

ANEXO.VI- RESUMO EFEITOS FÍSICOS



RELATÓRIO DE SIMULAÇÃO

Project : UN_01 - CSPecem

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_01- CSPecem
Chemical name..... : Methane
Type of release..... : Release through hole in
vessel
Vessel volume..... : 4550.3 m3
Initial pressure..... : 100 Bar
Initial temperature..... : 1500 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1527E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6044E6 m

RESULTS

Mass flow rate at time t..... : 17.15 kg/s
Pressure at time t..... : 7.507 Bar
Temperature at time t..... : 1120.2 °C
Diameter expanded jet at time t..... : 0.32 m
Total mass released..... : 46448 kg
Average mass flow rate..... : 45.568 kg/s
...Based upon time..... : 1019.3 s
Maximum mass flow rate..... : 199.8 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

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Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Gas release from vessel or pipe (133)
Date of this calculation       : 03 Jul 2009 18:28:02
Calculation performed by      : AMPLA Engenharia
Software library version       : 5.5.0.0293
Model driver version(s)        : 3.04
Model driver last modification : 20 Apr 2000
Model executable version(s)    : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr.                    : 1
References                      : This model is described in the Yellow Book 3rd edition
[1997], sections                :
                                2.5.2.1 to 2.5.2.4.
Project file name              : "UN_01 - CSPecem.ald"
Chemical database used         : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used     : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used          : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used      : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used      : "UN_01 - CSPecem.gbd" (last modified: 02 jul 2009
08:45:34)
Project file directory         : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory     : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
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End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

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Model..... : Multi energy explosion
model (125)
Case description..... : UN_01- CSPecem
Chemical name..... : Methane
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 1009.4 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1527E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6044E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

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RESULTS

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Confined mass in explosive range..... : 201.88 kg
Peak overpressure at Xd..... : 0.1643 Bar
Positive phase duration at Xd..... : 47 ms
Damage (general description) at Xd..... : Minor damage (Zone D: 3.5
- 17 kPa).
Damage to brick houses at Xd..... : Not habitable without
major repair works. Partial roof failures, 25% of all brick walls have failed, serious
damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).

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Damage to typical American-style houses at Xd..... : Moderate to minor damage. Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall covering has fallen down (15 kPa).
Damage to structures (empirical) at Xd..... : Walls made of concrete blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 18:28:04
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_01 - CSPecem.ald"
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_01 - CSPecem.gbd" (last modified: 02 jul 2009 08:45:34)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
Case description..... : UN_01- CSPecem
Chemical name..... : Methane
Mass flow rate of the source..... : 199.8 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 100 Bar
Initial temperature..... : 1500 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 70 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1527E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6044E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 4.72 kW/m2
 Fraction of mortality at X..... : 0 %
 Safe distance (Q" = 1 kW/m2)..... : 250.04 m
 Heat emission from surface of the flare..... : 444.32 kW/m2
 Angle between hole and flame axis..... : 4.15 deg
 Frustum lift off height..... : 12.68 m
 Width of frustum base..... : 2.44 m
 Width of frustum tip..... : 17.44 m
 Length of frustum (flame)..... : 71.07 m
 Tilt central axis flare..... : 4.15 deg
 View factor..... : 1 %
 Atmospheric transmissivity..... : 71 %

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 03 Jul 2009 18:28:06
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_01 - CSPecem.ald"
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_01 - CSPecem.gbd" (last modified: 02 jul 2009
 08:45:34)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
 release; explosive mass
 (108)
 Case description..... : UN_01- CSPecem
 Chemical name..... : Methane
 Mass flow rate of the source..... : 45.568 kg/s
 Length source in wind direction..... : 0 m
 Source width..... : 0.32 m
 Length source in z-direction..... : 0.32 m
 Height leak above ground level..... : 1.5 m
 Ambient temperature..... : 26.6 °C
 Pasquill stability class..... : C (Lightly Unstable)
 Wind speed at 10 m height..... : 3.8 m/s
 Roughness length description..... : Flat land
 X-coordinate of release (for mapping purposes)..... : 5.1527E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6044E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1113.1 kg
Maximum distance of source to LEL..... : 170.28 m
Maximum width between LEL..... : 17.43 m
Maximum height to LEL..... : 8.09 m
Maximum distance of source to UEL..... : 28.33 m
Maximum width between UEL..... : 2.85 m
Maximum height to UEL..... : 1.52 m

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:28:08
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_01 - CSpecem.ald"
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_01 - CSpecem.gbd" (last modified: 02 jul 2009
08:45:34)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_02 A) UTE ENGUIA GEN CE

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

INPUT

Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_02_A) ENGUIA GEN CE
Chemical name..... : Óleo Combustível
Type of release..... : Release through hole in
vessel
Vessel volume..... : 500 m3
Vessel type..... : Horizontal cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 100 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 45 °C

Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1663E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6035E6 m

RESULTS

Mass flow rate at time t..... : 65.76 kg/s
Total mass released at time t..... : 40590 kg
Filling degree at time t..... : 69 %
Height of liquid at time t..... : 4.22 m
Total mass released..... : 2.163E5 kg

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Liquid release from vessel or pipe (131)
Date of this calculation : 04 Jul 2009 09:18:45
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s) : MFLLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
Session nr. : 1
References : No reference available
Project file name : "UN_02 a) UTE ENGUIA GEN CE.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 a) UTE ENGUIA GEN CE.gbd" (last modified: 04 jul
2009 09:11:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_02_A) ENGUIA GEN CE
Chemical name..... : Óleo Combustível
Mass flow rate of the source..... : 65.76 kg/s
Length source in wind direction..... : 100 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 0 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.1663E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6035E6 m

Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1442.9 kg
Maximum distance of source to LEL..... : 142.8 m
Maximum width between LEL..... : 15.23 m
Maximum height to LEL..... : 8.13 m
Maximum distance of source to UEL..... : 16.15 m
Maximum width between UEL..... : 1.8 m
Maximum height to UEL..... : 0.96 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 04 Jul 2009 09:18:51
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_02 a) UTE ENGUIA GEN CE.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 a) UTE ENGUIA GEN CE.gbd" (last modified: 04 jul
2009 09:11:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_02_A) ENGUIA GEN CE
Chemical name..... : Óleo Combustível
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 1442.9 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1663E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6035E6 m
Predefined wind direction..... : E

Wind comes from (West = 180 degrees)..... : 0 deg
 Calculate all contours for..... : Physical effects
 Overpressure level (lowest) for first contour plot..... : 30 mBar
 Overpressure level for second contour plot..... : 700 mBar
 Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 288.58 kg
 Peak overpressure at Xd..... : 0.184 Bar
 Positive phase duration at Xd..... : 49 ms
 Damage (general description) at Xd..... : Moderate damage (Zone C:
 17 - 35 kPa).
 Damage to brick houses at Xd..... : Not habitable without
 major repair works. Partial roof failures, 25% of all brick walls have failed, serious
 damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
 Damage to typical American-style houses at Xd..... : Moderate to minor damage.
 Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall
 covering has fallen down (15 kPa).
 Damage to structures (empirical) at Xd..... : Walls made of concrete
 blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections
 between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage
 tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Multi energy explosion model (125)
 Date of this calculation : 04 Jul 2009 09:18:56
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_02 a) UTE ENGUIA GEN CE.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_02 a) UTE ENGUIA GEN CE.gbd" (last modified: 04 jul
 2009 09:11:14)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
 Case description..... : UN_02_A) ENGUIA GEN CE
 Chemical name..... : Óleo Combustível
 Mass flow rate of the source..... : 65.76 kg/s
 Height leak above ground level..... : 0 m

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Initial pressure..... : 1.1 Bar
Initial temperature..... : 45 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1663E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6035E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg
  
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RESULTS

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Heat radiation level at X..... : 5.61 kW/m2
Fraction of mortality at X..... : 0 %
Safe distance (Q" = 1 kW/m2)..... : 225.59 m
Heat emission from surface of the flare..... : 165.59 kW/m2
Angle between hole and flame axis..... : 30.23 deg
Frustum lift off height..... : 4.81 m
Width of frustum base..... : 9.67 m
Width of frustum tip..... : 29.86 m
Length of frustum (flame)..... : 68.03 m
Tilt central axis flare..... : 30.23 deg
View factor..... : 5 %
Atmospheric transmissivity..... : 71 %
  
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----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

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-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 04 Jul 2009 09:19:01
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_02 a) UTE ENGUIA GEN CE.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 a) UTE ENGUIA GEN CE.gbd" (last modified: 04 jul
2009 09:11:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
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End of administrative & version data:

Project : UN_02 B) GENPOWER
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_02_B) GENPOWER
Chemical name..... : Óleo Combustível
Type of release..... : Release through hole in
vessel
Vessel volume..... : 500 m3
Vessel type..... : Horizontal cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 100 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 45 °C
Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m

RESULTS

Mass flow rate at time t..... : 65.76 kg/s
Total mass released at time t..... : 40590 kg
Filling degree at time t..... : 69 %
Height of liquid at time t..... : 4.22 m
Total mass released..... : 2.163E5 kg

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Liquid release from vessel or pipe (131)
Date of this calculation : 04 Jul 2009 09:24:44
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s) : MFLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
Session nr. : 1
References : No reference available
Project file name : "UN_02 b) GENPOWER.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 b) GENPOWER.gbd" (last modified: 04 jul 2009
09:22:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_02_B) GENPOWER
Chemical name..... : Óleo Combustível
Mass flow rate of the source..... : 65.76 kg/s
Length source in wind direction..... : 100 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 0 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1442.9 kg
Maximum distance of source to LEL..... : 142.8 m
Maximum width between LEL..... : 15.23 m
Maximum height to LEL..... : 8.13 m
Maximum distance of source to UEL..... : 16.15 m
Maximum width between UEL..... : 1.8 m
Maximum height to UEL..... : 0.96 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 04 Jul 2009 09:24:49
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_02 b) GENPOWER.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 b) GENPOWER.gbd" (last modified: 04 jul 2009
09:22:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_02_B) GENPOWER
Chemical name..... : Óleo Combustível
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 1442.9 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 288.58 kg
Peak overpressure at Xd..... : 0.184 Bar
Positive phase duration at Xd..... : 49 ms
Damage (general description) at Xd..... : Moderate damage (Zone C:
17 - 35 kPa).
Damage to brick houses at Xd..... : Not habitable without
major repair works. Partial roof failures, 25% of all brick walls have failed, serious
damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
Damage to typical American-style houses at Xd..... : Moderate to minor damage.
Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall
covering has fallen down (15 kPa).
Damage to structures (empirical) at Xd..... : Walls made of concrete
blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections
between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage
tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 04 Jul 2009 09:24:57
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_02 b) GENPOWER.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 b) GENPOWER.gbd" (last modified: 04 jul 2009
09:22:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Chamberlain model (127)
Case description..... : UN_02_B) GENPOWER
Chemical name..... : Óleo Combustível
Mass flow rate of the source..... : 65.76 kg/s
Height leak above ground level..... : 0 m
Initial pressure..... : 1.1 Bar
Initial temperature..... : 45 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 5.61 kW/m2
Fraction of mortality at X..... : 0 %
Safe distance (Q" = 1 kW/m2)..... : 225.59 m
Heat emission from surface of the flare..... : 165.59 kW/m2
Angle between hole and flame axis..... : 30.23 deg
Frustum lift off height..... : 4.81 m
Width of frustum base..... : 9.67 m
Width of frustum tip..... : 29.86 m
Length of frustum (flame)..... : 68.03 m
Tilt central axis flare..... : 30.23 deg
View factor..... : 5 %
Atmospheric transmissivity..... : 71 %

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 04 Jul 2009 09:25:02
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_02 b) GENPOWER.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)

```
Map background file used      : "UN_02 b) GENPOWER.gbd" (last modified: 04 jul 2009
09:22:00)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
End of administrative & version data:
```

```
Project : UN_02 C) UTE JOSE DE ALENCAR
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT
```

```
Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_02_C) UTE JOSE DE
ALENCAR
Chemical name..... : Óleo Combustível
Type of release..... : Release through hole in
vessel
Vessel volume..... : 500 m3
Vessel type..... : Horizontal cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 100 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 45 °C
Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1624E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
```

RESULTS

```
Mass flow rate at time t..... : 65.76 kg/s
Total mass released at time t..... : 40590 kg
Filling degree at time t..... : 69 %
Height of liquid at time t..... : 4.22 m
Total mass released..... : 2.163E5 kg
```

```
----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
```

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Liquid release from vessel or pipe (131)
Date of this calculation : 04 Jul 2009 09:27:05
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s) : MFLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
Session nr. : 1
References : No reference available
```



```

Project file name           : "UN_02 c) UTE JOSE DE ALENCAR.ald
Chemical database used     : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used  : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used       : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used   : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used   : "UN_02 c) UTE JOSE DE ALENCAR.gbd" (last modified: 04
jul 2009 09:26:22)
Project file directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory   : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_02_C) UTE JOSE DE
ALENCAR
Chemical name..... : Óleo Combustível
Mass flow rate of the source..... : 65.76 kg/s
Length source in wind direction..... : 100 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 0 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.1624E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

```

RESULTS

```

Maximum explosive mass..... : 1442.9 kg
Maximum distance of source to LEL..... : 142.8 m
Maximum width between LEL..... : 15.23 m
Maximum height to LEL..... : 8.13 m
Maximum distance of source to UEL..... : 16.15 m
Maximum width between UEL..... : 1.8 m
Maximum height to UEL..... : 0.96 m

```

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Neutral gas; continuous release; explosive mass (108)
Date of this calculation       : 04 Jul 2009 09:27:09
Calculation performed by      : AMPLA Engenharia
Software library version      : 5.5.0.0293
Model driver version(s)       : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s)    : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr.                   : 1

```




```

References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_02 c) UTE JOSE DE ALENCAR.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 c) UTE JOSE DE ALENCAR.gbd" (last modified: 04
jul 2009 09:26:22)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Multi energy explosion
model (125)
Case description..... : UN_02_C) UTE JOSE DE
ALENCAR
Chemical name..... : Óleo Combustível
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 1442.9 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1624E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

```

RESULTS

```

Confined mass in explosive range..... : 288.58 kg
Peak overpressure at Xd..... : 0.184 Bar
Positive phase duration at Xd..... : 49 ms
Damage (general description) at Xd..... : Moderate damage (Zone C:
17 - 35 kPa).
Damage to brick houses at Xd..... : Not habitable without
major repair works. Partial roof failures, 25% of all brick walls have failed, serious
damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
Damage to typical American-style houses at Xd..... : Moderate to minor damage.
Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall
covering has fallen down (15 kPa).
Damage to structures (empirical) at Xd..... : Walls made of concrete
blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections
between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage
tank has collapsed (7 kPa).

