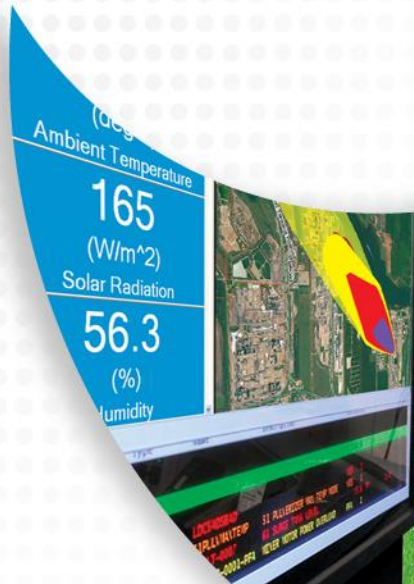


# Integrated IT Technology for HazMat Incidents Decision Support

## 8th INTERNATIONAL CONFERENCE FOR FIRE BRIGADES IN THE HIGH HAZARD INDUSTRY

10<sup>th</sup> – 11<sup>th</sup> November 2015  
Danubius Hotel Helia, Budapest

**Eric Quatreville**  
Regional Business Manager



# Chemical Release: The Challenge

- What's happening?
- Where is it coming from?
- How big is it?
- Where is it headed?
- How long will it last?
- What are the actual downwind concentrations?
- Where should we stage our resources?
- Whom should we notify?
- Whom should we warn?
- Which areas require evacuation?
- Can we shelter in place?
- What roads should be closed?
- How do we prioritize actions with limited resources?
- How can we share this information?
  - With the EOC & other responders
  - With the community



# SAFER Systems Overview

- 30+ Years of Emergency Response Information Management Solutions
- Software Developer
- Turn-key, Integrated Solutions
- Technical Support and Upgrades
- 600+ Installation Worldwide

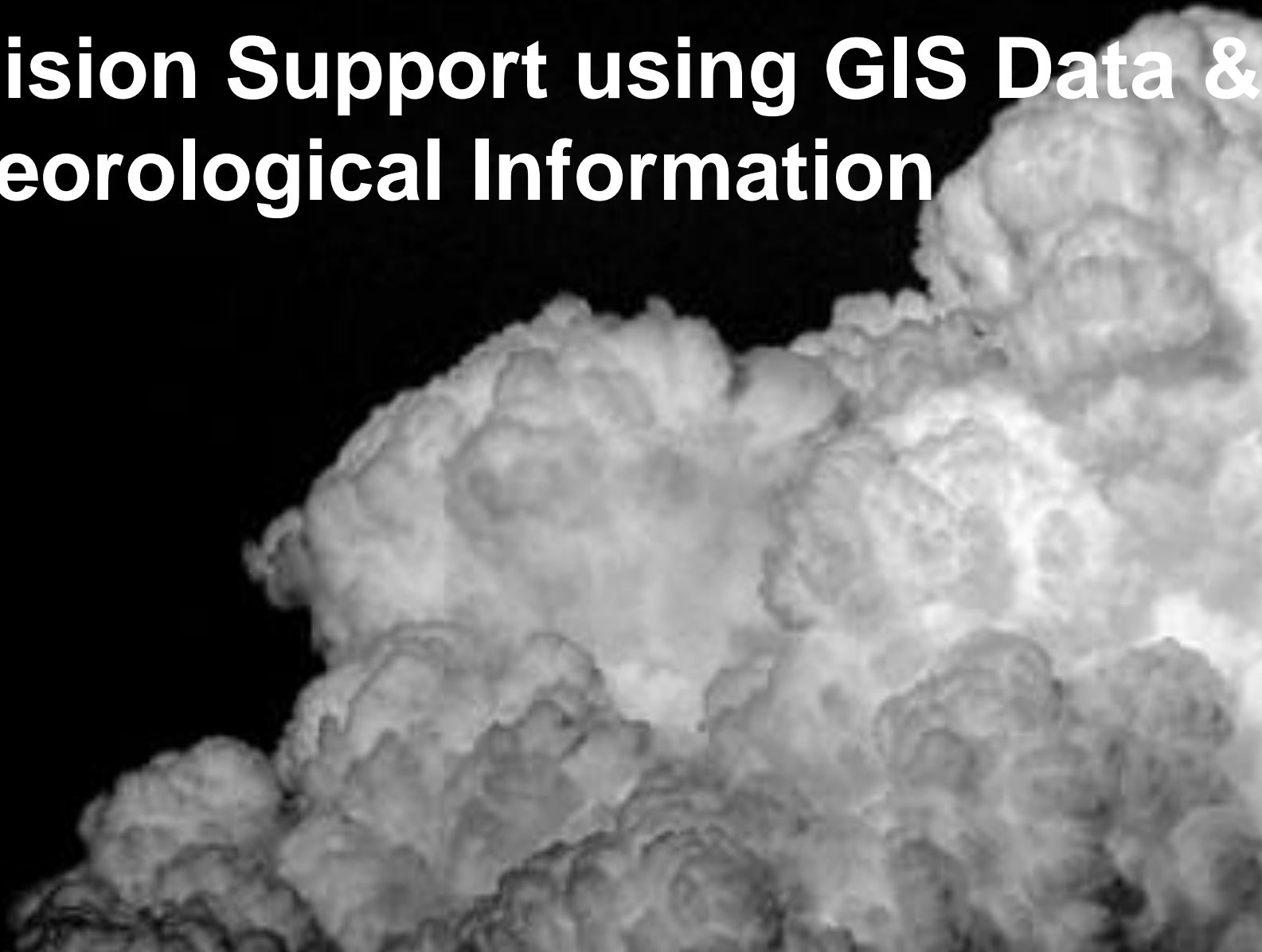


# SAFER Key Differentiators

- Geographic Information System (GIS)
- Real-time Meteorology
- Complex Terrain Wind Fields
- Real-Time Gas Sensor Data Integration
- Advanced Back Calculation Algorithm
- Combustion Analysis Model



# **Decision Support using GIS Data & Meteorological Information**



Unten einen Standort wählen, um diesen einzusehen, zu bearbeiten oder zu starten. Oder

- GLOBAL
- InfraLeuna Leuna Germany
  - Dow Schkopau Germany
  - CEA Bruyère le Chatel France
  - Boehringer Ingelheim Germany
  - GESIP Demo La Défense France
  - GIGN Versailles France
  - NEC Birmingham UK
  - TOTAL Flandres France
  - BASF Ludwigshafen Germany
  - PetroPlus Coryton UK
  - TOTAL Feluy Belgium
  - Heidelberg Demo Germany
  - Wacker Chemie Burghausen Germany
  - AGIP KCO Brentford UK
  - ExxonMobil Antwerp Belgium
  - CODAH Le Havre France
  - GDF SUEZ Saint-Denis France
  - heidelberg, DE
  - CIMO Monthey Switzerland
  - Dow Terneuzen Netherlands
  - CHEMELOT Geleen NL
  - SABIC BOZ NL Demo



Starten



Neu



Öffnen



Entfernen



Hilfe



Karten Breite = 3155085.2 (m) LON: 31.984271 LAT: 44.851909

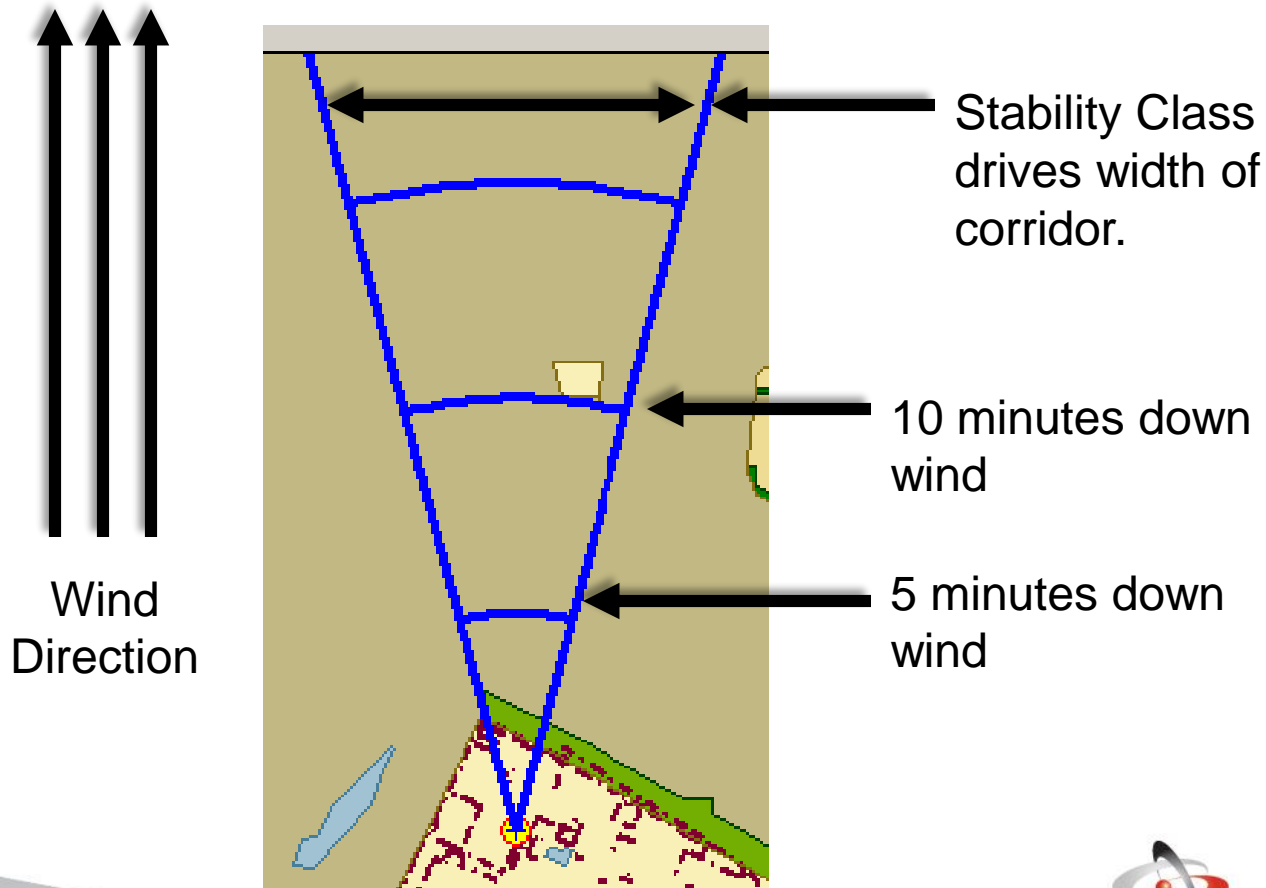


# Real-Time Weather Data Input

- Fixed Met Stations
- Portable Met Station
- Internet Weather
- Manual Input



# What the wind corridor means...





# List of Receptors of Concern Potentially Affected

Quick Response

Met Stations Manual MET

Corridor Origin Release Source

Map Width = 1970.8 (m) LON: 3.826436 LAT: 50.473633

**Manual Met**

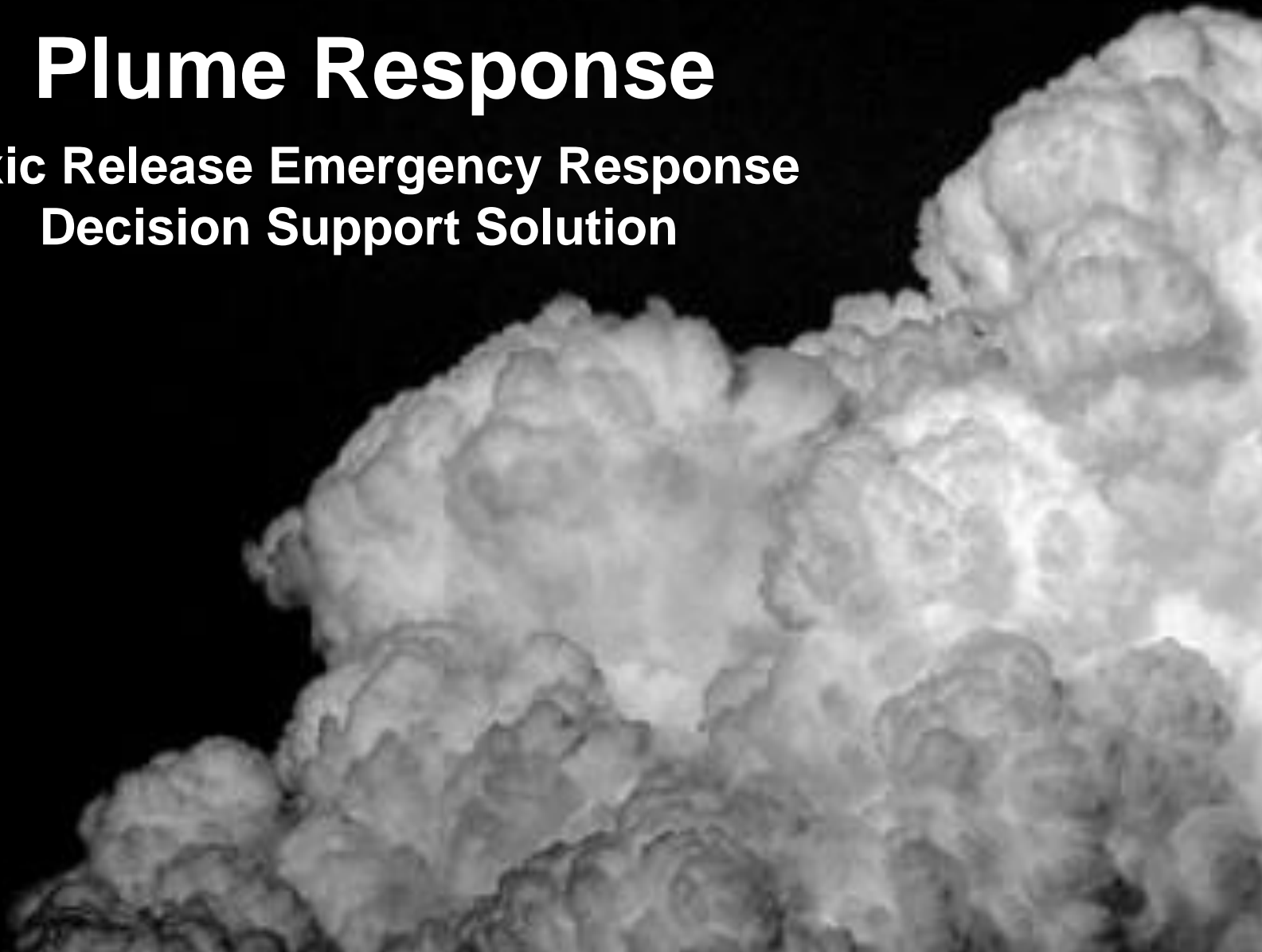
List of Impacted receptors

- ARISTA
- ATHÉNÉE ROYAL MONS I
- BAUDOUR
- BIBLIOTHÈQUE DE MONS
- BPOST MONS MARCHÉ AUX HER
- BPOST MONS PLACE LOUISE
- BPOST NIMY
- BUREAU DE RECETTE CONTRIBU
- C.H.R. CLINIQUE SAINT-JOSEPH
- C.H.R. CLINIQUE SAINT-JOSEPH-
- C.H.R. ST.JOSEPH - HÔPITAL DE
- C.H.U. AMBROISE PARÉ
- C.H.U. AMBROISE PARÉ-URGENC
- CENTRE CULTUREL DE LA REGIO
- CENTRE CULTUREL RÉGION DE
- CENTRE HOSPITALIER EPICURA
- CENTRE HOSPITALIER UNIVERSI
- CENTRE SCOLAIRE SAINT-STANIS
- CH Universitaire et Psychiatrique d
- CONSULAT HONORAIRES FRANCE
- CONSULAT HONORAIRES MEXIQU

