

Risk management in process industry – practical approach in Poland

Andrzej Kozak
Office of Technical Inspection
02-353 Warsaw
34, Szczesliwicka Str.
Poland
andrzej.kozak@udt.gov.pl

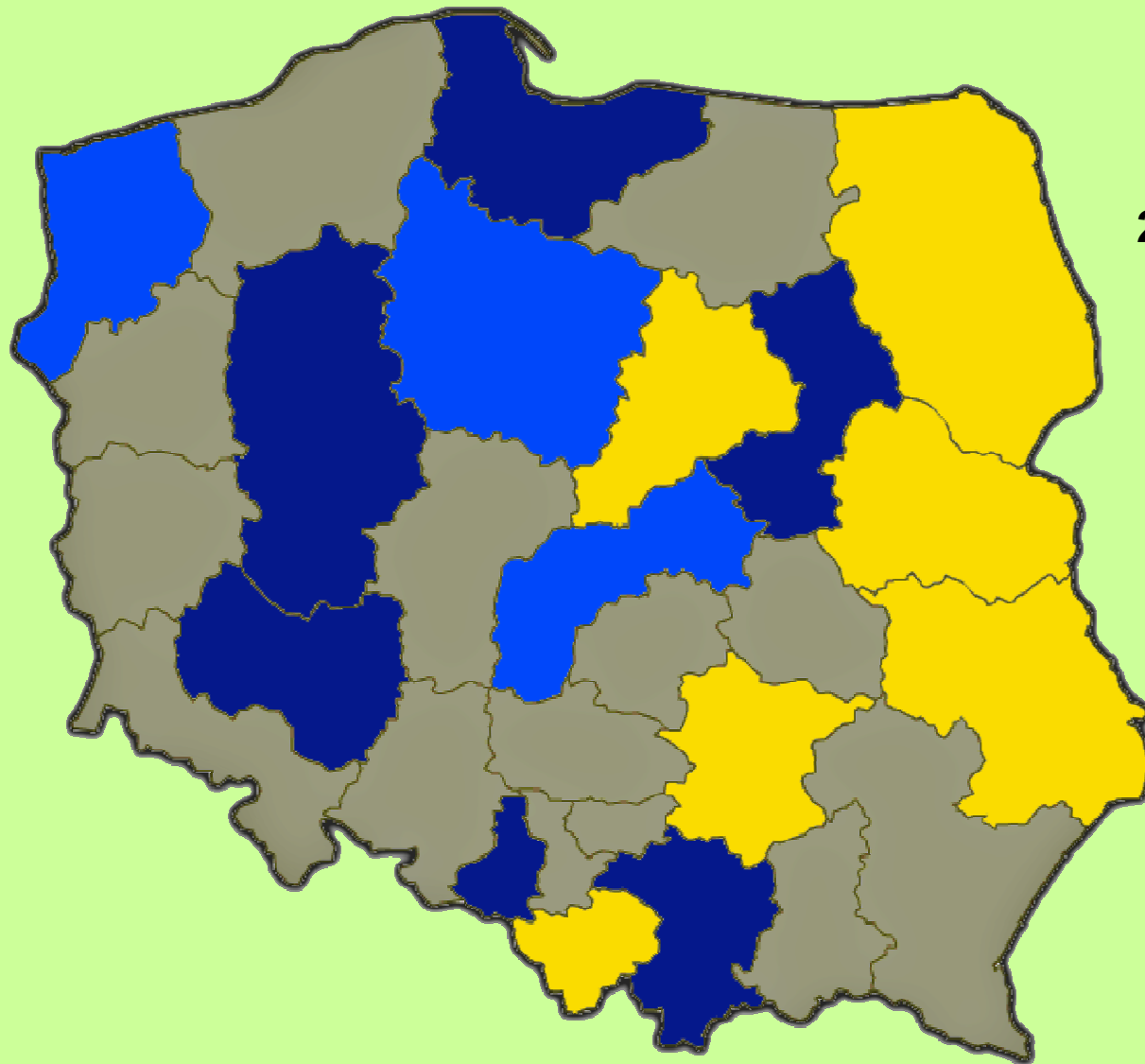


Office of Technical Inspection is a Polish inspection body (established 100 year ago) in order to ensure safety of technical devices and installations.

Office's main task is to assess the conformity of technical equipment with relevant regulations and specifications during design, manufacture and service.