```

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 04 Jul 2009 09:27:13
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_02 c) UTE JOSE DE ALENCAR.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 c) UTE JOSE DE ALENCAR.gbd" (last modified: 04
jul 2009 09:26:22)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Chamberlain model (127)
Case description..... : UN_02_C) UTE JOSE DE
ALENCAR
Chemical name..... : Óleo Combustível
Mass flow rate of the source..... : 65.76 kg/s
Height leak above ground level..... : 0 m
Initial pressure..... : 1.1 Bar
Initial temperature..... : 45 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1624E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 5.61 kW/m2
Fraction of mortality at X..... : 0 %
Safe distance (Q" = 1 kW/m2)..... : 225.59 m
Heat emission from surface of the flare..... : 165.59 kW/m2
Angle between hole and flame axis..... : 30.23 deg
Frustum lift off height..... : 4.81 m
Width of frustum base..... : 9.67 m
Width of frustum tip..... : 29.86 m
Length of frustum (flame)..... : 68.03 m
Tilt central axis flare..... : 30.23 deg

View factor..... : 5 %
Atmospheric transmissivity..... : 71 %

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 04 Jul 2009 09:27:17
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_02 c) UTE JOSE DE ALENCAR.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 c) UTE JOSE DE ALENCAR.gbd" (last modified: 04
jul 2009 09:26:22)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_02 D) UTE TERMOCEARÁ

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

INPUT

Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_02_D) UTE TERMOCEARÁ
Chemical name..... : Óleo Combustível
Type of release..... : Release through hole in
vessel
Vessel volume..... : 500 m3
Vessel type..... : Horizontal cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 100 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 45 °C
Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m

RESULTS

Mass flow rate at time t..... : 65.76 kg/s
Total mass released at time t..... : 40590 kg
Filling degree at time t..... : 69 %



Height of liquid at time t..... : 4.22 m
Total mass released..... : 2.163E5 kg

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Liquid release from vessel or pipe (131)
Date of this calculation : 03 Jul 2009 18:14:30
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s) : MFLLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
Session nr. : 1
References : No reference available
Project file name : "UN_02 d) UTE TERMOCEARÁ.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 d) UTE TERMOCEARÁ.gbd" (last modified: 01 jul
2009 15:17:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_02_D) UTE TERMOCEARÁ
Chemical name..... : Óleo Combustível
Mass flow rate of the source..... : 65.76 kg/s
Length source in wind direction..... : 100 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 0 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m
Predefined wind direction..... : SE
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1442.9 kg
Maximum distance of source to LEL..... : 142.8 m
Maximum width between LEL..... : 15.23 m
Maximum height to LEL..... : 8.13 m
Maximum distance of source to UEL..... : 16.15 m

Maximum width between UEL..... : 1.8 m
Maximum height to UEL..... : 0.96 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Neutral gas; continuous release; explosive mass (108)
Date of this calculation       : 03 Jul 2009 18:14:32
Calculation performed by      : AMPLA Engenharia
Software library version      : 5.5.0.0293
Model driver version(s)       : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s)    : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr.                   : 1
References                    : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name             : "UN_02 d) UTE TERMOCEARÁ.ald
Chemical database used       : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used    : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used        : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used    : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used    : "UN_02 d) UTE TERMOCEARÁ.gbd" (last modified: 01 jul
2009 15:17:14)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory    : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

```
Model..... : Multi energy explosion
model (125)
Case description..... : UN_02_D) UTE TERMOCEARÁ
Chemical name..... : Óleo Combustível
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 1442.9 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m
Predefined wind direction..... : SE
Wind comes from (West = 180 degrees)..... : 315 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar
```

RESULTS

```
Confined mass in explosive range..... : 288.58 kg
Peak overpressure at Xd..... : 0.184 Bar
```

Positive phase duration at Xd..... : 49 ms
 Damage (general description) at Xd..... : Moderate damage (Zone C: 17 - 35 kPa).
 Damage to brick houses at Xd..... : Not habitable without major repair works. Partial roof failures, 25% of all brick walls have failed, serious damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
 Damage to typical American-style houses at Xd..... : Moderate to minor damage. Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall covering has fallen down (15 kPa).
 Damage to structures (empirical) at Xd..... : Walls made of concrete blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Multi energy explosion model (125)
 Date of this calculation : 03 Jul 2009 18:14:34
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_02 d) UTE TERMOCEARÁ.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_02 d) UTE TERMOCEARÁ.gbd" (last modified: 01 jul 2009 15:17:14)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
 Case description..... : UN_02_D) UTE TERMOCEARÁ
 Chemical name..... : Óleo Combustível
 Mass flow rate of the source..... : 65.76 kg/s
 Height leak above ground level..... : 0 m
 Initial pressure..... : 1.1 Bar
 Initial temperature..... : 45 °C
 Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
 Wind speed at 10 m height..... : 3.8 m/s
 Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 82 %
 Fraction CO2 in atmosphere..... : 0.03 %
 Distance from release (X)..... : 100 m
 Exposure duration to heat radiation..... : 600 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.1429E5 m

Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 5.61 kW/m2
Fraction of mortality at X..... : 100 %
Safe distance (Q" = 1 kW/m2)..... : 225.59 m
Heat emission from surface of the flare..... : 165.59 kW/m2
Angle between hole and flame axis..... : 30.23 deg
Frustum lift off height..... : 4.81 m
Width of frustum base..... : 9.67 m
Width of frustum tip..... : 29.86 m
Length of frustum (flame)..... : 68.03 m
Tilt central axis flare..... : 30.23 deg
View factor..... : 5 %
Atmospheric transmissivity..... : 71 %

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 18:14:36
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_02 d) UTE TERMOCEARÁ.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_02 d) UTE TERMOCEARÁ.gbd" (last modified: 01 jul
2009 15:17:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_03 A) GENPOWER

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_03 A) GENPOWER
Chemical name..... : Carvão Mineral e Gases
Combustíveis



Type of release..... : Release through hole in vessel
 Vessel volume..... : 10 m3
 Initial pressure..... : 50 Bar
 Initial temperature..... : 2000 °C
 Discharge coefficient..... : 0.62 -
 Hole diameter..... : 100 mm
 Time t after start release..... : 600 s
 X-coordinate of release (for mapping purposes)..... : 5.121E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m

RESULTS

Mass flow rate at time t..... : 0 kg/s
 Pressure at time t..... : 1 Bar
 Temperature at time t..... : 1044.1 °C
 Diameter expanded jet at time t..... : 0 m
 Total mass released..... : 39.48 kg
 Average mass flow rate..... : 3.4378 kg/s
 ...Based upon time..... : 11.484 s
 Maximum mass flow rate..... : 14.12 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Gas release from vessel or pipe (133)
 Date of this calculation : 03 Jul 2009 18:16:37
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 20 Apr 2000
 Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
 Session nr. : 1
 References : This model is described in the Yellow Book 3rd edition [1997], sections 2.5.2.1 to 2.5.2.4.
 Project file name : "UN_03 A) GENPOWER.ald"
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_03 A) GENPOWER.gbd" (last modified: 02 jul 2009 16:41:44)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
 Case description..... : UN_03 A) GENPOWER
 Chemical name..... : Carvão Mineral e Gases Combustíveis
 Mass flow rate of the source..... : 14.12 kg/s



Height leak above ground level..... : 1.5 m
 Initial pressure..... : 50 Bar
 Initial temperature..... : 2000 °C
 Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
 Wind speed at 10 m height..... : 3.8 m/s
 Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 82 %
 Fraction CO2 in atmosphere..... : 0.03 %
 Distance from release (X)..... : 10 m
 Exposure duration to heat radiation..... : 600 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.121E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
 Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 12.68 kW/m2
 Fraction of mortality at X..... : 100 %
 Safe distance (Q" = 1 kW/m2)..... : 69.68 m
 Heat emission from surface of the flare..... : 482.75 kW/m2
 Angle between hole and flame axis..... : 5.66 deg
 Frustum lift off height..... : 3.7 m
 Width of frustum base..... : 0.51 m
 Width of frustum tip..... : 5.08 m
 Length of frustum (flame)..... : 15.87 m
 Tilt central axis flare..... : 5.66 deg
 View factor..... : 3 %
 Atmospheric transmissivity..... : 81 %

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 03 Jul 2009 18:16:39
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_03 A) GENPOWER.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_03 A) GENPOWER.gbd" (last modified: 02 jul 2009
 16:41:44)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT



```

Model..... : Neutral gas; semi-
continuous release; explosive
                                     mass (104)
Case description..... : UN_03 A) GENPOWER
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Mass flow rate of the source..... : 3.4378 kg/s
Duration of the release..... : 11.484 s
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Concentration averaging time..... : 600 s
Roughness length description..... : Flat land
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

```

RESULTS

```

Total explosive mass at time t..... : 0 kg
Maximum distance of source to LEL at time t..... : 0 m
Minimum distance of source to LEL at time t..... : 0 m
Width between LEL at time t..... : 0 m
Maximum height to LEL at time t..... : 0 m
Maximum distance of source to UEL at time t..... : 0 m
Minimum distance of source to UEL at time t..... : 0 m
Width between UEL at time t..... : 0 m
Maximum height to UEL at time t..... : 0 m
Maximum explosive mass..... : 11.58 kg
...at time..... : 11.48 s
Maximum distance of source to LEL..... : 24.27 m

```

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; semi-continuous release; explosive mass
(104)
Date of this calculation : 03 Jul 2009 18:16:42
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOTYZ.EXE 05 Oct 2001 17:10:52 (CRC=5D4D03FE)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_03 A) GENPOWER.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_03 A) GENPOWER.gbd" (last modified: 02 jul 2009
16:41:44)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

```



Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_03 A) GENPOWER
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 11.58 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 10 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 2.32 kg
Peak overpressure at Xd..... : 0.5892 Bar
Positive phase duration at Xd..... : 8.007 ms
Damage (general description) at Xd..... : Heavy damage (Zone B: 35
- 83 kPa).
Damage to brick houses at Xd..... : The damage is not
repairable; 50% to 75% of the outer brick walls are lightly to heavily damaged. The
remaining brick walls are unreliable (35 kPa).
Damage to typical American-style houses at Xd..... : Serious damage. Collapse
of some walls (30 kPa).
Damage to structures (empirical) at Xd..... : Brickstone walls (20-30
cm) have collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of
connecting pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of
a pipe-bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa).
Damage to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards
(35 kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light industry
building ripped-off (30 kPa). Collapse of steel frames and displac

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 18:16:44
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_03 A) GENPOWER.ald"
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)



```
Environment database used      : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used          : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used     : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used     : "UN_03 A) GENPOWER.gbd" (last modified: 02 jul 2009
16:41:44)
Project file directory        : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory     : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory      : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_03 A) GENPOWER
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Mass flow rate of the source..... : 3.4378 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.121E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6034E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg
```

RESULTS

```
Maximum explosive mass..... : 19.38 kg
Maximum distance of source to LEL..... : 38.77 m
Maximum width between LEL..... : 3.72 m
Maximum height to LEL..... : 1.87 m
Maximum distance of source to UEL..... : 6.99 m
Maximum width between UEL..... : 0.78 m
Maximum height to UEL..... : 0.42 m
```

----- END OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:16:46
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_03 A) GENPOWER.ald"
```



```
Chemical database used          : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used       : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used           : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used       : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used       : "UN_03 A) GENPOWER.gbd" (last modified: 02 jul 2009
16:41:44)
Project file directory         : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory     : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory      : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
End of administrative & version data:
```



