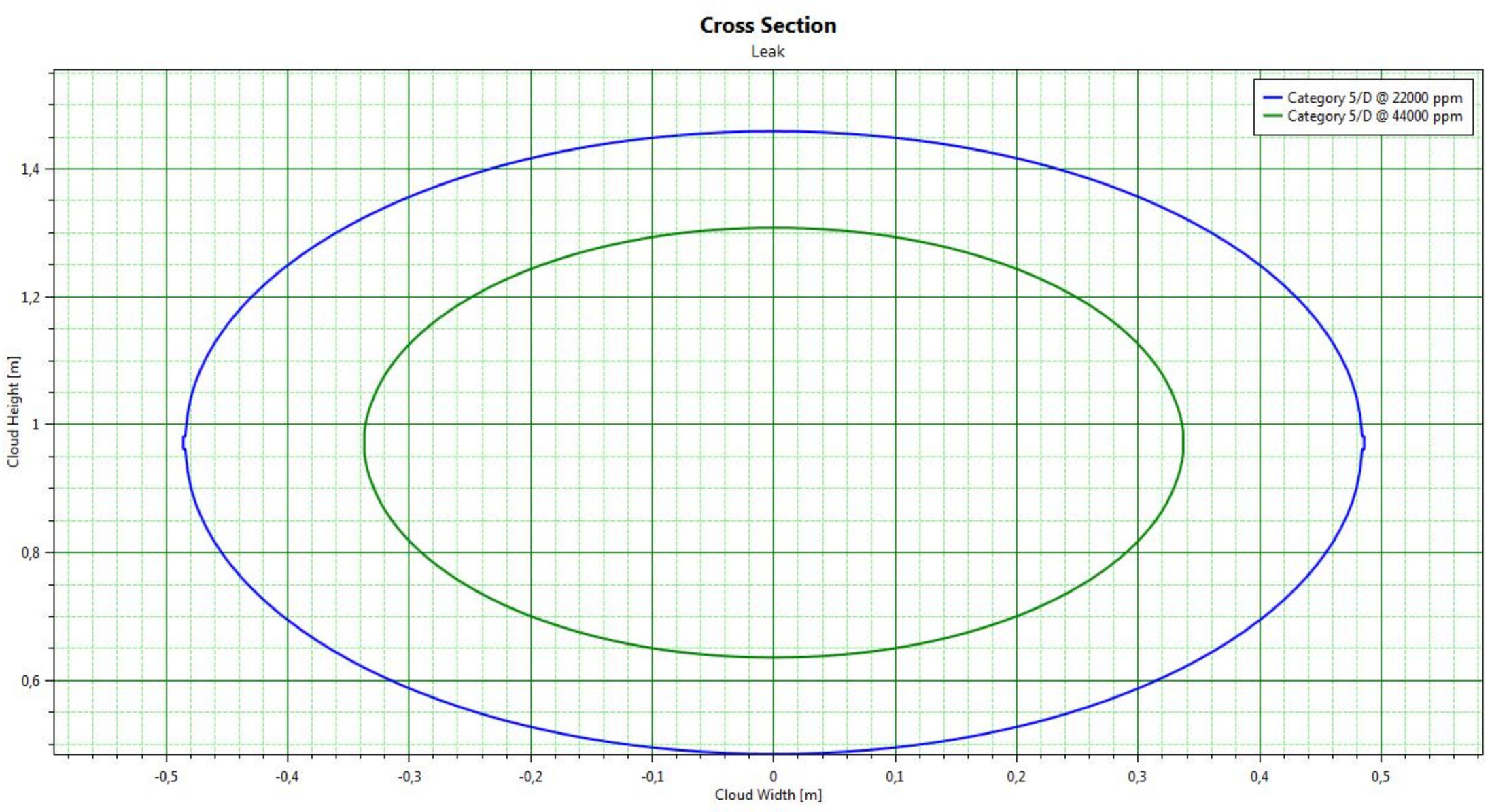
Audit Number	92415
Averaging time	Flammable (18,75 s)
Downwind Distance	10 m
Equipment	pipe
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	12,5046 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	92415
Averaging time	Flammable (18,75 s)
Equipment	pipe
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	2,81175 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	92415
Averaging time	Flammable (18,75 s)
Downwind Distance	3,56982 m
Equipment	pipe
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	2,81175 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top7_Pipe mandata vaporizzatori

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top7_Pipe mandata vaporizzatori

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	639	kg
		Volume inventory	1,57829	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	70	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	6	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	1,57829	m3
		Tank vapour volume	0	m3
		Tank liquid volume	1,57829	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_10mm

Leak

17129I_LNG_rev00\Top7_Pipe mandata vaporizzatori\pipe_70bar

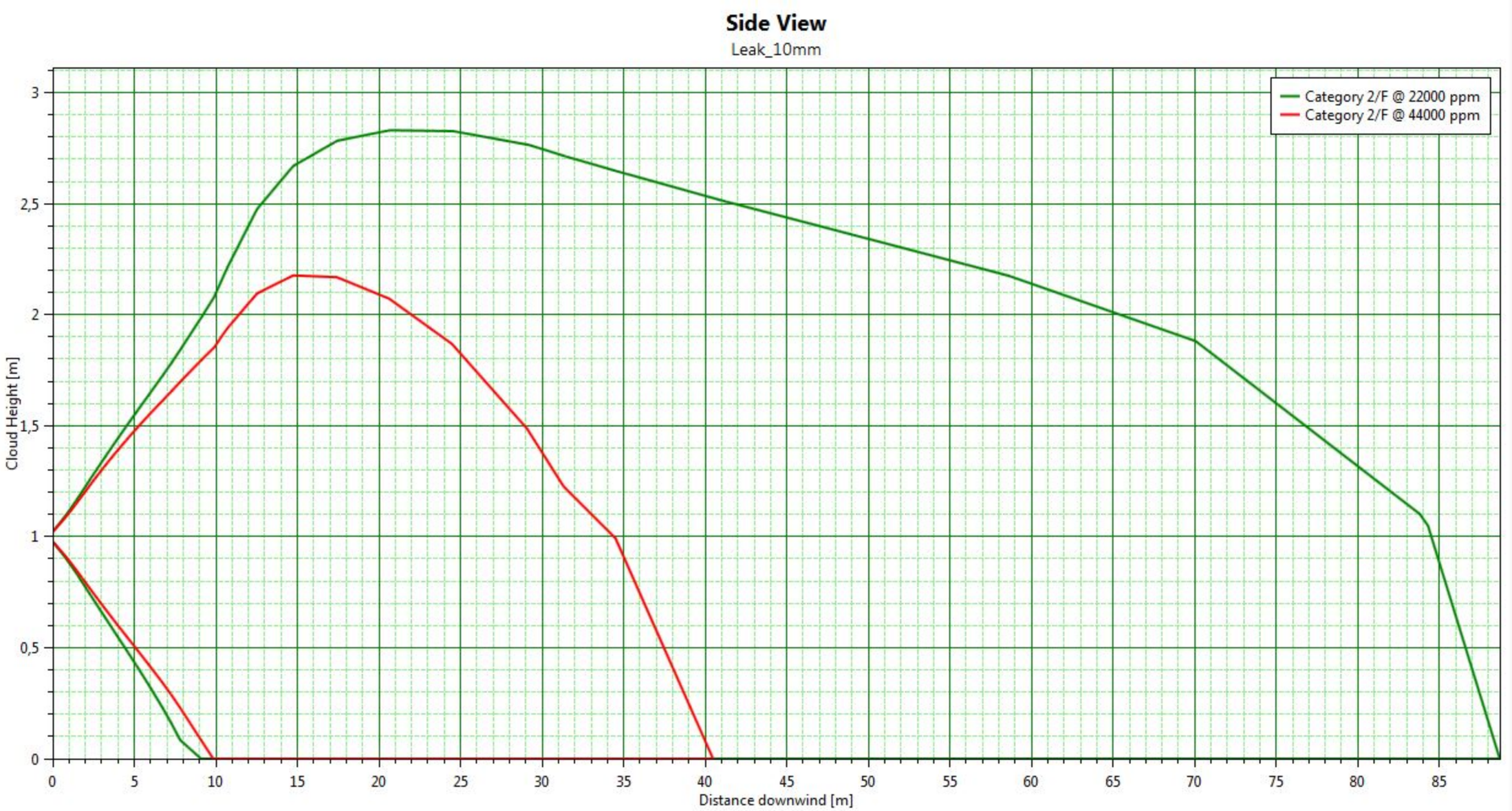
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	10	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

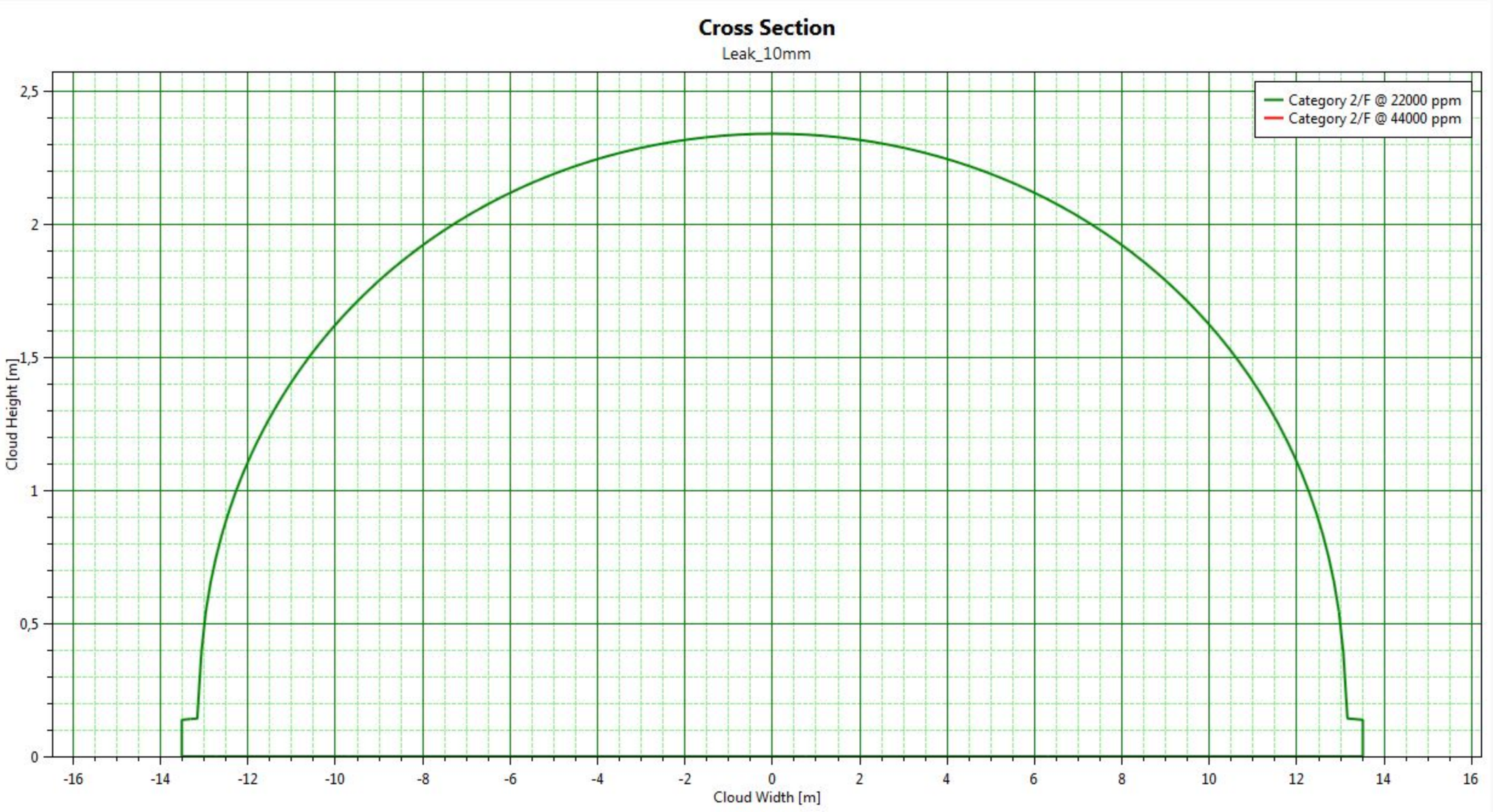
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

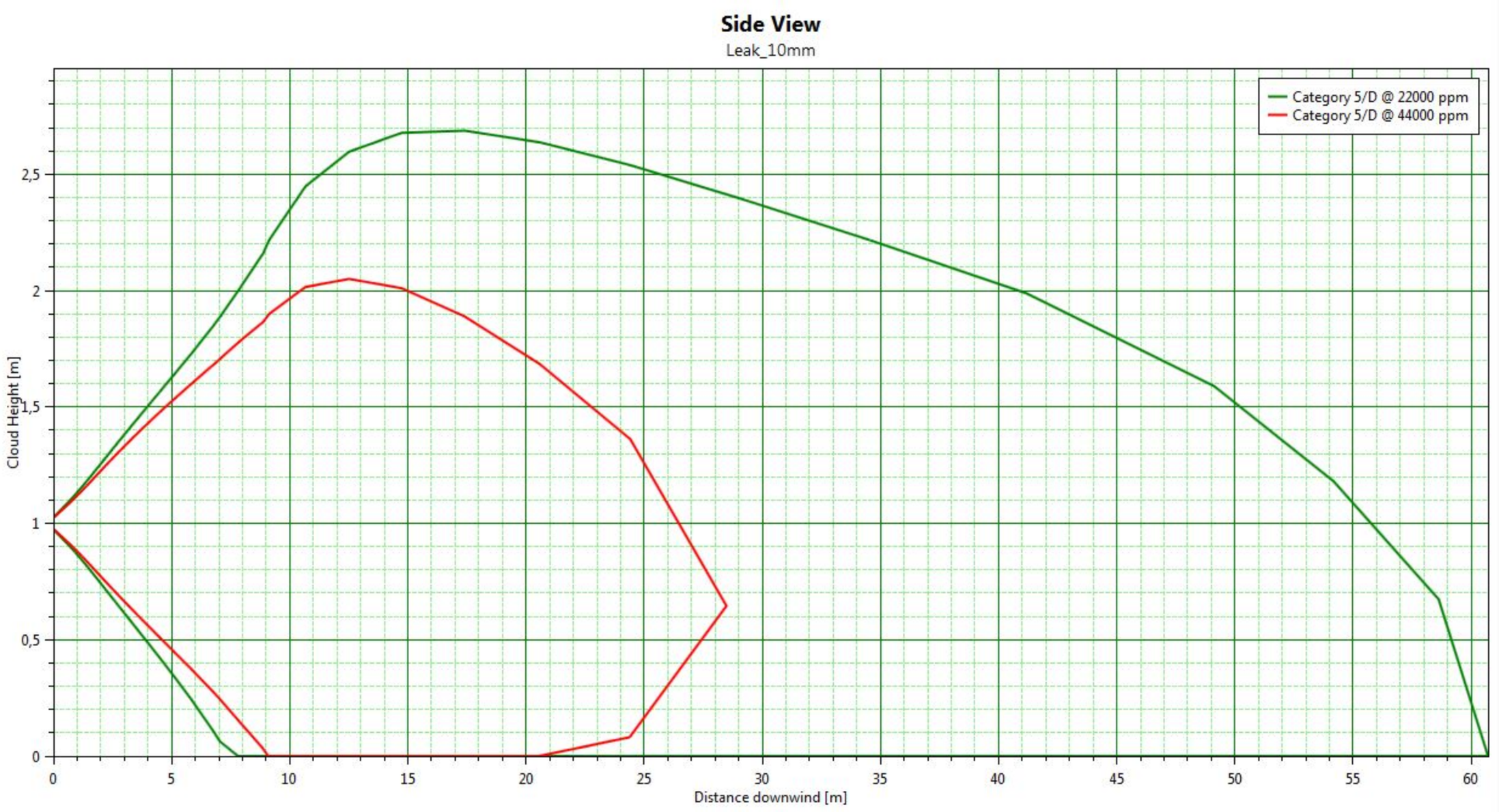
Audit Number	92788
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_10mm
Time	54,8177 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