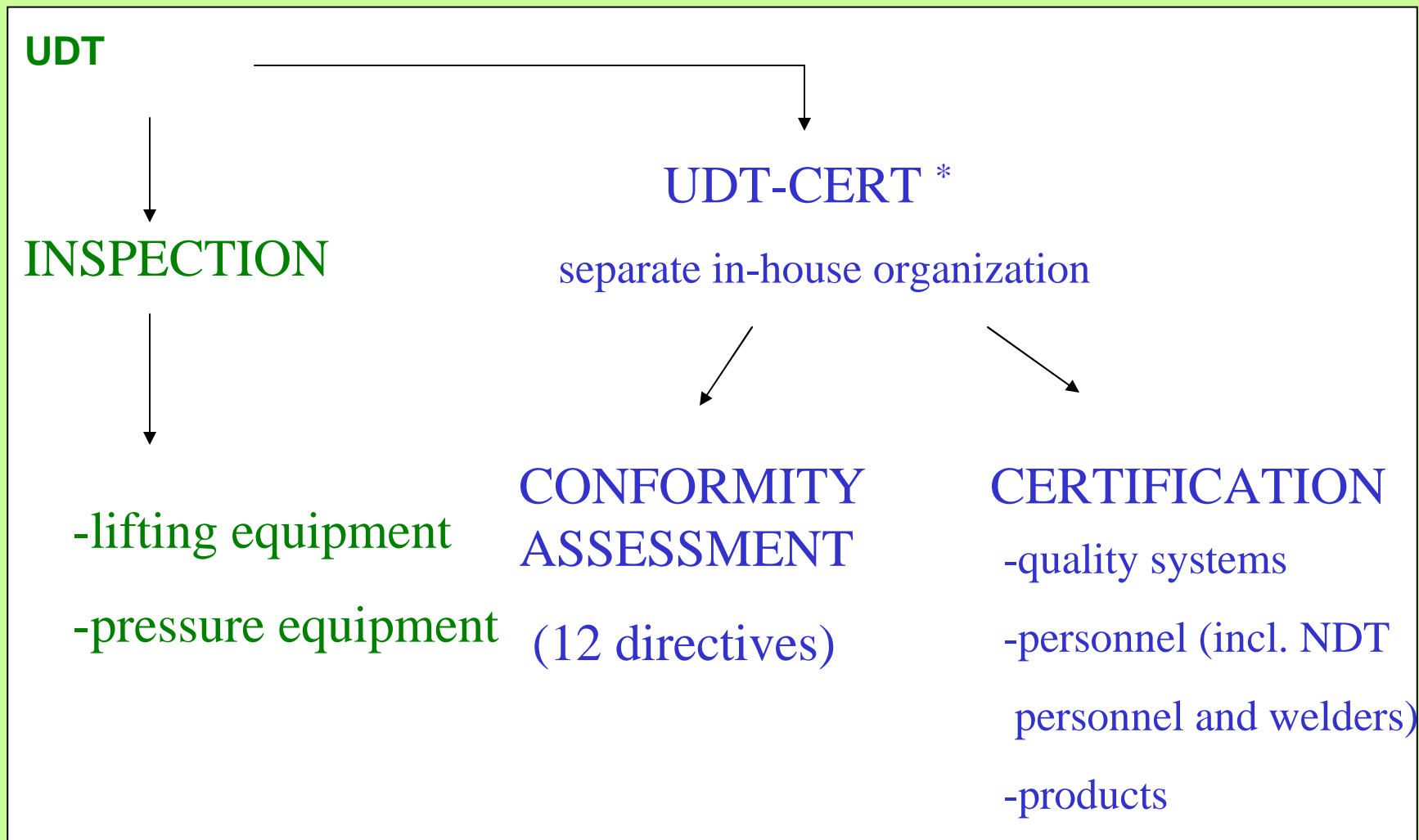
Our duties also include safety & failure analyses as well as distribution of information concerning the problems of technical safety.

Office of Technical Inspection is a non-profit organization, independent both in its finance and technical activities.



**29 Branch Offices covering
the whole
territory of Poland
and Central Laboratory
in Poznan**

**1500 highly qualified and
competent
engineers and inspectors**



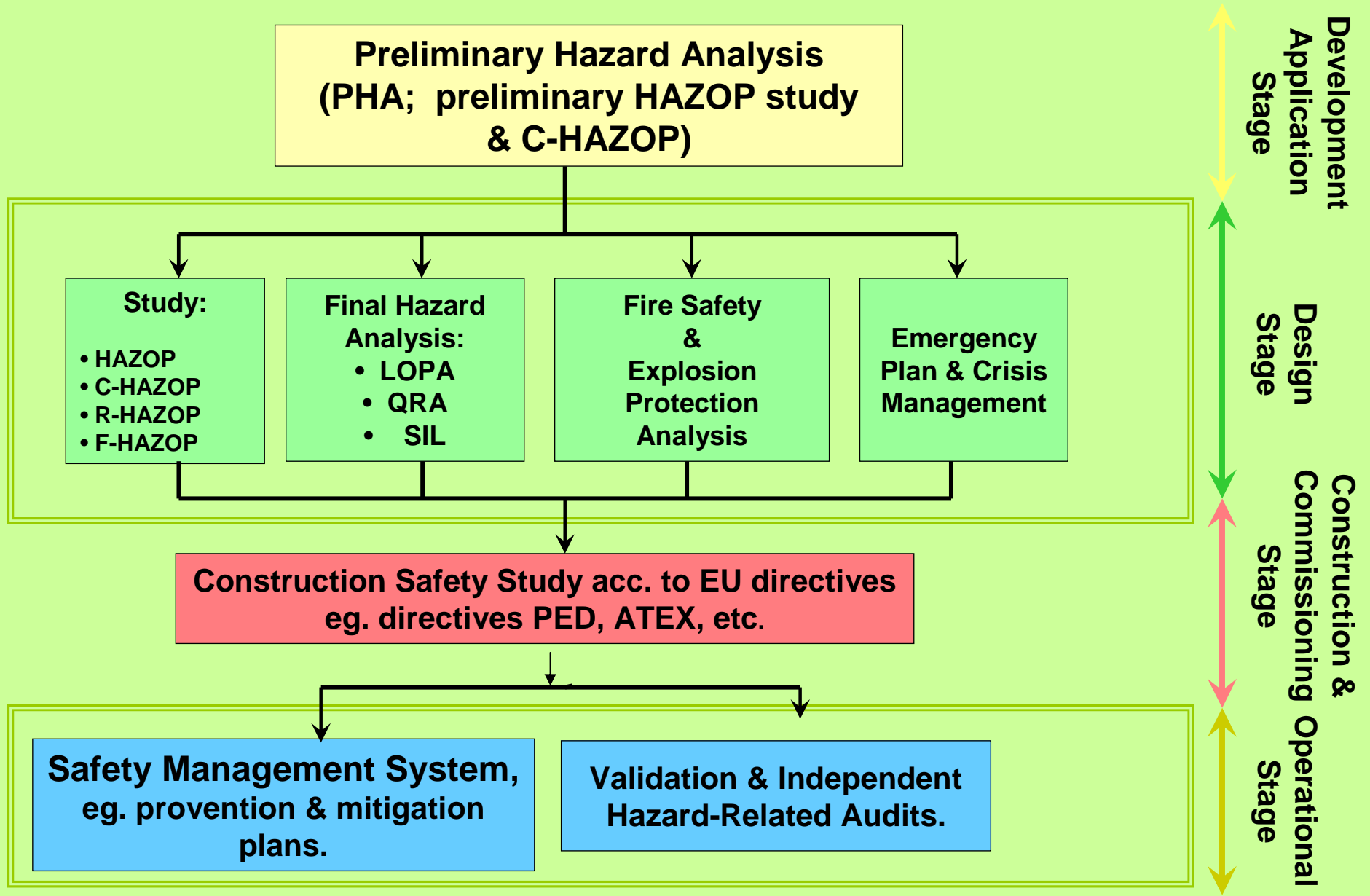
*)UDT-CERT is an independent structure in view of financial issues, activity, data base