Project : UN_03 B) UTE MPX PECÉM
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_03 B) UTE MPX PECÉM
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Type of release..... : Release through hole in
vessel
Vessel volume..... : 10 m3
Initial pressure..... : 50 Bar
Initial temperature..... : 2000 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 100 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.137E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m

RESULTS

Mass flow rate at time t..... : 0 kg/s
Pressure at time t..... : 1 Bar
Temperature at time t..... : 1044.1 °C
Diameter expanded jet at time t..... : 0 m
Total mass released..... : 39.48 kg
Average mass flow rate..... : 3.4378 kg/s
..Based upon time..... : 11.484 s
Maximum mass flow rate..... : 14.12 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Gas release from vessel or pipe (133)
Date of this calculation : 03 Jul 2009 18:18:23
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 20 Apr 2000
Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
[1997], sections
2.5.2.1 to 2.5.2.4.
Project file name : "UN_03 B) UTE MPX PECÉM.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)

```

System database used           : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used      : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used     : "UN_03 B) UTE MPX PECÉM.gbd" (last modified: 02 jul
2009 09:13:06)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Chamberlain model (127)
Case description..... : UN_03 B) UTE MPX PECEM
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Mass flow rate of the source..... : 14.12 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 50 Bar
Initial temperature..... : 2000 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical)... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 10 m
Exposure duration to heat radiation..... : 600 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.137E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

```

RESULTS

```

Heat radiation level at X..... : 12.68 kW/m2
Fraction of mortality at X..... : 100 %
Safe distance (Q" = 1 kW/m2)..... : 69.68 m
Heat emission from surface of the flare..... : 482.75 kW/m2
Angle between hole and flame axis..... : 5.66 deg
Frustum lift off height..... : 3.7 m
Width of frustum base..... : 0.51 m
Width of frustum tip..... : 5.08 m
Length of frustum (flame)..... : 15.87 m
Tilt central axis flare..... : 5.66 deg
View factor..... : 3 %
Atmospheric transmissivity..... : 81 %

```

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 18:18:25
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)

```

Session nr. : 1
Project file name : "UN_03 B) UTE MPX PECÉM.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_03 B) UTE MPX PECÉM.gbd" (last modified: 02 jul
2009 09:13:06)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; semi-
continuous release; explosive
mass (104)
Case description..... : UN_03 B) UTE MPX PECÉM
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Mass flow rate of the source..... : 3.4378 kg/s
Duration of the release..... : 11.484 s
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Concentration averaging time..... : 600 s
Roughness length description..... : Flat land
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.137E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Total explosive mass at time t..... : 0 kg
Maximum distance of source to LEL at time t..... : 0 m
Minimum distance of source to LEL at time t..... : 0 m
Width between LEL at time t..... : 0 m
Maximum height to LEL at time t..... : 0 m
Maximum distance of source to UEL at time t..... : 0 m
Minimum distance of source to UEL at time t..... : 0 m
Width between UEL at time t..... : 0 m
Maximum height to UEL at time t..... : 0 m
Maximum explosive mass..... : 11.58 kg
...at time..... : 11.48 s
Maximum distance of source to LEL..... : 24.27 m

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)



```

Model name                : Neutral gas; semi-continuous release; explosive mass
(104)
Date of this calculation  : 03 Jul 2009  18:18:29
Calculation performed by  : AMPLA Engenharia
Software library version  : 5.5.0.0293
Model driver version(s)   : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOTYZ.EXE 05 Oct 2001  17:10:52 (CRC=5D4D03FE)
Session nr.                : 1
References                 : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name         : "UN_03 B) UTE MPX PECÉM.ald
Chemical database used    : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997  13:40:48)
System database used     : "Standard.CPF" (last modified: 14 jan 1999  17:38:14)
Dispersion database used  : "Standard.dpf" (last modified: 10 out 1997  13:40:48)
Map background file used  : "UN_03 B) UTE MPX PECÉM.gbd" (last modified: 02 jul
2009  09:13:06)
Project file directory    : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory   : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

```

Model..... : Multi energy explosion
model (125)
Case description..... : UN_03 B) UTE MPX PECEM
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 11.58 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 10 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.137E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

```

RESULTS

```

Confined mass in explosive range..... : 2.32 kg
Peak overpressure at Xd..... : 0.5892 Bar
Positive phase duration at Xd..... : 8.007 ms
Damage (general description) at Xd..... : Heavy damage (Zone B: 35
- 83 kPa).
Damage to brick houses at Xd..... : The damage is not
repairable; 50% to 75% of the outer brick walls are lightly to heavily damaged. The
remaining brick walls are unreliable (35 kPa).
Damage to typical American-style houses at Xd..... : Serious damage. Collapse
of some walls (30 kPa).

```

Damage to structures (empirical) at Xd..... : Brickstone walls (20-30 cm) have collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of connecting pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of a pipe-bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa). Damage to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards (35 kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light industry building ripped-off (30 kPa). Collapse of steel frames and displac

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 18:18:31
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_03 B) UTE MPX PECÉM.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_03 B) UTE MPX PECÉM.gbd" (last modified: 02 jul
2009 09:13:06)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:



Project : UN_03 C) UTE PORTO DO PECÉM II
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_03 C) UTE PORTO DO
PECEM II
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Type of release..... : Release through hole in
vessel
Vessel volume..... : 10 m3
Initial pressure..... : 50 Bar
Initial temperature..... : 2000 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 100 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1368E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6038E6 m

RESULTS

Mass flow rate at time t..... : 0 kg/s
Pressure at time t..... : 1 Bar
Temperature at time t..... : 1044.1 °C
Diameter expanded jet at time t..... : 0 m
Total mass released..... : 39.48 kg
Average mass flow rate..... : 3.4378 kg/s
...Based upon time..... : 11.484 s
Maximum mass flow rate..... : 14.12 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                      : Gas release from vessel or pipe (133)
Date of this calculation        : 03 Jul 2009 18:20:01
Calculation performed by       : AMPLA Engenharia
Software library version        : 5.5.0.0293
Model driver version(s)         : 3.04
Model driver last modification  : 20 Apr 2000
Model executable version(s)     : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr.                     : 1
References                       : This model is described in the Yellow Book 3rd edition
[1997], sections                :
                                2.5.2.1 to 2.5.2.4.
Project file name               : "UN_03 C) UTE PORTO DO PECÉM II.ald
Chemical database used          : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used      : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used           : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used       : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used       : "UN_03 C) UTE PORTO DO PECÉM II.gbd" (last modified: 02
jul 2009 09:15:20)
Project file directory          : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory     : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory       : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory        : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Chamberlain model (127)
Case description..... : UN_03 C) UTE PORTO DO
PECEM II
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Mass flow rate of the source..... : 14.12 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 50 Bar
Initial temperature..... : 2000 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 10 m
Exposure duration to heat radiation..... : 600 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1368E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6038E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg
```

RESULTS

```
Heat radiation level at X..... : 12.68 kW/m2
Fraction of mortality at X..... : 100 %
Safe distance (Q" = 1 kW/m2)..... : 69.68 m
Heat emission from surface of the flare..... : 482.75 kW/m2
```



Angle between hole and flame axis..... : 5.66 deg
 Frustum lift off height..... : 3.7 m
 Width of frustum base..... : 0.51 m
 Width of frustum tip..... : 5.08 m
 Length of frustum (flame)..... : 15.87 m
 Tilt central axis flare..... : 5.66 deg
 View factor..... : 3 %
 Atmospheric transmissivity..... : 81 %

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 03 Jul 2009 18:20:03
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_03 C) UTE PORTO DO PECÉM II.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_03 C) UTE PORTO DO PECÉM II.gbd" (last modified: 02
 jul 2009 09:15:20)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; semi-
 continuous release; explosive
 mass (104)
 Case description..... : UN_03 C) UTE PORTO DO
 PECEM II
 Chemical name..... : Carvão Mineral e Gases
 Combustíveis
 Mass flow rate of the source..... : 3.4378 kg/s
 Duration of the release..... : 11.484 s
 Source width..... : 0 m
 Length source in z-direction..... : 0 m
 Height leak above ground level..... : 1.5 m
 Ambient temperature..... : 26.6 °C
 Pasquill stability class..... : C (Lightly Unstable)
 Wind speed at 10 m height..... : 3.8 m/s
 Concentration averaging time..... : 600 s
 Roughness length description..... : Flat land
 Time t after start release..... : 600 s
 X-coordinate of release (for mapping purposes)..... : 5.1368E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6038E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Total explosive mass at time t..... : 0 kg
Maximum distance of source to LEL at time t..... : 0 m
Minimum distance of source to LEL at time t..... : 0 m
Width between LEL at time t..... : 0 m
Maximum height to LEL at time t..... : 0 m
Maximum distance of source to UEL at time t..... : 0 m
Minimum distance of source to UEL at time t..... : 0 m
Width between UEL at time t..... : 0 m
Maximum height to UEL at time t..... : 0 m
Maximum explosive mass..... : 11.58 kg
...at time..... : 11.48 s
Maximum distance of source to LEL..... : 24.27 m

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; semi-continuous release; explosive mass
(104)
Date of this calculation : 03 Jul 2009 18:20:07
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOTYZ.EXE 05 Oct 2001 17:10:52 (CRC=5D4D03FE)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_03 C) UTE PORTO DO PECÉM II.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_03 C) UTE PORTO DO PECÉM II.gbd" (last modified: 02
jul 2009 09:15:20)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_03 C) UTE PORTO DO
PECEM II
Chemical name..... : Carvão Mineral e Gases
Combustíveis
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 11.58 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)

Distance from release (Xd)..... : 10 m
 Offset between release centre and cloud centre..... : 0 m
 Offset between cloud centre and explosion centre..... : 0 m
 X-coordinate of release (for mapping purposes)..... : 5.1368E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6038E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 0 deg
 Calculate all contours for..... : Physical effects
 Overpressure level (lowest) for first contour plot..... : 30 mBar
 Overpressure level for second contour plot..... : 700 mBar
 Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 2.32 kg
 Peak overpressure at Xd..... : 0.5892 Bar
 Positive phase duration at Xd..... : 8.007 ms
 Damage (general description) at Xd..... : Heavy damage (Zone B: 35 - 83 kPa).
 Damage to brick houses at Xd..... : The damage is not repairable; 50% to 75% of the outer brick walls are lightly to heavily damaged. The remaining brick walls are unreliable (35 kPa).
 Damage to typical American-style houses at Xd..... : Serious damage. Collapse of some walls (30 kPa).
 Damage to structures (empirical) at Xd..... : Brickstone walls (20-30 cm) have collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of connecting pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of a pipe-bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa). Damage to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards (35 kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light industry building ripped-off (30 kPa). Collapse of steel frames and displac

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Multi energy explosion model (125)
 Date of this calculation : 03 Jul 2009 18:20:10
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_03 C) UTE PORTO DO PECÉM II.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_03 C) UTE PORTO DO PECÉM II.gbd" (last modified: 02 jul 2009 09:15:20)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:



Project : UN_04 a) UTE JOSÉ DE ALENCAR
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_04 A) UTE JOSÉ DE
ALECAR
Chemical name..... : Gás Natural

Type of release..... : Release through hole in vessel
 Vessel volume..... : 35 m3
 Initial pressure..... : 50 Bar
 Initial temperature..... : 35 °C
 Discharge coefficient..... : 0.62 -
 Hole diameter..... : 250 mm
 Time t after start release..... : 600 s
 X-coordinate of release (for mapping purposes)..... : 5.1545E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m

RESULTS

Mass flow rate at time t..... : 0 kg/s
 Pressure at time t..... : 1 Bar
 Temperature at time t..... : 24.85 °C
 Diameter expanded jet at time t..... : 0 m
 Total mass released..... : 998.6 kg
 Average mass flow rate..... : 62.009 kg/s
 ...Based upon time..... : 16.104 s
 Maximum mass flow rate..... : 254.1 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Gas release from vessel or pipe (133)
 Date of this calculation : 03 Jul 2009 18:05:49
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 20 Apr 2000
 Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
 Session nr. : 1
 References : This model is described in the Yellow Book 3rd edition [1997], sections 2.5.2.1 to 2.5.2.4.
 Project file name : "UN_04 a) UTE JOSÉ DE ALENCAR.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_04 a) UTE JOSÉ DE ALENCAR.gbd" (last modified: 02 jul 2009 16:42:50)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

 End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Multi energy explosion model (125)
 Case description..... : UN_04 A) UTE JOSÉ DE ALECAR
 Chemical name..... : Gás Natural

Ambient temperature..... : 26.6 °C
 Total mass in explosive range..... : 1584.2 kg
 Fraction of flammable cloud confined..... : 20 %
 Curve number..... : 8 (Very strong
 deflagration)
 Distance from release (Xd)..... : 100 m
 Offset between release centre and cloud centre..... : 0 m
 Offset between cloud centre and explosion centre..... : 0 m
 X-coordinate of release (for mapping purposes)..... : 5.1545E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 0 deg
 Calculate all contours for..... : Physical effects
 Overpressure level (lowest) for first contour plot..... : 30 mBar
 Overpressure level for second contour plot..... : 700 mBar
 Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 316.84 kg
 Peak overpressure at Xd..... : 0.1947 Bar
 Positive phase duration at Xd..... : 51 ms
 Damage (general description) at Xd..... : Moderate damage (Zone C:
 17 - 35 kPa).
 Damage to brick houses at Xd..... : Not habitable without
 major repair works. Partial roof failures, 25% of all brick walls have failed, serious
 damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
 Damage to typical American-style houses at Xd..... : Moderate to minor damage.
 Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall
 covering has fallen down (15 kPa).
 Damage to structures (empirical) at Xd..... : Walls made of concrete
 blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections
 between steel or aluminium undulated plates have failed 7-14 kPa). The roof of a storage
 tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Multi energy explosion model (125)
 Date of this calculation : 03 Jul 2009 18:05:51
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_04 a) UTE JOSÉ DE ALENCAR.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_04 a) UTE JOSÉ DE ALENCAR.gbd" (last modified: 02
 jul 2009 16:42:50)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
Case description..... : UN_04 A) UTE JOSÉ DE
ALECAR
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 254.1 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 50 Bar
Initial temperature..... : 35 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 600 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1545E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 5.94 kW/m2
Fraction of mortality at X..... : 100 %
Safe distance (Q" = 1 kW/m2)..... : 287.48 m
Heat emission from surface of the flare..... : 342.76 kW/m2
Angle between hole and flame axis..... : 6.06 deg
Frustum lift off height..... : 16.91 m
Width of frustum base..... : 7.31 m
Width of frustum tip..... : 25.34 m
Length of frustum (flame)..... : 74.03 m
Tilt central axis flare..... : 6.06 deg
View factor..... : 2 %
Atmospheric transmissivity..... : 70 %

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 18:05:54
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_04 a) UTE JOSÉ DE ALENCAR.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_04 a) UTE JOSÉ DE ALENCAR.gbd" (last modified: 02
jul 2009 16:42:50)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass

(108)
Case description..... : UN_04 A) UTE JOSÉ DE
ALECAR
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 62.009 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.1545E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5944E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1584.2 kg
Maximum distance of source to LEL..... : 204.32 m
Maximum width between LEL..... : 20.65 m
Maximum height to LEL..... : 9.76 m
Maximum distance of source to UEL..... : 36.26 m
Maximum width between UEL..... : 3.47 m
Maximum height to UEL..... : 1.77 m

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:05:56
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_04 a) UTE JOSÉ DE ALENCAR.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_04 a) UTE JOSÉ DE ALENCAR.gbd" (last modified: 02
jul 2009 16:42:50)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_04 B) UTE TERMOCEARÁ

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_04 B) UTE TERMOCEARÁ
Chemical name..... : Gás Natural
Type of release..... : Release through hole in
vessel
Vessel volume..... : 35 m3
Initial pressure..... : 50 Bar
Initial temperature..... : 35 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m

RESULTS

Mass flow rate at time t..... : 0 kg/s
Pressure at time t..... : 1 Bar
Temperature at time t..... : 24.85 °C
Diameter expanded jet at time t..... : 0 m
Total mass released..... : 998.6 kg
Average mass flow rate..... : 62.009 kg/s
...Based upon time..... : 16.104 s
Maximum mass flow rate..... : 254.1 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Gas release from vessel or pipe (133)
Date of this calculation : 03 Jul 2009 18:06:33
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 20 Apr 2000
Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
[1997], sections
2.5.2.1 to 2.5.2.4.
Project file name : "UN_04 B) UTE TERMOCEARÁ.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_04 B) UTE TERMOCEARÁ.gbd" (last modified: 02 jul
2009 09:24:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"



Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_04 B) UTE TERMOCEARÁ
Chemical name..... : Gás Natural
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 1584.2 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 316.84 kg
Peak overpressure at Xd..... : 0.1947 Bar
Positive phase duration at Xd..... : 51 ms
Damage (general description) at Xd..... : Moderate damage (Zone C:
17 - 35 kPa).
Damage to brick houses at Xd..... : Not habitable without
major repair works. Partial roof failures, 25% of all brick walls have failed, serious
damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
Damage to typical American-style houses at Xd..... : Moderate to minor damage.
Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall
covering has fallen down (15 kPa).
Damage to structures (empirical) at Xd..... : Walls made of concrete
blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections
between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage
tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 18:06:36
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_04 B) UTE TERMOCEARÁ.ald