Generate Report

# **Plume Response**

**Toxic Release Emergency Response  
Decision Support Solution**

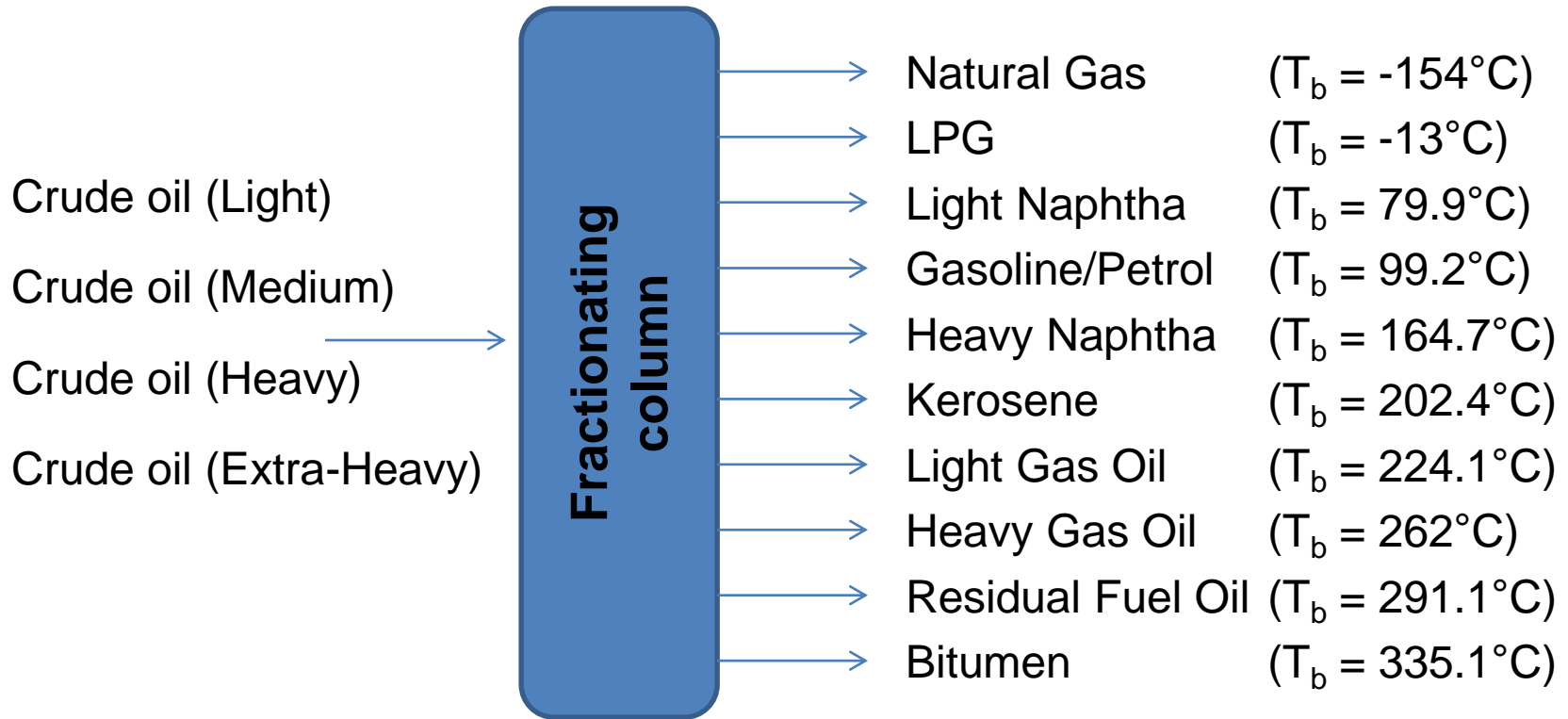


# Source Term Modeling Scenarios

- Plume Dispersion Algorithms
  - Gas release, Liquid release, Two-phase release
  - Pool evaporation
  - Tank releases
  - Pipeline releases
  - Stack / Jet Releases
- Scenario entry
  - Manual Scenarios
  - Pre-Defined Scenario database



# Crude Oil and Petroleum Fractions

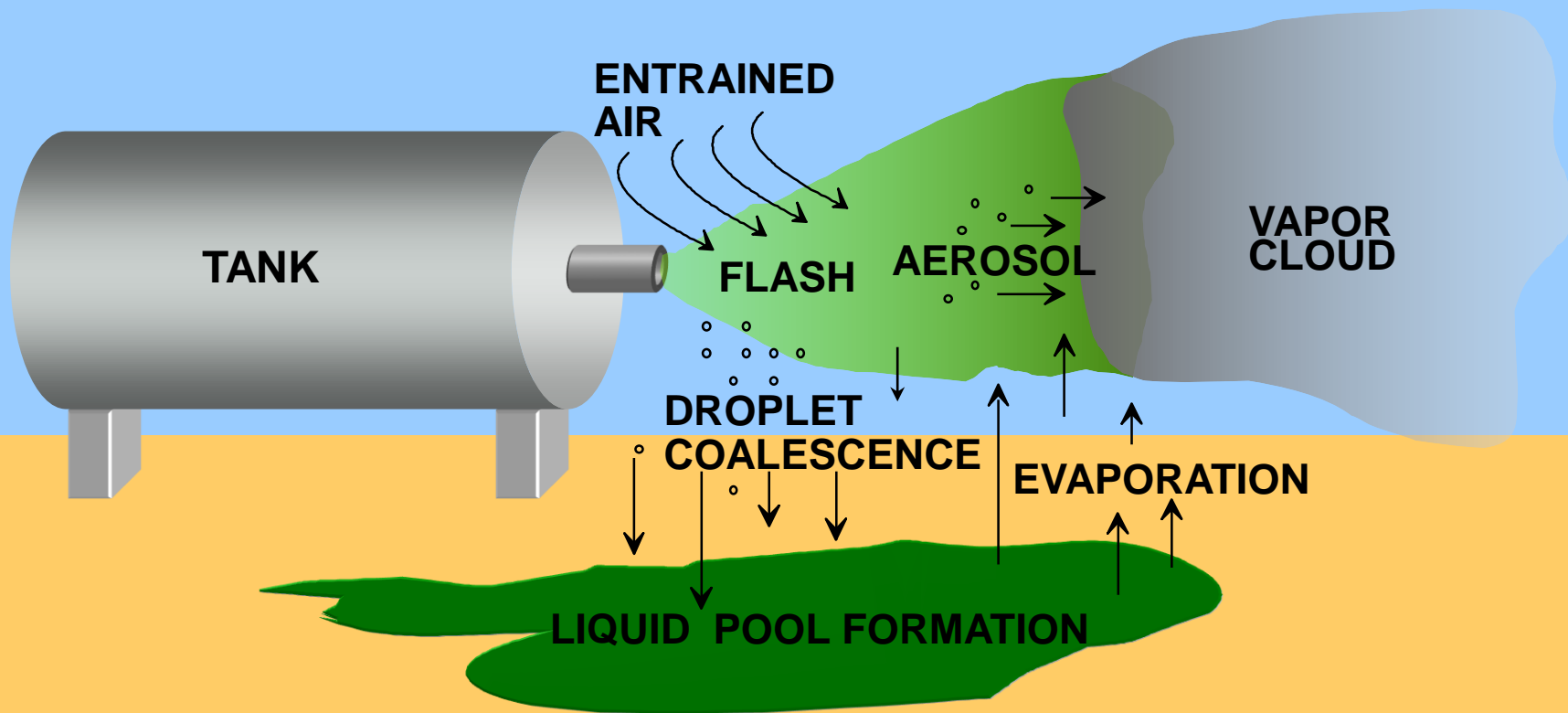


Four types of crude oil, H<sub>2</sub>S and SO<sub>2</sub> are built in to the database.

Ten petroleum fractions are included



# Dispersion Dynamics



### Scenario Options

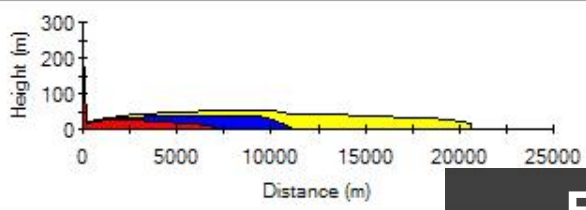
- RUN THE MODEL
- Update Scenario
- Change to Back Calculation
- Reports
- Plume Analysis
- Infiltration Analysis
- Export Plume
- Run Pre-defined Case
- All Done (QUIT)

**Decision Making Menu**



- Bow Valley Alliance Church
- Bowcroft Elementary
- Bowmont Community Pre
- Bowness
- Bowness Community Hea
- Bowness Senior Citizens
- Bowness Tennis Court
- Bowwood
- Chinatown
- Edw...
- Edw...
- Fire Station 15
- Foothills United Church
- Greenwood-Greenbriar
- Greenwood/Greenbriar

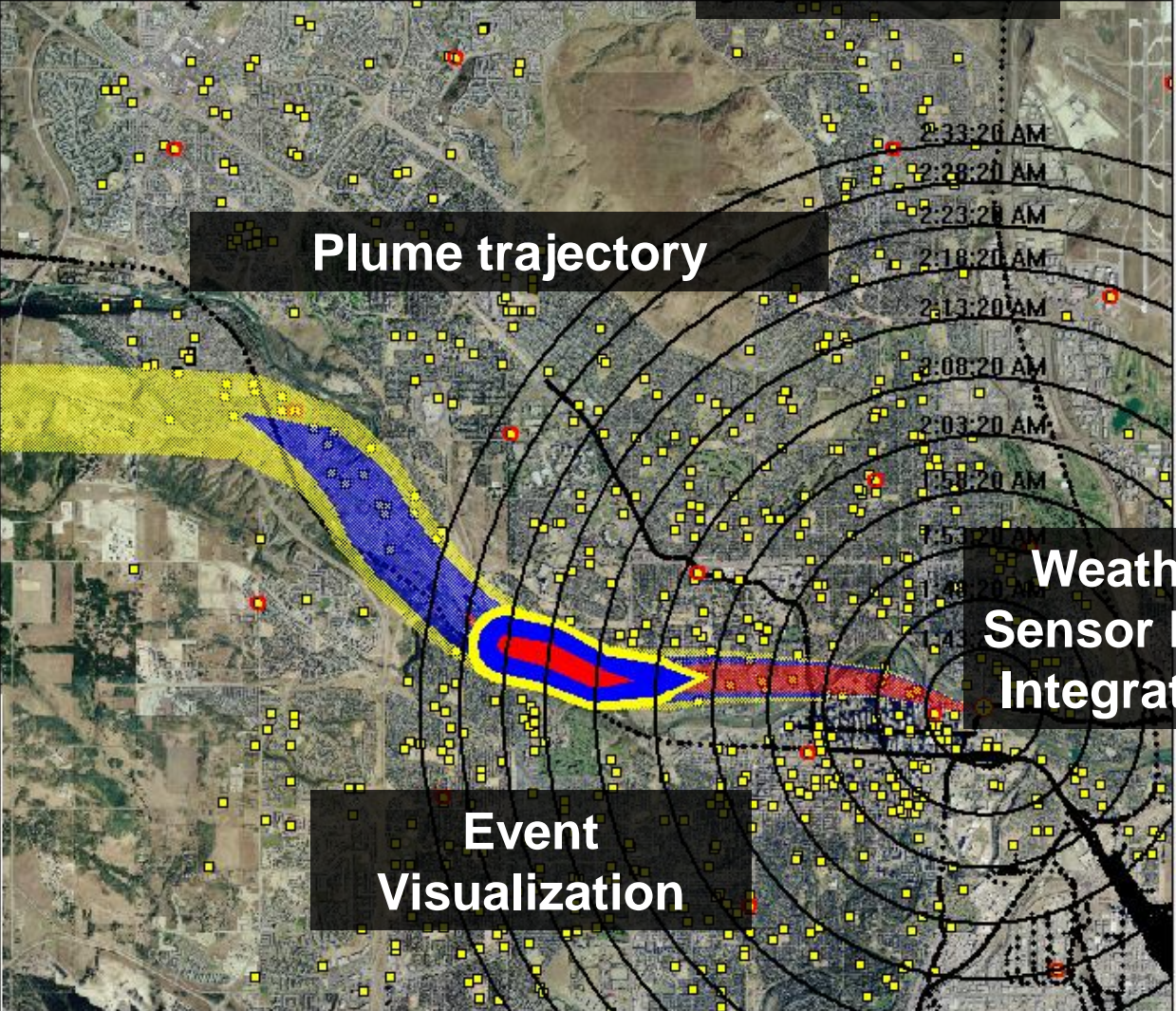
**Impact Information**



Release time 1:38:20 AM  
 Elapsed Time 43 (Minutes)  
 Last Update 1:42:18 AM  
 Current Time 31/05/2004 2:22:19 AM  
 Release Location -3578.77, 5657021.51

**Event Information**

Map Width = 15422.4 (m)



**Plume trajectory**

**Weather Sensor Data Integration**

**Event Visualization**

Meteorology
10.0 (km/h)
East (From)
10.0 (Deg C)
400.0 (W/m <sup>2</sup> )
0.0 (%)
6.0 [H Stability]
5.0 [V Stability]



Scenario Options

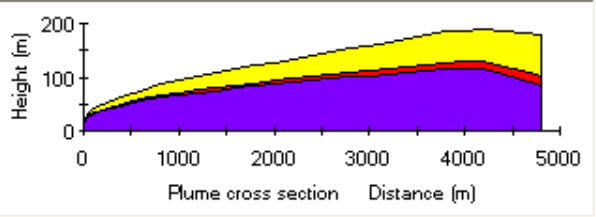
- RUN THE MODEL**
- Update Scenario
- Update Manual Met
- Change to Back Calculation
- Reports
- Plume Analysis
- Infiltration Analysis
- Export Plume
- Run Pre-defined Case
- All Done (QUIT)



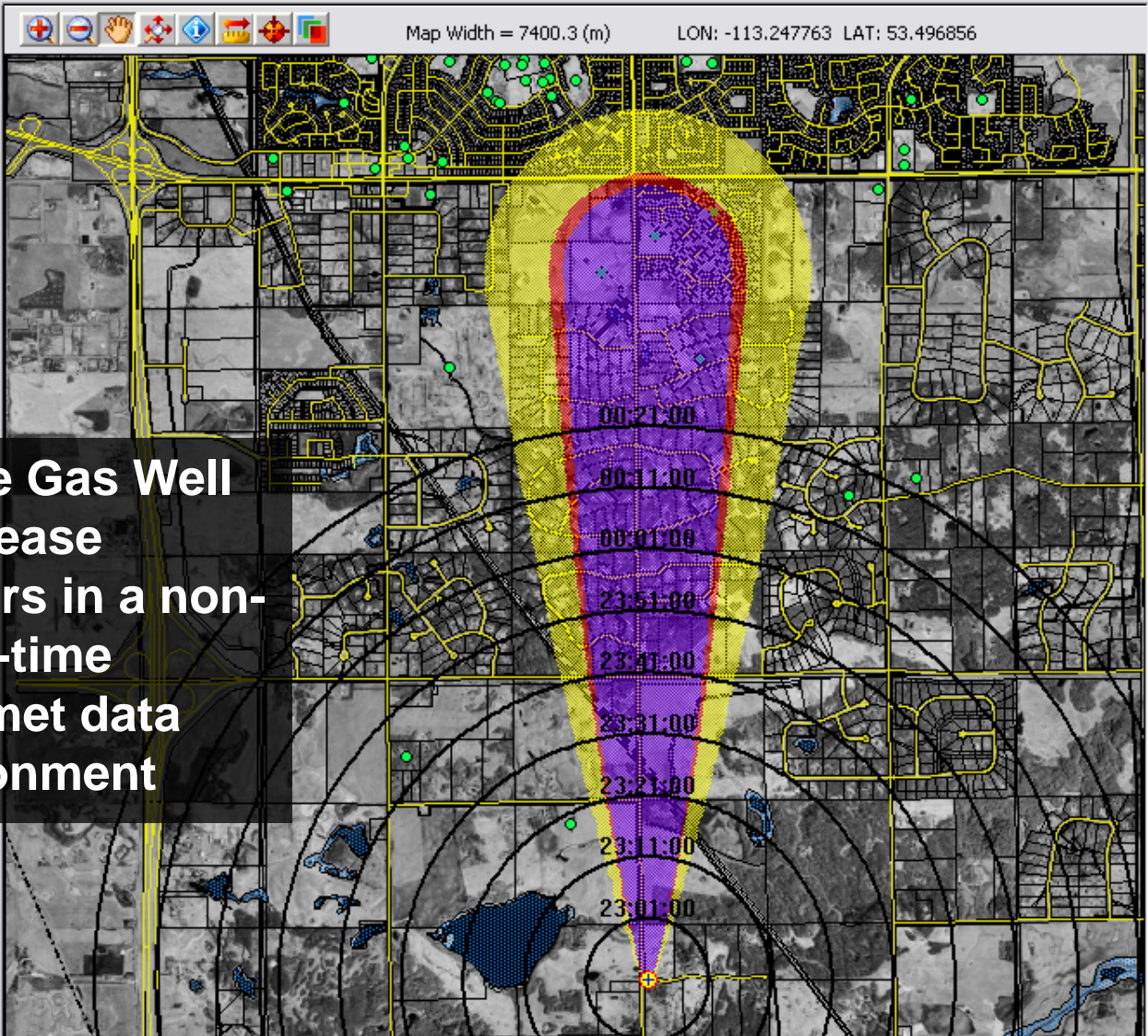
Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Manual Met  
 Last Update 23:21:37  
 Current Time 03/14/06 23:29:55  
 Release Location -113.294906, 53.465183