Special activities of Division of Functional and Process Safety :

1. Process industry safety analysis:
 - i. HAZOP
 - ii. LOPA or QRA
2. RBI eg. -Reliability-based Inspection
3. SIL allocation and validation
4. SIL certification
5. Explosive atmospheres - ATEX
6. Certification of Functional Safety Expert

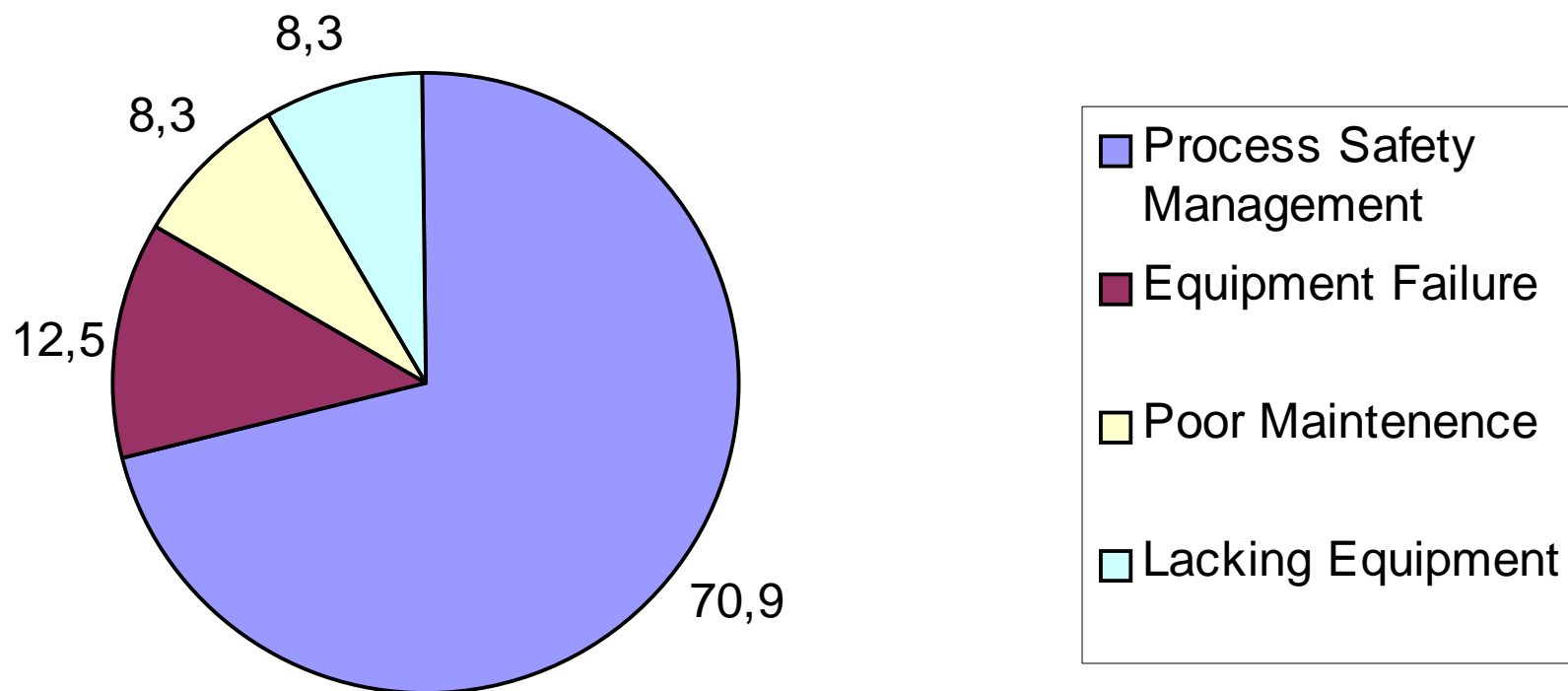
The Hazards-Related Assessment Process



La vérité sort de la bouche des enfants



Contribution of failures to explosions in gas-fired plants



Safety culture

**General assumption: *Risk ist not spreaded
steadily on a plant***





Technique: PHA or preliminary HAZOP and C-HAZOP

Weak points:

- a. lack of maturity of technology and/or technical documentation**
- b. lack of implementation of contracted technical specification**