```

Chemical database used      : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used   : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used       : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used   : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used   : "UN_04 B) UTE TERMOCEARÁ.gbd" (last modified: 02 jul
2009 09:24:14)
Project file directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory   : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Chamberlain model (127)
Case description..... : UN_04 B) UTE TERMOCEARÁ
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 254.1 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 50 Bar
Initial temperature..... : 35 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical)... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 600 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

```

RESULTS

```

Heat radiation level at X..... : 5.94 kW/m2
Fraction of mortality at X..... : 100 %
Safe distance (Q" = 1 kW/m2)..... : 287.48 m
Heat emission from surface of the flare..... : 342.76 kW/m2
Angle between hole and flame axis..... : 6.06 deg
Frustum lift off height..... : 16.91 m
Width of frustum base..... : 7.31 m
Width of frustum tip..... : 25.34 m
Length of frustum (flame)..... : 74.03 m
Tilt central axis flare..... : 6.06 deg
View factor..... : 2 %
Atmospheric transmissivity..... : 70 %

```

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 18:06:38
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08

```



Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_04 B) UTE TERMOCEARÁ.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_04 B) UTE TERMOCEARÁ.gbd" (last modified: 02 jul
2009 09:24:14)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_04 B) UTE TERMOCEARÁ
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 62.009 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.1429E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5918E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1584.2 kg
Maximum distance of source to LEL..... : 204.32 m
Maximum width between LEL..... : 20.65 m
Maximum height to LEL..... : 9.76 m
Maximum distance of source to UEL..... : 36.26 m
Maximum width between UEL..... : 3.47 m
Maximum height to UEL..... : 1.77 m

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:06:41
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001



```

Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr.                  : 1
References                   : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name           : "UN_04 B) UTE TERMOCEARÁ.ald
Chemical database used      : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used   : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used        : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used    : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used    : "UN_04 B) UTE TERMOCEARÁ.gbd" (last modified: 02 jul
2009 09:24:14)
Project file directory      : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory    : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
End of administrative & version data:

```

```

Project : UN_04 C) UTE TERMOFORTALEZA
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

```

```

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_04 C) UTE
TERMOFORTALEZA
Chemical name..... : Gás Natural
Type of release..... : Release through hole in
vessel
Vessel volume..... : 35 m3
Initial pressure..... : 50 Bar
Initial temperature..... : 35 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1491E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5931E6 m

```

RESULTS

```

Mass flow rate at time t..... : 0 kg/s
Pressure at time t..... : 1 Bar
Temperature at time t..... : 24.85 °C
Diameter expanded jet at time t..... : 0 m
Total mass released..... : 998.6 kg
Average mass flow rate..... : 62.009 kg/s
...Based upon time..... : 16.104 s
Maximum mass flow rate..... : 254.1 kg/s

```

```

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

```

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Gas release from vessel or pipe (133)

```

Date of this calculation : 03 Jul 2009 18:08:36
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 20 Apr 2000
 Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
 Session nr. : 1
 References : This model is described in the Yellow Book 3rd edition [1997], sections 2.5.2.1 to 2.5.2.4.

Project file name : "UN_04 C) UTE TERMOFORTALEZA.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_04 C) UTE TERMOFORTALEZA.gbd" (last modified: 02 jul 2009 09:25:20)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

 End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
 INPUT

Model..... : Multi energy explosion
 model (125)
 Case description..... : UN_04 C) UTE
 TERMOFORTALEZA
 Chemical name..... : Gás Natural
 Ambient temperature..... : 26.6 °C
 Total mass in explosive range..... : 1584.2 kg
 Fraction of flammable cloud confined..... : 20 %
 Curve number..... : 8 (Very strong
 deflagration)
 Distance from release (Xd)..... : 100 m
 Offset between release centre and cloud centre..... : 0 m
 Offset between cloud centre and explosion centre..... : 0 m
 X-coordinate of release (for mapping purposes)..... : 5.1491E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.5931E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 0 deg
 Calculate all contours for..... : Physical effects
 Overpressure level (lowest) for first contour plot..... : 30 mBar
 Overpressure level for second contour plot..... : 700 mBar
 Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 316.84 kg
 Peak overpressure at Xd..... : 0.1947 Bar
 Positive phase duration at Xd..... : 51 ms
 Damage (general description) at Xd..... : Moderate damage (Zone C:
 17 - 35 kPa).
 Damage to brick houses at Xd..... : Not habitable without
 major repair works. Partial roof failures, 25% of all brick walls have failed, serious
 damage to the remaining carrying elements. Damage to windowframes and doors (7-15 kPa).
 Damage to typical American-style houses at Xd..... : Moderate to minor damage.
 Deformed walls and doors; failure of joints. Doors and window frames have failed. Wall
 covering has fallen down (15 kPa).

Damage to structures (empirical) at Xd..... : Walls made of concrete blocks have collapsed (15-20). Minor damage to steel frames (8-10 kPa). Connections between steel or aluminium ondulated plates have failed 7-14 kPa). The roof of a storage tank has collapsed (7 kPa).

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Multi energy explosion model (125)
Date of this calculation       : 03 Jul 2009 18:08:38
Calculation performed by      : AMPLA Engenharia
Software library version      : 5.5.0.0293
Model driver version(s)       : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s)    : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr.                   : 1
References                    : No reference available
Project file name              : "UN_04 C) UTE TERMOFORTALEZA.ald
Chemical database used        : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used     : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used          : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used      : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used      : "UN_04 C) UTE TERMOFORTALEZA.gbd" (last modified: 02
jul 2009 09:25:20)
Project file directory        : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory     : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory      : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

```
Model..... : Chamberlain model (127)
Case description..... : UN_04 C) UTE
TERMOFORTALEZA
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 254.1 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 50 Bar
Initial temperature..... : 35 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 600 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1491E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5931E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg
```

RESULTS