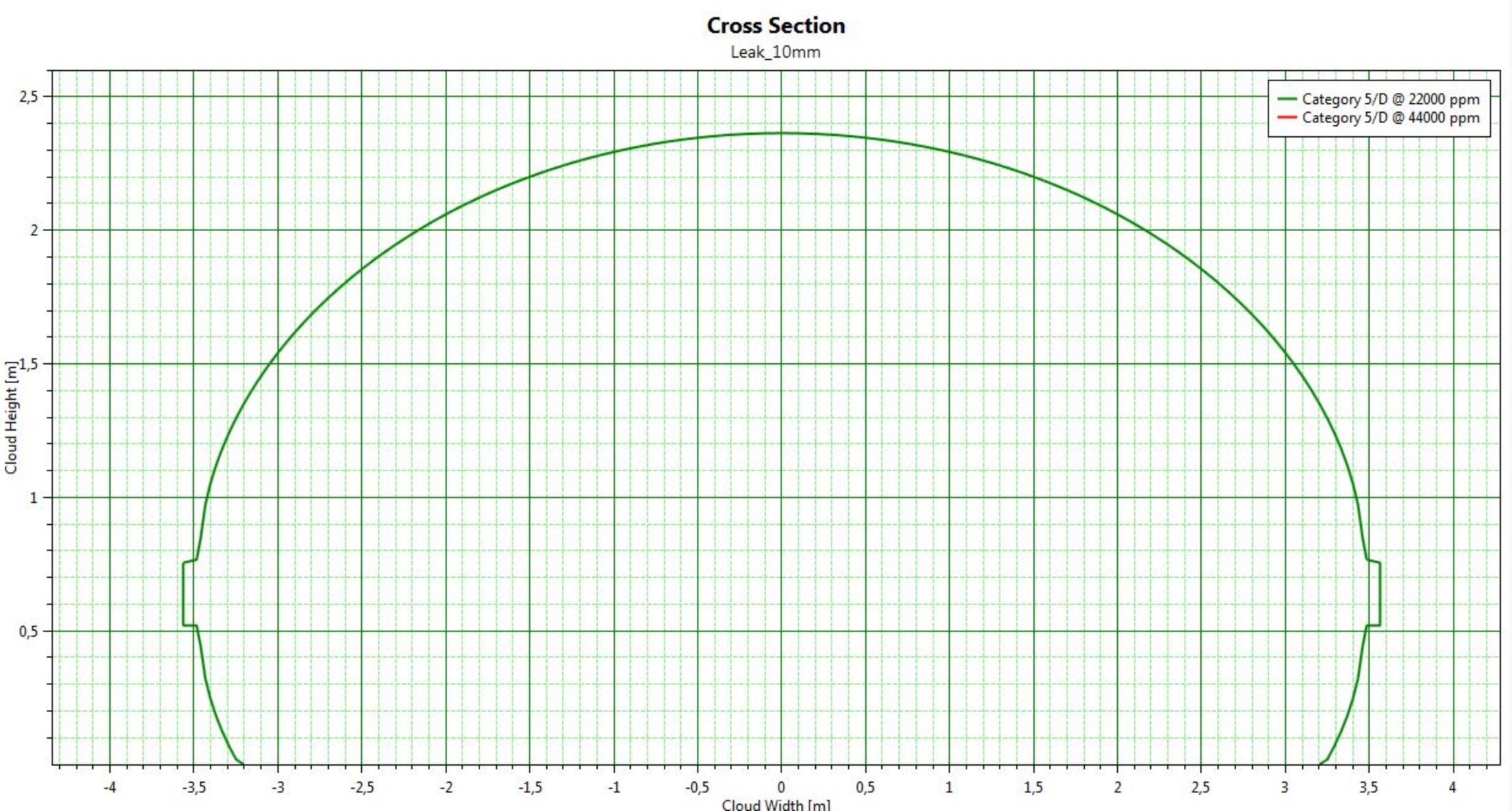
Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	50 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_10mm
Time	72,2935 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_10mm
Time	12,4538 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	30 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_10mm
Time	12,4538 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top8_Pipe mandata rete

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top8_Pipe mandata rete

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	390	kg
		Volume inventory	6,57675	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	0	degC
		Pressure (gauge)	70	bar
		Fluid state	Vapour	
		Liquid mole fraction	0	fraction

		Phase to be released	Vapour	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	6,57675	m3
		Tank vapour volume	6,57675	m3
		Tank liquid volume	0	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak

Leak

17129I_LNG_rev00\Top8_Pipe mandata rete\pipe_70bar

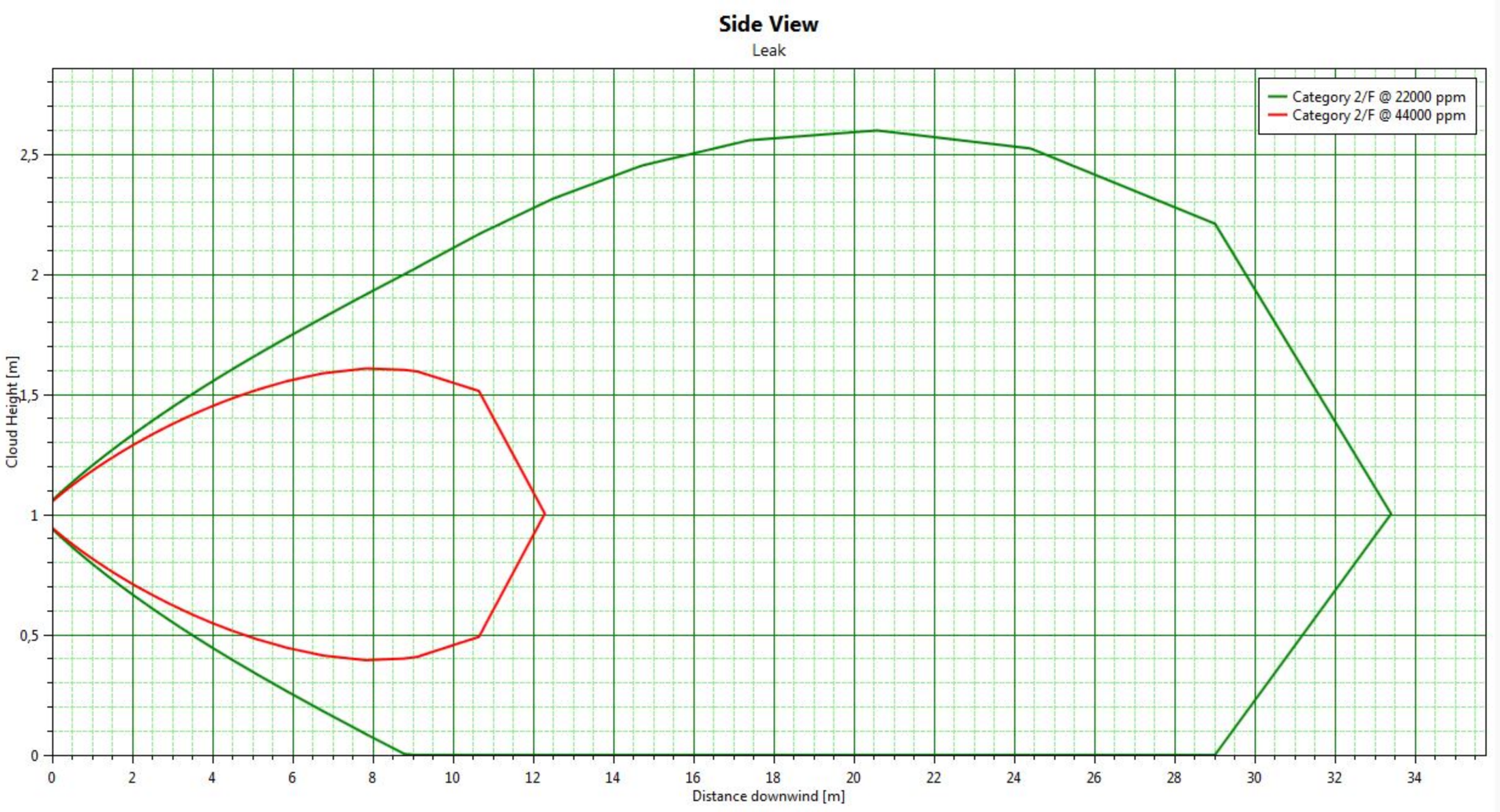
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	15	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Vapour	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

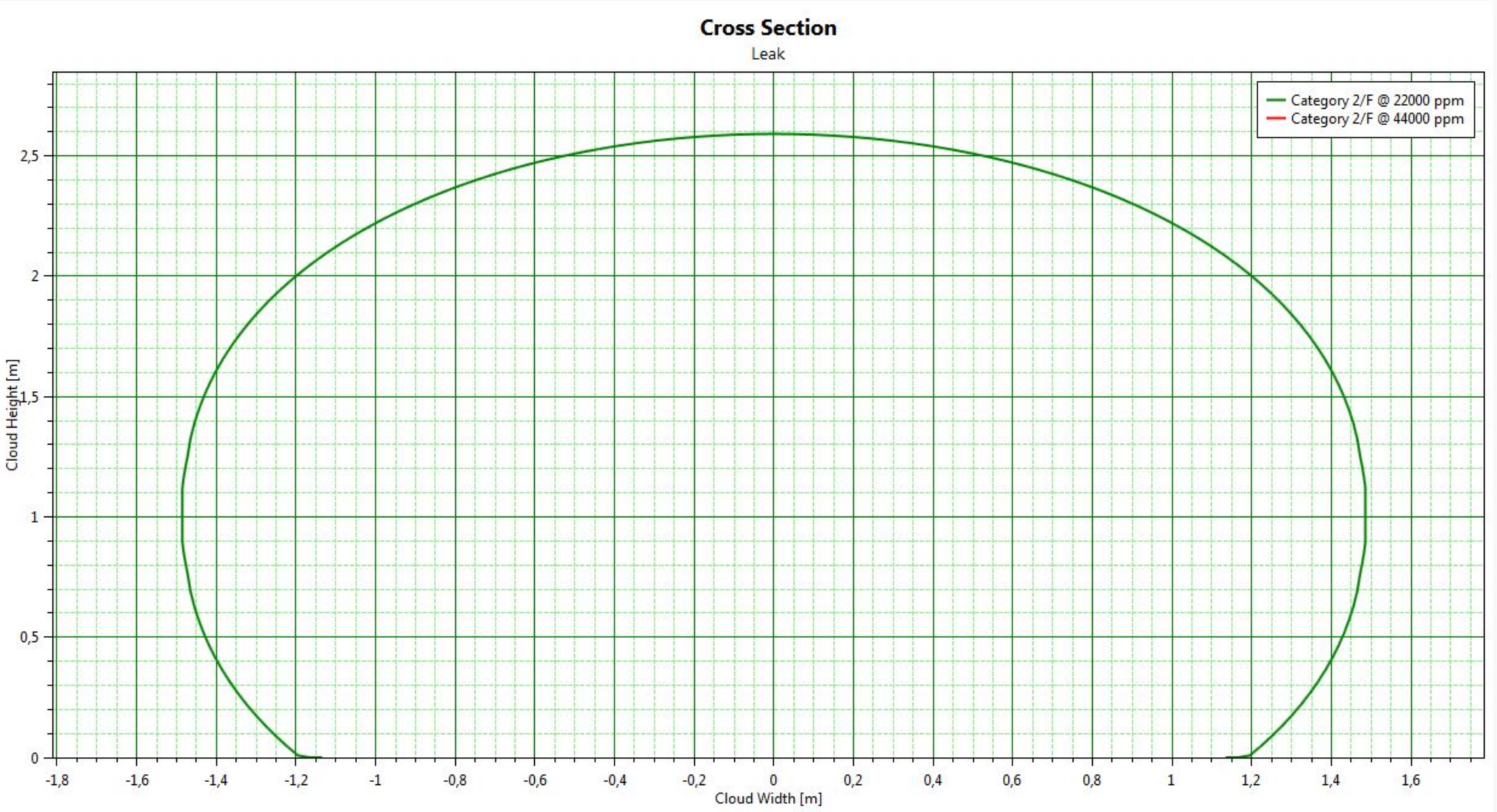
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

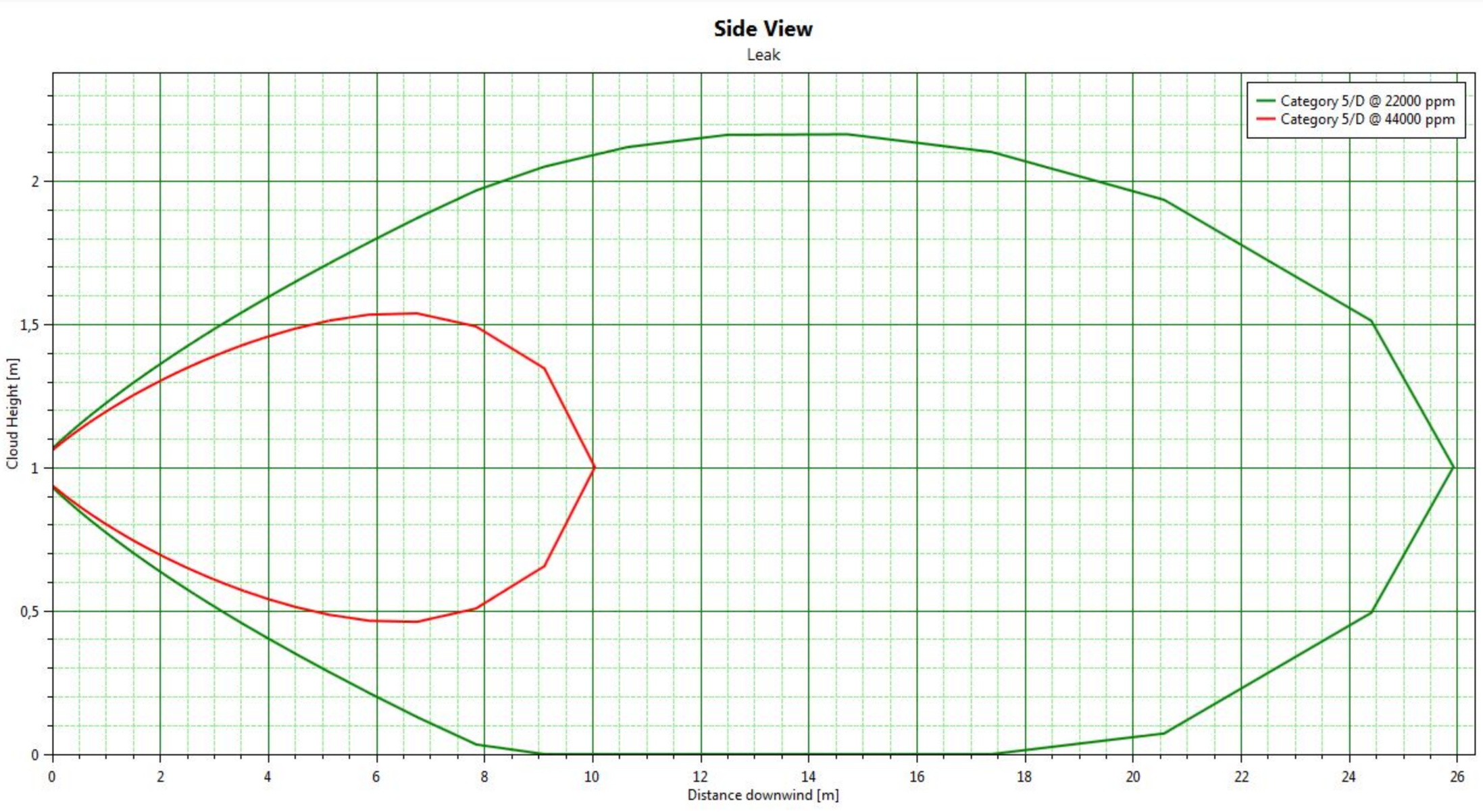
Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	6,17579 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