Map Width = 7400.3 (m) LON: -113.247763 LAT: 53.496856

Manual Simulatic

2.4 (km/h)  
 South (deg [from])  
 5.5 (deg C)  
 0 (W/m<sup>2</sup>)  
 64.0 (%)

**30 Minute Gas Well Release over 2 hours in a non-real-time static met data environment**

- Potentially impacted receptors
- Estates of Shropshire Park
  - Estates of Sherwood Park
  - Glenwood Memorial Garden
  - Whitcroft Community

Plume Interval

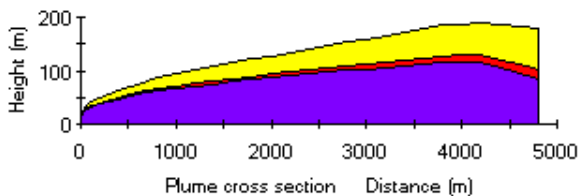
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

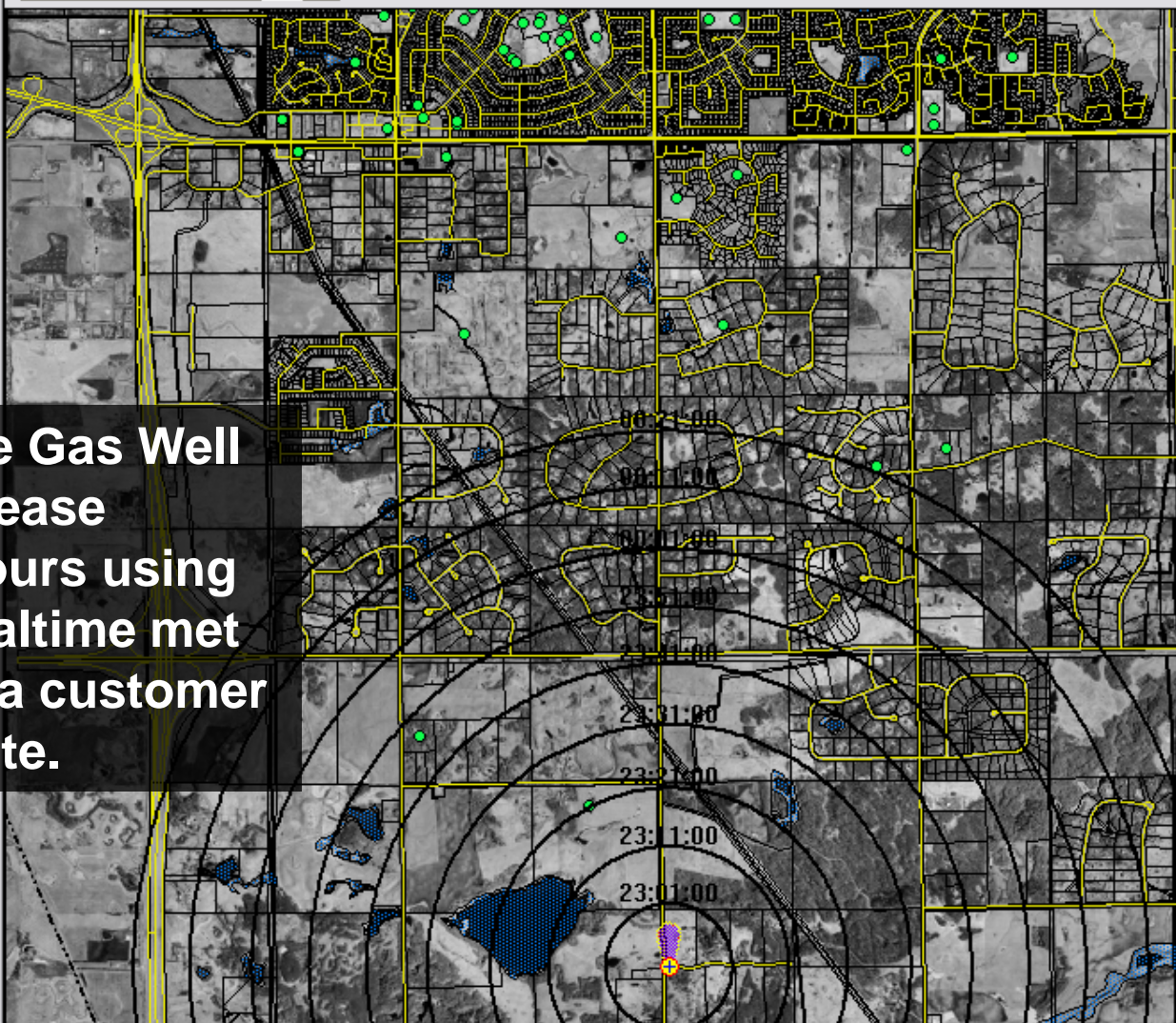
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:25:16  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.356371 LAT: 53.505633



Manual Simulatic

2.4

(km/h)

SW

(deg [from])

5.5

(deg C)

0

(W/m<sup>2</sup>)

64.0

(%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church



Plume Interval

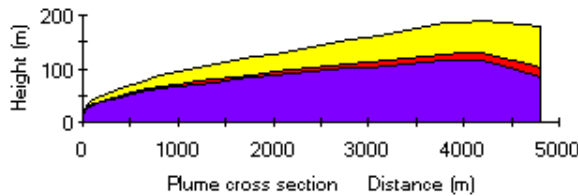
(click on map)

- 5 Minutes
- 10 Minutes**
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

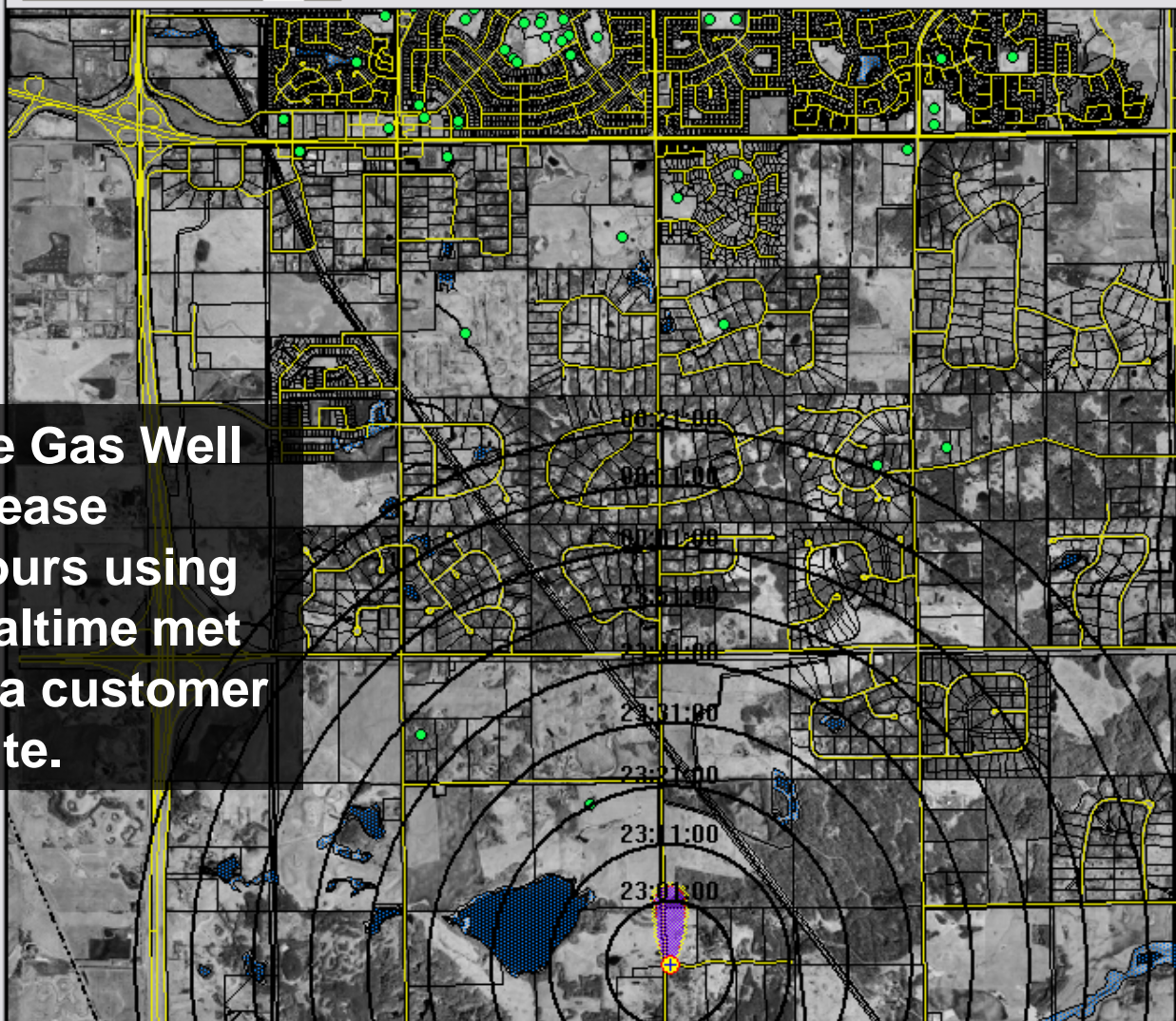
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:25:52  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4 (km/h)

SW (deg [from])

5.5 (deg C)

0 (W/m^2)

64.0 (%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

Plume Interval

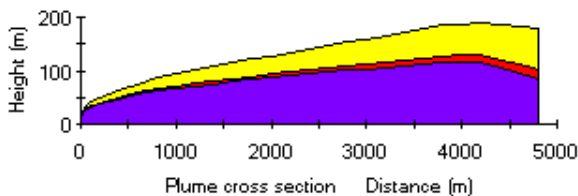
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes**
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00



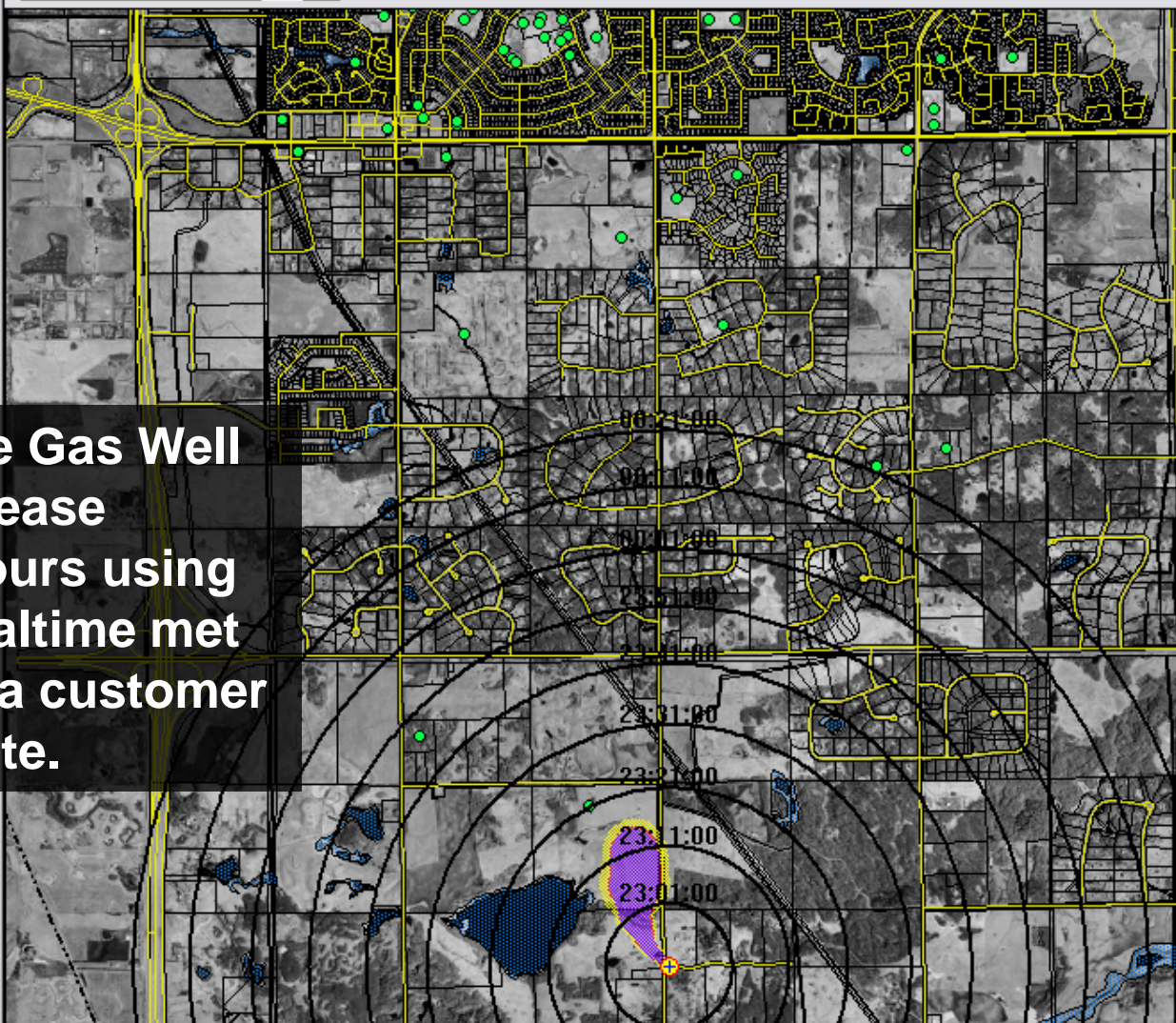
Manual Met

Last Update 23:21:37

Current Time 03/14/06 23:26:05

Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4

(km/h)

SW

(deg [from])

5.5

(deg C)

0

(W/m<sup>2</sup>)

64.0

(%)

**30 Minute Gas Well Release**  
**over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

Plume Interval

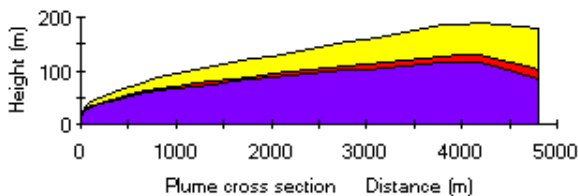
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes**
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00