```
Heat radiation level at X..... : 5.94 kW/m2
Fraction of mortality at X..... : 100 %
```

Safe distance (Q" = 1 kW/m2)..... : 287.48 m
 Heat emission from surface of the flare..... : 342.76 kW/m2
 Angle between hole and flame axis..... : 6.06 deg
 Frustum lift off height..... : 16.91 m
 Width of frustum base..... : 7.31 m
 Width of frustum tip..... : 25.34 m
 Length of frustum (flame)..... : 74.03 m
 Tilt central axis flare..... : 6.06 deg
 View factor..... : 2 %
 Atmospheric transmissivity..... : 70 %

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 03 Jul 2009 18:08:40
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_04 C) UTE TERMOFORTALEZA.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_04 C) UTE TERMOFORTALEZA.gbd" (last modified: 02
 jul 2009 09:25:20)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
 release; explosive mass
 (108)
 Case description..... : UN_04 C) UTE
 TERMOFORTALEZA
 Chemical name..... : Gás Natural
 Mass flow rate of the source..... : 62.009 kg/s
 Length source in wind direction..... : 0 m
 Source width..... : 0 m
 Length source in z-direction..... : 0 m
 Height leak above ground level..... : 1.5 m
 Ambient temperature..... : 26.6 °C
 Pasquill stability class..... : C (Lightly Unstable)
 Wind speed at 10 m height..... : 3.8 m/s
 Roughness length description..... : Flat land
 X-coordinate of release (for mapping purposes)..... : 5.1491E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.5931E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 1584.2 kg
Maximum distance of source to LEL..... : 204.32 m
Maximum width between LEL..... : 20.65 m
Maximum height to LEL..... : 9.76 m
Maximum distance of source to UEL..... : 36.26 m
Maximum width between UEL..... : 3.47 m
Maximum height to UEL..... : 1.77 m

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:08:42
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_04 C) UTE TERMOFORTALEZA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_04 C) UTE TERMOFORTALEZA.gbd" (last modified: 02
jul 2009 09:25:20)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_05 A)TECEM

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

INPUT

Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_05 - TECEM
Chemical name..... : Combustíveis Líquidos
Type of release..... : Release through hole in
vessel
Vessel volume..... : 1.1155E6 m3
Vessel type..... : Horizontal cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 250 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 45 °C
Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1823E5 m

Y-coordinate of release (for mapping purposes)..... : 9.6023E6 m

RESULTS

Mass flow rate at time t..... : 1488.5 kg/s
 Total mass released at time t..... : 9.112E5 kg
 Filling degree at time t..... : 80 %
 Height of liquid at time t..... : 229.21 m
 Total mass released..... : 6.246E8 kg

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Liquid release from vessel or pipe (131)
 Date of this calculation : 04 Jul 2009 09:37:06
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.03
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : MFLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_05 A)TECEM.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_05 A)TECEM.gbd" (last modified: 02 jul 2009
 16:43:40)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
 release; explosive mass
 (108)
 Case description..... : UN_05 - TECEM
 Chemical name..... : Combustíveis Líquidos
 Mass flow rate of the source..... : 489.54 kg/s
 Length source in wind direction..... : 0 m
 Source width..... : 0 m
 Length source in z-direction..... : 0 m
 Height leak above ground level..... : 1.5 m
 Ambient temperature..... : 26.6 °C
 Pasquill stability class..... : C (Lightly Unstable)
 Wind speed at 10 m height..... : 3.8 m/s
 Roughness length description..... : Flat land
 X-coordinate of release (for mapping purposes)..... : 5.1823E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6023E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 36900 kg
Maximum distance of source to LEL..... : 452.12 m
Maximum width between LEL..... : 42.35 m
Maximum height to LEL..... : 20.23 m
Maximum distance of source to UEL..... : 38.6 m
Maximum width between UEL..... : 3.7 m
Maximum height to UEL..... : 1.86 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 04 Jul 2009 09:37:10
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_05 A)TECEM.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_05 A)TECEM.gbd" (last modified: 02 jul 2009
16:43:40)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_05 - TECEM
Chemical name..... : Combustíveis Líquidos
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 36900 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1823E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6023E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar

Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 7380 kg
Peak overpressure at Xd..... : 1.248 Bar
Positive phase duration at Xd..... : 96 ms
Damage (general description) at Xd..... : Total destruction (Zone A: > 83 kPa).
Damage to brick houses at Xd..... : More than 75% of all outer brick walls have collapsed (70 kPa).
Damage to typical American-style houses at Xd..... : Total collapse of building (70 kPa).
Damage to structures (empirical) at Xd..... : The supporting structure of a round storage tank has collapsed (100 kPa). Brickstone walls (20-30 cm) have collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of connecting pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of a pipe-bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa). Damage to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards (35 kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light i

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 04 Jul 2009 09:37:15
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_05 A)TECEM.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_05 A)TECEM.gbd" (last modified: 02 jul 2009 16:43:40)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : BLEVE (136)
Case description..... : UN_05 - TECEM
Chemical name..... : Combustíveis Líquidos
Total mass in vessel..... : 2.6982E7 kg
Initial temperature in vessel..... : 45 °C
Burst pressure vessel..... : 10 Bar

Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 82 %
 Amount of CO2 in atmosphere..... : 0.03 %
 Distance from centre of vessel (Xd)..... : 1000 m
 Exposure duration to heat radiation..... : 20 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.1823E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6023E6 m
 Calculate all contours for..... : Physical effects
 Heat radiation level (lowest) for first contour plot..... : 9.8 kW/m2
 Heat radiation level for second contour plot..... : 19.45 kW/m2
 Heat radiation level (highest) for third contour plot..... : 48.1 kW/m2

RESULTS

Heat radiation at Xd..... : 52.511 kW/m2
 Heat emission from fire surface..... : 457.45 kW/m2
 Duration of the fireball..... : 72.865 s
 Radius of the fireball..... : 842.64 m
 Height bottom of the fire ball..... : 842.64 m
 View factor..... : 18.49 %
 Atmospheric transmissivity..... : 62.083 %
 Flame temperature..... : 1412.6 °C

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : BLEVE (136)
 Date of this calculation : 04 Jul 2009 09:37:21
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 5.08
 Model driver last modification : 16 Nov 2002
 Model executable version(s) : N/A
 Session nr. : 1
 References : Yellow Book (CPR-14E), 3rd edition 1997, Paragraph 6.5.7
 Project file name : "UN_05 A)TECEM.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_05 A)TECEM.gbd" (last modified: 02 jul 2009 16:43:40)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
 Case description..... : UN_05 - TECEM
 Chemical name..... : Combustíveis Líquidos
 Mass flow rate of the source..... : 489.54 kg/s



Height leak above ground level..... : 1.5 m
 Initial pressure..... : 1.1 Bar
 Initial temperature..... : 45 °C
 Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
 Wind speed at 10 m height..... : 3.8 m/s
 Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 82 %
 Fraction CO2 in atmosphere..... : 0.03 %
 Distance from release (X)..... : 100 m
 Exposure duration to heat radiation..... : 20 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.1823E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6023E6 m
 Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 20.69 kW/m2
 Fraction of mortality at X..... : 58.268 %
 Safe distance (Q" = 1 kW/m2)..... : 580 m
 Heat emission from surface of the flare..... : 222.8 kW/m2
 Angle between hole and flame axis..... : 25.57 deg
 Frustum lift off height..... : 11.1 m
 Width of frustum base..... : 29.05 m
 Width of frustum tip..... : 68.92 m
 Length of frustum (flame)..... : 151.45 m
 Tilt central axis flare..... : 25.57 deg
 View factor..... : 13 %
 Atmospheric transmissivity..... : 69 %

----- END OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 04 Jul 2009 09:37:27
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_05 A)TECEM.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_05 A)TECEM.gbd" (last modified: 02 jul 2009
 16:43:40)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_05 B) NACIONAL GÁS

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Two-phase release from
vessel or pipe (132)
Case description..... : UN_05 B) NACIONAL GÁS
Chemical name..... : GLP
Type of release..... : Release through hole in
vessel
Vessel volume..... : 1500 m3
Vessel type..... : Sphere
Filling degree..... : 80 %
Hole diameter..... : 250 mm
Height leak above tank bottom..... : 0 m
Initial temperature..... : 26.6 °C
Discharge coefficient..... : 0.62 -
Ambient temperature..... : 26.6 °C
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1895E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6015E6 m

RESULTS

Mass flow rate at time t..... : 455.16 kg/s
Exit vapour mass fraction at time t..... : 0 %
Temperature at pipe exit at time t..... : 25.85 °C
Pressure in vessel at time t..... : 2.579 Bar
Temperature in vessel at time t..... : 25.85 °C
Total mass released at time t..... : 2.786E5 kg
Mass of liquid in vessel at time t..... : 4.075E5 kg
Mass of vapour in vessel at time t..... : 4751.9 kg
Filling degree at time t..... : 47 %
Height of liquid at time t..... : 6.89 m
Average mass flow rate..... : 442.04 kg/s
...Based upon time..... : 1537.1 s
Maximum mass flow rate..... : 482.1 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Two-phase release from vessel or pipe (132)
Date of this calculation : 03 Jul 2009 18:12:15
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s) : MFLIQVAV.EXE 05 Oct 2001 17:10:54 (CRC=35AF271B)
Session nr. : 1
References : No reference available
Project file name : "UN_05 B) NACIONAL GÁS.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_05 B) NACIONAL GÁS.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass

(108)
Case description..... : UN_05 B) NACIONAL GÁS
Chemical name..... : GLP
Mass flow rate of the source..... : 442.04 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 0 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Habitated land
X-coordinate of release (for mapping purposes)..... : 5.1895E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6015E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 25710 kg
Maximum distance of source to LEL..... : 398.52 m
Maximum width between LEL..... : 36.65 m
Maximum height to LEL..... : 33.34 m
Maximum distance of source to UEL..... : 42.04 m
Maximum width between UEL..... : 4.69 m
Maximum height to UEL..... : 4.92 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:12:17
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_05 B) NACIONAL GÁS.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpF" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_05 B) NACIONAL GÁS.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"



Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_05 B) NACIONAL GÁS
Chemical name..... : GLP
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 25710 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1895E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6015E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 5142 kg
Peak overpressure at Xd..... : 0.9764 Bar
Positive phase duration at Xd..... : 91 ms
Damage (general description) at Xd..... : Total destruction (Zone
A: > 83 kPa).
Damage to brick houses at Xd..... : More than 75% of all
outer brick walls have collapsed (70 kPa).
Damage to typical American-style houses at Xd..... : Total collapse of
building (70 kPa).
Damage to structures (empirical) at Xd..... : Brickstone walls (20-30
cm) have collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of
connecting pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of
a pipe-bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa).
Damage to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards
(35 kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light industry
building ripped-off (30 kPa). Collapse of steel frames and displac

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 18:12:19
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr. : 1
References : No reference available
Project file name : "UN_05 B) NACIONAL GÁS.ald

```

Chemical database used      : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used   : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used       : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used    : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used    : "UN_05 B) NACIONAL GÁS.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory    : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : BLEVE (136)
Case description..... : UN_05 B) NACIONAL GÁS
Chemical name..... : GLP
Total mass in vessel..... : 4751.9 kg
Initial temperature in vessel..... : 26.6 °C
Burst pressure vessel..... : 10 Bar
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Amount of CO2 in atmosphere..... : 0.03 %
Distance from centre of vessel (Xd)..... : 1000 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1895E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6015E6 m
Calculate all contours for..... : Physical effects
Heat radiation level (lowest) for first contour plot..... : 9.85 kW/m2
Heat radiation level for second contour plot..... : 14.45 kW/m2
Heat radiation level (highest) for third contour plot..... : 48.1 kW/m2

```

RESULTS

```

Heat radiation at Xd..... : 0.27719 kW/m2
Heat emission from fire surface..... : 212.06 kW/m2
Duration of the fireball..... : 7.6988 s
Radius of the fireball..... : 50.761 m
Height bottom of the fire ball..... : 50.761 m
View factor..... : 0.25504 %
Atmospheric transmissivity..... : 51.253 %
Flame temperature..... : 1118.2 °C

```

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : BLEVE (136)
Date of this calculation : 03 Jul 2009 18:12:21
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 5.08
Model driver last modification : 16 Nov 2002
Model executable version(s) : N/A
Session nr. : 1

```

```
References : Yellow Book (CPR-14E), 3rd edition 1997, Paragraph
6.5.7
Project file name : "UN_05 B) NACIONAL GÁS.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_05 B) NACIONAL GÁS.gbd" (last modified: 01 jan 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
```

End of administrative & version data:

Project : UN_06 REFINARIA PREMIUM 2
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_06- REFINARIA PREMIUM
2
Chemical name..... : Derivado de Petróleo
Type of release..... : Release through hole in
vessel
Vessel volume..... : 70000 m3
Vessel type..... : Vertical cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 10 Bar
Hole diameter..... : 250 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 60 °C
Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
```

RESULTS

```
Mass flow rate at time t..... : 1185 kg/s
Total mass released at time t..... : 7.255E5 kg
Filling degree at time t..... : 79 %
Height of liquid at time t..... : 11.78 m
Total mass released..... : 3.4275E7 kg
```

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Liquid release from vessel or pipe (131)
Date of this calculation : 02 Jul 2009 11:46:11
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s) : MFLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
```

Session nr. : 1
References : No reference available
Project file name : "UN_06 REFINARIA PREMIUM 2.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_06 REFINARIA PREMIUM 2.gbd" (last modified: 01 jan
0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

Model..... : Combustion rate and
combustion products (124)
Case description..... : UN_06- REFINARIA PREMIUM
2
Chemical name..... : Derivado de Petróleo
Total mass released..... : 3.4275E7 kg
Fixed pool surface..... : 1500 m2
Temperature of the pool..... : 15 °C
Ambient temperature..... : 26.6 °C
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m

RESULTS

Combustion rate..... : 82.5 kg/s
Duration of the fire..... : 4.1545E5 s
Weight ratio of HCL/chemical..... : 0 %
Weight ratio of NO2/chemical..... : 0 %
Weight ratio of SO2/chemical..... : 0 %
Weight fraction of unburned chemical..... : 10 %

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Combustion rate and combustion products (124)
Date of this calculation : 03 Jul 2009 17:55:48
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s) : COMBUST.EXE 05 Oct 2001 17:10:52 (CRC=484D4A94)
Session nr. : 1
References : No reference available
Project file name : "UN_06 REFINARIA PREMIUM 2.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)



```
Map background file used      : "UN_06 REFINARIA PREMIUM 2.gbd" (last modified: 01 jan
0 00:00:00)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Multi energy explosion
model (125)
Case description..... : UN_06- REFINARIA PREMIUM
2
Chemical name..... : Derivado de Petróleo
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 6710 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar
```

RESULTS

```
Confined mass in explosive range..... : 1342 kg
Peak overpressure at Xd..... : 0.3666 Bar
Positive phase duration at Xd..... : 68 ms
Damage (general description) at Xd..... : Heavy damage (Zone B: 35
- 83 kPa).
Damage to brick houses at Xd..... : The damage is not
repairable; 50% to 75% of the outer brick walls are lightly to heavily damaged. The
remaining brick walls are unreliable (35 kPa).
Damage to typical American-style houses at Xd..... : Serious damage. Collapse
of some walls (30 kPa).
Damage to structures (empirical) at Xd..... : Displacement of a pipe-
bridge, rupture of piping (35-40 kPa). Damage to a fractioning column (35-80 kPa).
Plating of cars and trucks pressed inwards (35 kPa). Breakage of wooden telephone poles
(35 kPa). Cladding of light industry building ripped-off (30 kPa). Collapse of steel
frames and displacement of foundation (20 kPa). Industrial steel self-framing structure
collapsed (20-30 kPa). Cracking in empty oil-storage tanks (20-30 kPa). Slight
deformation of a pipe-bridge (20-30 kPa). Large trees have fallen down (20
```