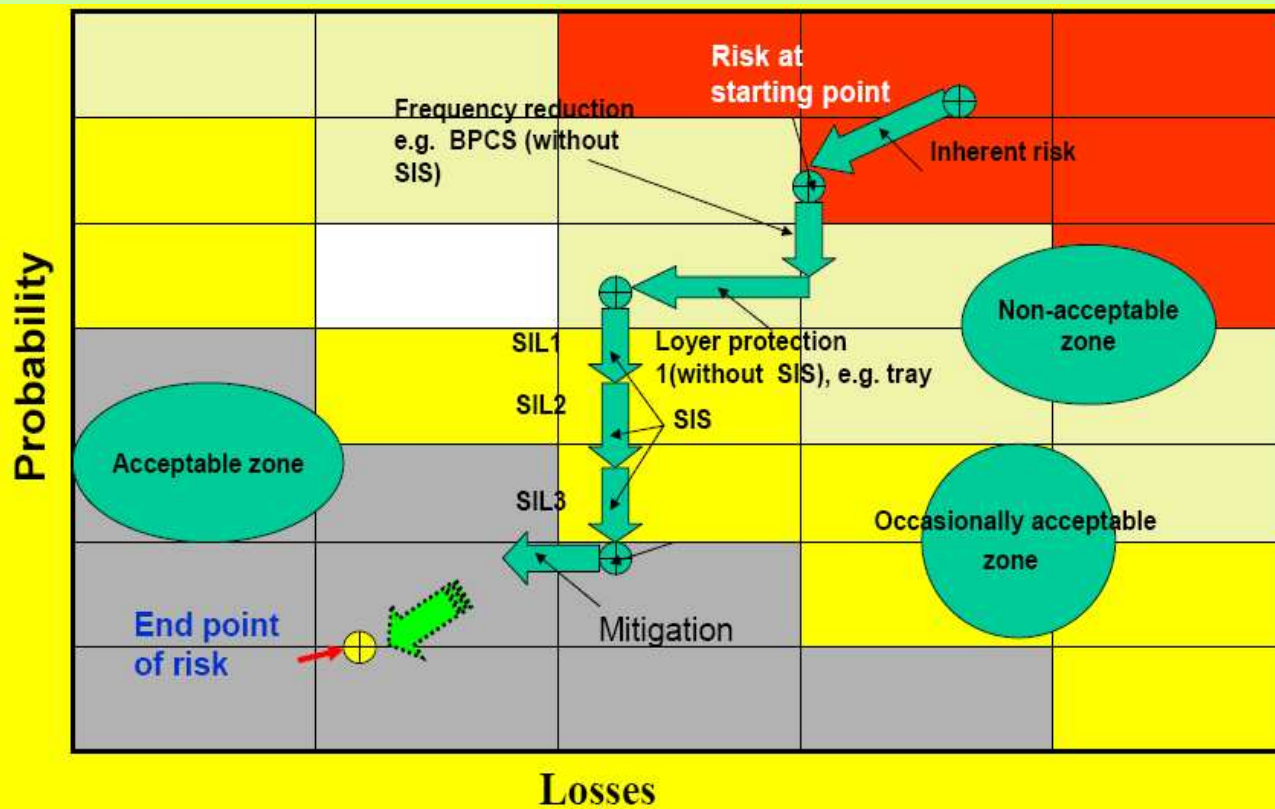


Technique: HAZOP (F-*, R-*, C-*)

Weak points:

- 1. no risk matrix**
- 2. lack of interest of end-user**
- 3. formal qualitative analysis**

Risk matrix



1. unacceptable risk level

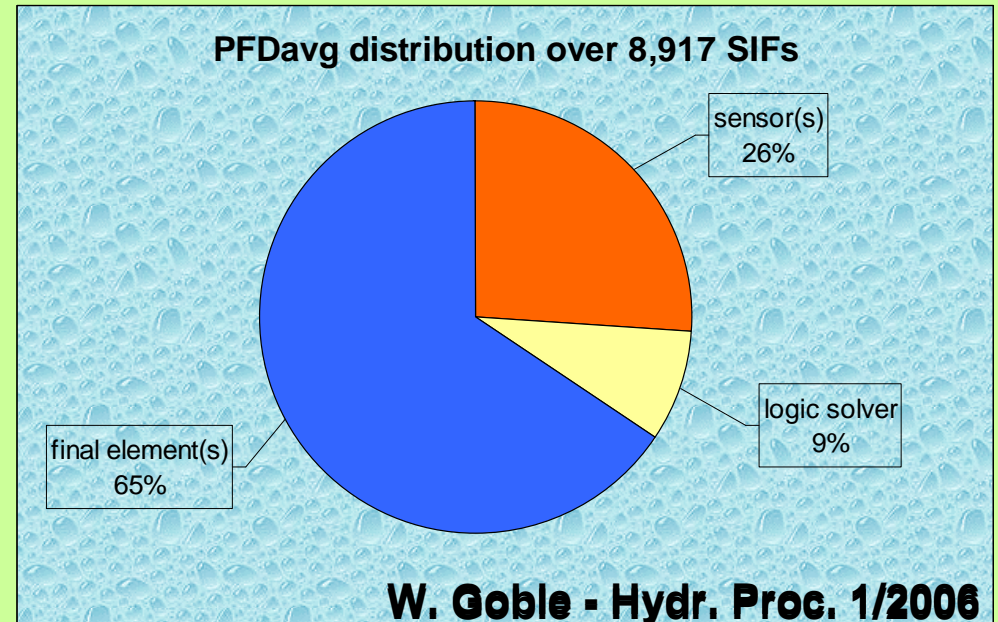
2. tolerable-unacceptable risk level

3. tolerable risk level

4. acceptable risk level



- 1. lack of experience with conformity assessment procedures**
- 2. not certified staff and service for emergency shut down systems or lock systems**
- 3. not enough reliable device applicated to control loops or ESD loops**