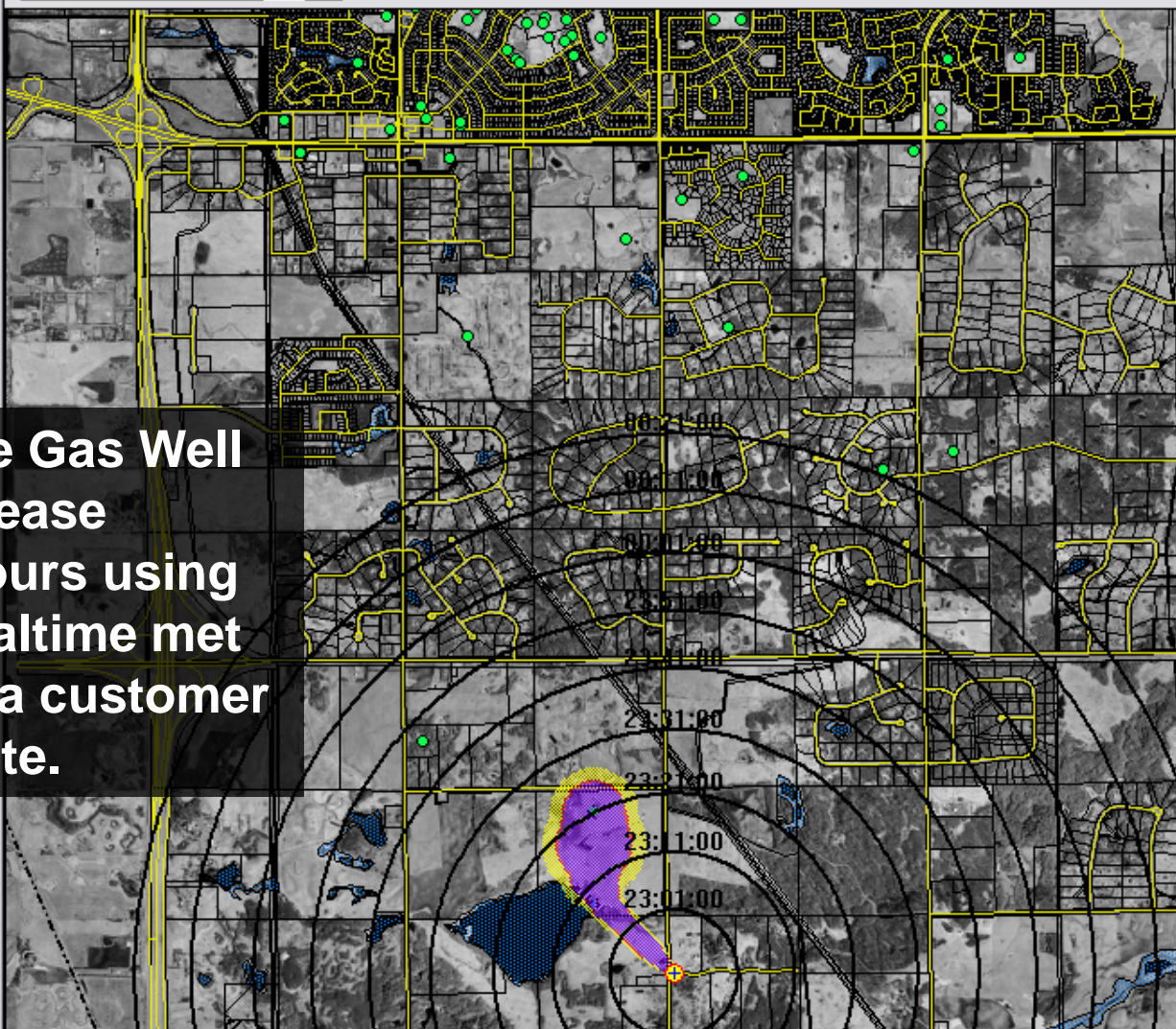
Manual Met

Last Update 23:21:37

Current Time 03/14/06 23:26:22

Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4

(km/h)

SW

(deg [from])

5.5

(deg C)

0

(W/m<sup>2</sup>)

64.0

(%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

Plume Interval

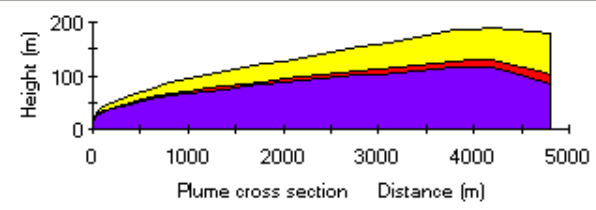
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

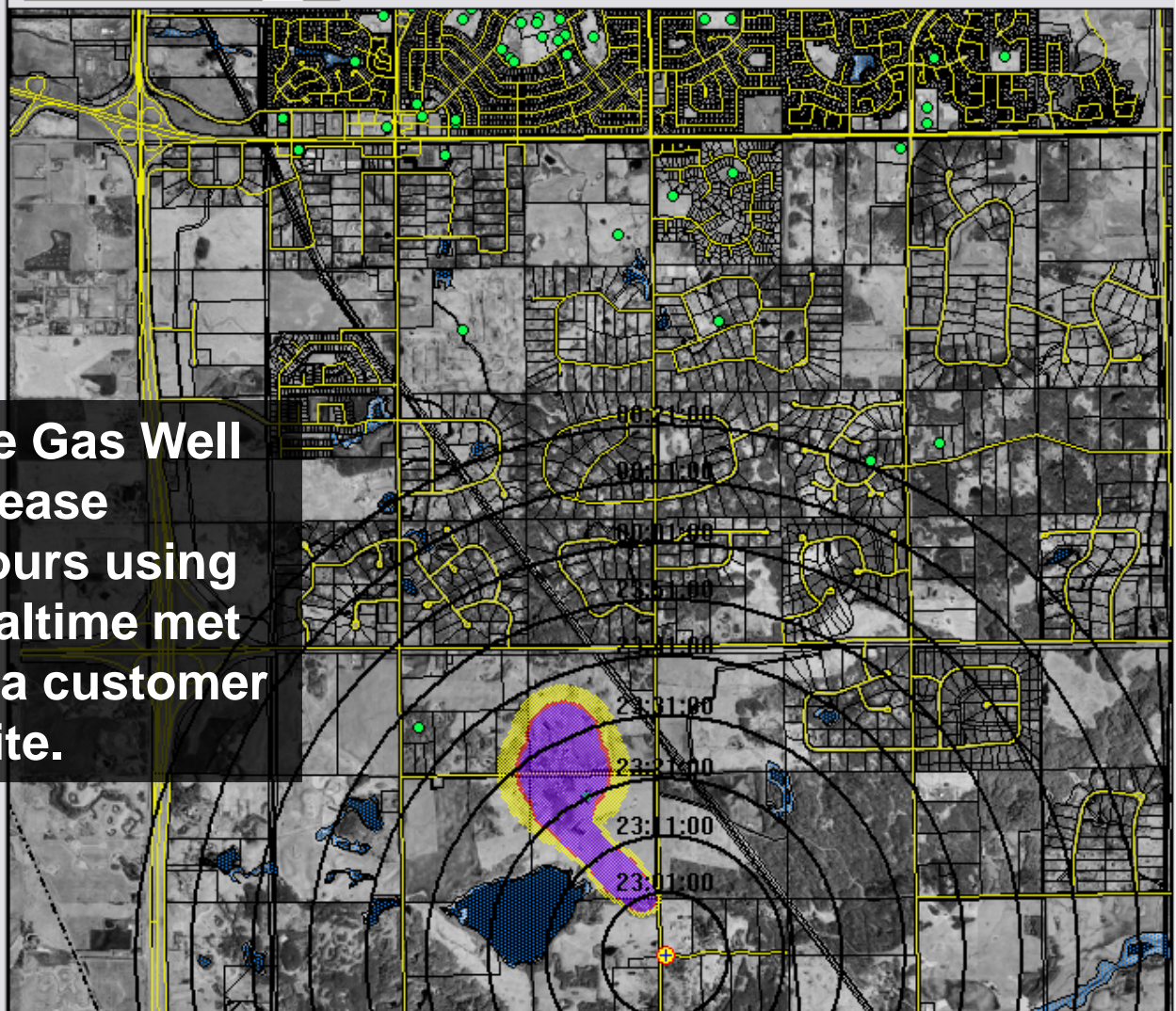
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:26:34  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4 (km/h)

SW (deg [from])

5.5 (deg C)

0 (W/m^2)

64.0 (%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

Plume Interval

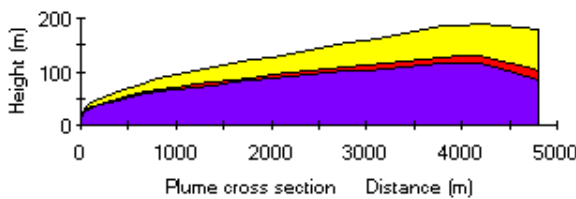
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

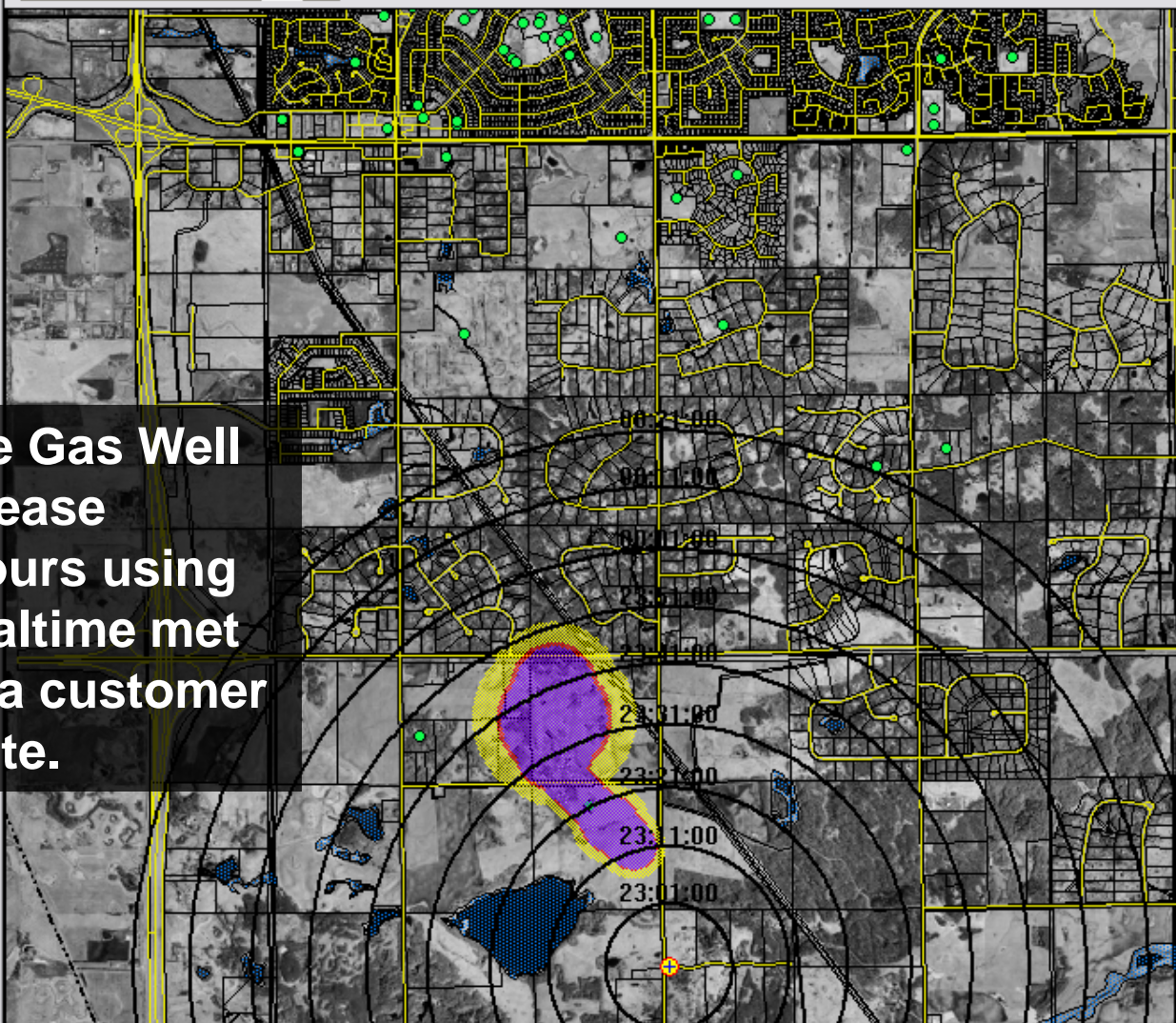
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:26:53  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4 (km/h)

SW (deg [from])

5.5 (deg C)

0 (W/m^2)

64.0 (%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

Plume Interval

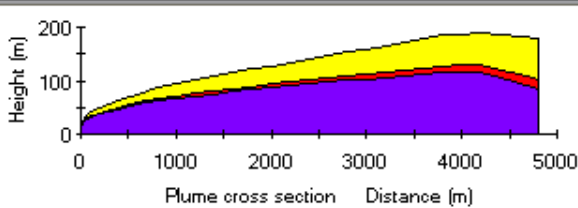
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

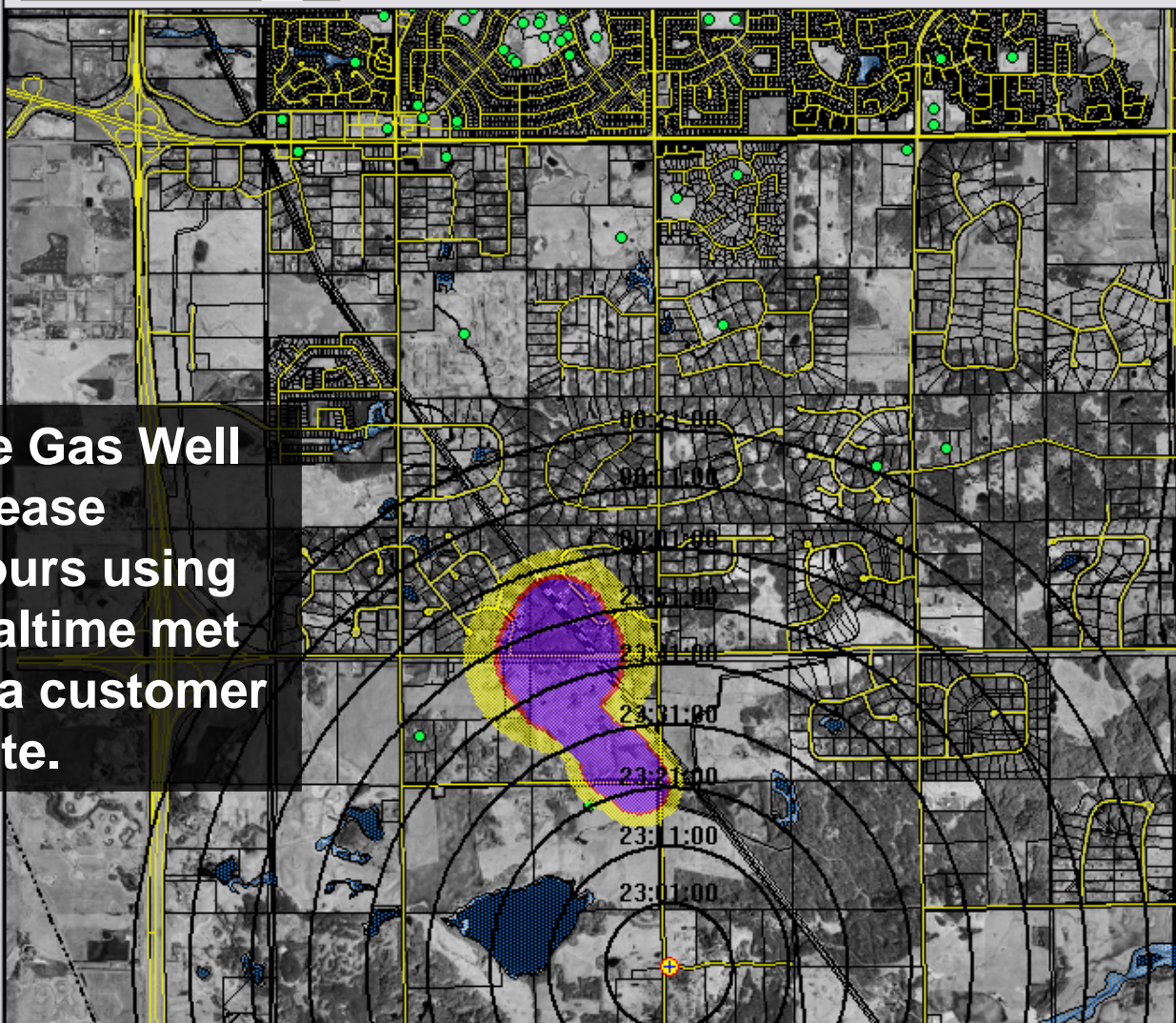
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:27:06  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4 (km/h)

SW (deg [from])

5.5 (deg C)

0 (W/m^2)

64.0 (%)

**30 Minute Gas Well Release**  
**over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial G.C.
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

Plume Interval

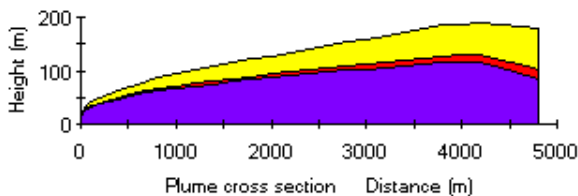
(click on map)

- 5 Minutes
- 10 Minutes
- 15 Minutes
- 20 Minutes
- 25 Minutes
- 30 Minutes
- 35 Minutes
- 40 Minutes
- 45 Minutes
- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes

Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00



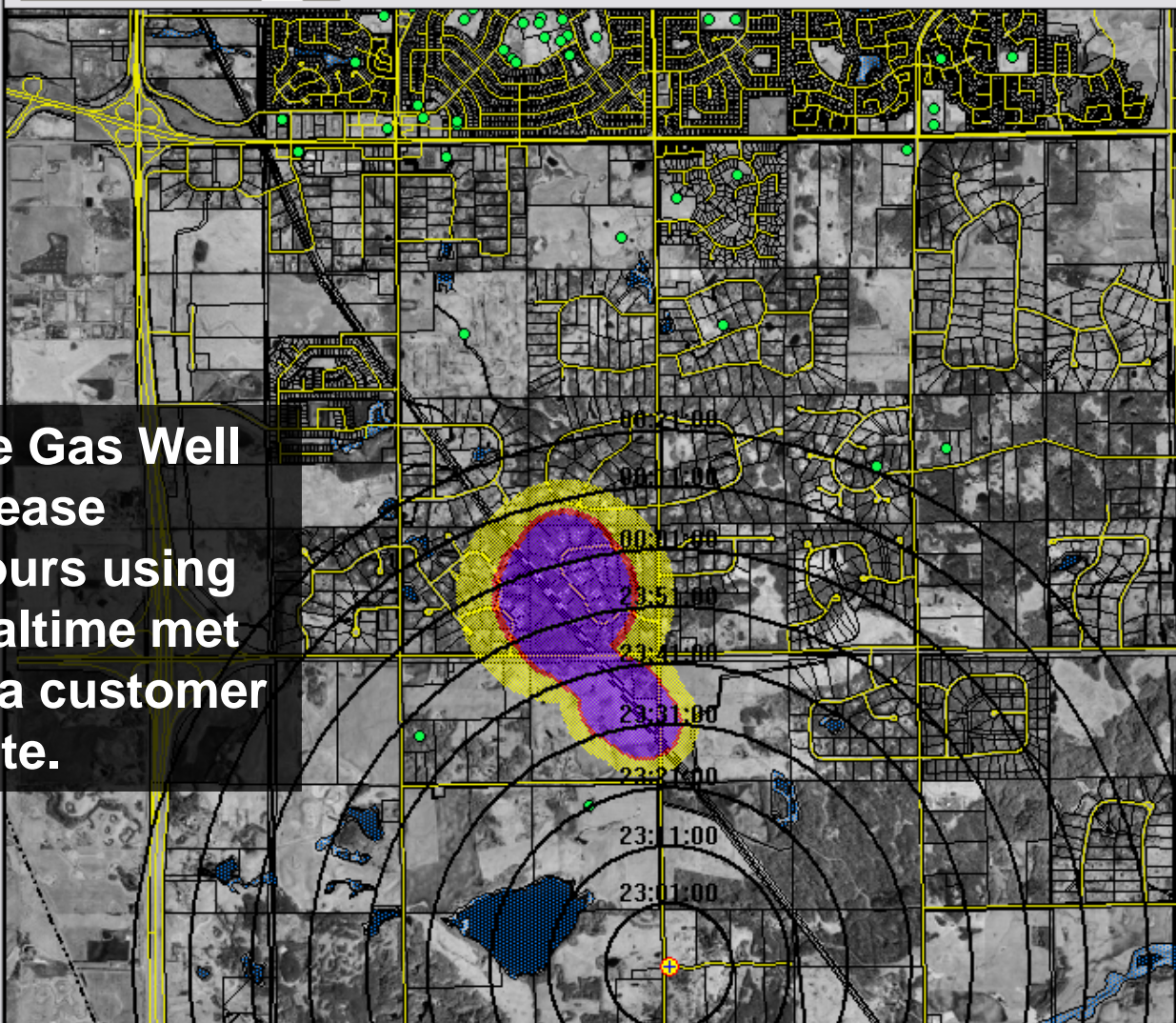
Manual Met

Last Update 23:21:37

Current Time 03/14/06 23:27:26

Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4

(km/h)

SW

(deg [from])

5.5

(deg C)

0

(W/m<sup>2</sup>)

64.0

(%)

**30 Minute Gas Well Release**  
**over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

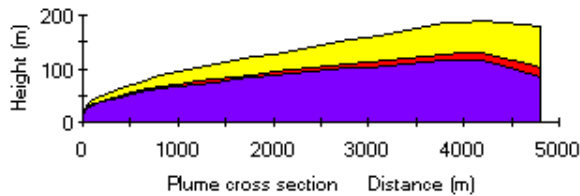
Plume Interval

- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes**
- 85 Minutes
- 90 Minutes
- 95 Minutes
- 100 Minutes
- 105 Minutes
- 110 Minutes
- 115 Minutes
- 120 Minutes
- RETURN

Gas Well Demo with H2S @:

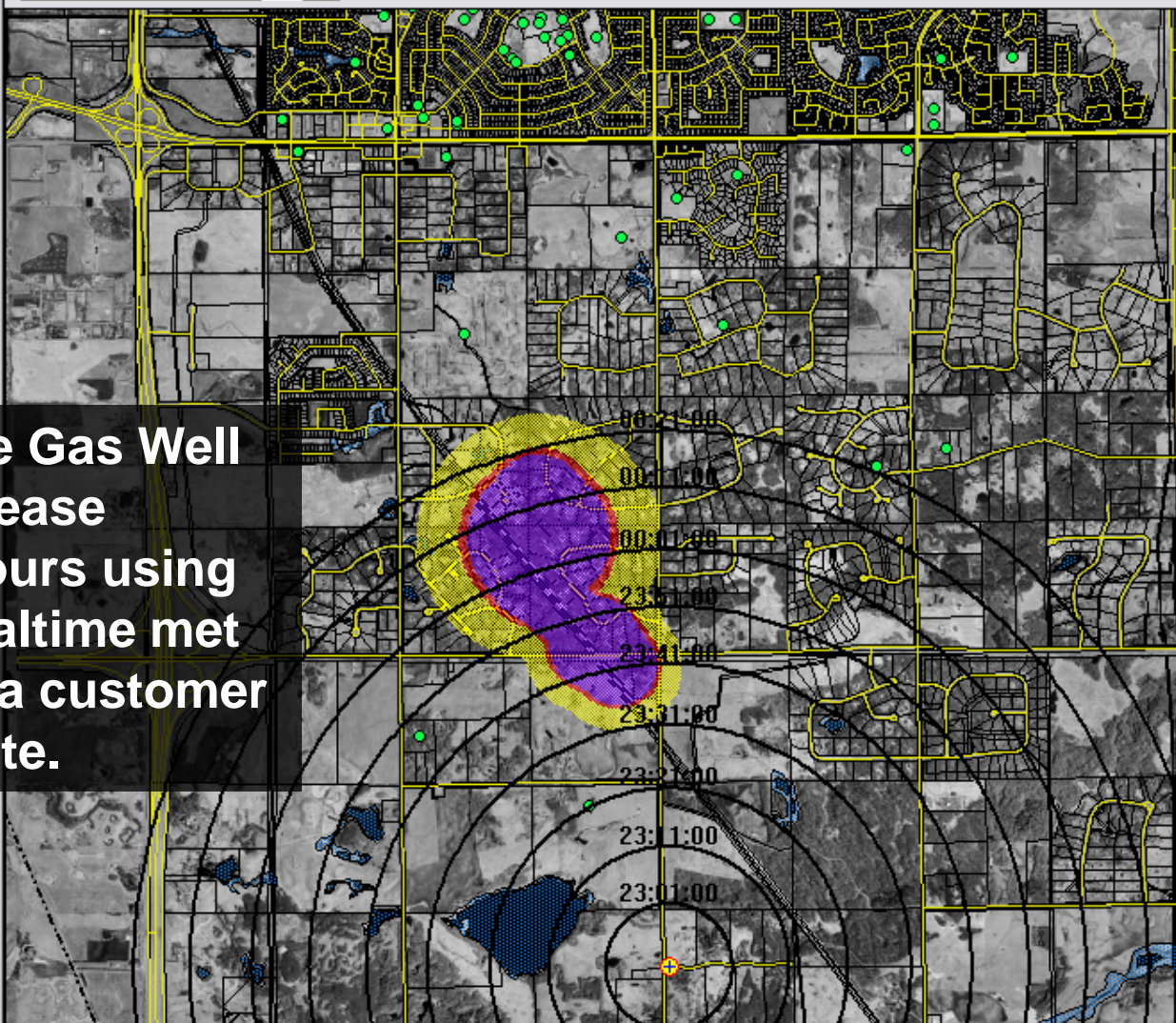
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:27:57  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4
(km/h)
SW
(deg [from])
5.5
(deg C)
0
(W/m <sup>2</sup> )
64.0
(%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church



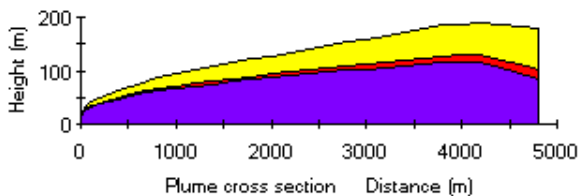
Plume Interval

- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes
- 85 Minutes
- 90 Minutes**
- 95 Minutes
- 100 Minutes
- 105 Minutes
- 110 Minutes
- 115 Minutes
- 120 Minutes
- RETURN

Gas Well Demo with H2S @:

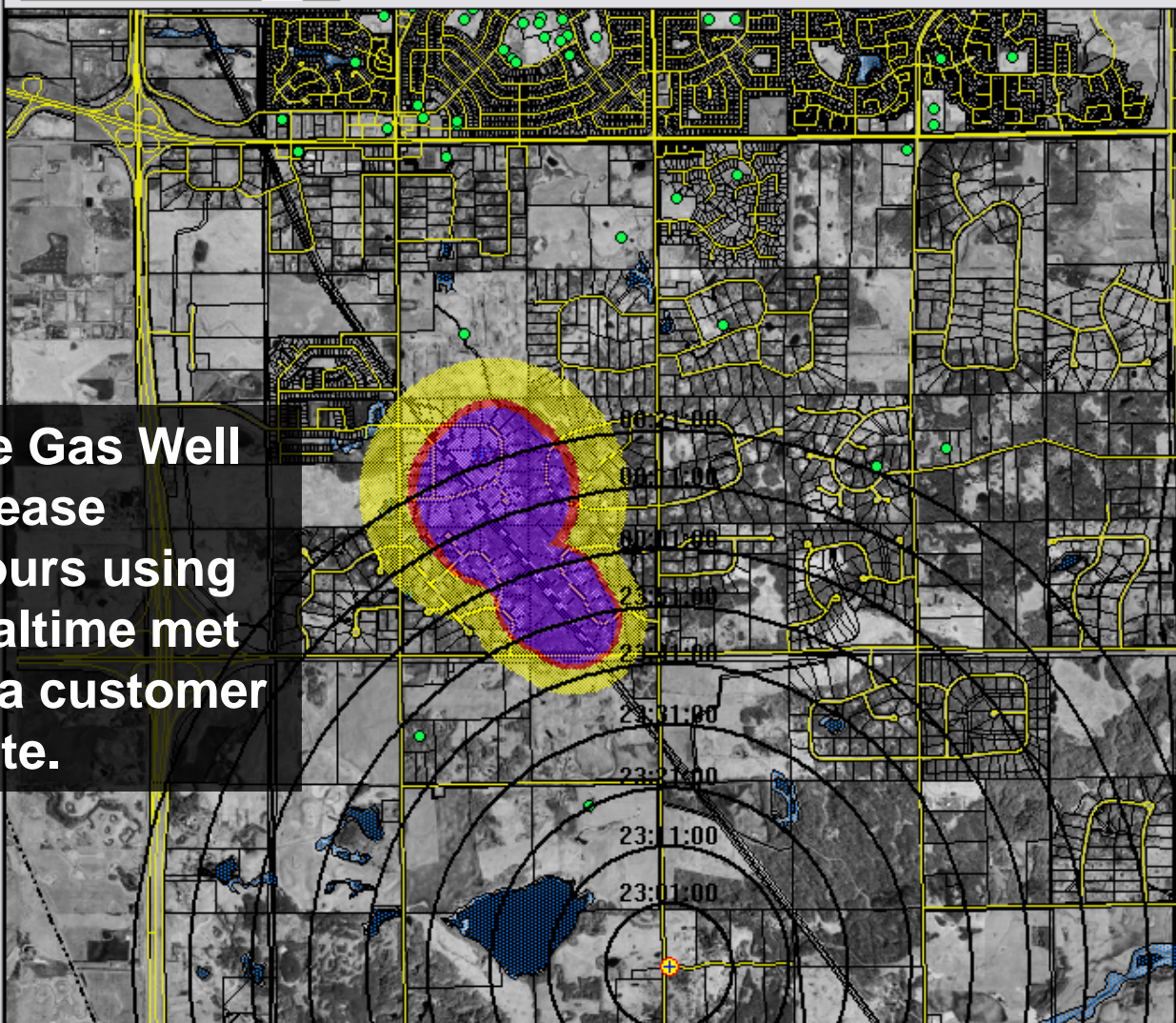
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:28:16  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4 (km/h)  
 SW (deg [from])  
 5.5 (deg C)  
 0 (W/m^2)  
 64.0 (%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

- Potentially impacted receptors
- Glenwood Memorial Golf Course
  - Sherwood Park Golf Course
  - St. Stephen's Anglican Church

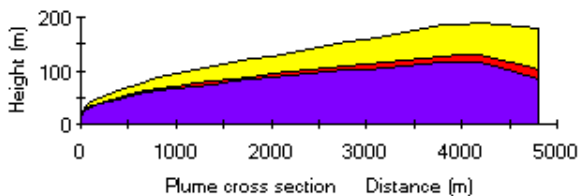
Plume Interval

- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes
- 85 Minutes
- 90 Minutes
- 95 Minutes
- 100 Minutes**
- 105 Minutes
- 110 Minutes
- 115 Minutes
- 120 Minutes
- RETURN

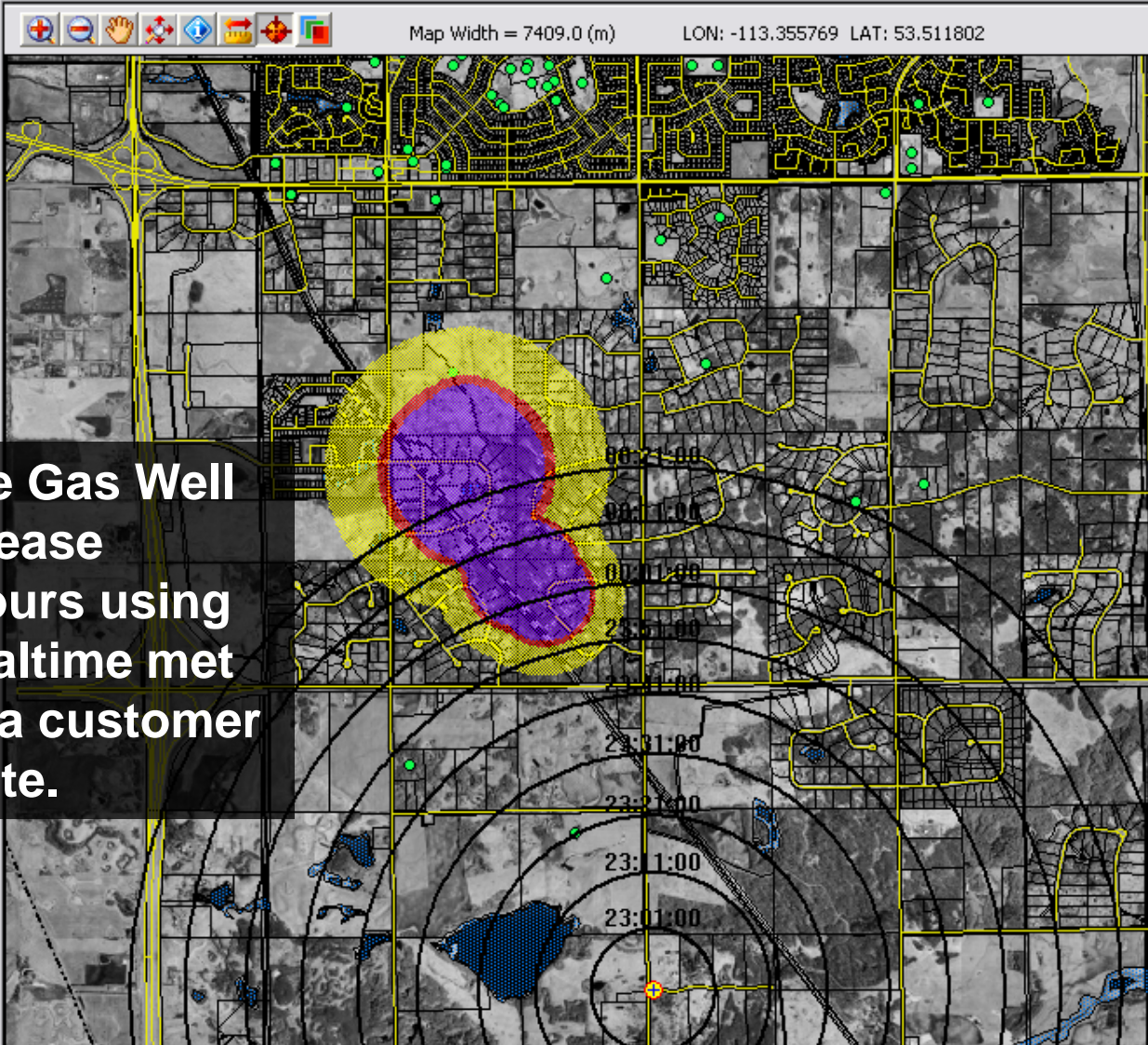
Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:28:31  
 Release Location -113.294906, 53.465183



Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802

Manual Simulatic

2.4

(km/h)

SW

(deg [from])

5.5

(deg C)

0

(W/m<sup>2</sup>)

64.0

(%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial Golf Course
- Sherwood Park Golf Course
- St. Stephen's Anglican Church

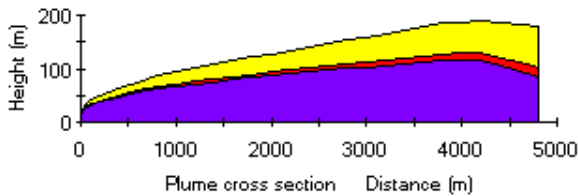
Plume Interval

- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes
- 85 Minutes
- 90 Minutes
- 95 Minutes
- 100 Minutes
- 105 Minutes
- 110 Minutes
- 115 Minutes
- 120 Minutes
- RETURN

Gas Well Demo with H2S @:

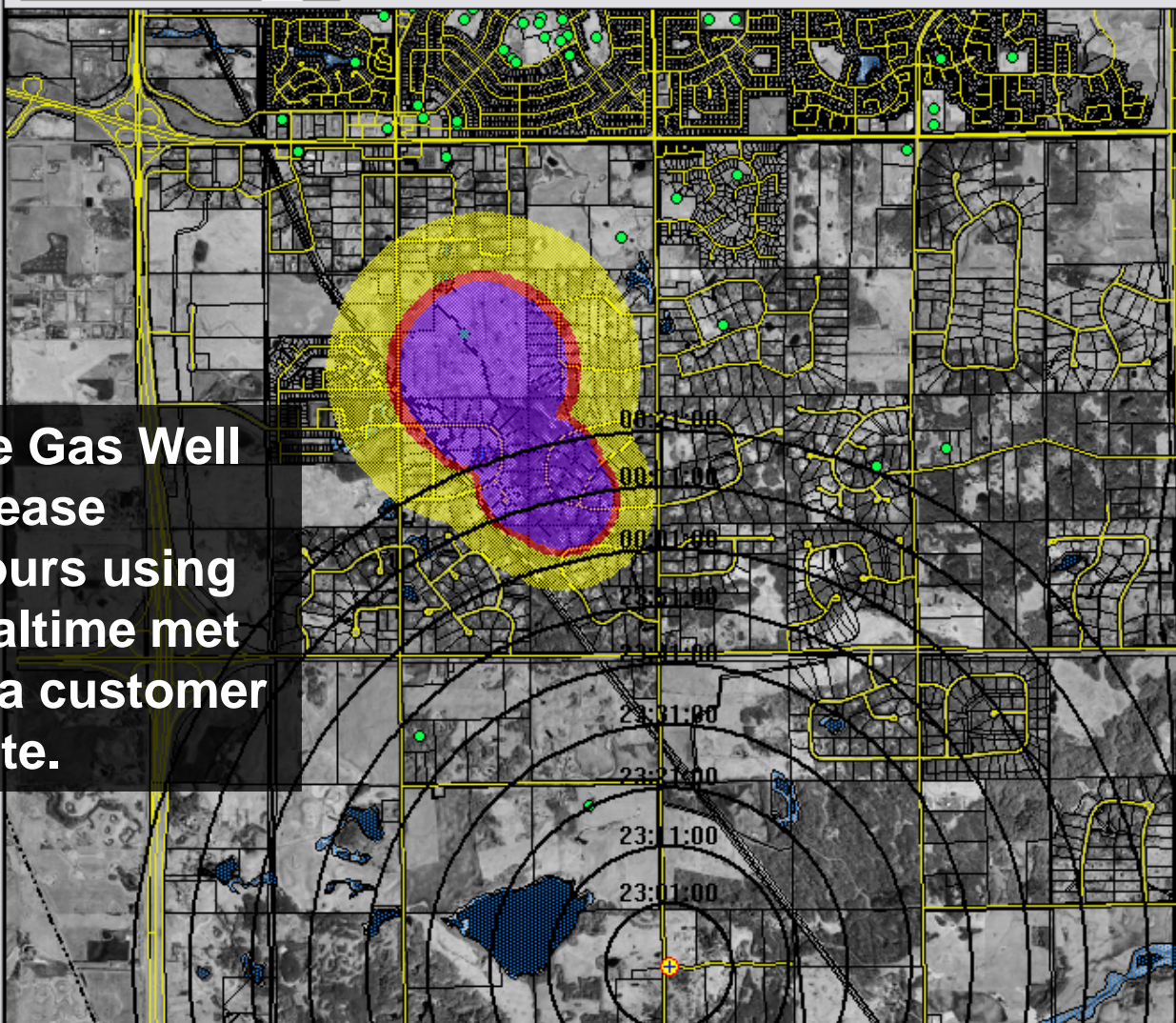
- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:29:00  
 Release Location -113.294906, 53.465183

Map Width = 7409.0 (m) LON: -113.355769 LAT: 53.511802



Manual Simulatic

2.4 (km/h)  
 SW (deg [from])  
 5.5 (deg C)  
 0 (W/m<sup>2</sup>)  
 64.0 (%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

- Potentially impacted receptors
- Glenwood Memorial G.C.
  - Sherwood Park Golf Course
  - St. Stephen's Anglican Church

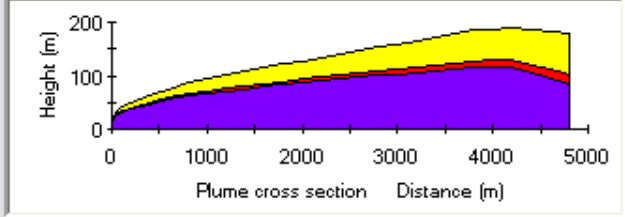
Plume Interval

- 50 Minutes
- 55 Minutes
- 60 Minutes
- 65 Minutes
- 70 Minutes
- 75 Minutes
- 80 Minutes
- 85 Minutes
- 90 Minutes
- 95 Minutes
- 100 Minutes
- 105 Minutes
- 110 Minutes
- 115 Minutes
- 120 Minutes
- RETURN

Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00

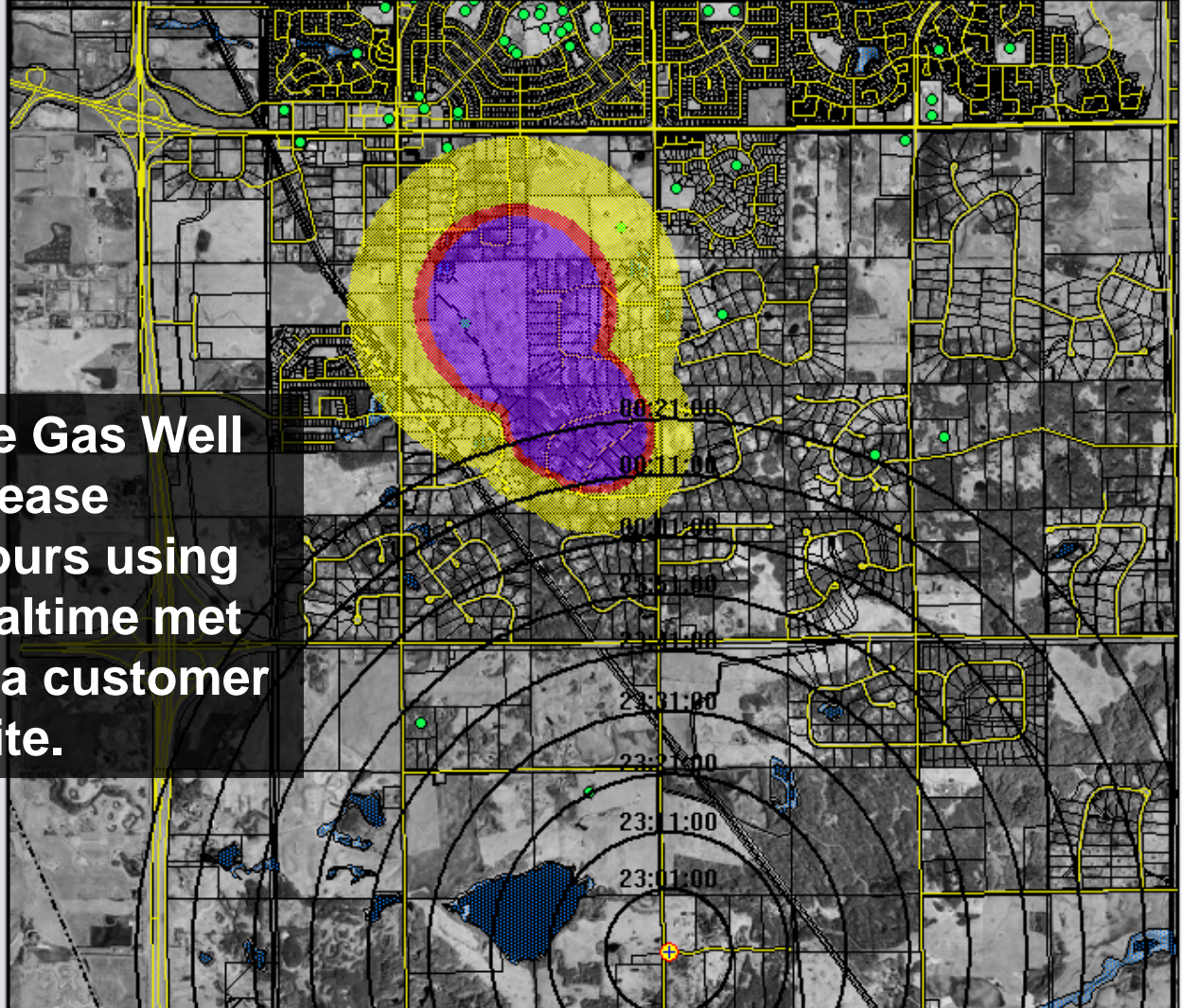
Last Update 23:21:37

Current Time 03/14/06 23:29:55

Release Location -113.294906, 53.465183

Manual Met

Map Width = 7409.0 (m) LON: -113.356723 LAT: 53.493594



Manual Simulatic

2.4	(km/h)
SW	(deg [from])
5.5	(deg C)
0	(W/m <sup>2</sup> )
64.0	(%)

**30 Minute Gas Well Release over 2 hours using actual realtime met data from a customer site.**

- Potentially impacted receptors
- Glenwood Memorial Golf Course
  - Sherwood Park Golf Course
  - St. Stephen's Anglican Church

Windows taskbar icons: Start, Help, Close, 1231, Refresh

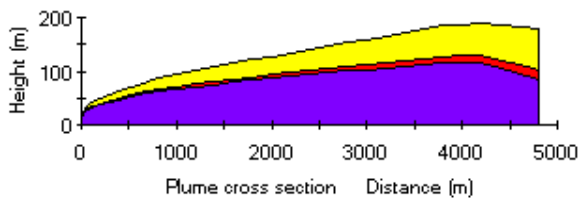
Scenario Options

- RUN THE MODEL**
- Update Scenario
- Update Manual Met
- Change to Back Calculation
- Reports
- Plume Analysis
- Infiltration Analysis
- Export Plume
- Run Pre-defined Case
- All Done (QUIT)

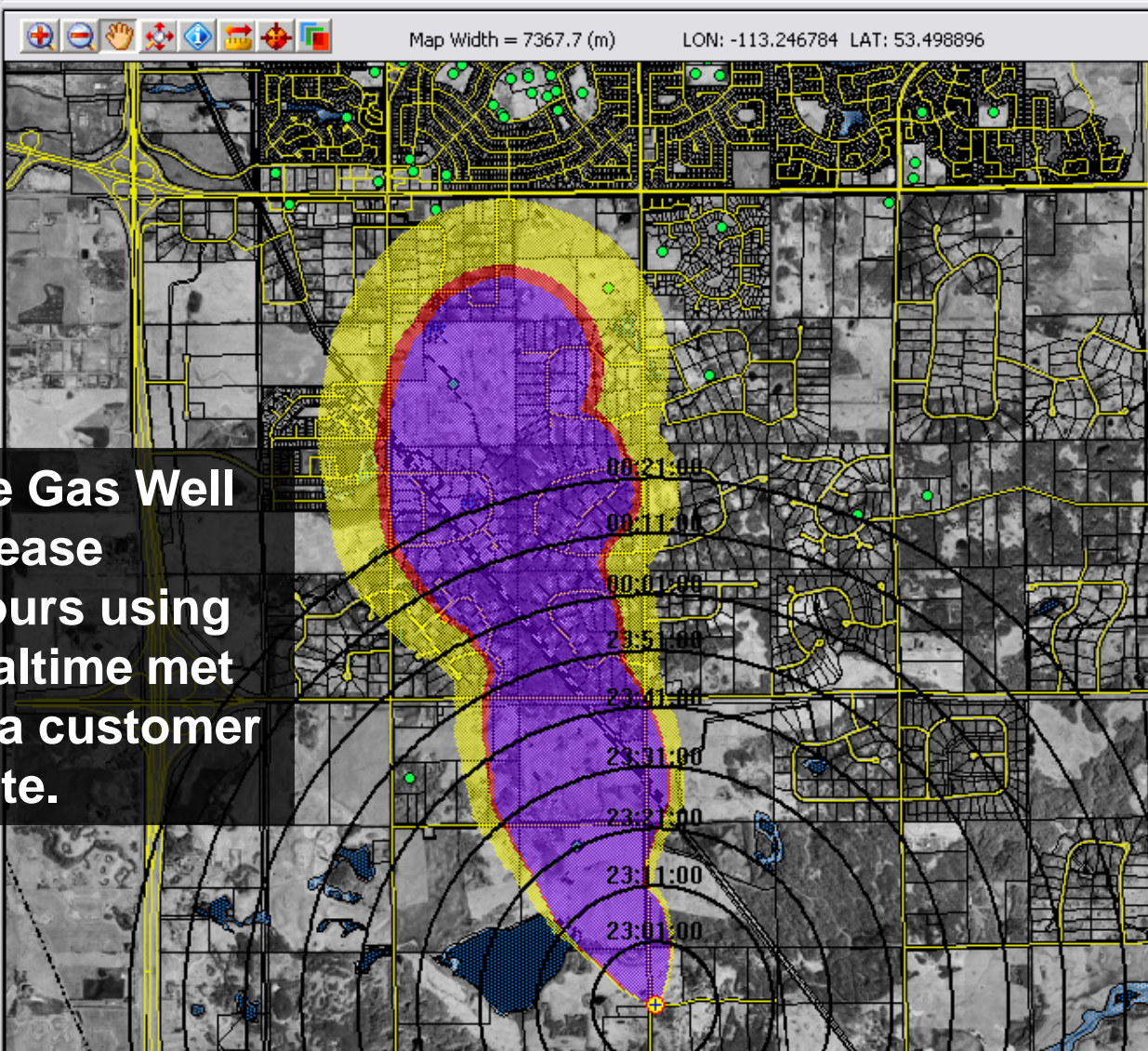
Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

View Snapshot



Release time 22:51:00  
 Last Update 23:21:37  
 Current Time 03/14/06 23:29:55  
 Release Location -113.294906, 53.465183



Manual Simulatic

2.4 (km/h)

SW (deg [from])

5.5 (deg C)

0 (W/m^2)

64.0 (%)

**30 Minute Gas Well Release**  
**over 2 hours using actual realtime met data from a customer site.**

Potentially impacted receptors

- Glenwood Memorial G.C.
- Sherwood Park Golf Course
- St. Stephen's Anglican Church