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 17:55:50
```



Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_06 REFINARIA PREMIUM 2.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_06 REFINARIA PREMIUM 2.gbd" (last modified: 01 jan
 0 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

 End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : BLEVE (136)
 Case description..... : UN_06- REFINARIA PREMIUM
 2
 Chemical name..... : Derivado de Petróleo
 Total mass in vessel..... : 1.34E5 kg
 Initial temperature in vessel..... : 60 °C
 Burst pressure vessel..... : 10 Bar
 Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 80 %
 Amount of CO2 in atmosphere..... : 0.03 %
 Distance from centre of vessel (Xd)..... : 1000 m
 Exposure duration to heat radiation..... : 20 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.182E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
 Calculate all contours for..... : Physical effects
 Heat radiation level (lowest) for first contour plot..... : 9.85 kW/m2
 Heat radiation level for second contour plot..... : 19.45 kW/m2
 Heat radiation level (highest) for third contour plot..... : 48.1 kW/m2

RESULTS

Heat radiation at Xd..... : 3.3014 kW/m2
 Heat emission from fire surface..... : 283.36 kW/m2
 Duration of the fireball..... : 18.344 s
 Radius of the fireball..... : 150.26 m
 Height bottom of the fire ball..... : 150.26 m
 View factor..... : 2.0709 %
 Atmospheric transmissivity..... : 56.261 %
 Flame temperature..... : 1222.6 °C

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)



```

Model name                : BLEVE (136)
Date of this calculation  : 03 Jul 2009  17:55:52
Calculation performed by : AMPLA Engenharia
Software library version  : 5.5.0.0293
Model driver version(s)  : 5.08
Model driver last modification : 16 Nov 2002
Model executable version(s) : N/A
Session nr.              : 1
References                : Yellow Book (CPR-14E), 3rd edition 1997, Paragraph
6.5.7
Project file name        : "UN_06 REFINARIA PREMIUM 2.ald
Chemical database used   : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997  13:40:48)
System database used     : "Standard.CPF" (last modified: 14 jan 1999  17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997  13:40:48)
Map background file used : "UN_06 REFINARIA PREMIUM 2.gbd" (last modified: 01 jan
0 00:00:00)
Project file directory   : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_06- REFINARIA PREMIUM
2
Chemical name..... : Derivado de Petróleo
Mass flow rate of the source..... : 1199.9 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Flat land
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

```

RESULTS

```

Maximum explosive mass..... : 1.341E5 kg
Maximum distance of source to LEL..... : 759.71 m
Maximum width between LEL..... : 67.49 m
Maximum height to LEL..... : 31.97 m
Maximum distance of source to UEL..... : 65.53 m
Maximum width between UEL..... : 6.75 m
Maximum height to UEL..... : 3 m

```

----- END OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----

Administrative & version data:



```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Neutral gas; continuous release; explosive mass (108)
Date of this calculation       : 03 Jul 2009 17:55:54
Calculation performed by      : AMPLA Engenharia
Software library version      : 5.5.0.0293
Model driver version(s)       : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s)    : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr.                   : 1
References                    : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name             : "UN_06 REFINARIA PREMIUM 2.ald"
Chemical database used        : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used     : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used         : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used     : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used     : "UN_06 REFINARIA PREMIUM 2.gbd" (last modified: 01 jan
0 00:00:00)
Project file directory        : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory     : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 6 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Chamberlain model (127)
Case description..... : UN_06- REFINARIA PREMIUM
2
Chemical name..... : Derivado de Petróleo
Mass flow rate of the source..... : 1199.9 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 10 Bar
Initial temperature..... : 60 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 80 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 100 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg
```

RESULTS

```
Heat radiation level at X..... : 11.97 kW/m2
Fraction of mortality at X..... : 4.8543 %
Safe distance (Q" = 1 kW/m2)..... : 718.94 m
Heat emission from surface of the flare..... : 273.54 kW/m2
Angle between hole and flame axis..... : 9.88 deg
Frustum lift off height..... : 32.09 m
Width of frustum base..... : 28.05 m
Width of frustum tip..... : 62.68 m
Length of frustum (flame)..... : 226.82 m
Tilt central axis flare..... : 9.88 deg
View factor..... : 6 %
```



Atmospheric transmissivity..... : 68 %

----- END OF SESSION 1 MODEL 6 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                      : Chamberlain model (127)
Date of this calculation        : 03 Jul 2009 17:55:56
Calculation performed by      : AMPLA Engenharia
Software library version       : 5.5.0.0293
Model driver version(s)        : 3.08
Model driver last modification  : 18 Aug 2003
Model executable version(s)    : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr.                    : 1
Project file name              : "UN_06 REFINARIA PREMIUM 2.ald
Chemical database used         : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used      : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used          : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used      : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used      : "UN_06 REFINARIA PREMIUM 2.gbd" (last modified: 01 jan
0 00:00:00)
Project file directory         : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory      : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory      : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
```

End of administrative & version data:

Project : UN_07- PORTO DO PECÉM

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

INPUT

```
Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_07- PORTO DO PECÉM
Chemical name..... : Combustível Líquido
Type of release..... : Release through hole in
vessel
Vessel volume..... : 8.117E6 m3
Vessel type..... : Horizontal cylinder
Length cylinder..... : 15 m
Filling degree..... : 80 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 250 mm
Height leak above tank bottom..... : 1.5 m
```

Initial temperature..... : 45 °C
 Discharge coefficient..... : 0.62 -
 Time t after start release..... : 600 s
 X-coordinate of release (for mapping purposes)..... : 5.2042E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6078E6 m

RESULTS

Mass flow rate at time t..... : 2400.2 kg/s
 Total mass released at time t..... : 1.461E6 kg
 Filling degree at time t..... : 80 %
 Height of liquid at time t..... : 618.97 m
 Total mass released..... : 4.5569E9 kg

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Liquid release from vessel or pipe (131)
 Date of this calculation : 03 Jul 2009 17:57:58
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.03
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : MFLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_07- PORTO DO PECÉM.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_07- PORTO DO PECÉM.gbd" (last modified: 01 jan 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
 release; explosive mass
 (108)
 Case description..... : UN_07- PORTO DO PECÉM
 Chemical name..... : Combustível Líquido
 Mass flow rate of the source..... : 2456.2 kg/s
 Length source in wind direction..... : 0 m
 Source width..... : 0 m
 Length source in z-direction..... : 0 m
 Height leak above ground level..... : 1.5 m
 Ambient temperature..... : 26.6 °C
 Pasquill stability class..... : C (Lightly Unstable)
 Wind speed at 10 m height..... : 3.8 m/s
 Roughness length description..... : Habitated land
 X-coordinate of release (for mapping purposes)..... : 5.2042E5 m

Y-coordinate of release (for mapping purposes)..... : 9.6078E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 3.43E5 kg
Maximum distance of source to LEL..... : 904.57 m
Maximum width between LEL..... : 76.72 m
Maximum height to LEL..... : 59.09 m
Maximum distance of source to UEL..... : 69.57 m
Maximum width between UEL..... : 7.6 m
Maximum height to UEL..... : 6.89 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 17:57:59
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_07- PORTO DO PECÉM.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_07- PORTO DO PECÉM.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_07- PORTO DO PECÉM
Chemical name..... : Combustível Líquido
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 3.43E5 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 100 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.2042E5 m
Y-coordinate of release (for mapping purposes)..... : 9.6078E6 m

Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 0 deg
 Calculate all contours for..... : Physical effects
 Overpressure level (lowest) for first contour plot..... : 30 mBar
 Overpressure level for second contour plot..... : 700 mBar
 Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 68600 kg
 Peak overpressure at Xd..... : 2.027 Bar
 Positive phase duration at Xd..... : 251 ms
 Damage (general description) at Xd..... : Total destruction (Zone A: > 83 kPa).
 Damage to brick houses at Xd..... : More than 75% of all outer brick walls have collapsed (70 kPa).
 Damage to typical American-style houses at Xd..... : Total collapse of building (70 kPa).
 Damage to structures (empirical) at Xd..... : The supporting structure of a round storage tank has collapsed (100 kPa). Brickstone walls (20-30 cm) have collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of connecting pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of a pipe-bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa). Damage to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards (35 kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light i

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Multi energy explosion model (125)
 Date of this calculation : 03 Jul 2009 17:58:02
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 11 Apr 2000
 Model executable version(s) : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
 Session nr. : 1
 References : No reference available
 Project file name : "UN_07- PORTO DO PECÉM.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_07- PORTO DO PECÉM.gbd" (last modified: 01 jan 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
 Case description..... : UN_07- PORTO DO PECÉM
 Chemical name..... : Combustível Líquido



Mass flow rate of the source..... : 2456.2 kg/s
 Height leak above ground level..... : 1.5 m
 Initial pressure..... : 1.1 Bar
 Initial temperature..... : 45 °C
 Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
 Wind speed at 10 m height..... : 3.8 m/s
 Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 82 %
 Fraction CO2 in atmosphere..... : 0.03 %
 Distance from release (X)..... : 100 m
 Exposure duration to heat radiation..... : 20 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.2042E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6078E6 m
 Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 28.96 kW/m2
 Fraction of mortality at X..... : 91.253 %
 Safe distance (Q" = 1 kW/m2)..... : 1245.1 m
 Heat emission from surface of the flare..... : 249.33 kW/m2
 Angle between hole and flame axis..... : 22.42 deg
 Frustum lift off height..... : 21.67 m
 Width of frustum base..... : 68.24 m
 Width of frustum tip..... : 134.56 m
 Length of frustum (flame)..... : 334.97 m
 Tilt central axis flare..... : 22.42 deg
 View factor..... : 18 %
 Atmospheric transmissivity..... : 66 %

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 03 Jul 2009 17:58:04
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_07- PORTO DO PECÉM.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_07- PORTO DO PECÉM.gbd" (last modified: 01 jan 0
 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_08 USINA DE REGASEIFICAÇÃO
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_08- USINA DE
REGASEIFICAÇÃO
Chemical name..... : GNL
Type of release..... : Release through hole in
vessel
Vessel volume..... : 7E6 m3
Initial pressure..... : 7 Bar
Initial temperature..... : -85 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m

RESULTS

Mass flow rate at time t..... : 45.58 kg/s
Pressure at time t..... : 6.904 Bar
Temperature at time t..... : 24.85 °C
Diameter expanded jet at time t..... : 0.33 m
Total mass released..... : 3.0967E6 kg
Average mass flow rate..... : 1720.4 kg/s
...Based upon time..... : 1800 s
Maximum mass flow rate..... : 45.61 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Gas release from vessel or pipe (133)
Date of this calculation : 03 Jul 2009 18:03:31
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 20 Apr 2000
Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
[1997], sections 2.5.2.1 to 2.5.2.4.
Project file name : "UN_08 USINA DE REGASEIFICAÇÃO.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_08 USINA DE REGASEIFICAÇÃO.gbd" (last modified: 01
jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

Model..... : Chamberlain model (127)
Case description..... : UN_08- USINA DE
REGASEIFICAÇÃO
Chemical name..... : GNL
Mass flow rate of the source..... : 45.61 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 7 Bar
Initial temperature..... : -85 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical)... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 10 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 8.05 kW/m2
Fraction of mortality at X..... : 0 %
Safe distance (Q" = 1 kW/m2)..... : 138.51 m
Heat emission from surface of the flare..... : 183.69 kW/m2
Angle between hole and flame axis..... : 9.43 deg
Frustum lift off height..... : 8.43 m
Width of frustum base..... : 4.17 m
Width of frustum tip..... : 13.92 m
Length of frustum (flame)..... : 55.9 m
Tilt central axis flare..... : 9.43 deg
View factor..... : 6 %
Atmospheric transmissivity..... : 77 %

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 18:03:33
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_08 USINA DE REGASEIFICAÇÃO.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_08 USINA DE REGASEIFICAÇÃO.gbd" (last modified: 01
jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"

Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

Model..... : BLEVE (136)
Case description..... : UN_08- USINA DE
REGASEIFICAÇÃO
Chemical name..... : GNL
Total mass in vessel..... : 3.0967E6 kg
Initial temperature in vessel..... : -85 °C
Burst pressure vessel..... : 10 Bar
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Amount of CO2 in atmosphere..... : 0.03 %
Distance from centre of vessel (Xd)..... : 1000 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Calculate all contours for..... : Physical effects
Heat radiation level (lowest) for first contour plot..... : 9.85 kW/m2
Heat radiation level for second contour plot..... : 19.45 kW/m2
Heat radiation level (highest) for third contour plot..... : 48.1 kW/m2