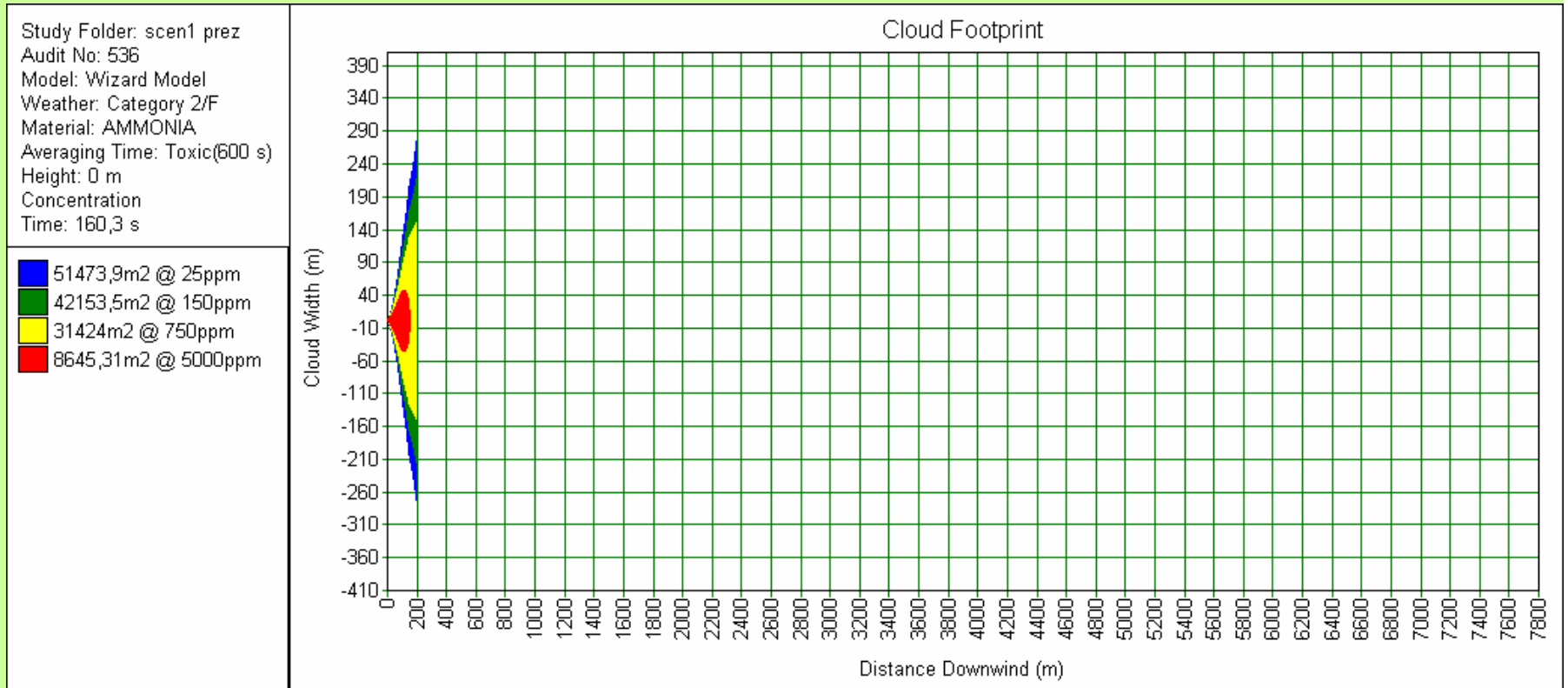


1. lack of dynamics plant analysis



Maximum airborne concentration of ammonia

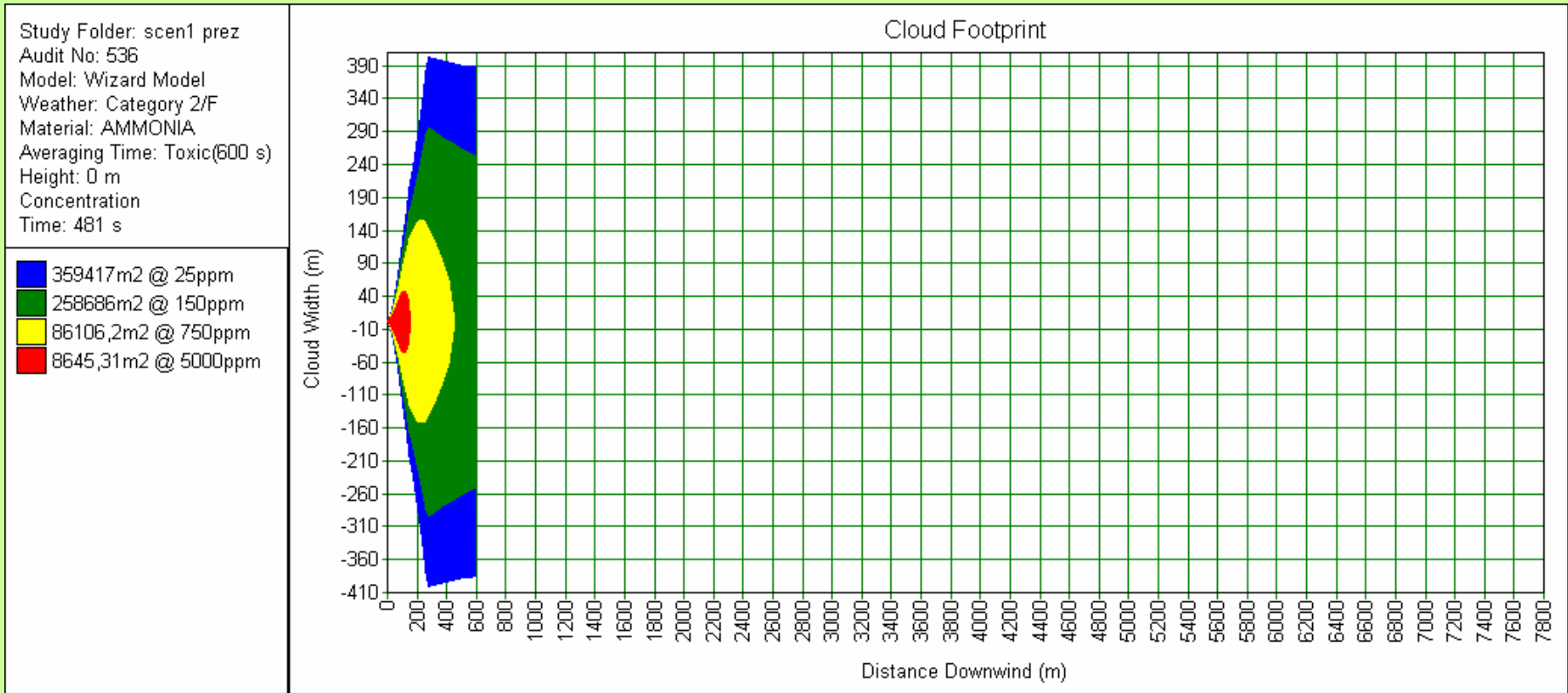
3 min. after pipe interruption



Dispersion of ammonia vapour cloud near ground