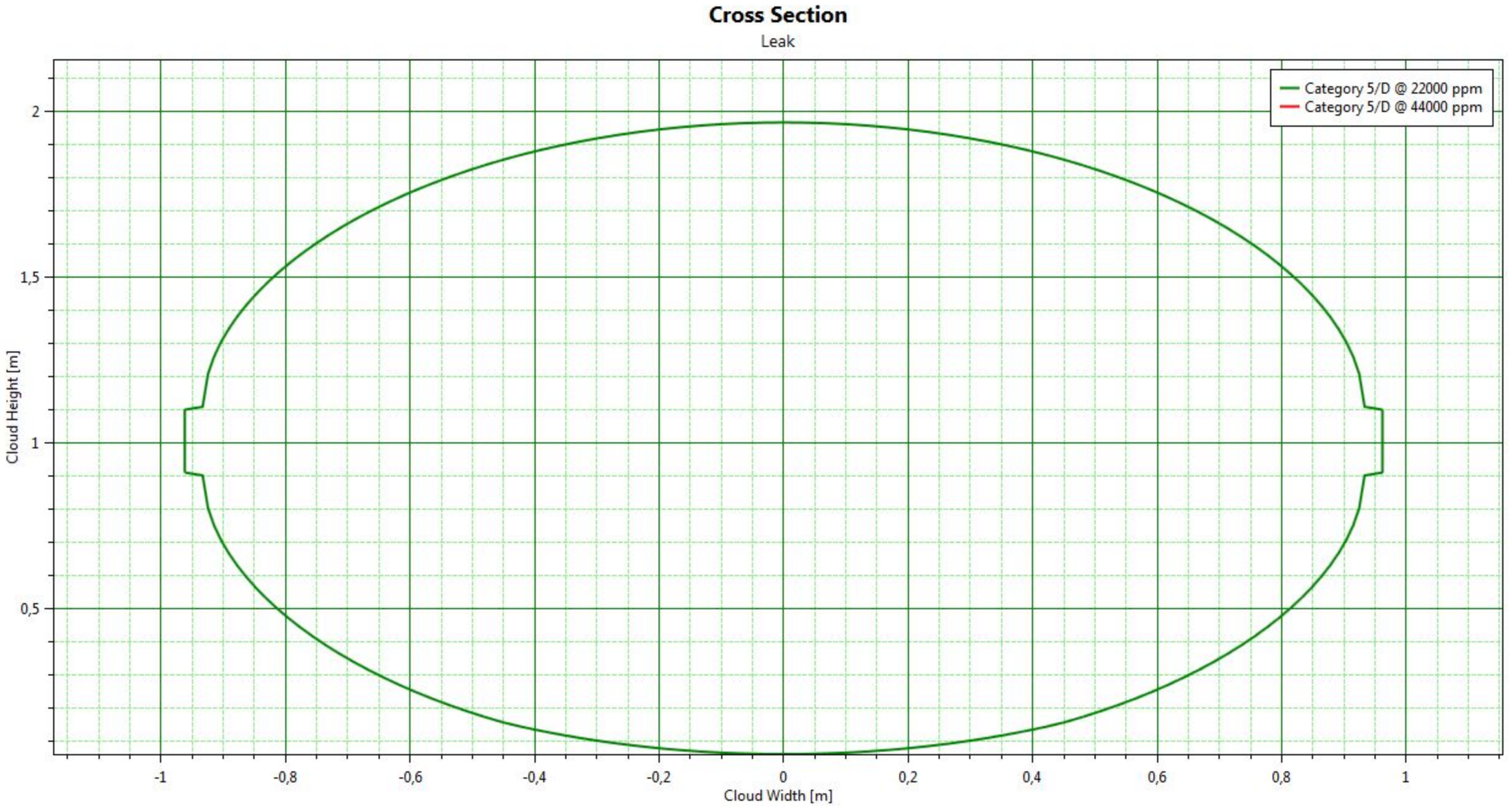
Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	20 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	6,17579 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak
Time	11,3101 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	20 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak
Time	11,3101 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top8_Pipe mandata rete

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top8_Pipe mandata rete

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	1100	kg
		Volume inventory	18,5498	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	0	degC
		Pressure (gauge)	70	bar
		Fluid state	Vapour	
		Liquid mole fraction	0	fraction

		Phase to be released	Vapour	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	18,5498	m3
		Tank vapour volume	18,5498	m3
		Tank liquid volume	0	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_25

Leak

17129I_LNG_rev00\Top8_Pipe mandata rete\pipe_70bar

Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	25	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Vapour	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

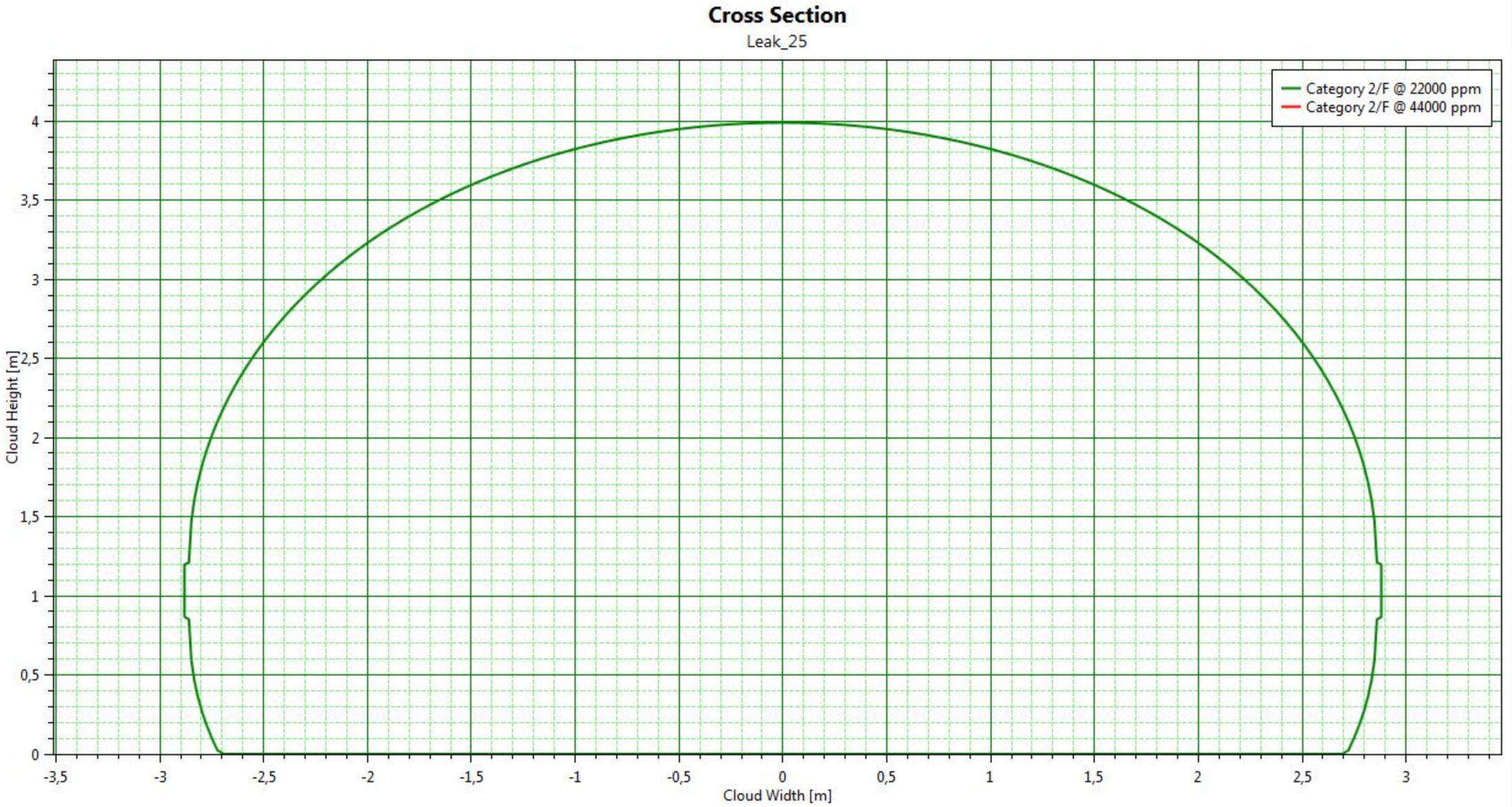
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

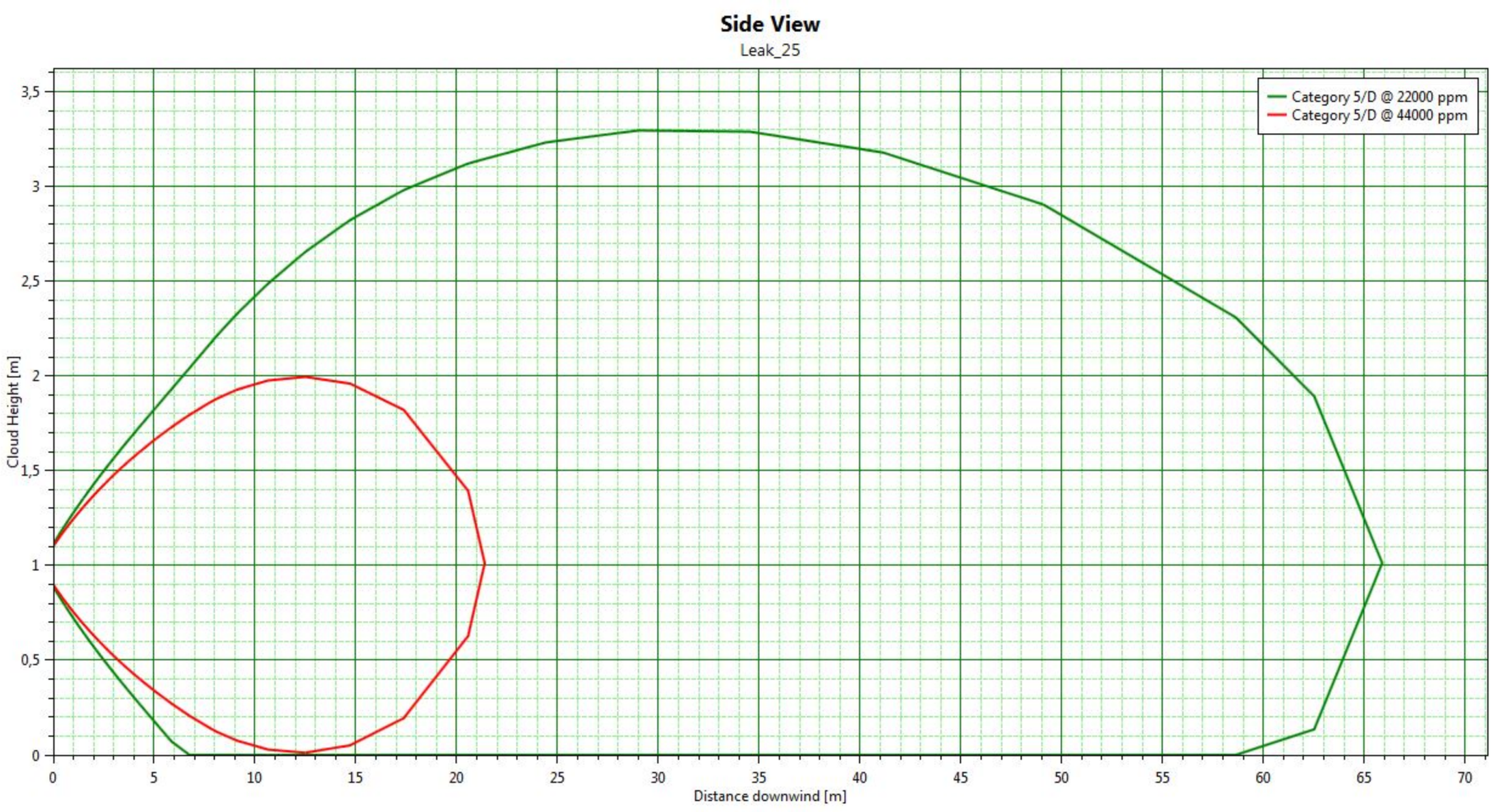
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_25
Time	12,7524 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00

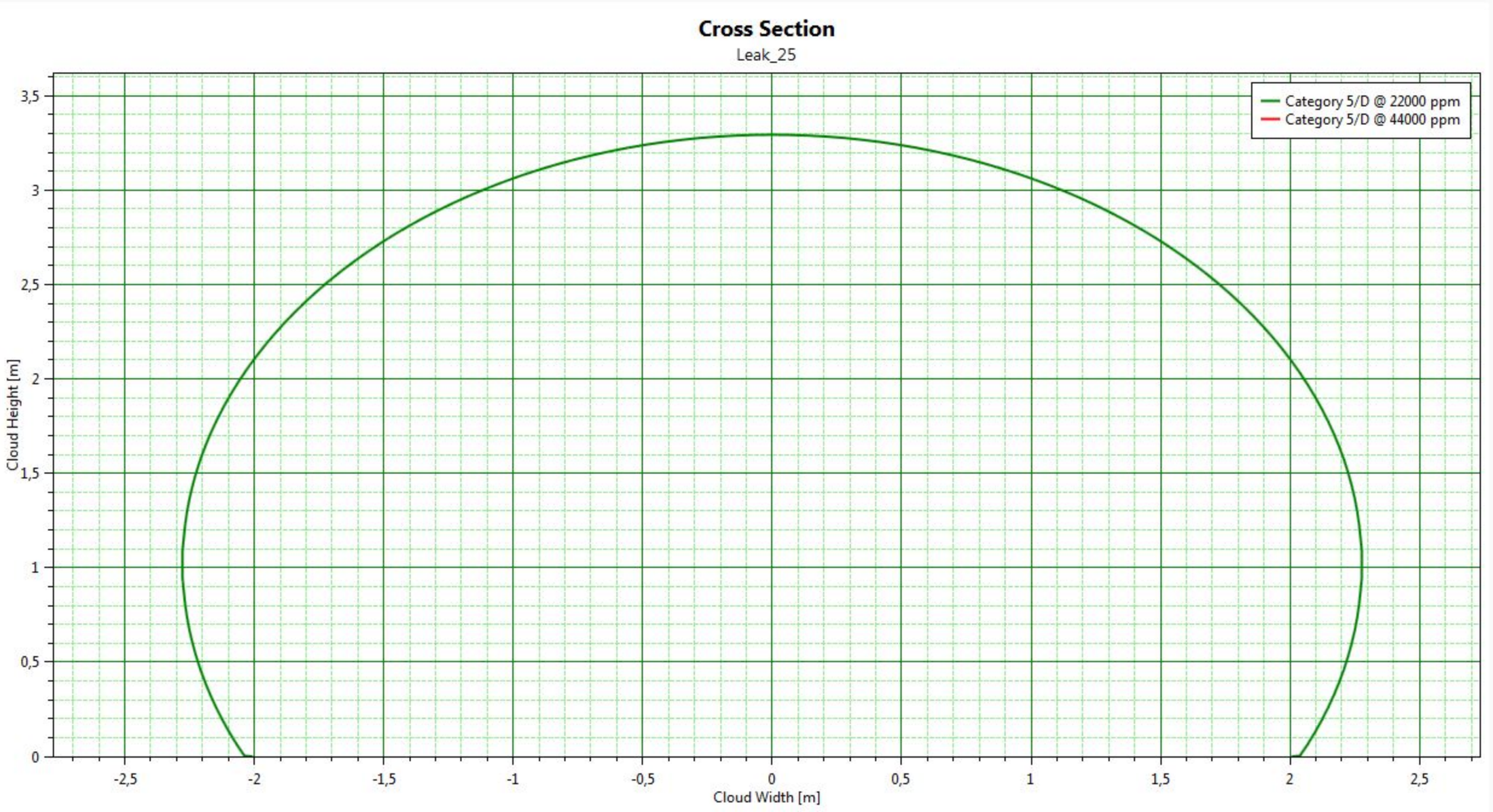
Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	30 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_25
Time	12,7524 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_25
Time	8,64015 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	30 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_25
Time	8,64015 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top9_Pipe BOG

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe

Pressure vessel

17129I_LNG_rev00\Top9_Pipe BOG

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	5	kg
		Volume inventory	0,550989	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-130	degC
		Pressure (gauge)	5	bar
		Fluid state	Vapour	
		Liquid mole fraction	0	fraction

		Phase to be released	Vapour	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	0,550989	m3
		Tank vapour volume	0,550989	m3
		Tank liquid volume	0	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_5mm

Leak

17129I_LNG_rev00\Top9_Pipe BOG\pipe

Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	5	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	3	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Vapour	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