RESULTS

Heat radiation at Xd..... : 24.656 kW/m2
Heat emission from fire surface..... : 391.76 kW/m2
Duration of the fireball..... : 41.502 s
Radius of the fireball..... : 416.95 m
Height bottom of the fire ball..... : 416.95 m
View factor..... : 10.254 %
Atmospheric transmissivity..... : 61.377 %
Flame temperature..... : 1348.6 °C

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : BLEVE (136)
Date of this calculation : 03 Jul 2009 18:03:35
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 5.08
Model driver last modification : 16 Nov 2002
Model executable version(s) : N/A
Session nr. : 1
References : Yellow Book (CPR-14E), 3rd edition 1997, Paragraph
6.5.7
Project file name : "UN_08 USINA DE REGASEIFICAÇÃO.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_08 USINA DE REGASEIFICAÇÃO.gbd" (last modified: 01
jan 0 00:00:00)

Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_08- USINA DE
REGASEIFICAÇÃO
Chemical name..... : GNL
Mass flow rate of the source..... : 1720.4 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0.33 m
Length source in z-direction..... : 0.33 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Habitated land
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 2.723E5 kg
Maximum distance of source to LEL..... : 1113.6 m
Maximum width between LEL..... : 92.66 m
Maximum height to LEL..... : 69.1 m
Maximum distance of source to UEL..... : 175.8 m
Maximum width between UEL..... : 17.47 m
Maximum height to UEL..... : 16.88 m

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 18:03:37
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_08 USINA DE REGASEIFICAÇÃO.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)

Map background file used : "UN_08 USINA DE REGASEIFICAÇÃO.gbd" (last modified: 01
jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----
INPUT

Model..... : Multi energy explosion
model (125)
Case description..... : UN_08- USINA DE
REGASEIFICAÇÃO
Chemical name..... : GNL
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 2.723E5 kg
Fraction of flammable cloud confined..... : 70 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 10 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.182E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5928E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

RESULTS

Confined mass in explosive range..... : 1.906E5 kg
Peak overpressure at Xd..... : 2.027 Bar
Positive phase duration at Xd..... : 405 ms
Damage (general description) at Xd..... : Total destruction (Zone
A: > 83 kPa).
Damage to brick houses at Xd..... : More than 75% of all
outer brick walls have
collapsed (70 kPa).
Damage to typical American-style houses at Xd..... : Total collapse of
building (70 kPa).
Damage to structures (empirical) at Xd..... : The supporting structure
of a round storage tank has collapsed (100 kPa). Brickstone walls (20-30 cm) have
collapsed (50 kPa). Displacement of a cylindrical storage tank, failure of connecting
pipes (50-100 kPa). Loaded train carriages turned over (50 kPa). Collapse of a pipe-
bridge (40-55 kPa). Displacement of a pipe-bridge, rupture of piping (35-40 kPa). Damage
to a fractioning column (35-80 kPa). Plating of cars and trucks pressed inwards (35
kPa). Breakage of wooden telephone poles (35 kPa). Cladding of light i

----- END OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Multi energy explosion model (125)
Date of this calculation : 03 Jul 2009 18:03:39



```

Calculation performed by      : AMPLA Engenharia
Software library version     : 5.5.0.0293
Model driver version(s)      : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s)  : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr.                  : 1
References                   : No reference available
Project file name            : "UN_08 USINA DE REGASEIFICAÇÃO.ald
Chemical database used       : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used    : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used         : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used     : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used     : "UN_08 USINA DE REGASEIFICAÇÃO.gbd" (last modified: 01
jan 00:00:00)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
End of administrative & version data:

```

```

Project : UN_09 WOBHEN
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

```

```

Model..... : Liquid release from
vessel or pipe (131)
Case description..... : UN_09 WOBHEN
Chemical name..... : Benzene
Type of release..... : Release through hole in
vessel
Vessel volume..... : 20 m3
Vessel type..... : Vertical cylinder
Length cylinder..... : 7 m
Filling degree..... : 90 %
Overpressure above liquid..... : 1.1 Bar
Hole diameter..... : 250 mm
Height leak above tank bottom..... : 1.5 m
Initial temperature..... : 60 °C
Discharge coefficient..... : 0.62 -
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1702E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5998E6 m

```

RESULTS

```

Mass flow rate at time t..... : 0 kg/s
Total mass released at time t..... : 15060 kg
Filling degree at time t..... : 0 %
Height of liquid at time t..... : 0 m
Total mass released..... : 11212 kg

```

```

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

```

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Liquid release from vessel or pipe (131)
Date of this calculation : 03 Jul 2009 17:30:06

```



```

Calculation performed by      : AMPLA Engenharia
Software library version     : 5.5.0.0293
Model driver version(s)     : 3.03
Model driver last modification : 11 Apr 2000
Model executable version(s)  : MFLIQVES.EXE 19 Mar 2002 11:04:36 (CRC=46EE8472)
Session nr.                  : 1
References                   : No reference available
Project file name           : "UN_09 WOB BEN.ald"
Chemical database used      : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used   : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used       : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used   : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used   : "UN_09 WOB BEN.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory   : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Combustion rate and
combustion products (124)
Case description..... : UN_09 WOB BEN
Chemical name..... : Benzene
Total mass released..... : 11212 kg
Fixed pool surface..... : 1500 m2
Temperature of the pool..... : 15 °C
Ambient temperature..... : 26.6 °C
X-coordinate of release (for mapping purposes)..... : 5.1702E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5998E6 m

```

RESULTS

```

Combustion rate..... : 127.5 kg/s
Duration of the fire..... : 87.937 s
Weight ratio of HCL/chemical..... : 0 %
Weight ratio of NO2/chemical..... : 0 %
Weight ratio of SO2/chemical..... : 0 %
Weight fraction of unburned chemical..... : 10 %

```

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                     : Combustion rate and combustion products (124)
Date of this calculation       : 03 Jul 2009 17:30:07
Calculation performed by     : AMPLA Engenharia
Software library version     : 5.5.0.0293
Model driver version(s)     : 3.04
Model driver last modification : 11 Apr 2000
Model executable version(s)  : COMBUST.EXE 05 Oct 2001 17:10:52 (CRC=484D4A94)
Session nr.                   : 1
References                   : No reference available
Project file name           : "UN_09 WOB BEN.ald"

```



```

Chemical database used      : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used   : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used       : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used    : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used    : "UN_09 WOB BEN.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory      : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory    : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Dense gas; evaporating
pool; explosive mass (76)
Case description..... : UN_09 WOB BEN
Chemical name..... : Benzene
Mass flow rate of the source..... : 0.01 kg/s
Duration of the release..... : 600 s
Fixed pool surface..... : 1500 m2
Temperature after release..... : 79.95 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Roughness length description..... : Habitated land
Time t after start release..... : 600 s
Distance from release (Xd)..... : 1000 m
Distance perpendicular to wind direction (Yd)..... : 0 m
Height (Zd)..... : 0 m
Number of time steps for conc - time diagram..... : 0
Time factor..... : 3 -
X-coordinate of release (for mapping purposes)..... : 5.1702E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5998E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

```

RESULTS

```

Total explosive mass at time t..... : 0 kg
Maximum distance of source to LEL at time t..... : 0 m
Minimum distance of source to LEL at time t..... : 0 m
Width between LEL at time t..... : 0 m
Maximum height to LEL at time t..... : 0 m
Maximum explosive mass..... : 0 kg
...at time..... : 0 s
Maximum distance of source to LEL..... : 0 m

```

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

```

-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Dense gas; evaporating pool; explosive mass (76)
Date of this calculation : 03 Jul 2009 17:30:09
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293

```

Model driver version(s) : 3.05
Model driver last modification : 17 jan 2001
Model executable version(s) : SLAB_RUN.EXE 05 Oct 2001 17:10:54 (CRC=FEC38EAF)
Session nr. : 1
References : No reference available
Project file name : "UN_09 WOB BEN.ald"
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_09 WOB BEN.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass (108)
Case description..... : UN_09 WOB BEN
Chemical name..... : Benzene
Mass flow rate of the source..... : 0.01 kg/s
Length source in wind direction..... : 100 m
Source width..... : 0 m
Length source in z-direction..... : 0 m
Height leak above ground level..... : 0 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Habitated land
X-coordinate of release (for mapping purposes)..... : 5.1702E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5998E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 0.002393 kg
Maximum distance of source to LEL..... : 1.51 m
Maximum width between LEL..... : 0.17 m
Maximum height to LEL..... : 0.18 m
Maximum distance of source to UEL..... : 0.17 m
Maximum width between UEL..... : 0.0194 m
Maximum height to UEL..... : 0.02 m

----- END OF SESSION 1 MODEL 4 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 17:30:11
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293



```

Model driver version(s)      : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s)   : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr.                  : 1
References                    : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name             : "UN_09 WOBBEN.ald"
Chemical database used        : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used     : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used          : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used      : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used      : "UN_09 WOBBEN.gbd" (last modified: 01 jan 00:00:00)
Project file directory        : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory      : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Multi energy explosion
model (125)
Case description..... : UN_09 WOBBEN
Chemical name..... : Benzene
Ambient temperature..... : 26.6 °C
Total mass in explosive range..... : 0 kg
Fraction of flammable cloud confined..... : 20 %
Curve number..... : 8 (Very strong
deflagration)
Distance from release (Xd)..... : 1000 m
Offset between release centre and cloud centre..... : 0 m
Offset between cloud centre and explosion centre..... : 0 m
X-coordinate of release (for mapping purposes)..... : 5.1702E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5998E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 0 deg
Calculate all contours for..... : Physical effects
Overpressure level (lowest) for first contour plot..... : 30 mBar
Overpressure level for second contour plot..... : 700 mBar
Overpressure level (highest) for third contour plot..... : 2000 mBar

```

RESULTS

```

Confined mass in explosive range..... : 0 kg
Peak overpressure at Xd..... : 0 Bar
Positive phase duration at Xd..... : 0 ms
Damage (general description) at Xd..... : No damage or very minor
damage
Damage to brick houses at Xd..... : No damage or very minor
damage
Damage to typical American-style houses at Xd..... : No damage or very minor
damage
Damage to structures (empirical) at Xd..... : No damage or very minor
damage

```

----- END OF SESSION 1 MODEL 5 (SCENARIO CALCULATION) -----



Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name                      : Multi energy explosion model (125)
Date of this calculation        : 03 Jul 2009 17:30:12
Calculation performed by      : AMPLA Engenharia
Software library version       : 5.5.0.0293
Model driver version(s)        : 3.04
Model driver last modification  : 11 Apr 2000
Model executable version(s)    : M_ENERGY.EXE 05 Oct 2001 17:10:54 (CRC=34CC91F0)
Session nr.                    : 1
References                      : No reference available
Project file name              : "UN_09 WOBHEN.ald"
Chemical database used         : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used      : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used           : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used       : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used       : "UN_09 WOBHEN.gbd" (last modified: 01 jan 0
00:00:00)
Project file directory         : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory      : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
```

End of administrative & version data:

Project : UN_11 A) CITYGATE CEGAS

----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_11 A) CITYGATE CEGAS
Chemical name..... : Gás Natural
Type of release..... : Release through hole in
vessel
Vessel volume..... : 1.29E5 m3
Initial pressure..... : 60 Bar
Initial temperature..... : 35 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
```

Time t after start release..... : 600 s
 X-coordinate of release (for mapping purposes)..... : 5.1706E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m

RESULTS

Mass flow rate at time t..... : 292.18 kg/s
 Pressure at time t..... : 56.38 Bar
 Temperature at time t..... : 31.52 °C
 Diameter expanded jet at time t..... : 0.87 m
 Total mass released..... : 4.4348E6 kg
 Average mass flow rate..... : 285.68 kg/s
 ...Based upon time..... : 1800 s
 Maximum mass flow rate..... : 305 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Gas release from vessel or pipe (133)
 Date of this calculation : 03 Jul 2009 17:31:15
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.04
 Model driver last modification : 20 Apr 2000
 Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
 Session nr. : 1
 References : This model is described in the Yellow Book 3rd edition
 [1997], sections 2.5.2.1 to 2.5.2.4.
 Project file name : "UN_11 A) CITYGATE CEGAS.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_11 A) CITYGATE CEGAS.gbd" (last modified: 01 jan
 0 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

INPUT

Model..... : Neutral gas; continuous
 release; explosive mass (108)
 Case description..... : UN_11 A) CITYGATE CEGAS
 Chemical name..... : Gás Natural
 Mass flow rate of the source..... : 285.68 kg/s
 Length source in wind direction..... : 0 m
 Source width..... : 0.87 m
 Length source in z-direction..... : 0.87 m
 Height leak above ground level..... : 1.5 m
 Ambient temperature..... : 26.6 °C
 Pasquill stability class..... : C (Lightly Unstable)