Scenario Options

**RUN THE MODEL**

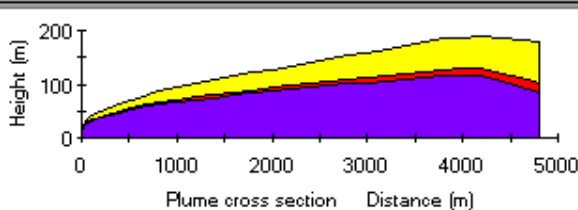
- Update Scenario
- Update Manual Met
- Change to Back Calculation Reports
- Plume Analysis
- Infiltration Analysis
- Export Plume
- Run Pre-defined Case
- All Done (QUIT)



Gas Well Demo with H2S @:

- 0.5 (ppm)
- 27.0 (ppm)
- 50.0 (ppm)

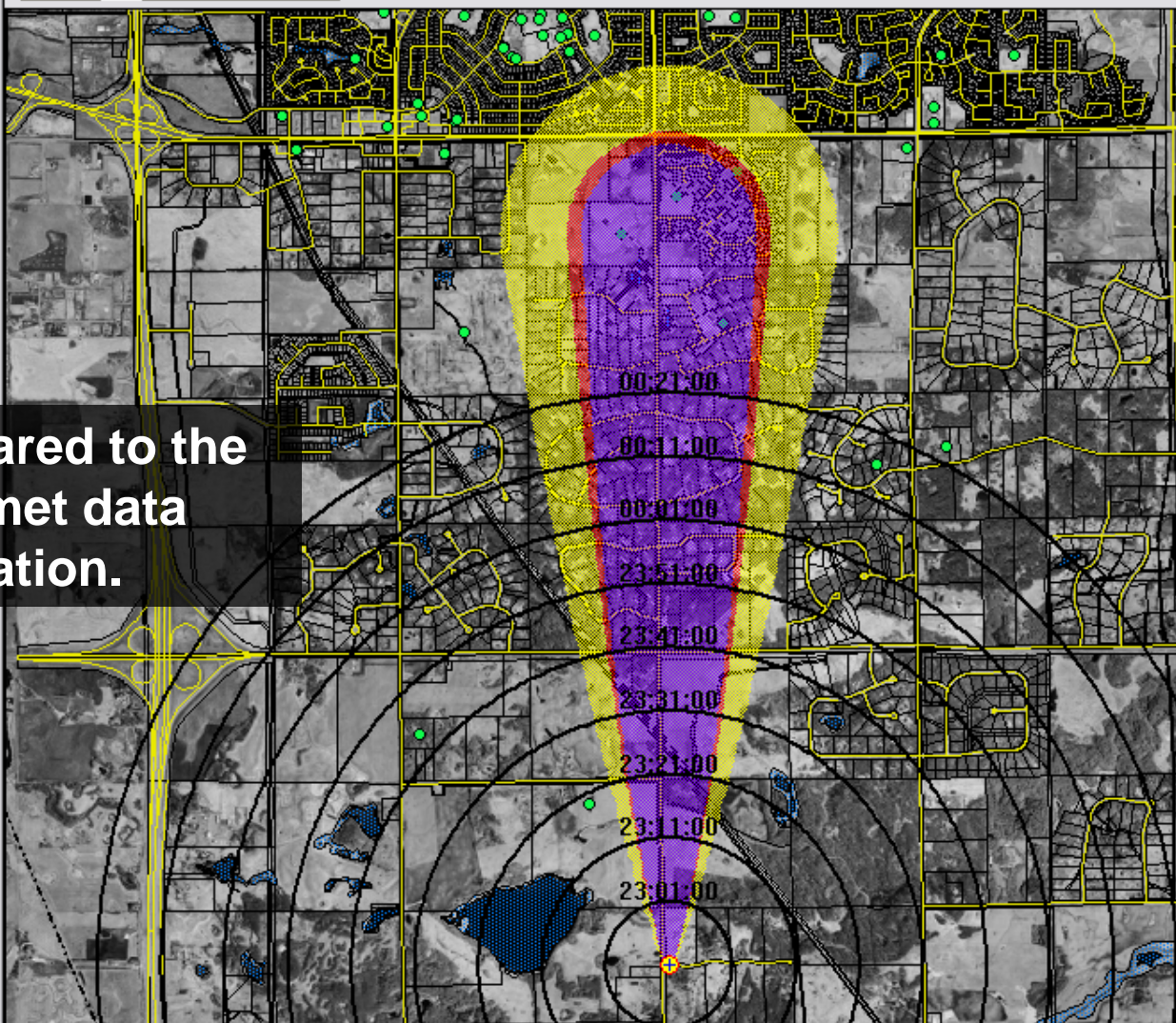
View Snapshot



Release time 22:51:00  
 Manual Met  
 Last Update 23:21:37  
 Current Time 03/14/06 23:29:55  
 Release Location -113.294906, 53.465183



Map Width = 7400.3 (m) LON: -113.247763 LAT: 53.496856



Manual Simulatic

2.4 (km/h)  
 South (deg [from])  
 5.5 (deg C)  
 0 (W/m^2)  
 64.0 (%)

**As compared to the static met data situation.**

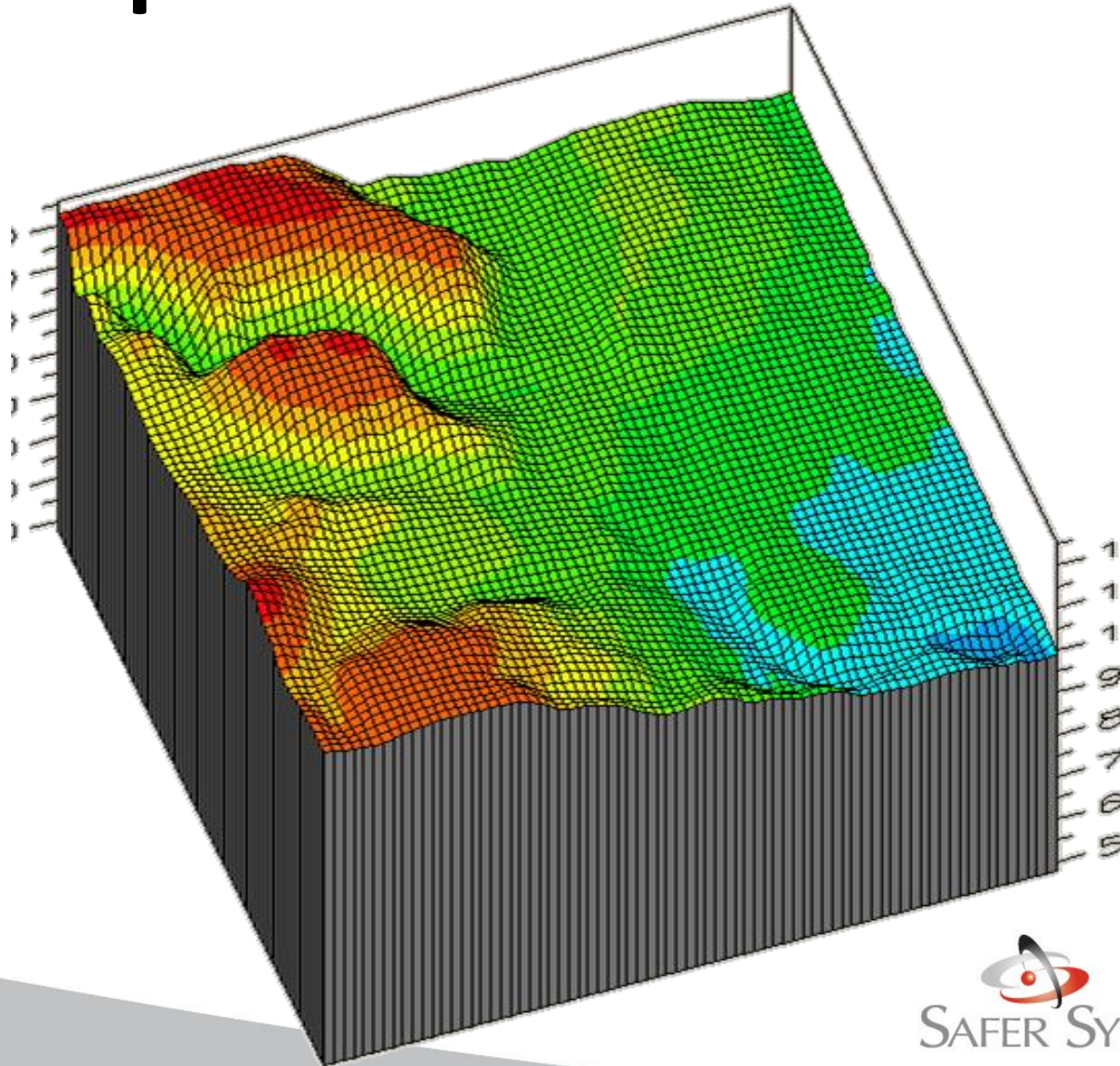
Potentially impacted

- Estates Of Sherwood Park
- Estates of Sherwood Park
- Glenwood Memorial Garden
- Whitcroft Community Hall

# Complex Terrain?



# Complex Terrain Wind Fields



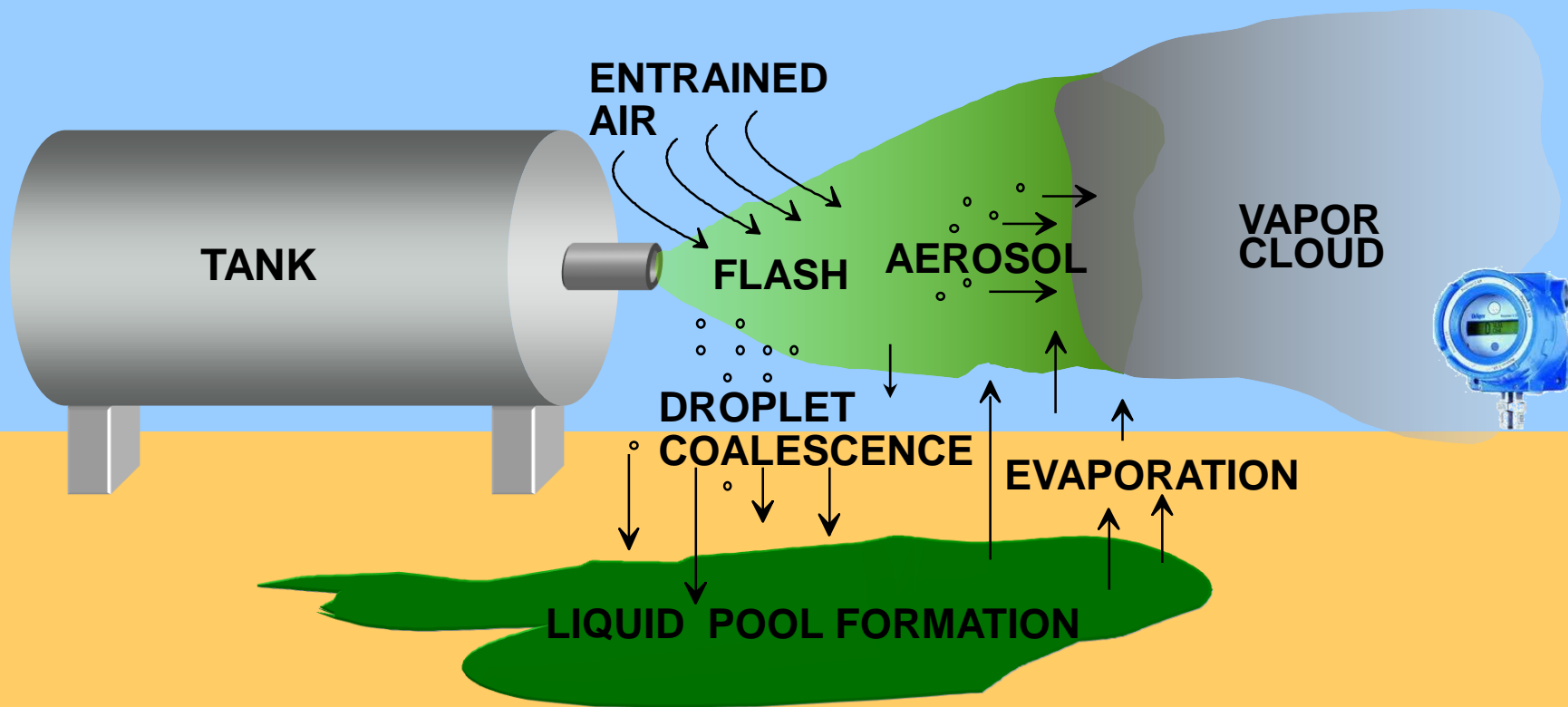


**What is the release rate ?**



# Advanced Back Calculation (ABC)

Release rate calculation based on real-time weather and gas concentration data input



Select an Activity

EMERGENCY

- Practice
- Replay
- Quick Report
- Corridor Location
- Admin Access



Potentially impacted receptors

- BENJAMIN FRANKLIN ELEI
- BESSIE OWENS COMMUNI
- BRUNSWICK STATION
- Callahan Park
- Calumet
- Cline Gardens Church
- EAST CHICAGO PUBLIC LI
- Garv Regional Airport
- GEORGE WASHINGTON E
- Gibson Woods Park
- HARBOR STATION
- Ispat Steel
- JOSEPH L BLOCK JR HIGH
- Mark Town Park
- Marktown
- MARTIN LUTHER KING CO

Release time

Elapsed Time  (Minutes)

Last Update

Current Time 1/12/2008 5:40:57 PM

Release Location -87.481774, 41.669518

**Idle Mode with GPS Sensors,  
Downwind Corridor &  
Receptor List**



WeatherPak

13.5  
(km/h)

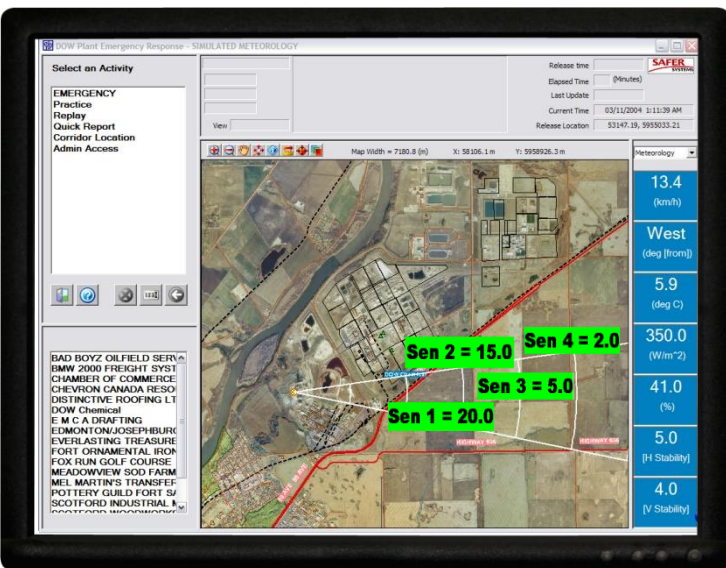
NW  
(deg [from])

15.0  
(deg C)

345  
(W/m<sup>2</sup>)

62.0  
(%)

# Plume Measurement vs. Modeling Alone



Remote Sensing Data or  
 and meteorological readings.

All data are archived for incident  
 debris, post-toxicological impact  
 systems, environmental analysis and  
 prepared

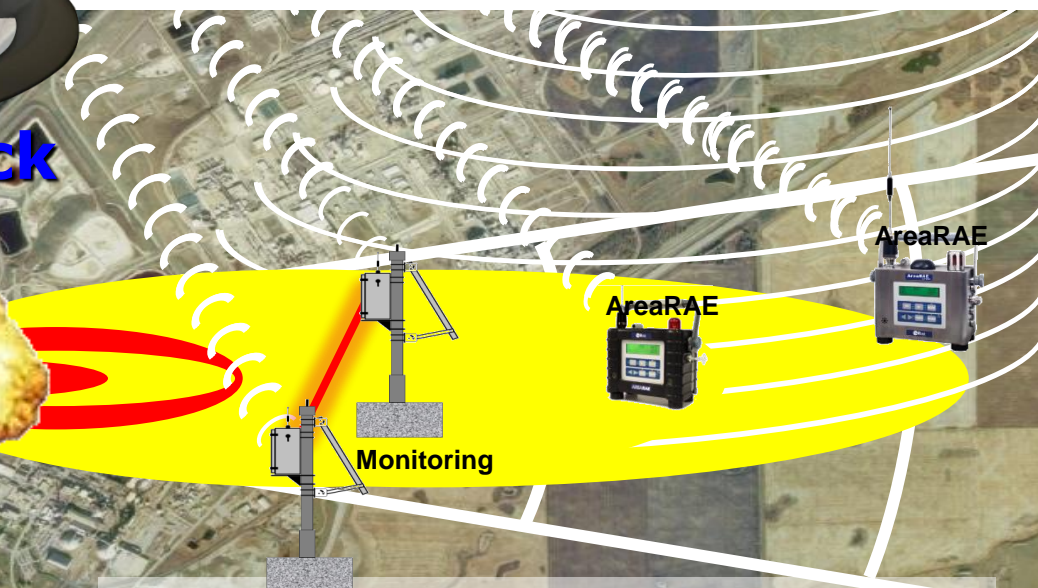
LEL (High)  
 Toxic (Medium)  
 Odor (Low)

SAFER

Advanced Back  
 Calculation



Loss of  
 Containment



Weather Based Prediction To  
 An Impact assessment continuously updated or  
 Identify Facilities At Risk

# Combustion Analysis Model

Fire and Explosion Emergency Response  
Decision Support Solution



Ran the Model. now what to do?