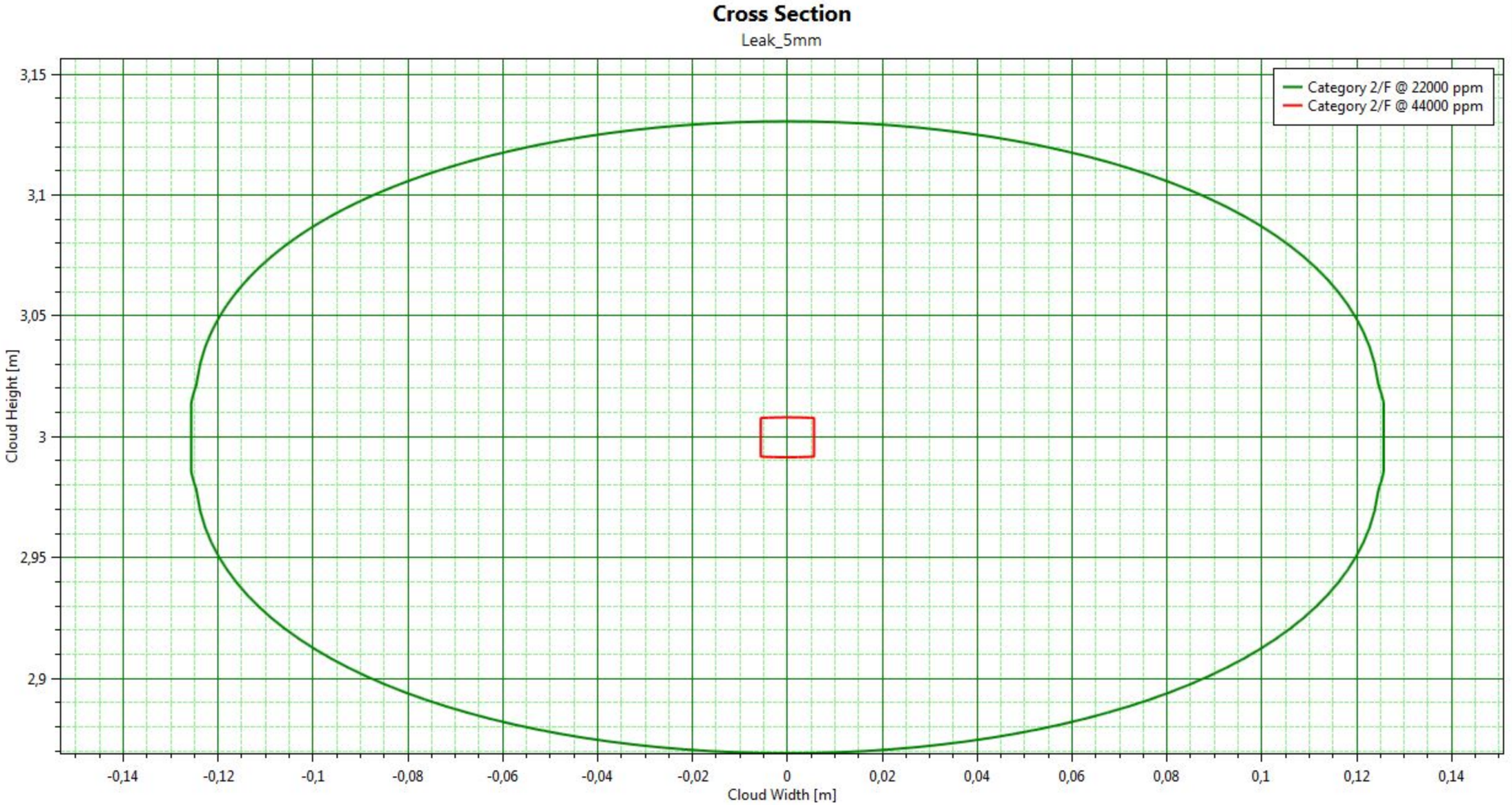
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	

		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	

		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

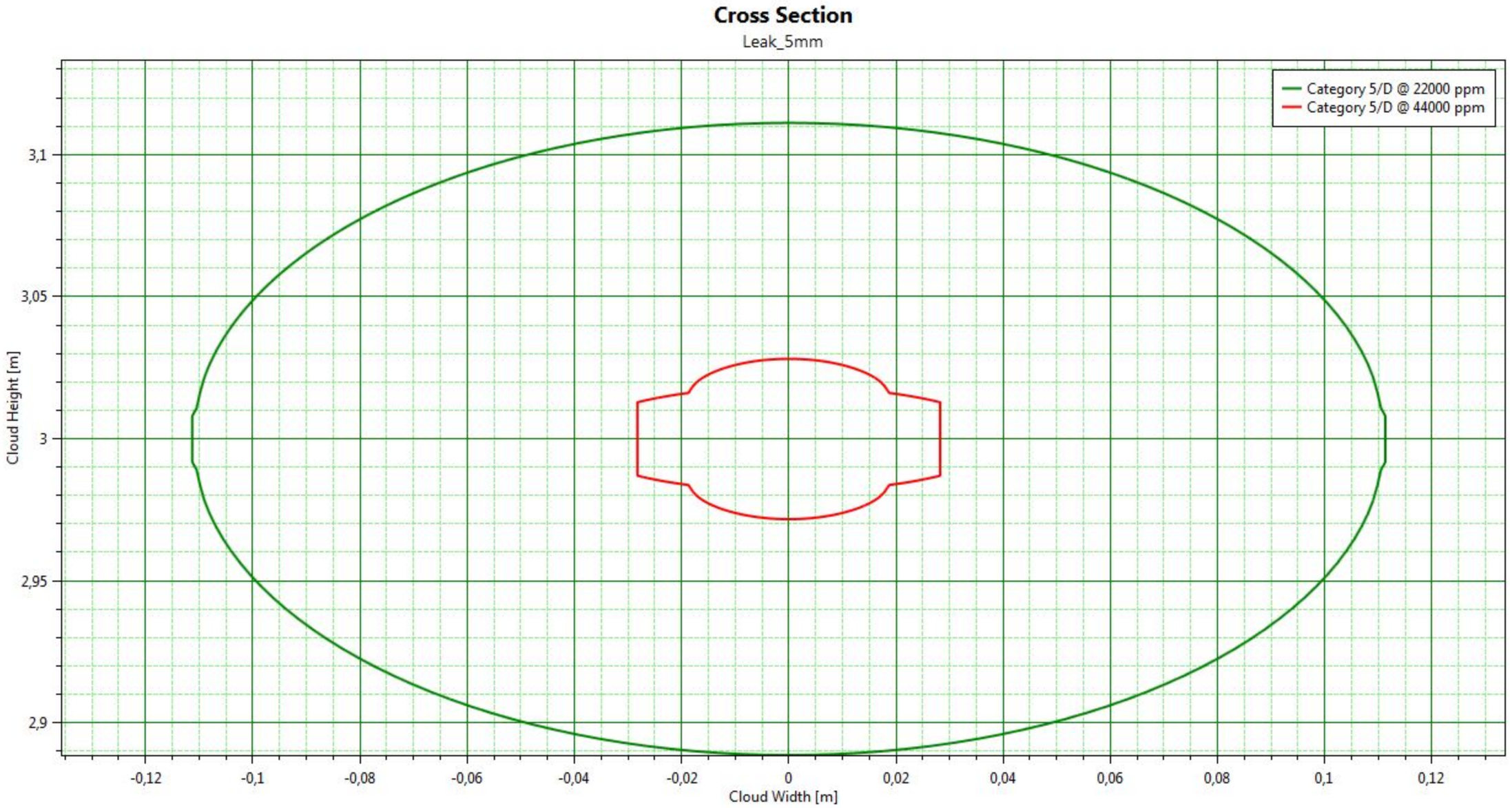
Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_5mm
Time	2,97251 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00

Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	1,57164 m
Equipment	pipe
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_5mm
Time	2,97251 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_5mm
Time	2,97171 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00

Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	1,35369 m
Equipment	pipe
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_5mm
Time	2,97171 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top9_Pipe BOG

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe

Pressure vessel

17129I_LNG_rev00\Top9_Pipe BOG

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	120	kg
		Volume inventory	13,2237	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-130	degC
		Pressure (gauge)	5	bar
		Fluid state	Vapour	
		Liquid mole fraction	0	fraction

		Phase to be released	Vapour	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	1	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	13,2237	m3
		Tank vapour volume	13,2237	m3
		Tank liquid volume	0	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_25mm

Leak

17129I_LNG_rev00\Top9_Pipe BOG\pipe

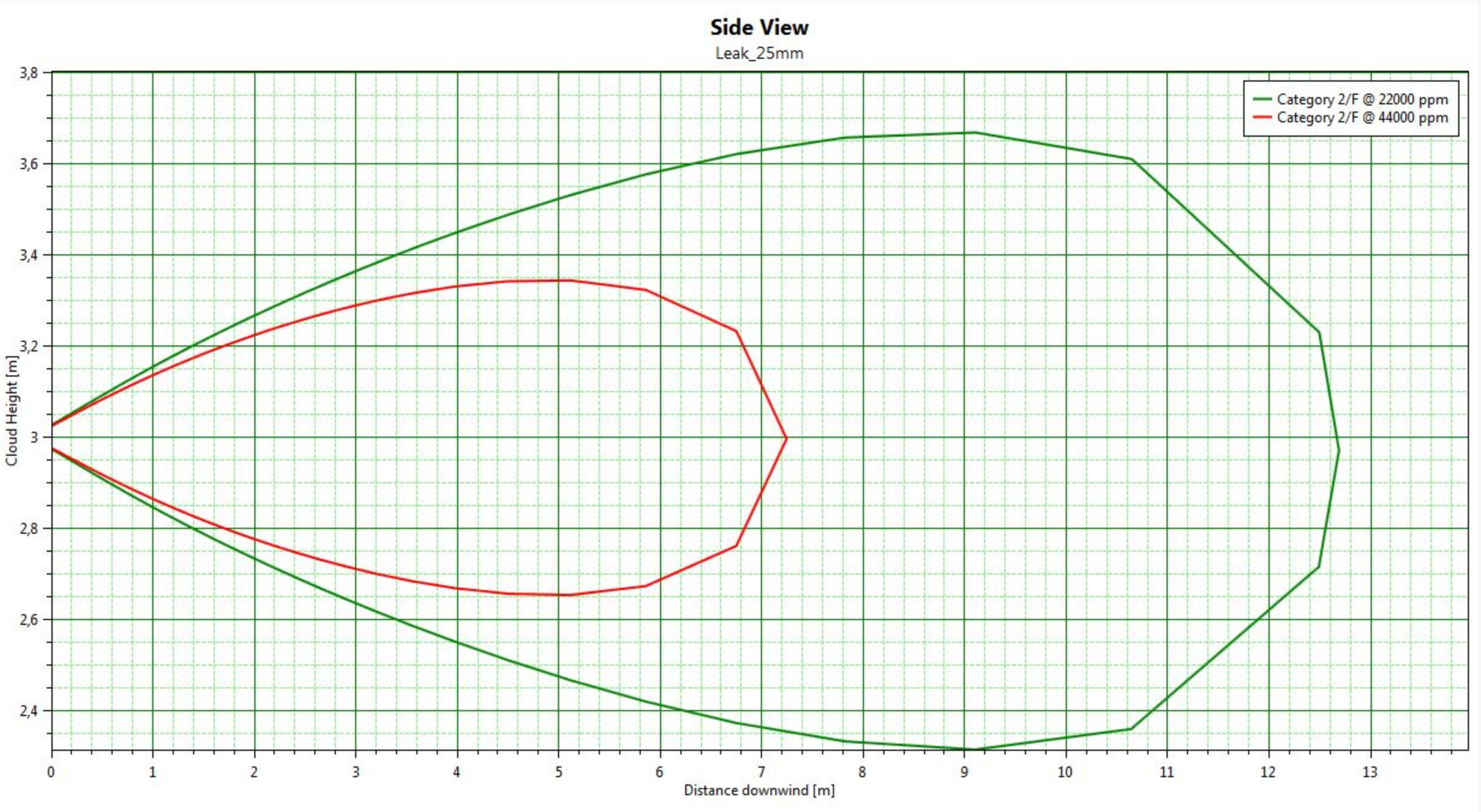
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	25	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	3	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Vapour	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

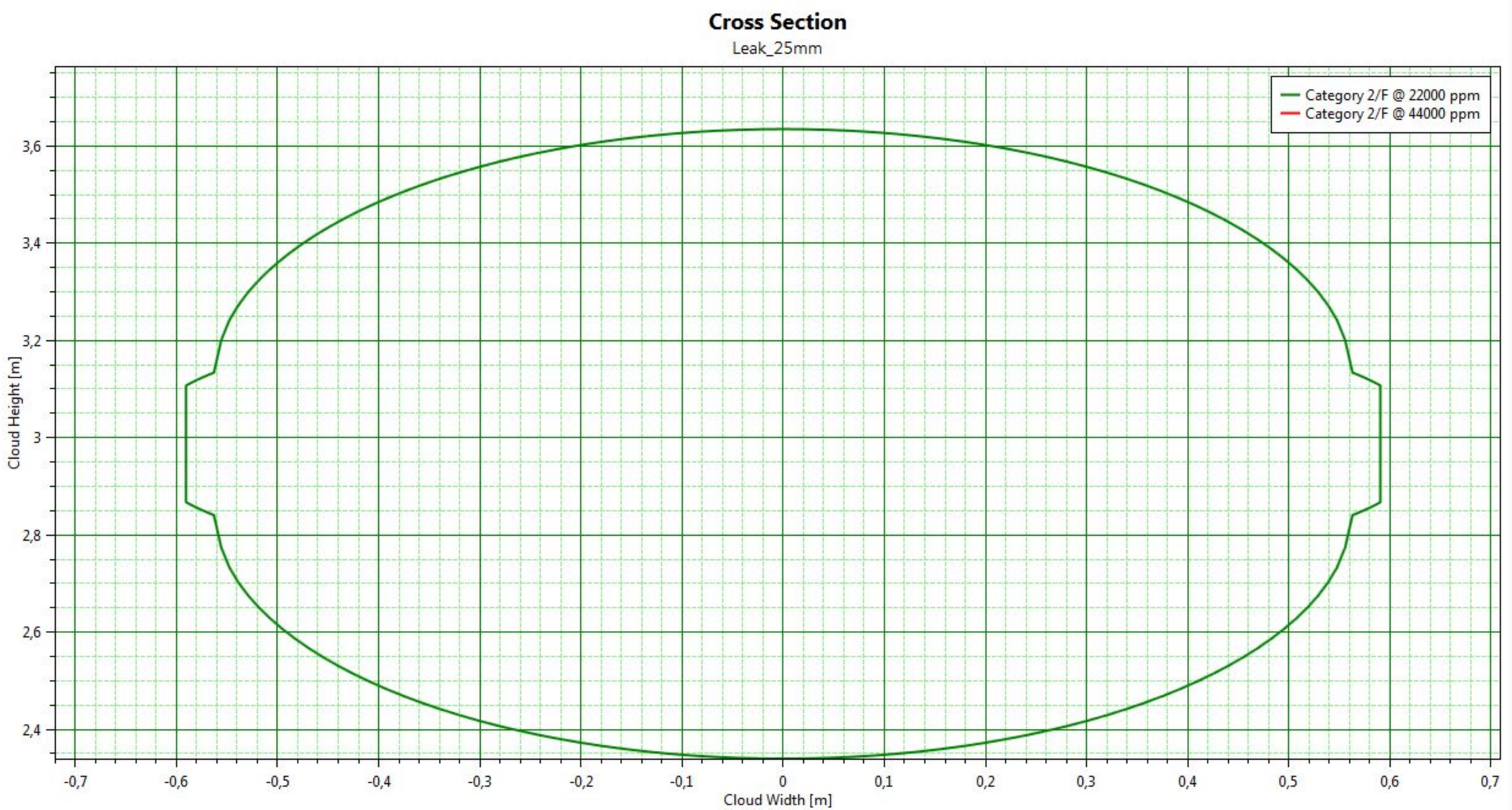
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

