

SIMULAZIONI RILASCIO GAS TOSSICO COMPRESSO DA CGEM

L'ipotesi riguarda il danneggiamento di un contenitore per gas ad elementi multipli contenente gas tossico, durante la movimentazione all'interno del terminal oppure durante il trasporto su strada. L'incidente comporta la rottura di un modulo con rilascio di gas compresso e conseguente dispersione in atmosfera.

Ipotesi simulazioni

Sostanza pericolosa: Trifluoruro di boro (BF₃)
Stato fisico: Gas compresso
Classificazione: Molto tossico
LC50: non disponibile
IDLH: 75 mg/m³

Tipo di contenitore: n. 1 elemento del CGEM
Volume: 2.5 m³

Tipo di rottura: rottura grave
Dimensione foro: 51 mm

Condizioni meteo: 4D
(maggiormente ricorrenti)

Risultati delle simulazioni

Scenario incidentale	Raggi di danno [m]		Durata effetti [s]
	LC50	IDLH	
Rilascio tossico	n.d.	1500	< 600

Tabella 2

Per quanto riguarda la classe di probabilità dell'evento di cui trattasi, tenuto conto:

- del numero dei gas molto tossici compressi in CGEM movimentati nel porto di Genova;
- dei dati disponibili sulla frequenza e la direzione dei venti che interessano il porto di Genova (principalmente venti di tramontana, che spirando da terra verso mare, tendono ad allontanare eventuali nubi tossiche dalla città);

la frequenza di un rilascio tossico che interessi le aree urbane è stimata < 1E-06 occ/anno; l'evento è quindi da ritenersi, secondo la bibliografia di settore, estremamente improbabile.

----- START OF SESSION 1(mYBNewGasRelease) -----

INPUT

Model..... : Gas release from vessel (139)
Version..... : 5.09
Reference..... : Yellow Book, CPR-14E, 3rd edition 1997, Paragraph 2.5.2.3 and Yellow Book, CPR-14E, 3rd edition 1997, Paragraph 2.5.2.3
Case description..... : Rilascio tossico - IMO 2.3 - Boron trifluoride
Chemical name..... : Borontrifluoride
Use which representative step..... : Second 20% average (toxic)
Expansion type..... : Adiabatic
Type of release..... : Release through hole in vessel
Hole diameter..... : 51 mm
Hole rounding..... : Sharp edges
Discharge coefficient..... : 0.62 -
Initial temperature in pipeline..... : 16 °C
Initial (absolute) pressure in vessel..... : 200 bar
Vessel volume..... : 2.5 m3
Type of calculation..... : Calculate until device is empty

RESULTS

Initial mass in vessel..... : 1410.3 kg
Time needed to empty vessel..... : 89.566 s
Total mass released..... : 1385.3 kg
Maximum mass flow rate..... : 87.274 kg/s
Representative release rate..... : 59.101 kg/s
Representative outflow duration..... : 23 s
Representative temperature..... : -4.2985 °C
Representative pressure..... : 130.32 bar
Representative density..... : 395.3 kg/m3