- Run the Model
- Update scenario
- Show ABC rate graph (dynamic)
- Show Map (dynamic-ABC)
- Analysis (dyn - no F&E)
- Infiltration (dyn - no F&E)
- Exfiltration (dynamic)

- Reports**
- Transfer Scenario
  - Export plume data for 3rd part
  - Switch to ABC (dyn - no F&E)
  - Save Case (dyn - case tool)
  - Save Pre. Scen. As Case (dyn)
  - All Done (QUIT)



LPG

- 1500.0 (W/m<sup>2</sup>)
- 5000.0 (W/m<sup>2</sup>)
- 10000.0 (W/m<sup>2</sup>)

View Thermal Radiation

Release time 10:46:43 AM

Elapsed Time 16 (Minutes)

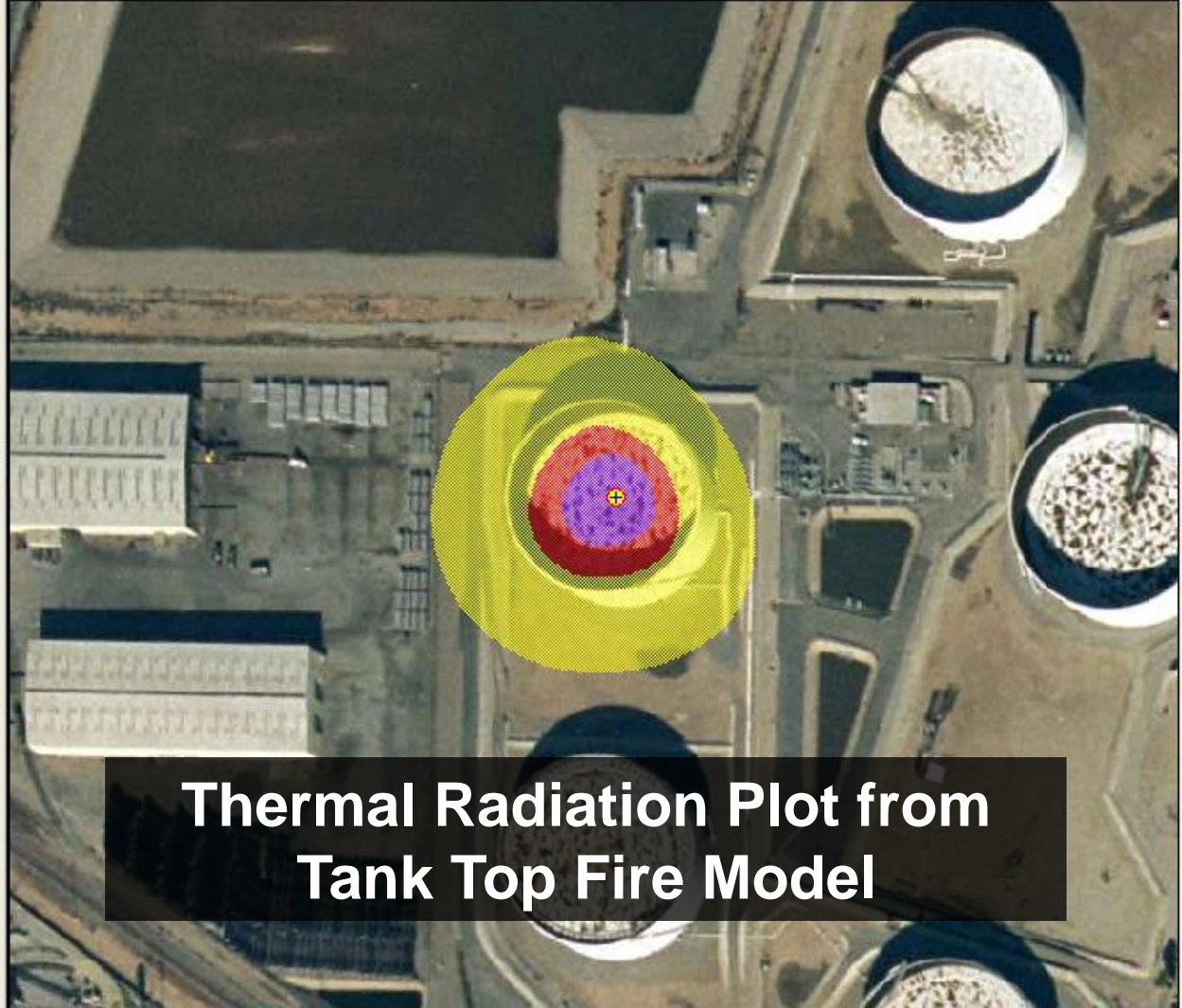
Last Update 11:02:45 AM

Current Time 10/22/2002 11:03:25 AM

Release Location 1976460.75, 533596.82



Map Width = 436 m X: 1976241.87 m Y: 533743.11 m



**Thermal Radiation Plot from Tank Top Fire Model**

Station 1

- 8.9 (mph)
- NE (deg [from])
- 80.3 (deg F)
- 780.0 (W/m<sup>2</sup>)
- 56.0 (%)
- 3.0 [H Stability]
- 2.0 [V Stability]

REPORT OPTIONS

- Release Information
- Release Scenario
- Sensor Readings Report
- Meteorology Report
- Downwind Distance Report
- Structural Damage Report
- Company Specific Report
- Receptor Dosage Report
- Receptor Details Report
- Chemical Toxicity Report

---

- Infiltration Report
- Chemical Properties Report
- Isopleth Limits Report

LPG

1500.0 (W/m<sup>2</sup>)

5000.0 (W/m<sup>2</sup>)

10000.0 (W/m<sup>2</sup>)

View Thermal Radiation

Release time 10:46:43 AM

Elapsed Time 17 (Minutes)

Last Update 11:02:45 AM

Current Time 10/22/2002 11:04:13 AM

Release Location 1976460.75, 533596.82



# Structural Damage Report from tank top fire model

Release time: 10/22/2002 10:46:43 AM

## Structural Damage Report

Effects	Thermal radiation (W/m <sup>2</sup> )	Distance (ft)
Comfortable zone	1600.0	223.8
Causes pain within 20 seconds	4000.0	128.9
Second degree burns	9500.0	71.2
Melting of plastic tubing	12500.0	58.7
Damage to process equipment	37500.0	25.9

Station 1

5.2 (mph)

ENE (deg [from])

80.3 (deg F)

780.0 (W/m<sup>2</sup>)

56.0 (%)

3.0 [H Stability]

2.0 [V Stability]





Scenario Options



SOOT

10 (mg/m<sup>3</sup>)100 (mg/m<sup>3</sup>)1000 (mg/m<sup>3</sup>)

# Combustion Analysis Model

## Tank Top Fire

### Products of Combustion

Release Time: 3:26:00 AM

Manual Met

Current Time: 4/20/2011 4:13:25 AM

Release Location: 388860.1, 4736336.2



Map Width = 14919.9 (m) X: 375536.7 m Y: 4755089.8 m

#### Case summary

Receptor

Combustion

#### Gas Composition (mass):

N<sub>2</sub> 43.7 (%)CO<sub>2</sub> 17.8 (%)

CO 16.1 (%)

H<sub>2</sub>O 12.3 (%)CH<sub>4</sub> 5.4 (%)H<sub>2</sub> 4.8 (%)NH<sub>3</sub> 0.02 (%)

#### Gas rate:

40487.8 (kg/min)

#### Soot rate:

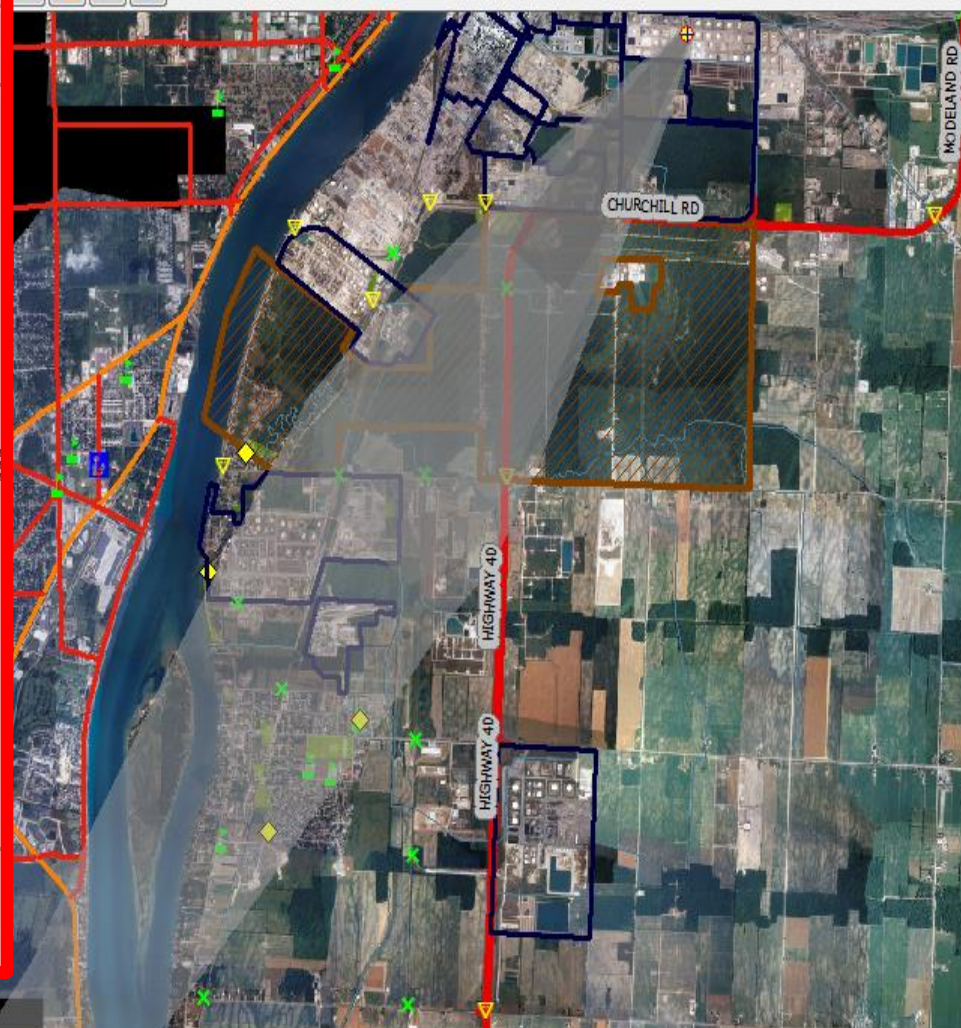
5949.1 (kg/min)

#### Release temperature:

617.0 (deg C)

#### Air to Fuel ratio:

1.0 (Very Sooty)



AWS

9.5  
(km/h)

NE  
(deg [from])

22.0  
(deg C)

750  
(W/m<sup>2</sup>)

75.0  
(%)





Soot Deposition

Reports

- Update Limits
- Update Manual Met
- Export Deposition
- Show in Google Earth
- RETURN



Case summary Receptor Combustion

Gas Composition (mass):

- N2 43.7 (%)
- CO2 17.8 (%)
- CO 16.1 (%)
- H2O 12.3 (%)
- CH4 5.4 (%)
- H2 4.8 (%)
- NH3 0.02 (%)

Gas rate:

40487.8 (kg/min)

Soot rate:

5949.1 (kg/min)

Release temperature:

617.0 (deg C)

Air to Fuel ratio:

1.0 (Very Sooty)

SOOT

10 (mg/m2)

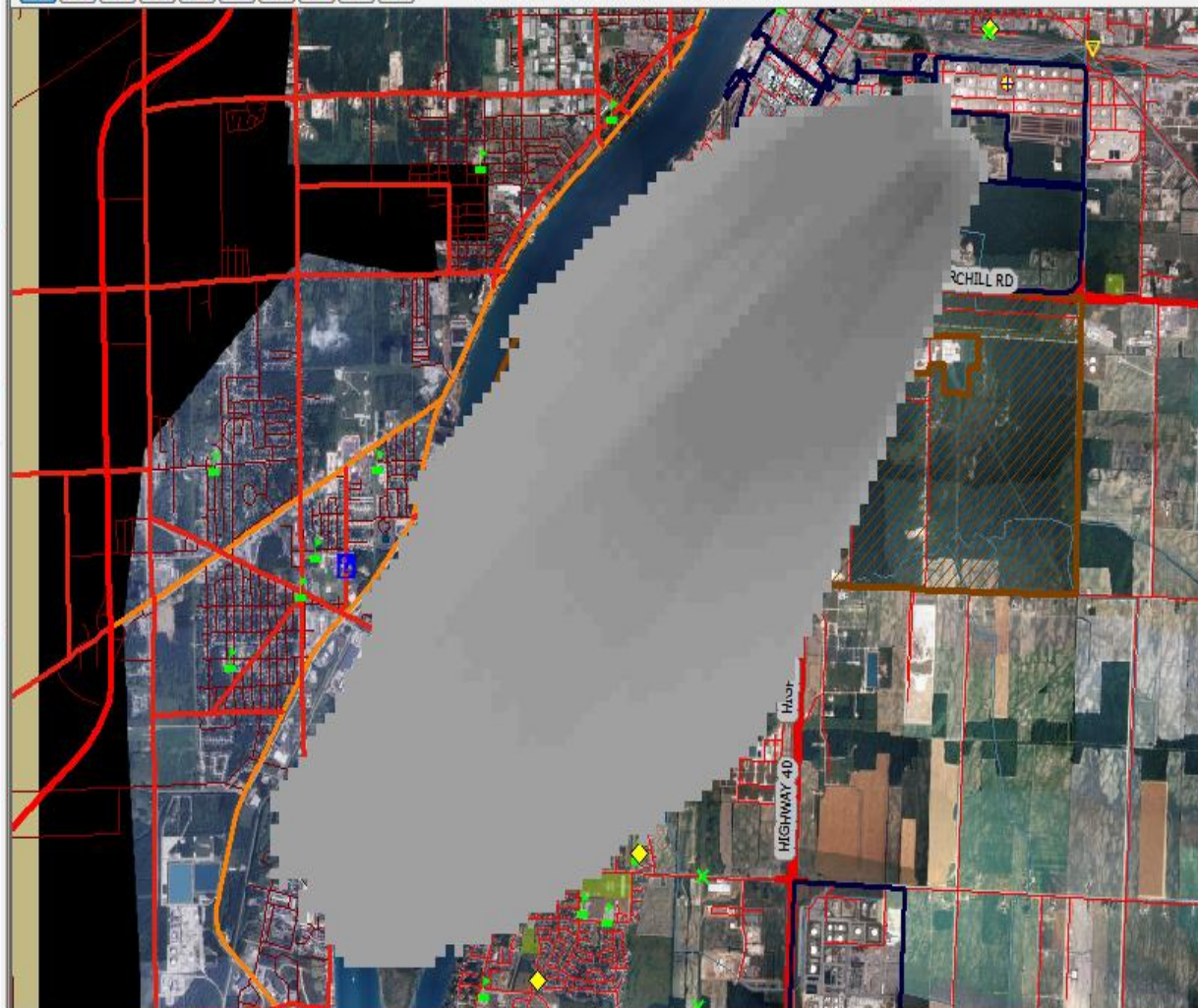
100 (mg/m2)

1000 (mg/m2)

Deposition



Map Width = 13034.9 (m) X: 378077.1 m Y: 4755103.2 m



AWS

9.5 (km/h)

NE (deg [from])

22.0 (deg C)

750 (W/m<sup>2</sup>)

75.0 (%)

# Beyond Emergency Response



# Thank You !



The right response to a chemical emergency.