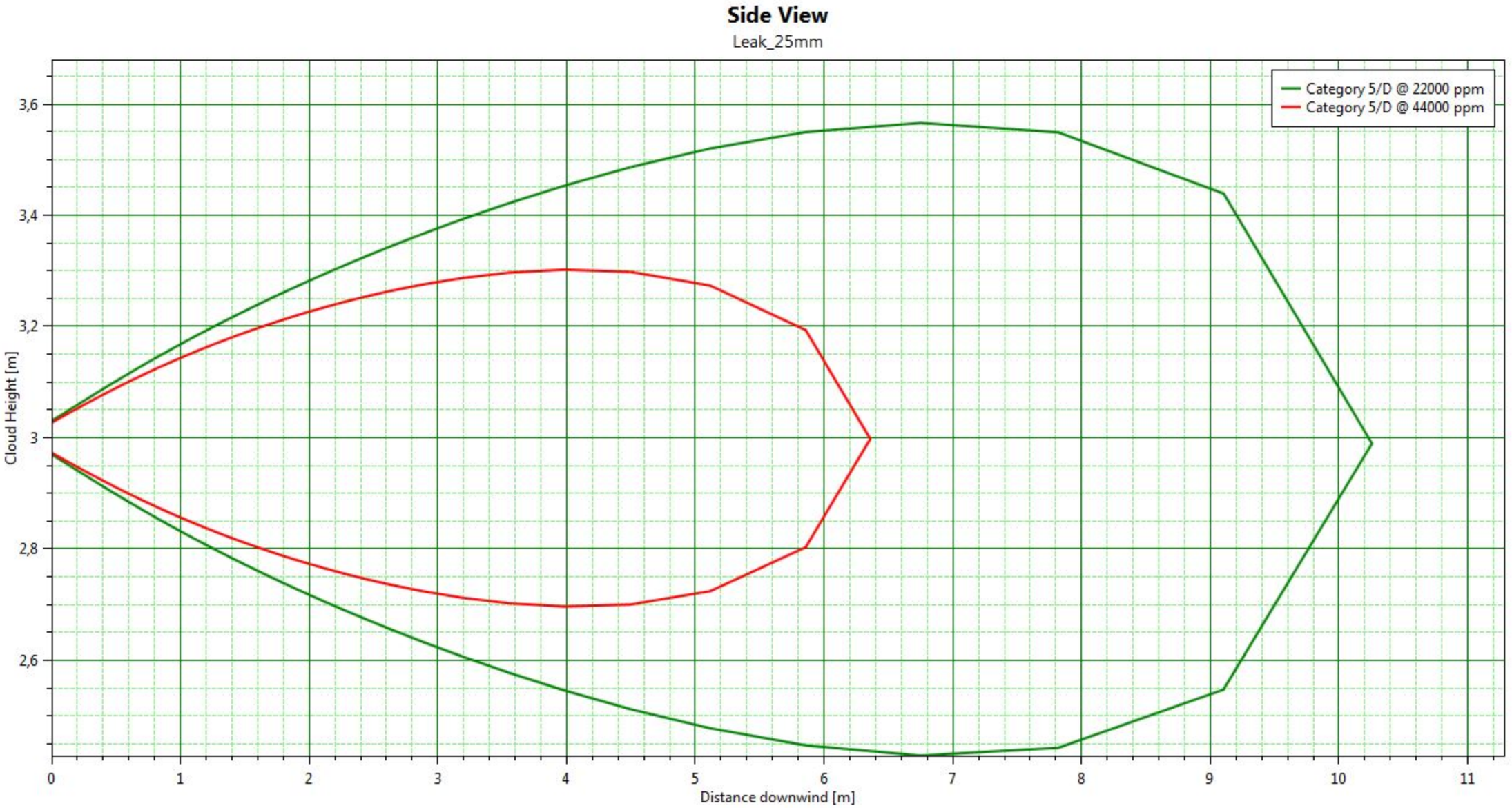
Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_25mm
Time	2,90132 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



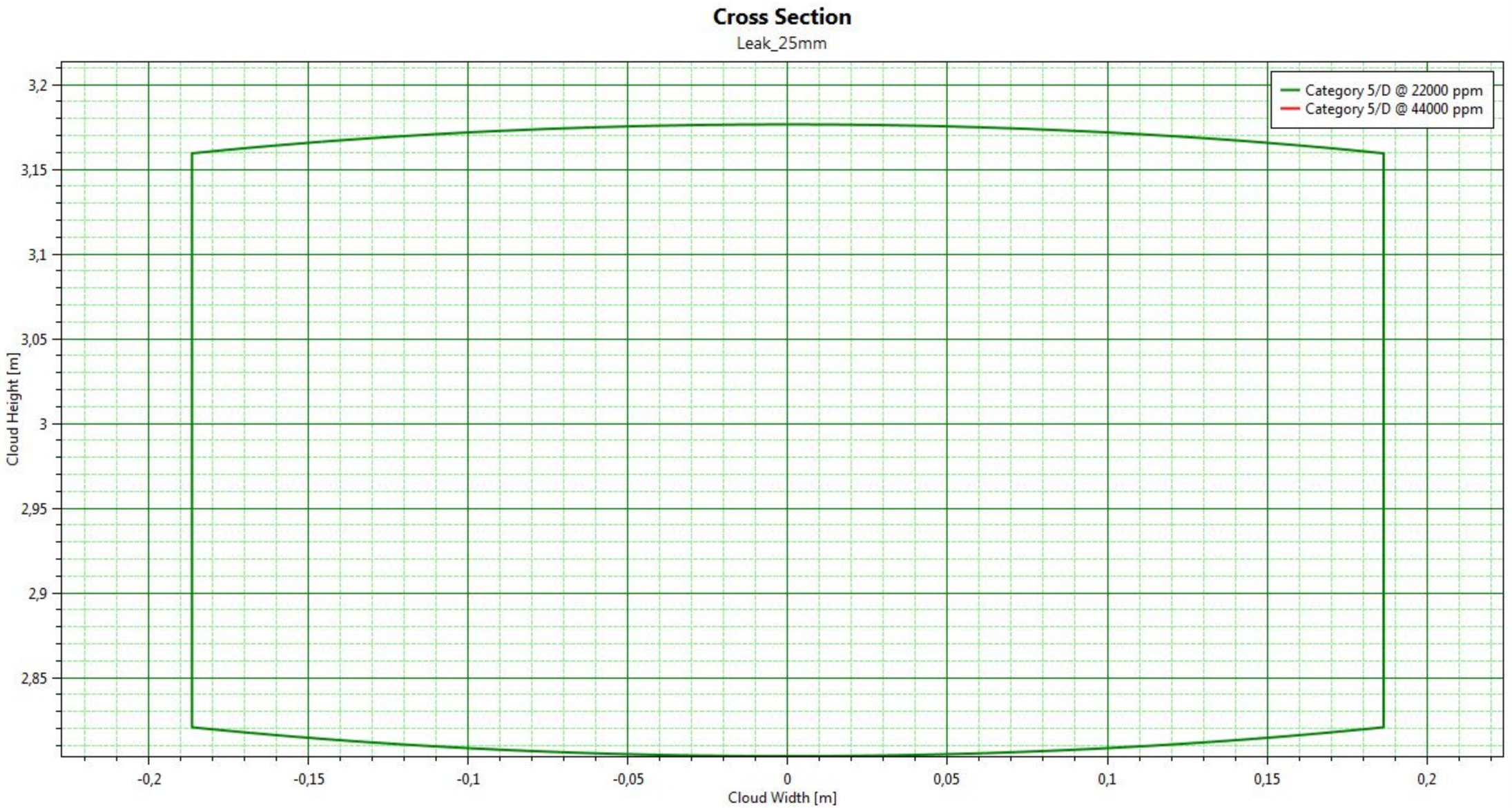
Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	10 m
Equipment	pipe
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_25mm
Time	2,90132 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Equipment	pipe
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_25mm
Time	2,89734 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94428
Averaging time	Flammable (18,75 s)
Downwind Distance	10 m
Equipment	pipe
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_25mm
Time	2,89734 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top10_Pipe evaporatore

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top10_Pipe evaporatore

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	2556	kg
		Volume inventory	6,31314	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	70	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	6	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	6,31314	m3
		Tank vapour volume	0	m3
		Tank liquid volume	6,31314	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_2mm

Leak

17129I_LNG_rev00\Top10_Pipe evaporatore\pipe_70bar

Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	2	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

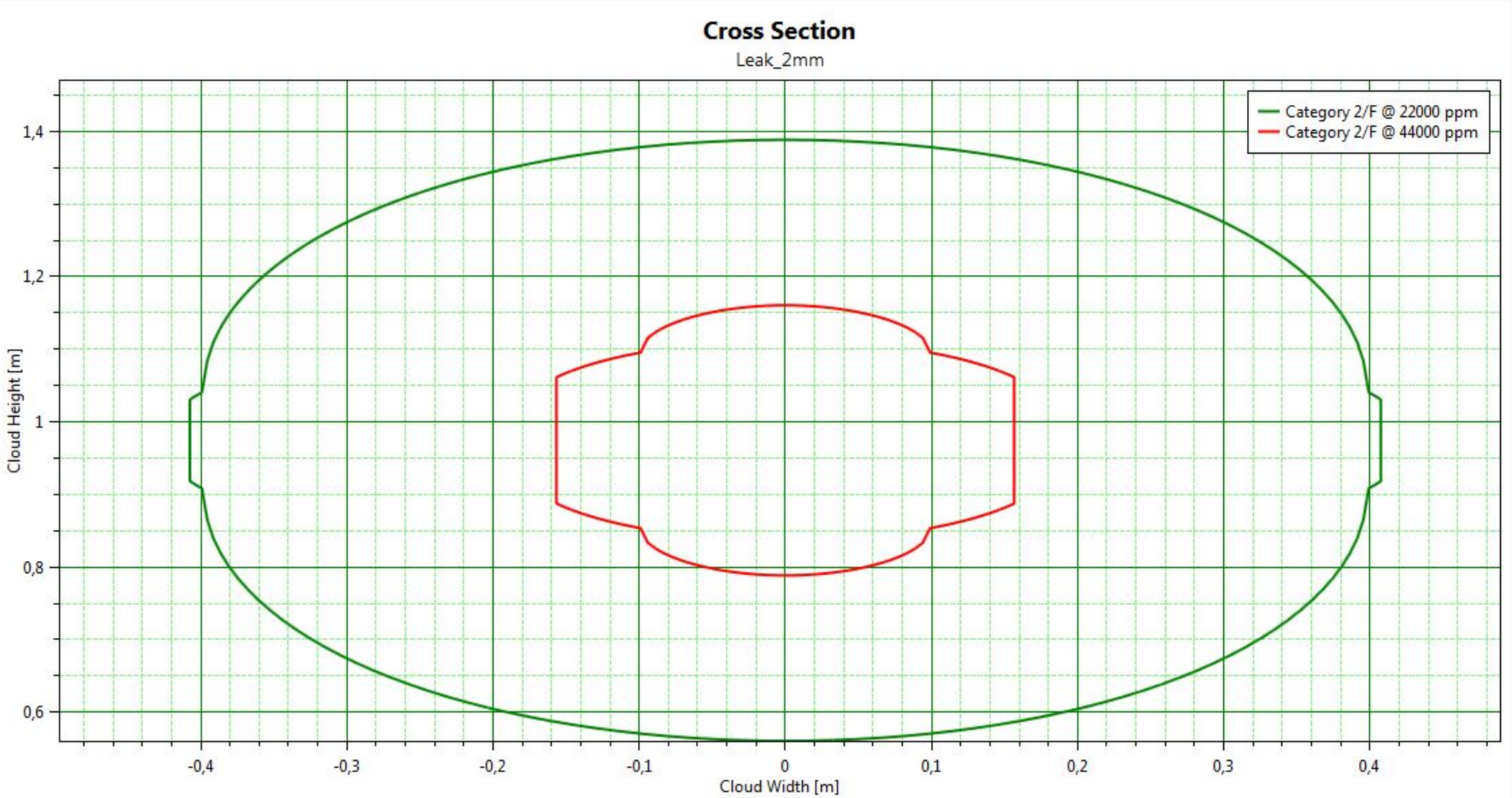
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	

		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	

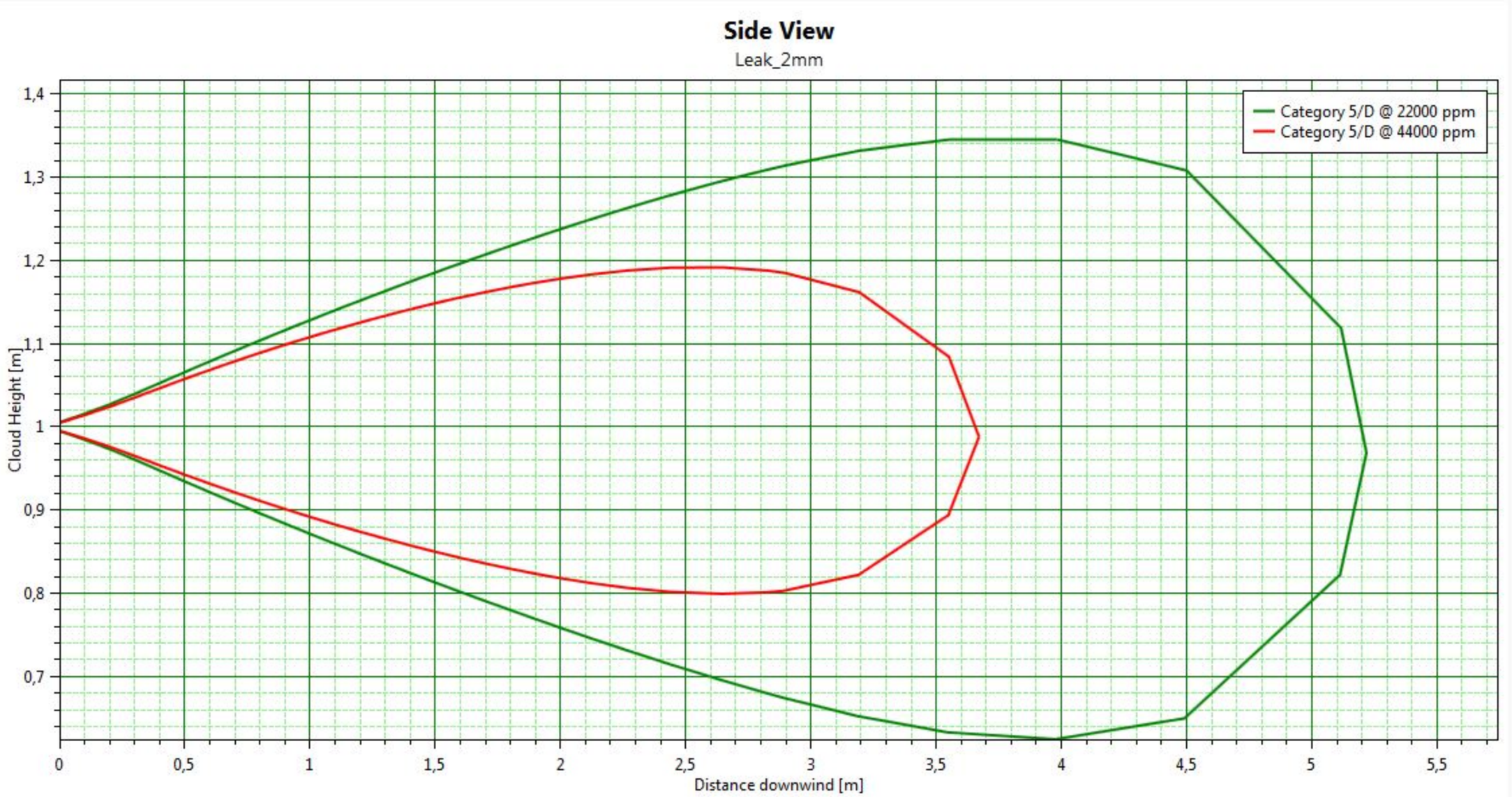
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_2mm
Time	110,126 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00