Maximum airborne concentration of ammonia

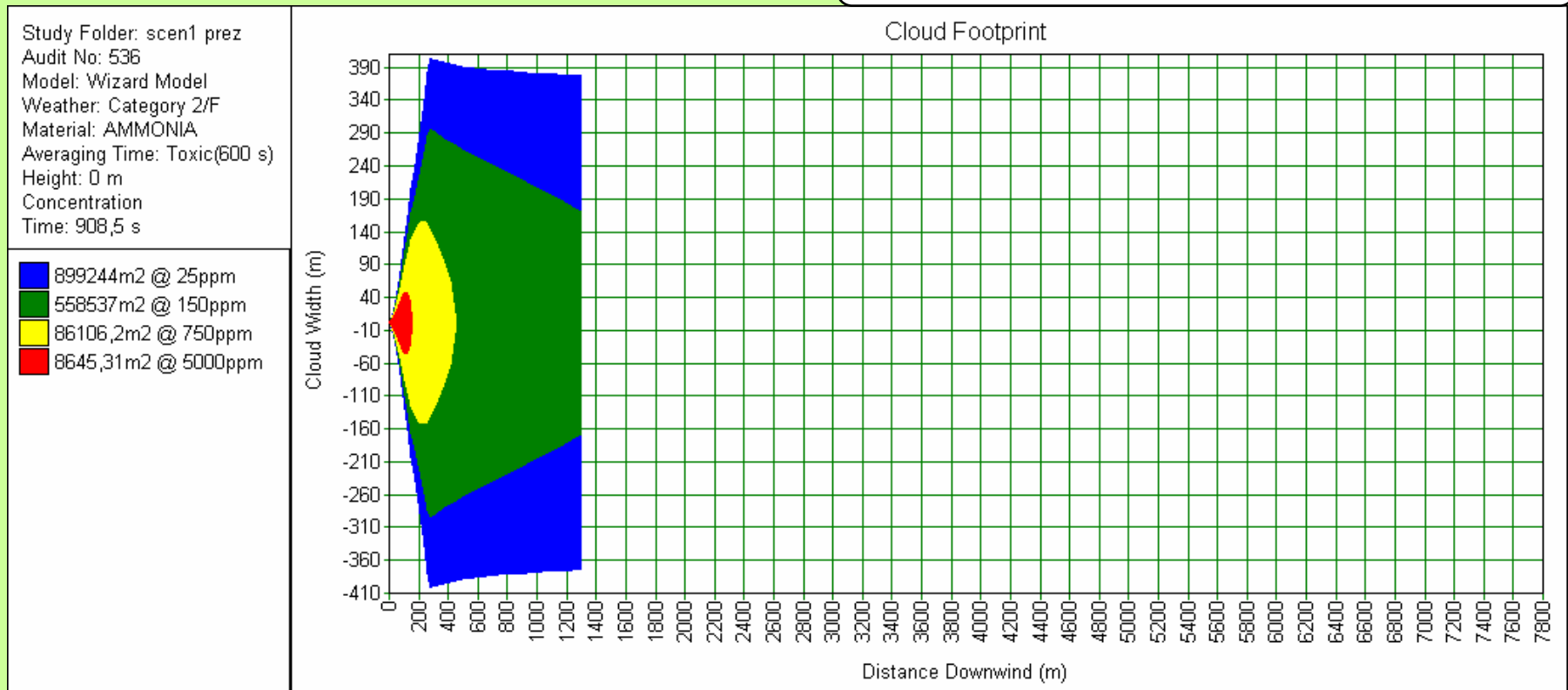
9 min. after pipe interruption



Dispersion of ammonia vapour cloud near ground

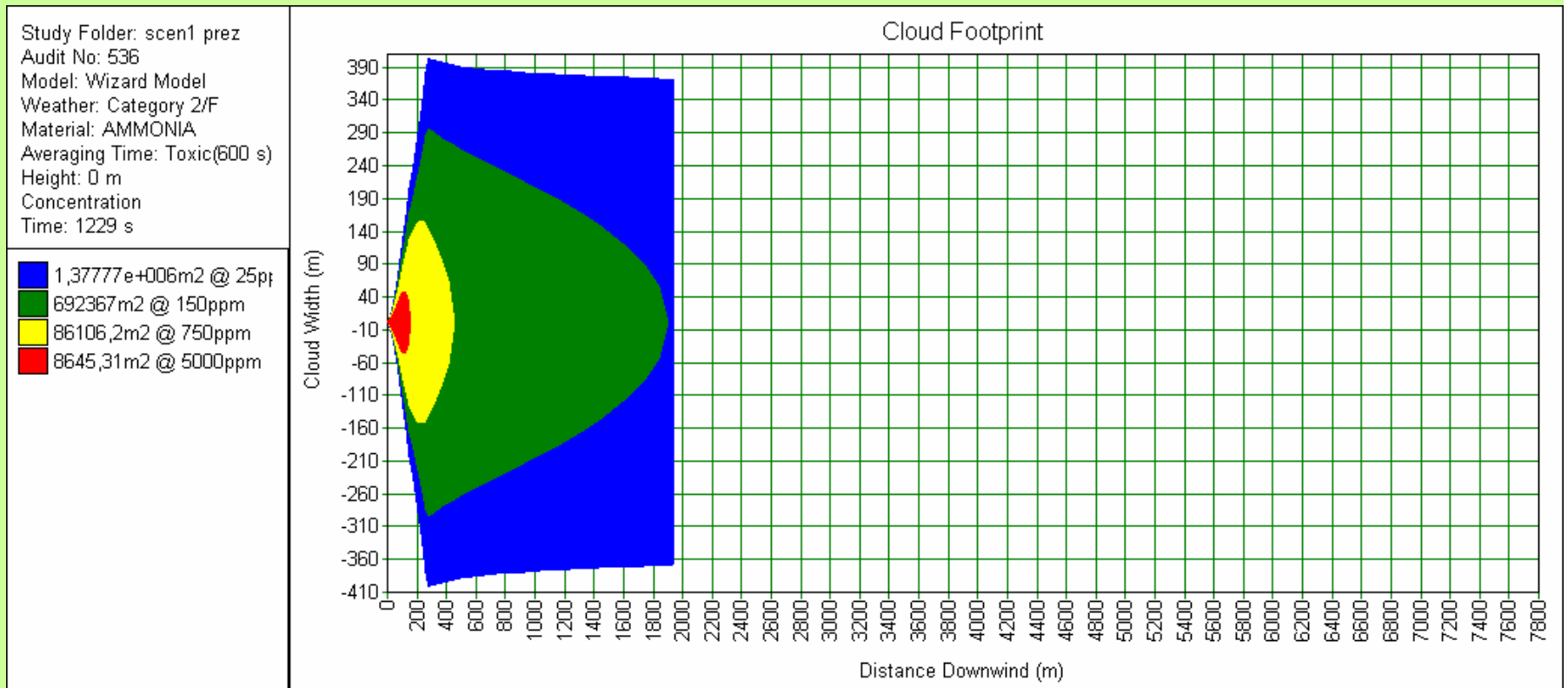
Maximum airborne concentration of ammonia