Wind speed at 10 m height..... : 3.8 m/s
 Roughness length description..... : Habitated land
 X-coordinate of release (for mapping purposes)..... : 5.1706E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m
 Predefined wind direction..... : E
 Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 12750 kg
 Maximum distance of source to LEL..... : 370.03 m
 Maximum width between LEL..... : 34.21 m
 Maximum height to LEL..... : 29.78 m
 Maximum distance of source to UEL..... : 62.65 m
 Maximum width between UEL..... : 6.73 m
 Maximum height to UEL..... : 5.87 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Neutral gas; continuous release; explosive mass (108)
 Date of this calculation : 03 Jul 2009 17:31:17
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.05
 Model driver last modification : 31 Aug 2001
 Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
 Session nr. : 1
 References : This model is described in the Yellow Book 3rd edition
 (1997), section 4.5.3
 Project file name : "UN_11 A) CITYGATE CEGAS.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_11 A) CITYGATE CEGAS.gbd" (last modified: 01 jan
 0 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
 Case description..... : UN_11 A) CITYGATE CEGAS
 Chemical name..... : Gás Natural
 Mass flow rate of the source..... : 305 kg/s
 Height leak above ground level..... : 1.5 m
 Initial pressure..... : 60 Bar
 Initial temperature..... : 35 °C
 Outflow angle in XZ plane (0°=horizontal ; 90°=vertical).... : 90 deg
 Wind speed at 10 m height..... : 3.8 m/s
 Ambient temperature..... : 26.6 °C
 Ambient relative humidity..... : 82 %



Fraction CO2 in atmosphere..... : 0.03 %
 Distance from release (X)..... : 10 m
 Exposure duration to heat radiation..... : 20 s
 Take protective effects of clothing into account?..... : No
 X-coordinate of release (for mapping purposes)..... : 5.1706E5 m
 Y-coordinate of release (for mapping purposes)..... : 9.6039E6 m
 Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 15.44 kW/m2
 Fraction of mortality at X..... : 21.468 %
 Safe distance (Q" = 1 kW/m2)..... : 313.02 m
 Heat emission from surface of the flare..... : 348.7 kW/m2
 Angle between hole and flame axis..... : 5.89 deg
 Frustum lift off height..... : 18.28 m
 Width of frustum base..... : 7.94 m
 Width of frustum tip..... : 27.32 m
 Length of frustum (flame)..... : 80.68 m
 Tilt central axis flare..... : 5.89 deg
 View factor..... : 6 %
 Atmospheric transmissivity..... : 74 %

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

 Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
 Model name : Chamberlain model (127)
 Date of this calculation : 03 Jul 2009 17:31:19
 Calculation performed by : AMPLA Engenharia
 Software library version : 5.5.0.0293
 Model driver version(s) : 3.08
 Model driver last modification : 18 Aug 2003
 Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
 Session nr. : 1
 Project file name : "UN_11 A) CITYGATE CEGAS.ald
 Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
 16:08:52)
 Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
 System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
 Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
 Map background file used : "UN_11 A) CITYGATE CEGAS.gbd" (last modified: 01 jan
 0 00:00:00)
 Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"
 Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 System database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
 5.5\Shared data\Databases"
 Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
 EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_11 b)CITYGATE TERMOCEARA
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_11B) CITYGATE
TERMOCEARA
Chemical name..... : Gás Natural
Type of release..... : Release through hole in
vessel
Vessel volume..... : 1.29E5 m3
Initial pressure..... : 60 Bar
Initial temperature..... : 35 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.1478E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5917E6 m

RESULTS

Mass flow rate at time t..... : 292.18 kg/s
Pressure at time t..... : 56.38 Bar
Temperature at time t..... : 31.52 °C
Diameter expanded jet at time t..... : 0.87 m
Total mass released..... : 4.4348E6 kg
Average mass flow rate..... : 285.68 kg/s
...Based upon time..... : 1800 s
Maximum mass flow rate..... : 305 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Gas release from vessel or pipe (133)
Date of this calculation : 03 Jul 2009 17:33:56
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 20 Apr 2000
Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
[1997], sections
2.5.2.1 to 2.5.2.4.
Project file name : "UN_11 b)CITYGATE TERMOCEARA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_11 b)CITYGATE TERMOCEARA.gbd" (last modified: 01
jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:



----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_11B) CITYGATE
TERMOCEARA
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 285.68 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0.87 m
Length source in z-direction..... : 0.87 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Habitated land
X-coordinate of release (for mapping purposes)..... : 5.1478E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5917E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg

RESULTS

Maximum explosive mass..... : 12750 kg
Maximum distance of source to LEL..... : 370.03 m
Maximum width between LEL..... : 34.21 m
Maximum height to LEL..... : 29.78 m
Maximum distance of source to UEL..... : 62.65 m
Maximum width between UEL..... : 6.73 m
Maximum height to UEL..... : 5.87 m

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 17:33:58
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_11 b)CITYGATE TERMOCEARA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_11 b)CITYGATE TERMOCEARA.gbd" (last modified: 01
jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

INPUT

Model..... : Chamberlain model (127)
Case description..... : UN_11B) CITYGATE
TERMOCEARA
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 305 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 60 Bar
Initial temperature..... : 35 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical)... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 10 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.1478E5 m
Y-coordinate of release (for mapping purposes)..... : 9.5917E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

RESULTS

Heat radiation level at X..... : 15.44 kW/m2
Fraction of mortality at X..... : 21.468 %
Safe distance (Q" = 1 kW/m2)..... : 313.02 m
Heat emission from surface of the flare..... : 348.7 kW/m2
Angle between hole and flame axis..... : 5.89 deg
Frustum lift off height..... : 18.28 m
Width of frustum base..... : 7.94 m
Width of frustum tip..... : 27.32 m
Length of frustum (flame)..... : 80.68 m
Tilt central axis flare..... : 5.89 deg
View factor..... : 6 %
Atmospheric transmissivity..... : 74 %

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 17:34:00
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)
Session nr. : 1
Project file name : "UN_11 b)CITYGATE TERMOCEARA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_11 b)CITYGATE TERMOCEARA.gbd" (last modified: 01
jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"



System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

End of administrative & version data:

Project : UN_11 C)CITYGATE TERMOFORTALEZA
----- START OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----
INPUT

Model..... : Gas release from vessel
or pipe (133)
Case description..... : UN_11C) CITYGATE
TERMOFORTALEZA
Chemical name..... : Gás Natural
Type of release..... : Release through hole in
vessel
Vessel volume..... : 1.29E5 m3
Initial pressure..... : 60 Bar
Initial temperature..... : 35 °C
Discharge coefficient..... : 0.62 -
Hole diameter..... : 250 mm
Time t after start release..... : 600 s
X-coordinate of release (for mapping purposes)..... : 5.153E5 m
Y-coordinate of release (for mapping purposes)..... : 9.593E6 m

RESULTS

Mass flow rate at time t..... : 292.18 kg/s
Pressure at time t..... : 56.38 Bar
Temperature at time t..... : 31.52 °C
Diameter expanded jet at time t..... : 0.87 m
Total mass released..... : 4.4348E6 kg
Average mass flow rate..... : 285.68 kg/s
...Based upon time..... : 1800 s
Maximum mass flow rate..... : 305 kg/s

----- END OF SESSION 1 MODEL 1 (SCENARIO CALCULATION) -----

Administrative & version data:

Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Gas release from vessel or pipe (133)
Date of this calculation : 03 Jul 2009 17:36:58
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.04
Model driver last modification : 20 Apr 2000
Model executable version(s) : MFGASVES.EXE 19 Mar 2002 12:08:46 (CRC=BC0F17F3)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
[1997], sections 2.5.2.1 to 2.5.2.4.
Project file name : "UN_11 C)CITYGATE TERMOFORTALEZA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)

```
Map background file used      : "UN_11 C)CITYGATE TERMOFORTALEZA.gbd" (last modified:
01 jan  0 00:00:00)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory   : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
```

End of administrative & version data:

----- START OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----
INPUT

```
Model..... : Neutral gas; continuous
release; explosive mass
(108)
Case description..... : UN_11C) CITYGATE
TERMOFORTALEZA
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 285.68 kg/s
Length source in wind direction..... : 0 m
Source width..... : 0.87 m
Length source in z-direction..... : 0.87 m
Height leak above ground level..... : 1.5 m
Ambient temperature..... : 26.6 °C
Pasquill stability class..... : C (Lightly Unstable)
Wind speed at 10 m height..... : 3.8 m/s
Roughness length description..... : Habitated land
X-coordinate of release (for mapping purposes)..... : 5.153E5 m
Y-coordinate of release (for mapping purposes)..... : 9.593E6 m
Predefined wind direction..... : E
Wind comes from (West = 180 degrees)..... : 180 deg
```

RESULTS

```
Maximum explosive mass..... : 12750 kg
Maximum distance of source to LEL..... : 370.03 m
Maximum width between LEL..... : 34.21 m
Maximum height to LEL..... : 29.78 m
Maximum distance of source to UEL..... : 62.65 m
Maximum width between UEL..... : 6.73 m
Maximum height to UEL..... : 5.87 m
```

----- END OF SESSION 1 MODEL 2 (SCENARIO CALCULATION) -----

Administrative & version data:

```
-----
Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Neutral gas; continuous release; explosive mass (108)
Date of this calculation : 03 Jul 2009 17:37:00
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.05
Model driver last modification : 31 Aug 2001
Model executable version(s) : EXPLOCYZ.EXE 05 Oct 2001 17:10:52 (CRC=34F7BDAC)
Session nr. : 1
References : This model is described in the Yellow Book 3rd edition
(1997), section 4.5.3
Project file name : "UN_11 C)CITYGATE TERMOFORTALEZA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
```

```

System database used           : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used      : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used     : "UN_11 C)CITYGATE TERMOFORTALEZA.gbd" (last modified:
01 jan 0 00:00:00)
Project file directory       : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory  : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory    : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory     : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"

```

End of administrative & version data:

----- START OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----
INPUT

```

Model..... : Chamberlain model (127)
Case description..... : UN_11C) CITYGATE
TERMOFORTALEZA
Chemical name..... : Gás Natural
Mass flow rate of the source..... : 305 kg/s
Height leak above ground level..... : 1.5 m
Initial pressure..... : 60 Bar
Initial temperature..... : 35 °C
Outflow angle in XZ plane (0°=horizontal ; 90°=vertical)... : 90 deg
Wind speed at 10 m height..... : 3.8 m/s
Ambient temperature..... : 26.6 °C
Ambient relative humidity..... : 82 %
Fraction CO2 in atmosphere..... : 0.03 %
Distance from release (X)..... : 10 m
Exposure duration to heat radiation..... : 20 s
Take protective effects of clothing into account?..... : No
X-coordinate of release (for mapping purposes)..... : 5.153E5 m
Y-coordinate of release (for mapping purposes)..... : 9.593E6 m
Outflow angle in XY plane (0=X axis; 90=Y axis)..... : 0 deg

```

RESULTS

```

Heat radiation level at X..... : 15.44 kW/m2
Fraction of mortality at X..... : 21.468 %
Safe distance (Q" = 1 kW/m2)..... : 313.02 m
Heat emission from surface of the flare..... : 348.7 kW/m2
Angle between hole and flame axis..... : 5.89 deg
Frustum lift off height..... : 18.28 m
Width of frustum base..... : 7.94 m
Width of frustum tip..... : 27.32 m
Length of frustum (flame)..... : 80.68 m
Tilt central axis flare..... : 5.89 deg
View factor..... : 6 %
Atmospheric transmissivity..... : 74 %

```

----- END OF SESSION 1 MODEL 3 (SCENARIO CALCULATION) -----

Administrative & version data:

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Main program (production date) : EffectsGIS (08 Sep 2003 16:19:16)
Model name : Chamberlain model (127)
Date of this calculation : 03 Jul 2009 17:37:02
Calculation performed by : AMPLA Engenharia
Software library version : 5.5.0.0293
Model driver version(s) : 3.08
Model driver last modification : 18 Aug 2003
Model executable version(s) : FLARE.EXE 05 Oct 2001 17:10:52 (CRC=7625AEFB)

```



```
Session nr. : 1
Project file name : "UN_11 C)CITYGATE TERMOFORTALEZA.ald
Chemical database used : "Purple_Book.Rdb" (last modified: 25 out 2002
16:08:52)
Environment database used : "Standard.Env" (last modified: 10 out 1997 13:40:48)
System database used : "Standard.CPF" (last modified: 14 jan 1999 17:38:14)
Dispersion database used : "Standard.dpf" (last modified: 10 out 1997 13:40:48)
Map background file used : "UN_11 C)CITYGATE TERMOFORTALEZA.gbd" (last modified:
01 jan 0 00:00:00)
Project file directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
Chemical database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Environment database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
System database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Dispersion database directory : "C:\Program Files\TNO Industrial Safety\Version
5.5\Shared data\Databases"
Map background directory : "C:\AMPLA\GESTÃO_2009\PROJETOS EM
EXECUÇÃO\136_CIPP\Modelagem"
-----
End of administrative & version data:
```