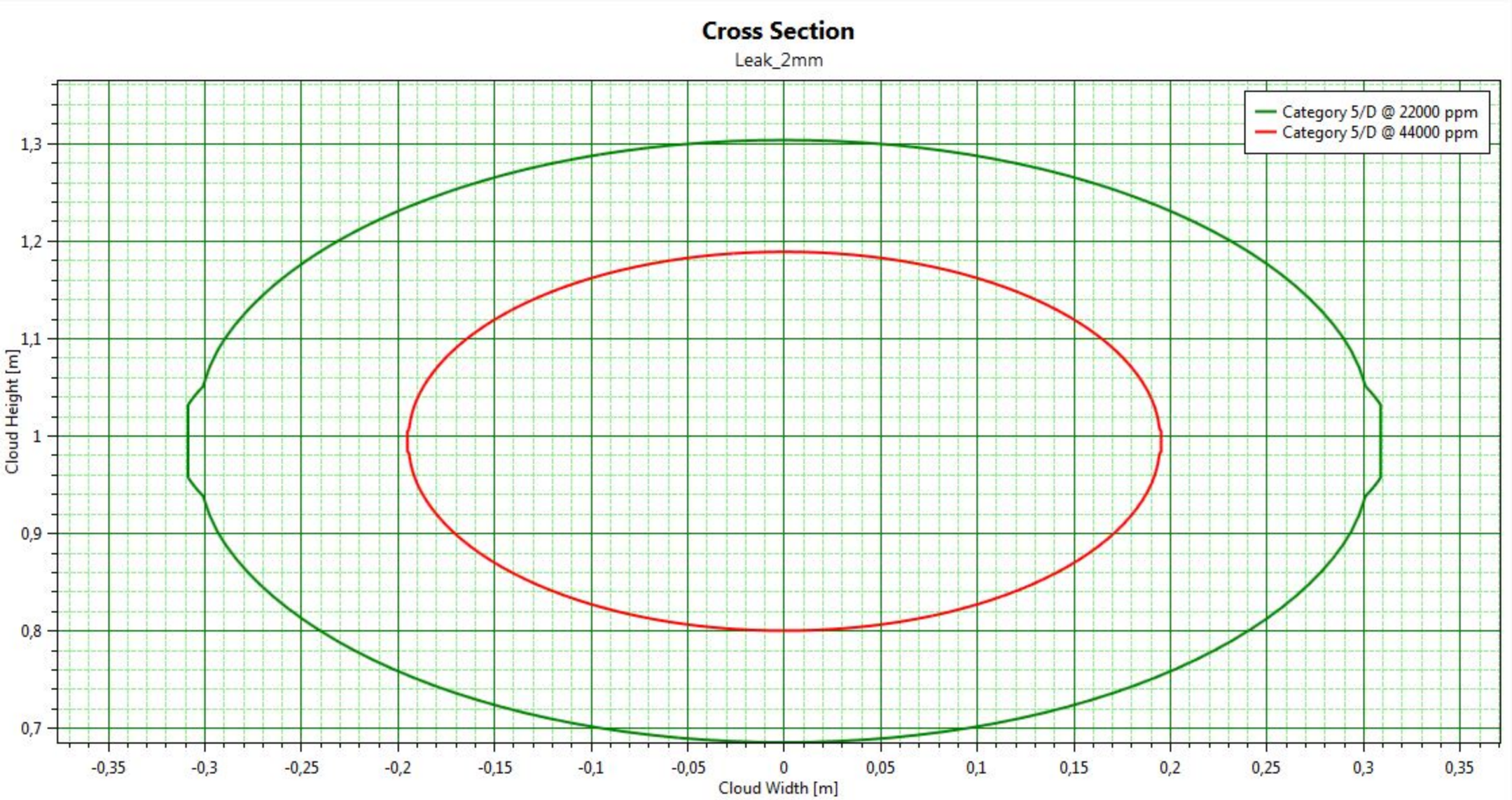
Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	4,17228 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_2mm
Time (Category 2/F)	1,16219 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_2mm
Time (Category 5/D)	0,484846 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	2,75648 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_2mm
Time (Category 5/D)	0,484846 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top10_Pipe evaporatore

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top10_Pipe evaporatore

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	2556	kg
		Volume inventory	6,31314	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	70	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	6	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	6,31314	m3
		Tank vapour volume	0	m3
		Tank liquid volume	6,31314	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_5mm

Leak

17129I_LNG_rev00\Top10_Pipe evaporatore\pipe_70bar

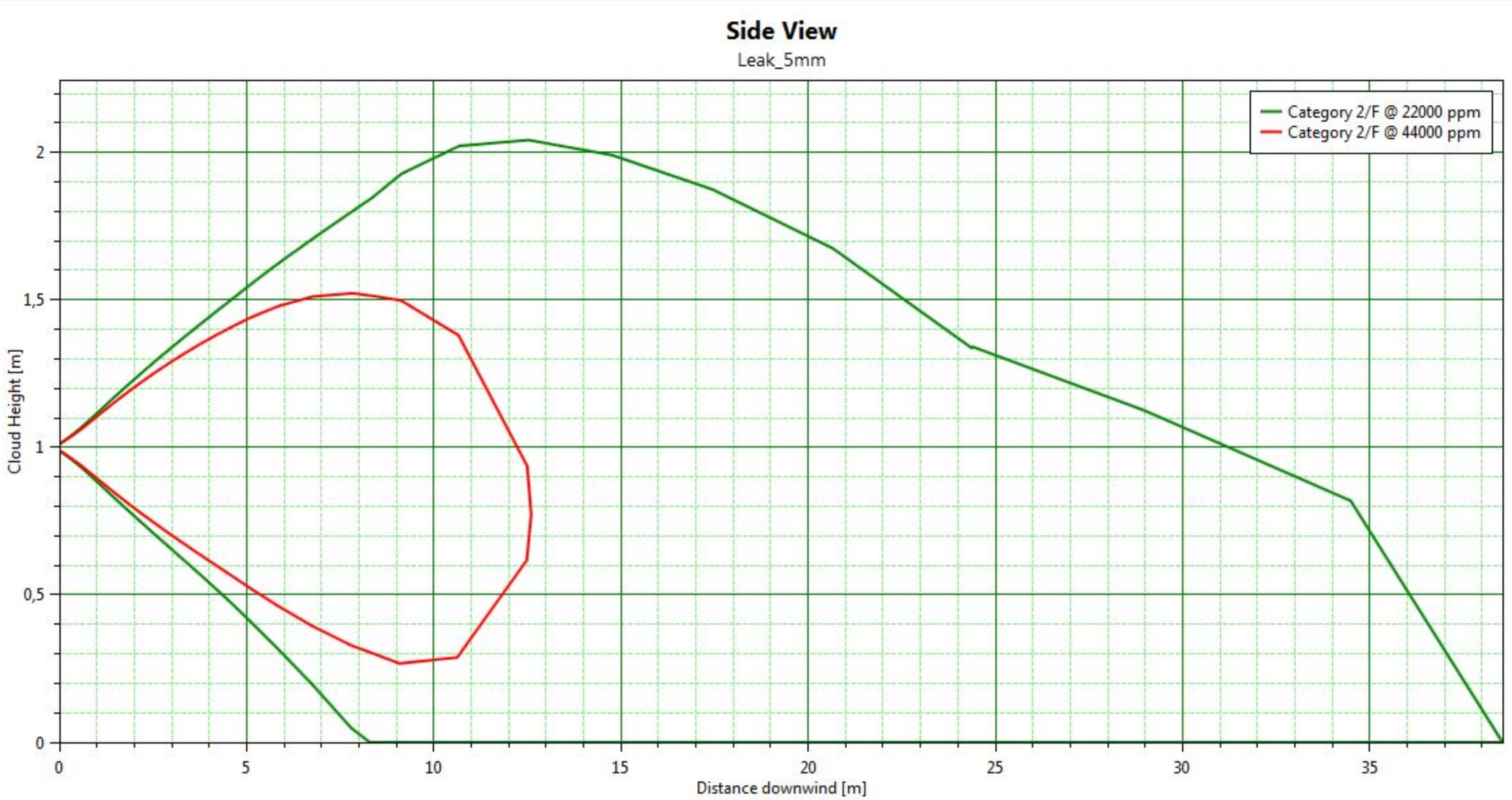
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	5	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

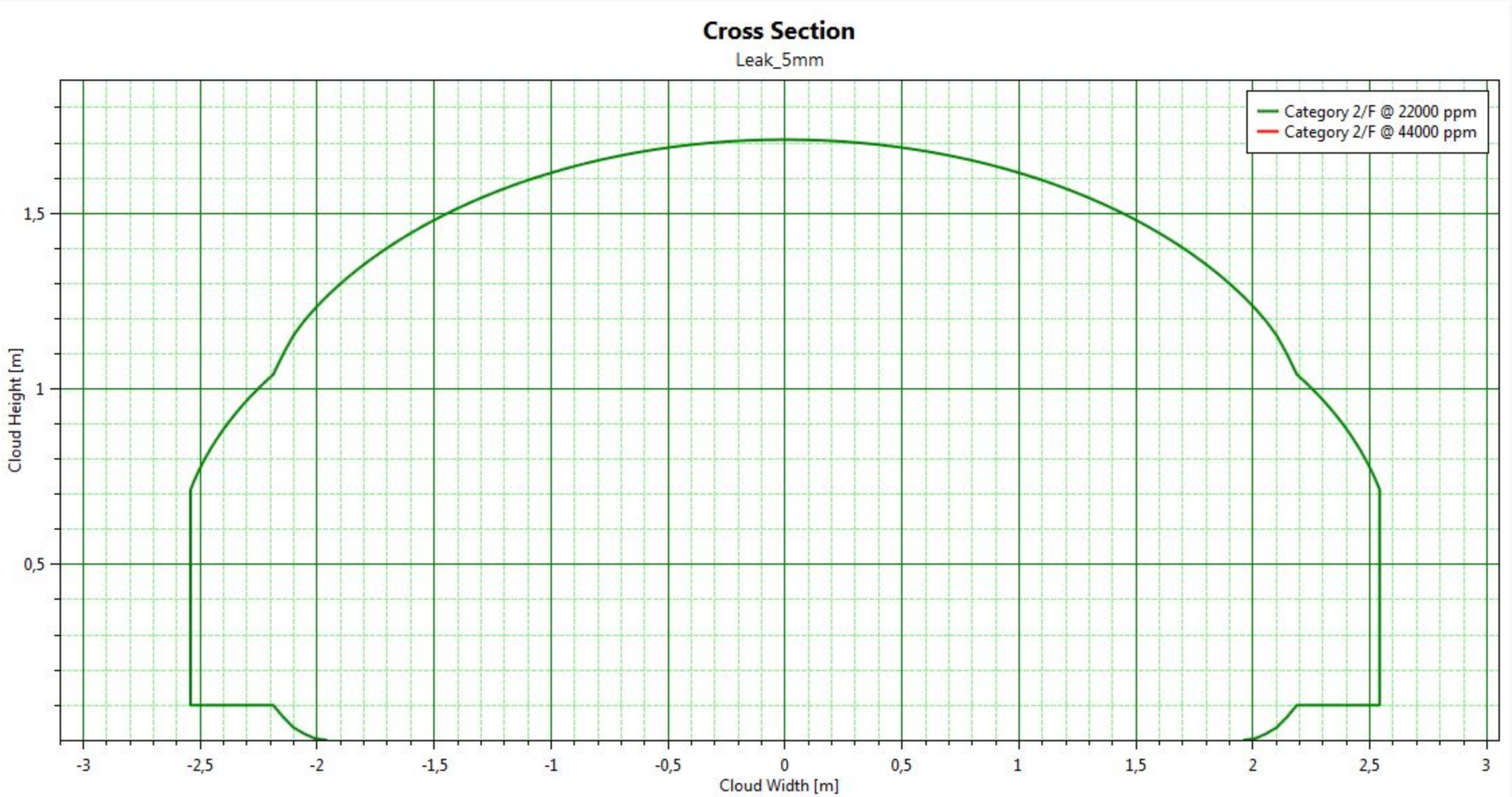
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

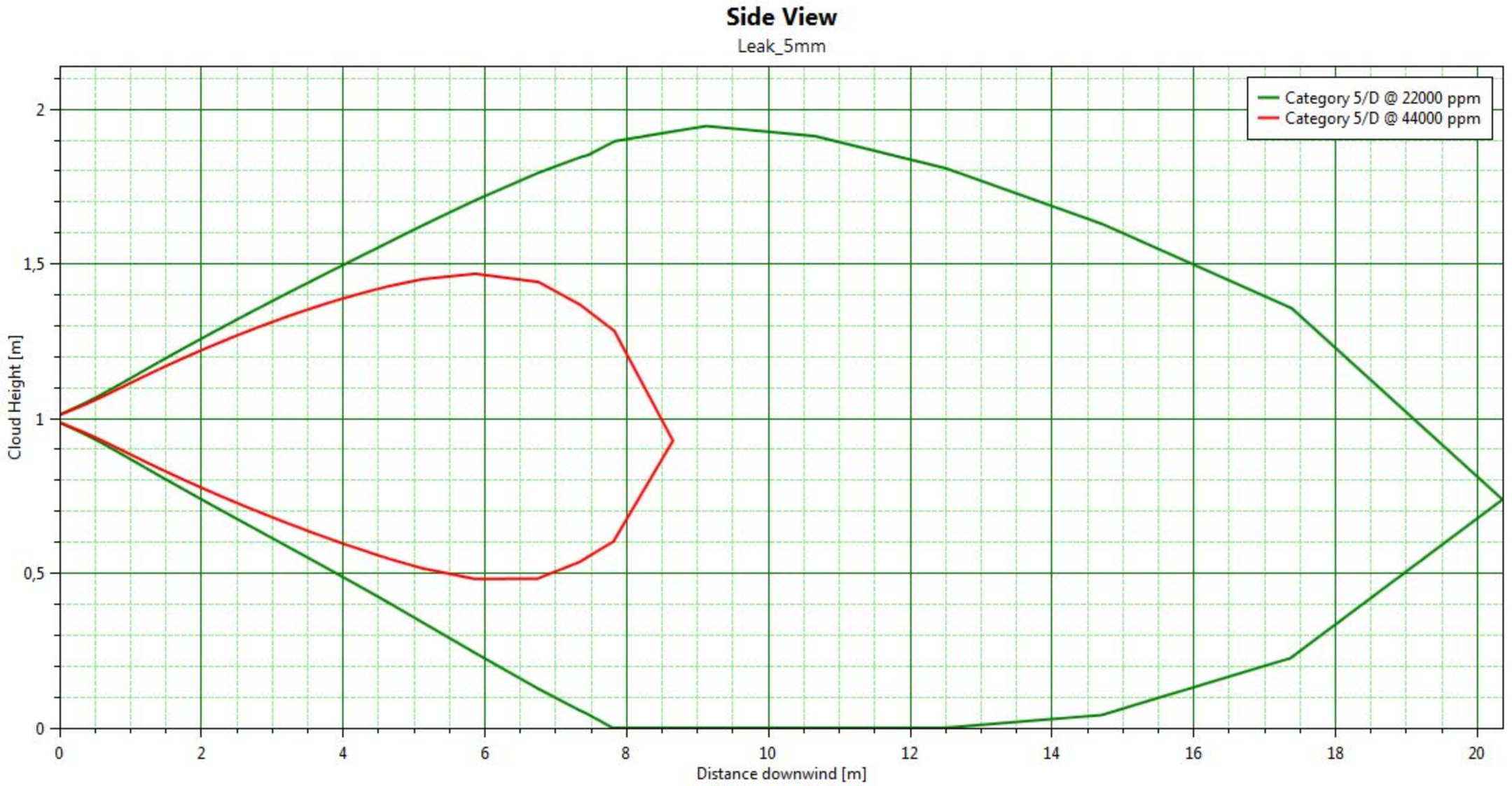
Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_5mm
Time	59,3957 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