15 min. after pipe interruption



Dispersion of ammonia vapour cloud near ground

21 min. after pipe interruption

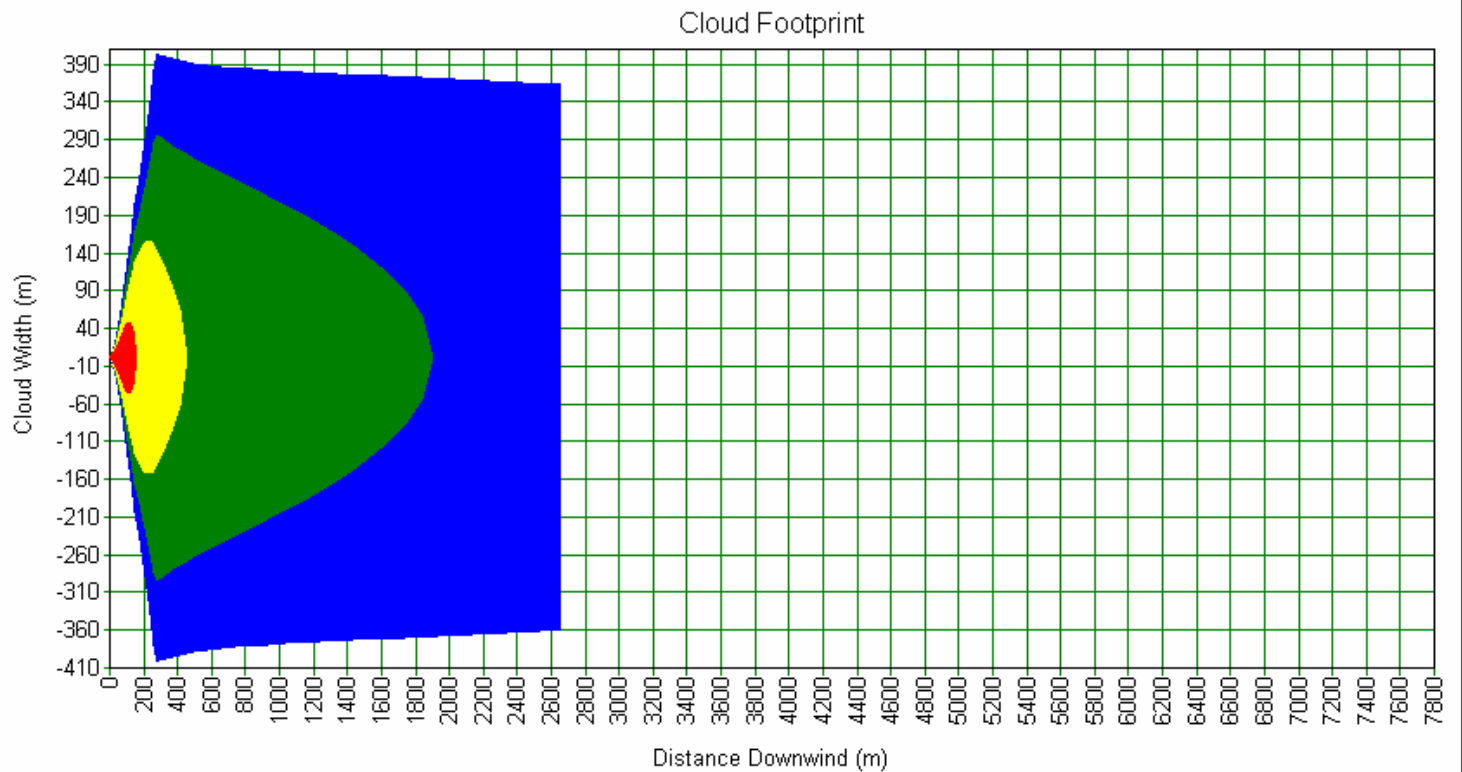


Dispersion of ammonia vapour cloud near ground

26 min. after pipe interruption

Study Folder: scen1 prez
Audit No: 536
Model: Wizard Model
Weather: Category 2/F
Material: AMMONIA
Averaging Time: Toxic(600 s)
Height: 0 m
Concentration
Time: 1550 s