----- END OF SESSION 1 -----

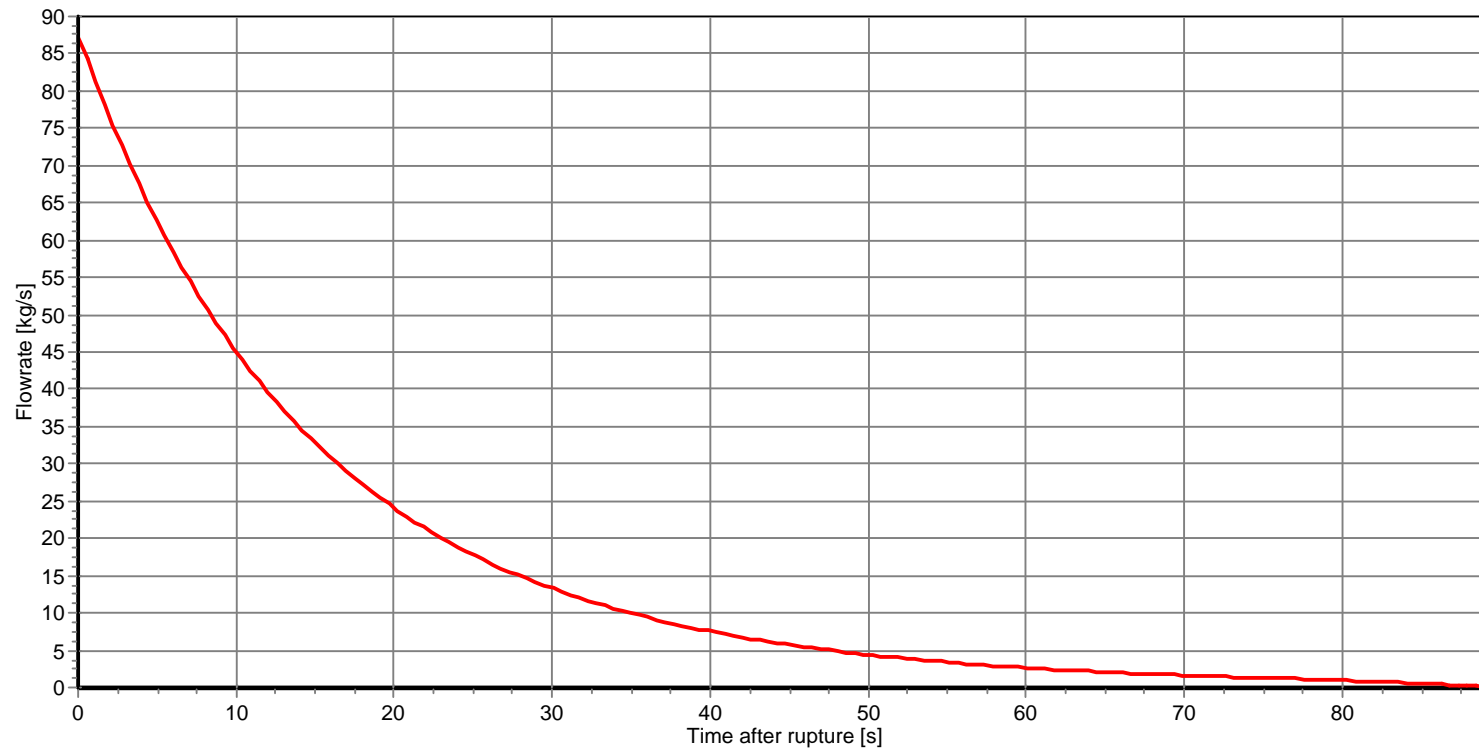
Administrative & version data:

Main program (production date) : Effects (24 Apr 2009 03:00:37)
Run mode (complexity level) : Expert
Model name : Gas release from vessel (139)
Date of this calculation : 29 Sep 2013 14:34:59
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.09
Model driver last modification : 10 July 2007
Model executable version(s) : N/A
Session nr. : 1
References : Yellow Book, CPR-14E, 3rd edition 1997, Paragraph 2.5.2.3 and Yellow Book, CPR-14E, 3rd edition 1997, Paragraph 2.5.2.3
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 15:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 09:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 09:53:47)
Dispersion database used : "Purple Book (1999).dpp" (20 mag 2008 09:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gbf" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"

End of administrative & version data:

Effects 7.6.4.3276 Calculation: 29 Sep 2013 14:37:38
Model: Gas release from vessel (139)
Graph: Flowrate hole vs Time (Gas Release)

Rilascio tossico - IMO 2.3 - Boron trifluoride



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Project : Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH
Session 1
----- START OF SESSION 1(mYBSlabNewCalculationConcentration) -----
INPUT
Model..... : Dense gas release; concentration
              (199)
Version..... : 5.13
Reference... : Yellow Book 3rd edition 1997 chapter
              4; Ermak, D.L. User manual for SLAB
              Lawrence Livermore National
              Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron
              trifluoride IDLH - 60"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s
Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
  X-coordinate of release..... : 0 m
  Y-coordinate of release..... : 0 m
  Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles,
              x/h < 15.
Time t after start release..... : 60 s
Concentration averaging time..... : 20 s
  Distance from release (Xd)..... : 100 m
  Distance perpendicular to wind direction (Yd)..... : 0 m
  Height (Zd)..... : 1.7 m
Predefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High

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RESULTS
Concentration at (Xd, Yd, Zd, t)..... : 11847 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m

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----- END OF SESSION 1 -----

Administrative & version data:

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Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:41
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 1
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
              for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).dpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gbf" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"
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End of administrative & version data:

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Session 2
----- START OF SESSION 2(mYBSlabNewCalculationConcentration) -----
INPUT
Model..... : Dense gas release; concentration
              (199)
Version..... : 5.13
Reference... : Yellow Book 3rd edition 1997 chapter

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4; Ermak, D.L. User manual for SLAB
Lawrence Livermore National
Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron
trifluoride IDLH - 180"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s
Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
X-coordinate of release..... : 0 m
Y-coordinate of release..... : 0 m
Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles,
x/h < 15.
Time t after start release..... : 180 s
Concentration averaging time..... : 20 s
Distance from release (Xd)..... : 100 m
Distance perpendicular to wind direction (Yd)..... : 0 m
Height (Zd)..... : 1.7 m
Predefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High

RESULTS

Concentration at (Xd, Yd, Zd, t)..... : 2.6995 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m

----- END OF SESSION 2 -----

Administrative & version data:

Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:42
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 2
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).dpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gb" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"

End of administrative & version data:

Session 3

----- START OF SESSION 3(mYBSlabNewCalculationConcentration) -----

INPUT

Model..... : Dense gas release; concentration
(199)
Version..... : 5.13
Reference..... : Yellow Book 3rd edition 1997 chapter
4; Ermak, D.L. User manual for SLAB
Lawrence Livermore National
Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron
trifluoride IDLH - 900"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s

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Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
  X-coordinate of release..... : 0 m
  Y-coordinate of release..... : 0 m
  Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles,
  x/h < 15.
Time t after start release..... : 900 s
Concentration averaging time..... : 20 s
  Distance from release (Xd)..... : 100 m
  Distance perpendicular to wind direction (Yd)..... : 0 m
  Height (Zd)..... : 1.7 m
Predefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High
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RESULTS

```
Concentration at (Xd, Yd, Zd, t)..... : 0 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m
```

----- END OF SESSION 3 -----

Administrative & version data:

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-----
Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:43
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 3
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
  for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).dpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gbf" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"
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```

End of administrative & version data:

Session 4

----- START OF SESSION 4(mYBSlabNewCalculationConcentration) -----

INPUT

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Model..... : Dense gas release; concentration
  (199)
Version..... : 5.13
Reference..... : Yellow Book 3rd edition 1997 chapter
  4; Ermak, D.L. User manual for SLAB
  Lawrence Livermore National
  Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron
  trifluoride IDLH - 1200"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s
Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
  X-coordinate of release..... : 0 m
  Y-coordinate of release..... : 0 m
  Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
```

Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles,
x/h < 15.
Time t after start release..... : 1200 s
Concentration averaging time..... : 20 s
Distance from release (Xd)..... : 100 m
Distance perpendicular to wind direction (Yd)..... : 0 m
Height (Zd)..... : 1.7 m
Predefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High

RESULTS

Concentration at (Xd, Yd, Zd, t)..... : 0 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m

----- END OF SESSION 4 -----

Administrative & version data:

Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:45
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 4
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).gpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gbf" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"

----- End of administrative & version data: -----

Session 5

----- START OF SESSION 5(mYBSlabNewCalculationConcentration) -----

INPUT

Model..... : Dense gas release; concentration
(199)
Version..... : 5.13
Reference..... : Yellow Book 3rd edition 1997 chapter
4; Ermak, D.L. User manual for SLAB
Lawrence Livermore National
Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron
trifluoride IDLH - 1800"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s
Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
X-coordinate of release..... : 0 m
Y-coordinate of release..... : 0 m
Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles,
x/h < 15.
Time t after start release..... : 1800 s
Concentration averaging time..... : 20 s
Distance from release (Xd)..... : 100 m
Distance perpendicular to wind direction (Yd)..... : 0 m
Height (Zd)..... : 1.7 m

Redefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High

RESULTS

Concentration at (Xd, Yd, Zd, t)..... : 0 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m

----- END OF SESSION 5 -----

Administrative & version data:

Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:46
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 5
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).xdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).dpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gbfi" (01 gen 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"

End of administrative & version data:

Session 6

----- START OF SESSION 6(mYBSlabNewCalculationConcentration) -----

INPUT

Model..... : Dense gas release; concentration (199)
Version..... : 5.13
Reference..... : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual for SLAB Lawrence Livermore National Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron trifluoride IDLH - 300"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s
Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
X-coordinate of release..... : 0 m
Y-coordinate of release..... : 0 m
Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles, x/h < 15.
Time t after start release..... : 300 s
Concentration averaging time..... : 20 s
Distance from release (Xd)..... : 100 m
Distance perpendicular to wind direction (Yd)..... : 0 m
Height (Zd)..... : 1.7 m
Predefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High

RESULTS

Concentration at (Xd, Yd, Zd, t)..... : 0.0098695 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m

----- END OF SESSION 6 -----

Administrative & version data:

Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:47
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 6
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).dpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gb" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"

End of administrative & version data:

Session 7

----- START OF SESSION 7(mYBSlabNewCalculationConcentration) -----

INPUT

Model..... : Dense gas release; concentration
(199)
Version..... : 5.13
Reference..... : Yellow Book 3rd edition 1997 chapter
4; Ermak, D.L. User manual for SLAB
Lawrence Livermore National
Laboratory, June 1990
Case description..... : Rilascio tossico - IMO 2.3 - Boron
trifluoride IDLH - 600"
Chemical name..... : Borontrifluoride
Type of release..... : Horizontal Jet release
Mass flow rate of the source..... : 59.101 kg/s
Duration of the release..... : 23 s
Initial liquid mass fraction..... : 0 %
Diameter of expanded jet..... : 1 m
Temperature after release..... : -99.8 °C
X-coordinate of release..... : 0 m
Y-coordinate of release..... : 0 m
Z-coordinate (height) of release..... : 1.7 m
Ambient temperature..... : 16 °C
Meteorological data..... : Pasquill
Pasquill stability class..... : D (Neutral)
Wind speed at 10 m height..... : 4 m/s
Ambient relative humidity..... : 66 %
Roughness length description..... : Parkland, bushes; numerous obstacles,
x/h < 15.
Time t after start release..... : 600 s
Concentration averaging time..... : 20 s
Distance from release (Xd)..... : 100 m
Distance perpendicular to wind direction (Yd)..... : 0 m
Height (Zd)..... : 1.7 m
Predefined concentration..... : User defined
Threshold concentration..... : 75 mg/m3
Contour plot accuracy..... : 1 %
Predefined wind direction..... : User defined
Wind comes from (West = 180 degrees)..... : 180 deg
Perform Maximum concentration vs Distance graph..... : Yes
Resolution of the time consuming graphs..... : High

RESULTS

Concentration at (Xd, Yd, Zd, t)..... : 0 mg/m3
Maximum concentration at (Yd, Zd)..... : 2.8575E06 mg/m3
...at distance..... : 4.3381 m
Inverse Monin-Obukhov length (1/L) used..... : 0 1/m

Administrative & version data:

Main program (production date) : Effects (24 Apr 2009 02:00:37)
Run mode (complexity level) : Expert
Model name : Dense gas release; concentration (199)
Date of this calculation : 13 Dec 2013 12:03:48
License owner : rachele
Calculation performed by : rachele
Software library version : 7.6.4.3276
Model driver version(s) : 5.13
Model driver last modification : 31 Jul 2008
Model executable version(s) : TNO_DENSEGAS.EXE 20 May 2008 08:53:42 (CRC=E1B5A7AE)
Session nr. : 7
References : Yellow Book 3rd edition 1997 chapter 4; Ermak, D.L. User manual
for SLAB Lawrence Livermore National Laboratory, June 1990
Project file name : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.alf"
Chemical database used : "Purple Book (1999).rdb" (30 ago 2013 14:58:00)
Environment database used : "Purple Book (1999).Env" (20 mag 2008 08:53:47)
System database used : "Purple Book (1999).SPF" (20 mag 2008 08:53:47)
Dispersion database used : "Purple Book (1999).dpf" (20 mag 2008 08:53:47)
Map background file used : "Rilascio tossico CGEM - IMO 2.3 - BF3 IDLH.gbf" (01 gen 0 00:00:00)
Project file directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni RISP\IMO 2.3\Boron trifluoride CGEM"
Chemical database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Environment database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
System database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Dispersion database directory : "C:\Program Files (x86)\TNO\Effects 7.6\Shared data\Databases"
Map background directory : "C:\PC08_Rachele\RISP\RISP_2013\Simulazioni trasporti\IMO 2.3\Boron trifluoride CGEM"

End of administrative & version data:

Effects 7.6.4.3276 Calculation: 13 Dec 2013 12:07:35
Model: Dense gas release; concentration (199)
Graph: Concentration Contour Plot at Zd

rachele