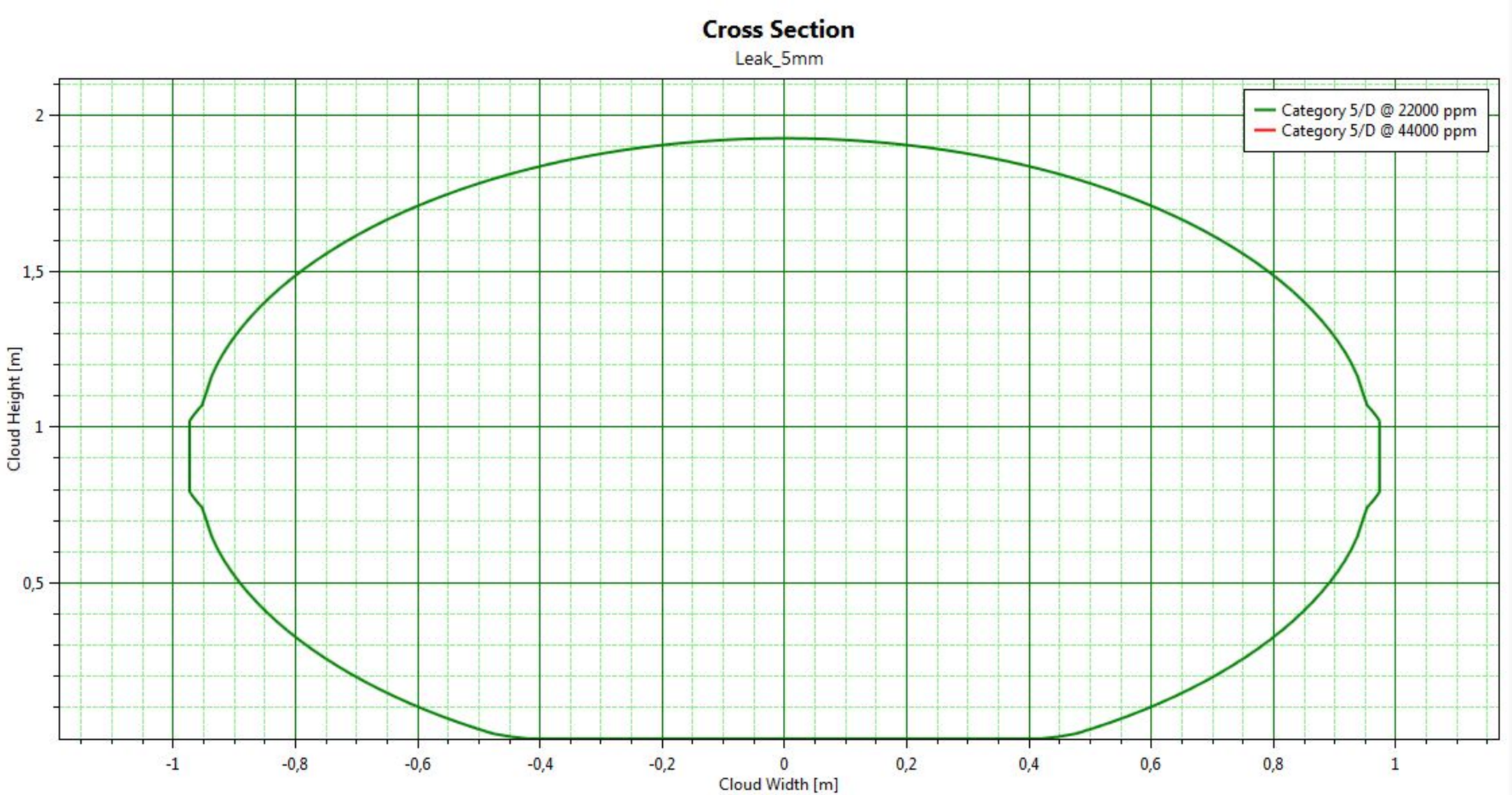
Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	20 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_5mm
Time	30,1978 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_5mm
Time	59,1083 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	10 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_5mm
Time	59,1083 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top10_Pipe evaporatore

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top10_Pipe evaporatore

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	2556	kg
		Volume inventory	6,31314	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	70	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	6	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	6,31314	m3
		Tank vapour volume	0	m3
		Tank liquid volume	6,31314	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_2mm

Leak

17129I_LNG_rev00\Top10_Pipe evaporatore\pipe_70bar

Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	2	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

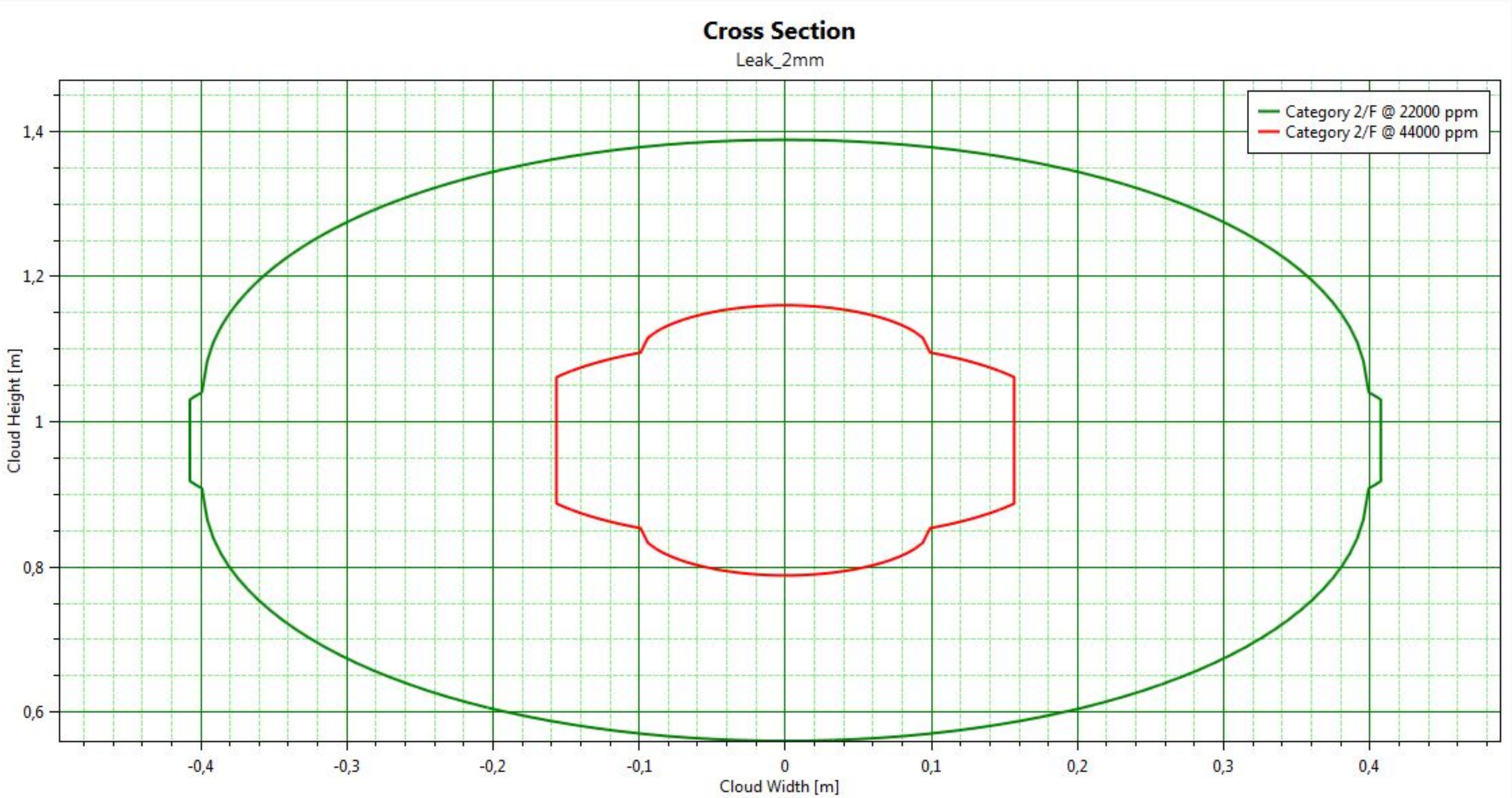
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	

		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	

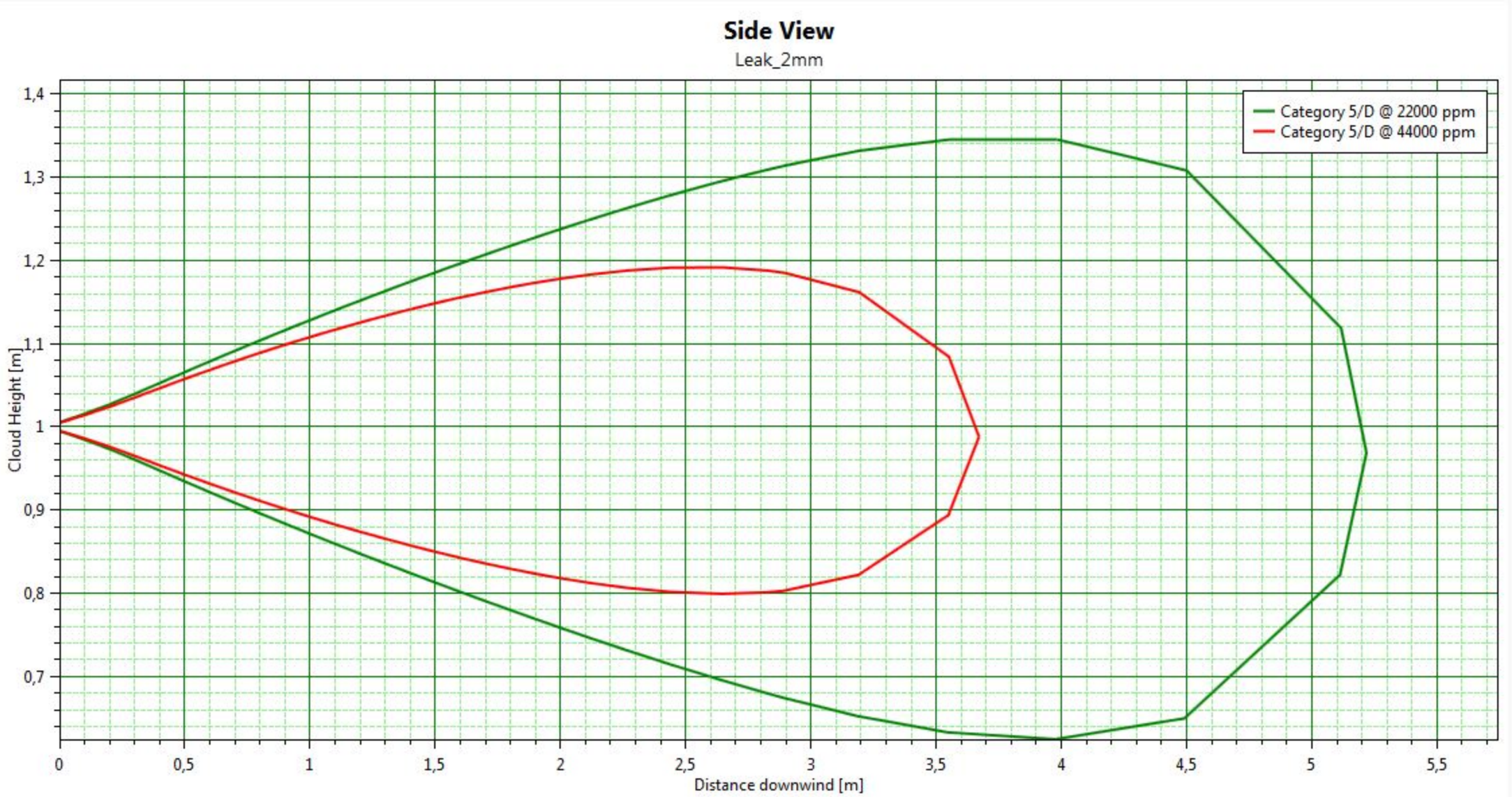
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_2mm
Time	110,126 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00

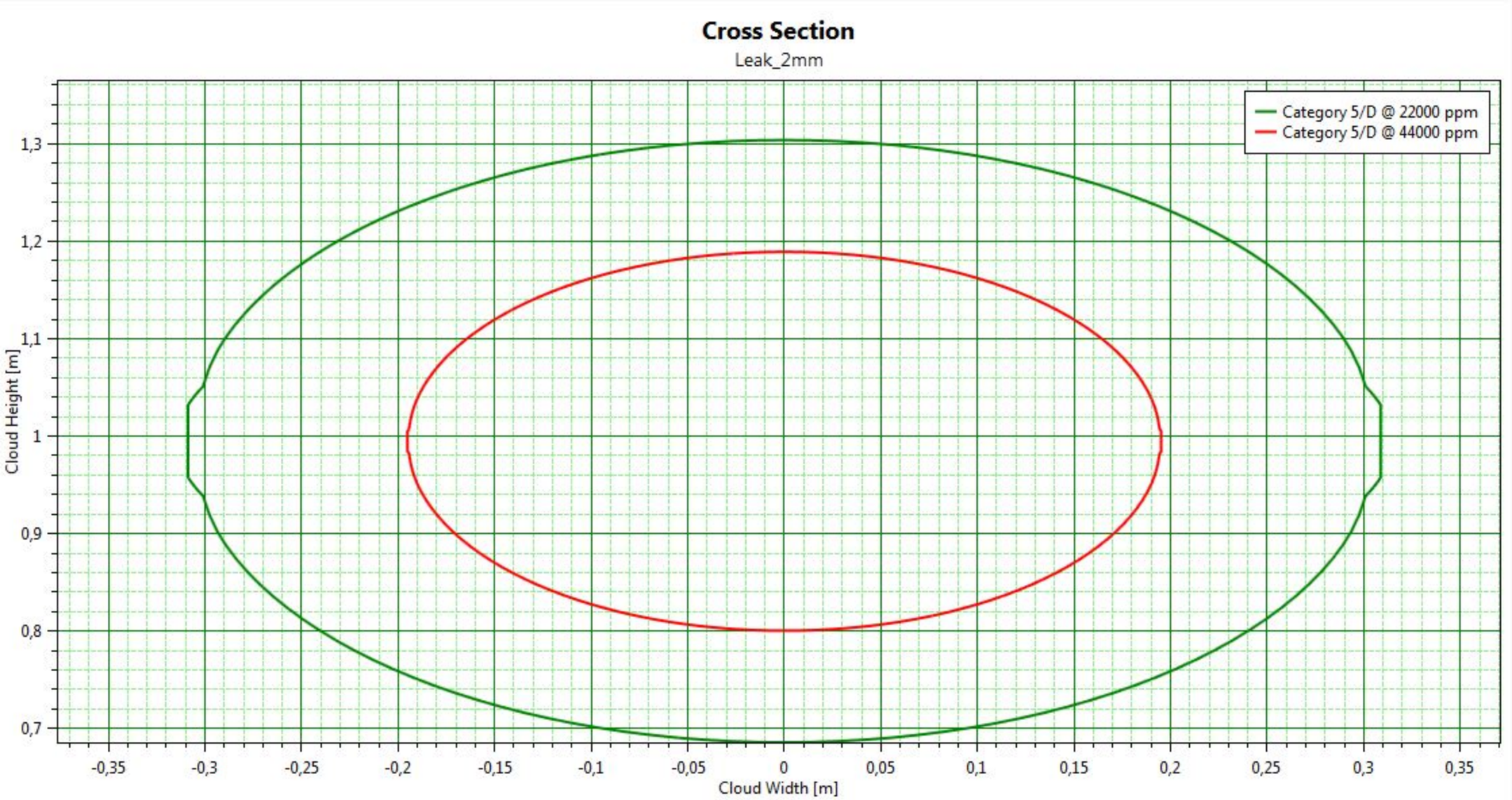
Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	4,17228 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_2mm
Time (Category 2/F)	1,16219 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_2mm
Time (Category 5/D)	0,484846 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	2,75648 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_2mm
Time (Category 5/D)	0,484846 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Input Report

Workspace: 17129I_LNG_rev00

Top10_Pipe evaporatore

Study

17129I_LNG_rev00

Tab	Group	Field	Value	Units
Context of calculations	Selection of context	Weathers to use for this study	Weather folder	
		Parameters to use for this study	Parameter set	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
Dispersion	Distances of interest	Distances of interest		m

pipe_70bar

Pressure vessel

17129I_LNG_rev00\Top10_Pipe evaporatore

Tab	Group	Field	Value	Units
Material	Material	Material	METHANE	
		Specify volume inventory?	No	
		Mass inventory	2556	kg
		Volume inventory	6,31314	m3
		Material to track	METHANE	
	Phase	Specified condition	Pressure/temperature	
		Temperature	-150	degC
		Pressure (gauge)	70	bar
		Fluid state	Liquid	
		Liquid mole fraction	1	fraction

		Phase to be released	Liquid	
Scenario	Pipe dimensions	Pipe length		m
	Release location	Elevation	6	m
		Tank head	0	m
		Release height from vessel bottom		m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - instantaneous	Use flashing correlation	
		Droplet break-up mechanism - continuous	Use flashing correlation	
Short pipe	Pipe characteristics	Pipe roughness	0,0457	mm
	Frequencies	Frequency of bends in pipe	0	/m
		Frequency of couplings in pipe	0	/m
		Frequency of junctions in pipe	0	/m
	Frequencies of valves	Frequency of excess flow valves	0	/m
		Frequency of non-return valves	0	/m
		Frequency of shut-off valves	0	/m
	Velocity head losses	Excess flow valve velocity head losses	0	
		Non-return valve velocity head losses	0	
		Shut-off valve velocity head losses	0	
Time varying releases	Modelling of time-varying leaks and line ruptures	Vacuum relief valve	Operating	
		Vacuum relief valve set point	0	bar
	Dimensions	Tank shape		
		Tank height		m
		Tank width		m
		Tank length		m
		Tank diameter		m
	Inventory data	Tank volume	6,31314	m3
		Tank vapour volume	0	m3
		Tank liquid volume	6,31314	m3

		Tank liquid level	0	m
		Maximum vapour release height		m
		Maximum mass inventory	1E+09	kg
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	
		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
	Building definition	Specify a release building	No	
		Specified building (release building)		
		Building wake effect	None	
		Wind or release angle from North	0	deg
		Handling of droplets	Not trapped	
		Indoor mass modification factor	3	
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Crosswind angle	0	deg
		Horizontal options	Use standard method	
		Correlation	Recommended	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	

		Intensity levels	5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s
Geometry	Geometry	East	0	m
		North	0	m

Leak_5mm

Leak

17129I_LNG_rev00\Top10_Pipe evaporatore\pipe_70bar

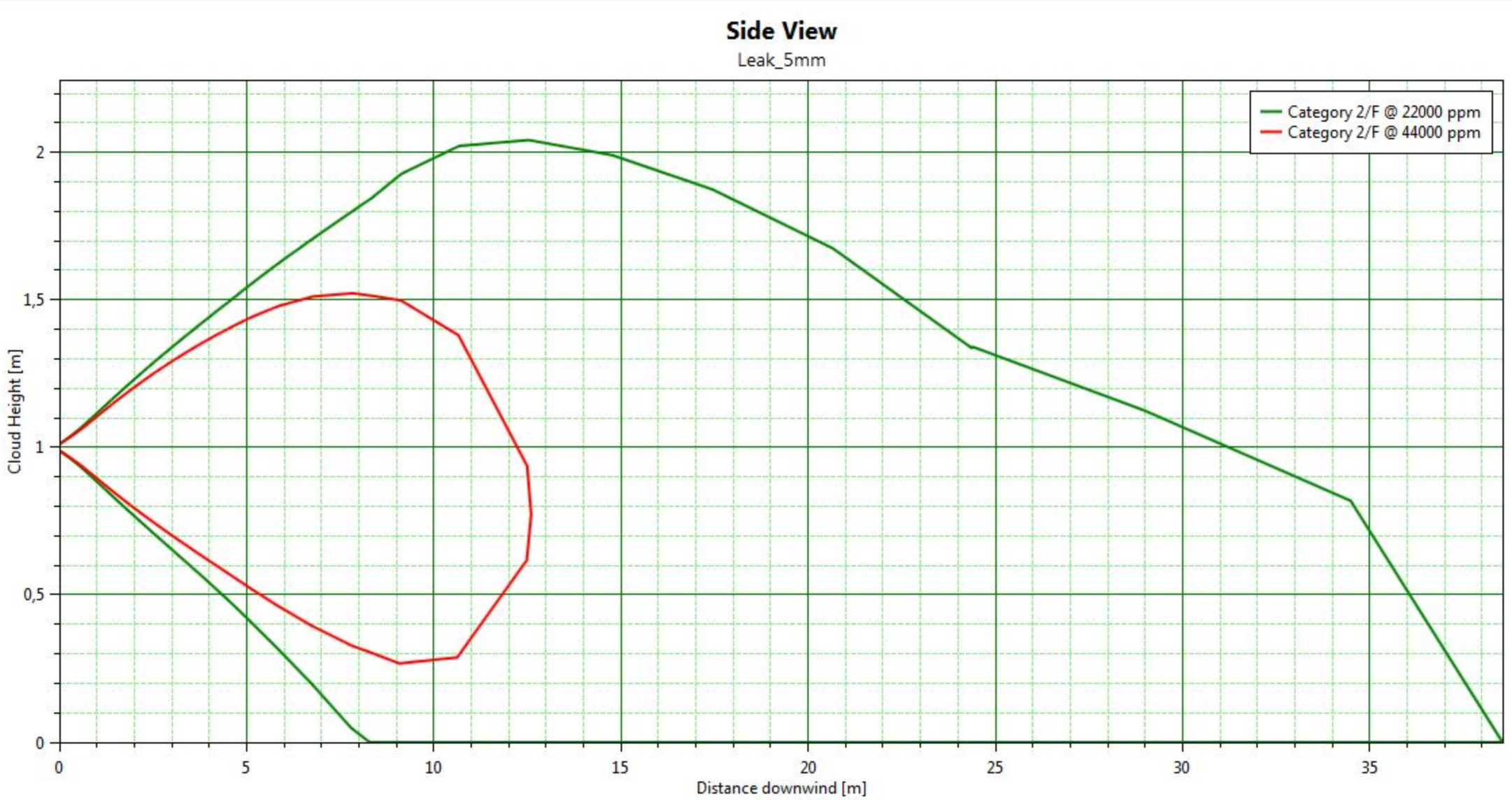
Tab	Group	Field	Value	Units
Scenario	Hole	Orifice diameter	5	mm
		Use specified discharge coefficient?	No	
		Discharge coefficient		fraction
	Release location	Elevation	1	m
		Tank head	0	m
	Direction	Outdoor release direction	Horizontal	
		Outdoor release angle	0	deg
Material	Material	Material characteristics	Flammable only	
		Material to track	METHANE	
	Phase	Phase to be released	Liquid	
Discharge parameters	Model settings	Atmospheric expansion method	Closest to initial conditions	
		Is flashing allowed to the orifice?	Allow flashing in the orifice	
	Droplet break-up mechanism	Droplet break-up mechanism - continuous	Use flashing correlation	
Dispersion	Dispersion scope	Concentration of interest	19390	ppm
		Averaging time for concentration of interest	Flammable	
		Specify user-defined averaging time	No	

		User defined averaging time		s
	Distances of interest	Distances of interest		m
	Averaging time for reports	ERPG [1 hr]	No	
		IDLH [30 mins]	No	
		STEL [15 mins]	No	
Bund, building and terrain	Terrain definition	Type of terrain for dispersion turbulence	Terrain types\Default terrain	
	Bund definition	Bund and type of surface for pools	Bund types\No bund	
Toxic parameters	Indoor toxic calculations	Specify the downwind building type	Unselected	
		Building type (downwind building type)	Buildings\Building type	
	Exposure time data	Set averaging time equal to exposure time	Use a fixed averaging time	
		Cut-off fraction of toxic load for exposure time calculation	0,05	fraction
		Cut-off concentration for exposure time calculations	0	fraction
	Toxic contours	Number of toxic levels	4	
		Dose levels	130000; 1,3E+06; 1,3E+07; 1,3E+08	
		Probit levels	2; 3; 4; 10	
		Lethality levels	0,001; 0,01; 0,1; 0,99	fraction
Explosion parameters	Explosion method (Consequence calculations only)	Explosion method	TNT	
	Ignition	Supply late ignition location	No ignition location	
		Location of late ignition		m
	Vapour liquid method	Use of explosion mass modification factor	Early and late explosions	
		Explosion mass modification factor	3	
TNT	TNT parameters	Air or ground burst	Air burst	
		Default TNT explosion efficiency	0,1	fraction
Fireball	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	3	

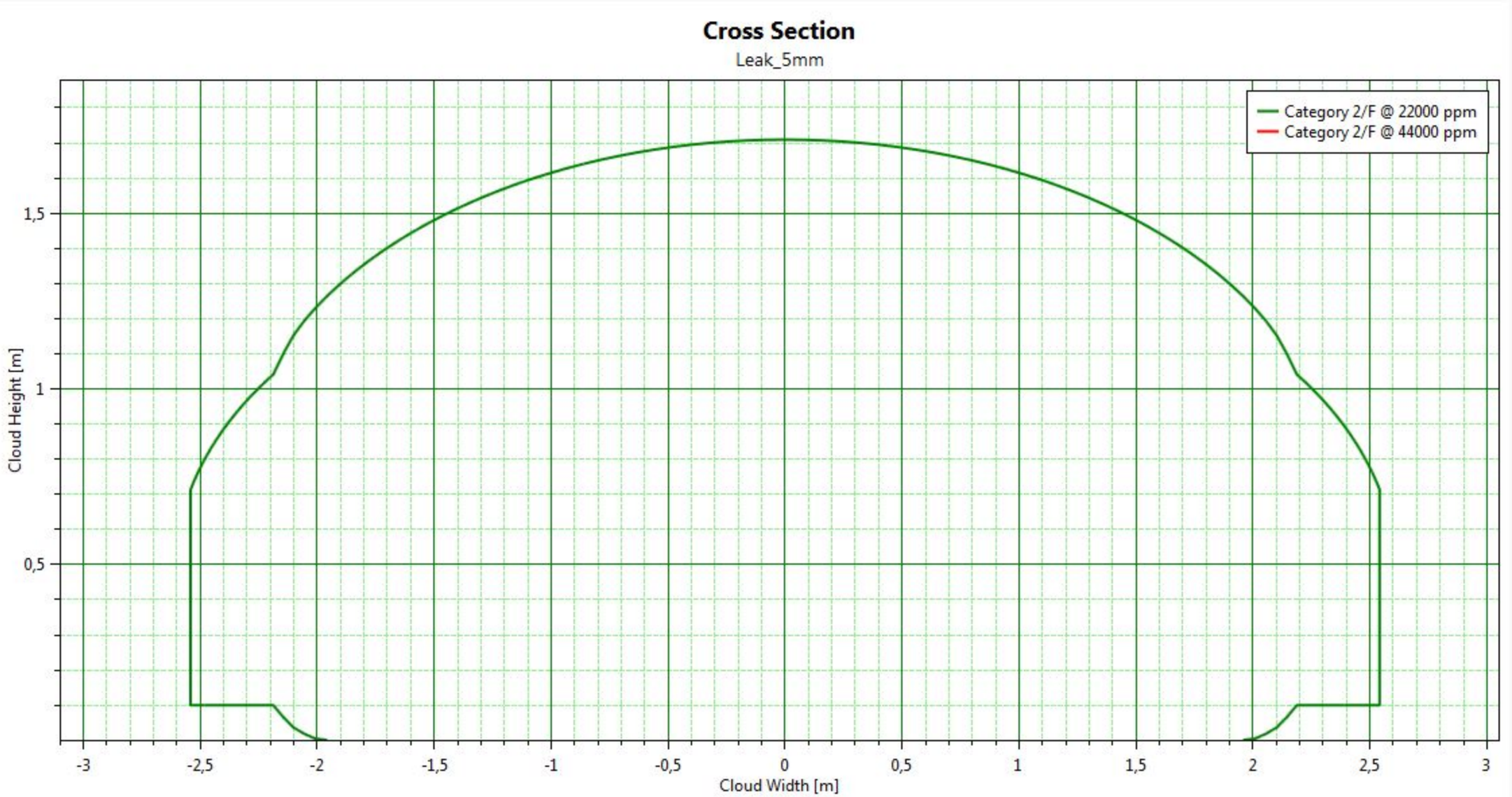
		Intensity levels	4; 12,5; 37,5	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Mass modification factor	3	
		Fireball maximum exposure duration	20	s
	Calculation method	Fireball model	Recommended	
		TNO model flame temperature	1726,85	degC
Jet fire	Jet fire method	Jet fire method	Cone model	
	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2
		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Rate modification factor	3	
		Jet fire maximum exposure duration	20	s
	Cone model data	Correlation	Recommended	
		Horizontal options	Use standard method	
	Surface emissive power	Calculation method for surface emissive power	Calculate SEP	
		Flame emissive power		kW/m2
		Emissivity fraction		fraction
Pool fire	Result types to calculate	Calculate probit	No	
		Calculate dose	No	
		Calculate lethality	No	
	Radiation levels	Number of input radiation levels	5	
		Intensity levels	5; 12,5; 37,5; 7; 3	kW/m2

		Probit levels	2,73; 3,72; 7,5	
		Dose levels	1,27E+06; 5,8E+06; 2,51E+07	
		Lethality levels	0,01; 0,1; 0,99	fraction
	Parameters	Radiative fraction for general fires	0,4	fraction
		Pool fire maximum exposure duration	20	s

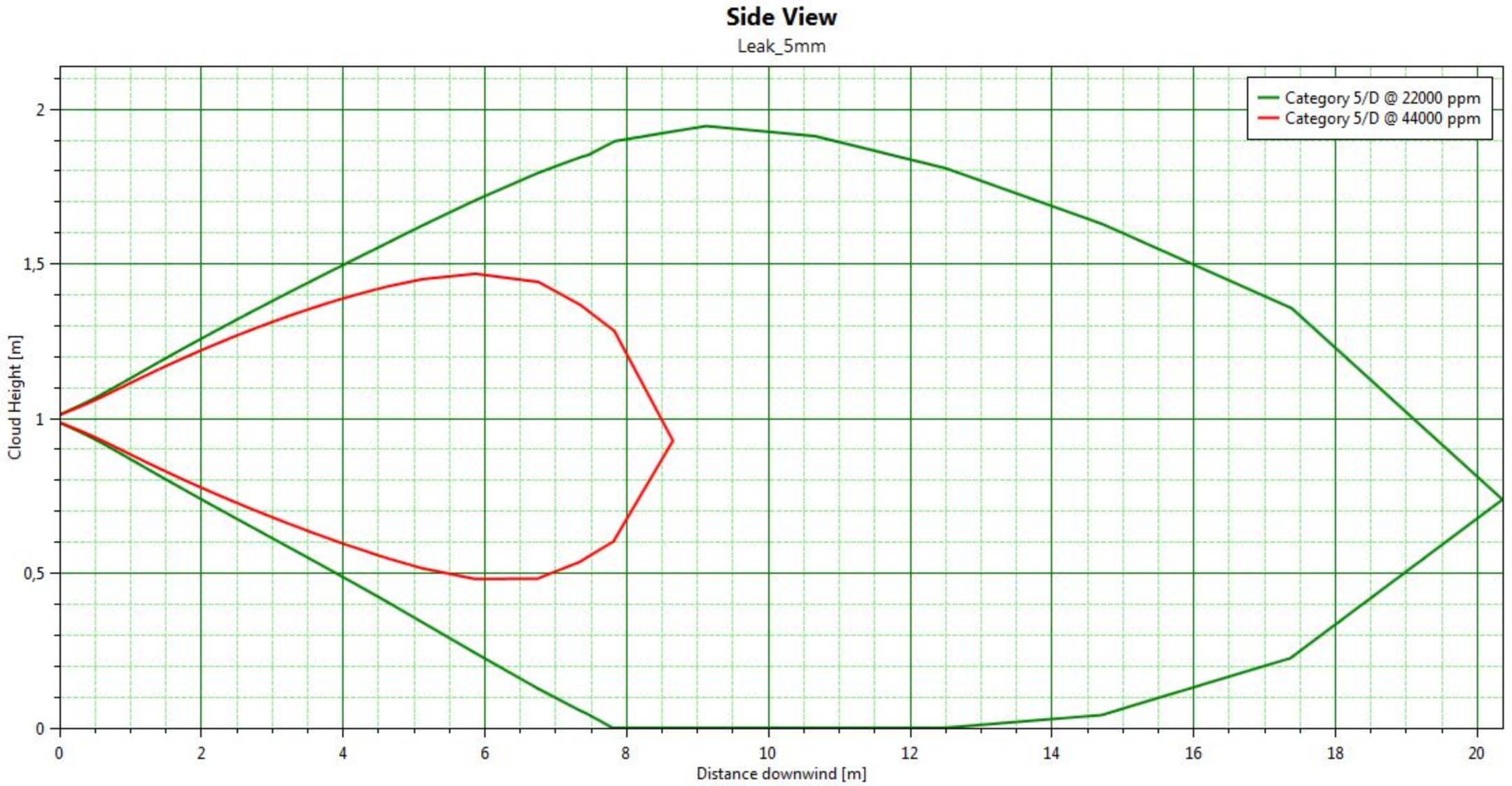
Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_5mm
Time	59,3957 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	20 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_5mm
Time	30,1978 s
Weather	Category 2/F
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Offset Distance	0 m
Program	Phast 7,21
Scenario	Leak_5mm
Time	59,1083 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00



Audit Number	94612
Averaging time	Flammable (18,75 s)
Downwind Distance	10 m
Equipment	pipe_70bar
Material	METHANE
Reference	METHANE
Program	Phast 7,21
Scenario	Leak_5mm
Time	59,1083 s
Weather	Category 5/D
Workspace	17129I_LNG_rev00