1,90441e+006m2 @ 25ppm
692367m2 @ 150ppm
86106,2m2 @ 750ppm
8645,31m2 @ 5000ppm

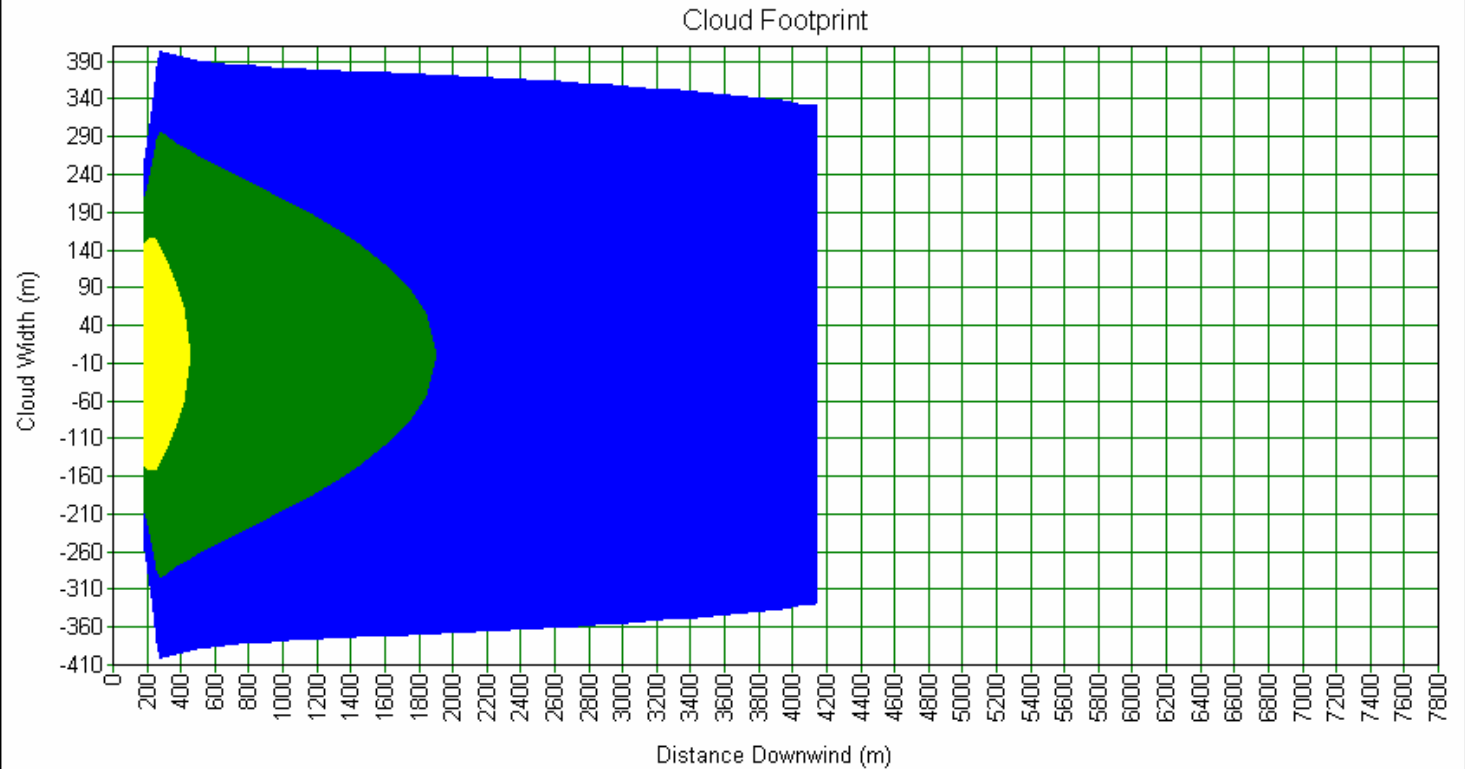


Dispersion of ammonia vapour cloud near ground

36 min. after pipe interruption

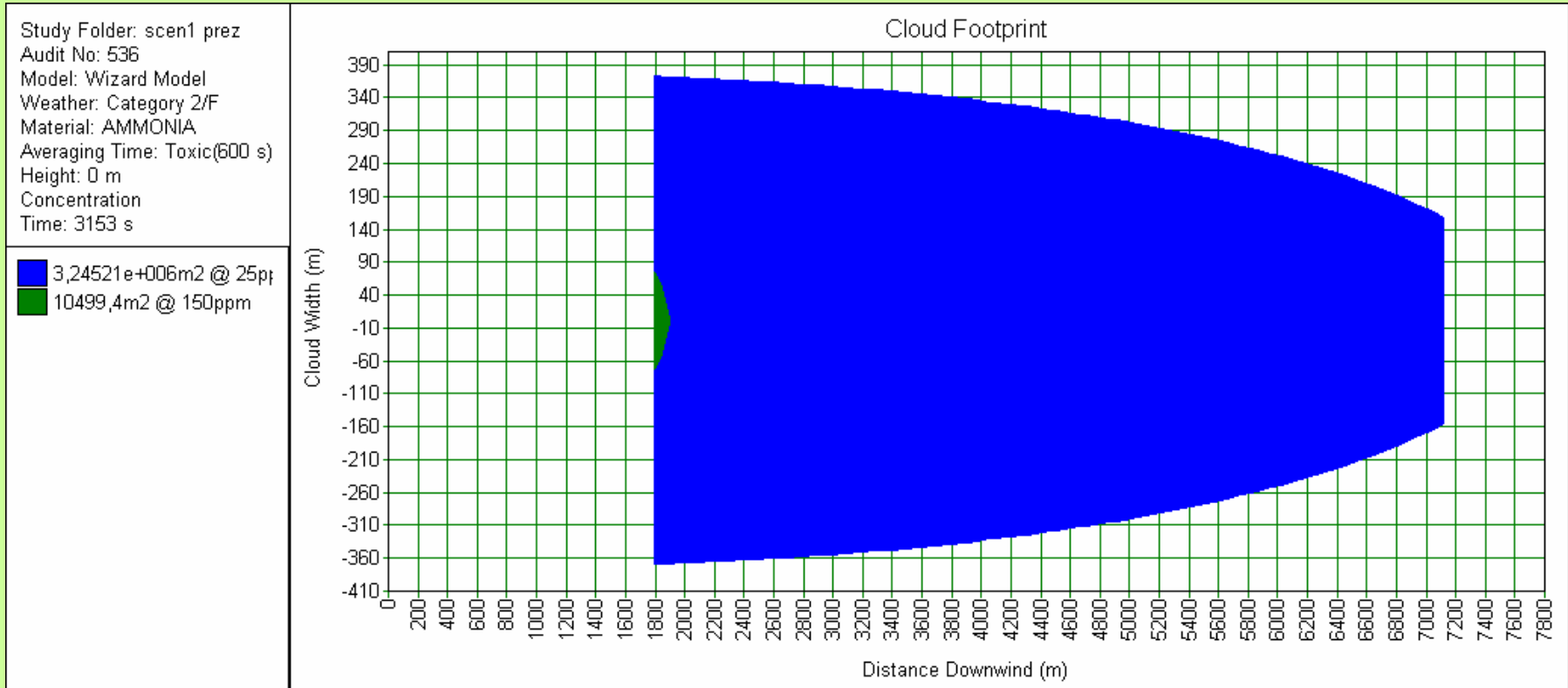
Study Folder: scen1 prez
Audit No: 536
Model: Wizard Model
Weather: Category 2/F
Material: AMMONIA
Averaging Time: Toxic(600 s)
Height: 0 m
Concentration
Time: 2138 s

■ 2,89885e+006m2 @ 25pt
■ 659328m2 @ 150ppm
■ 60901,8m2 @ 750ppm



Dispersion of ammonia vapour cloud near ground

53 min. after pipe interruption

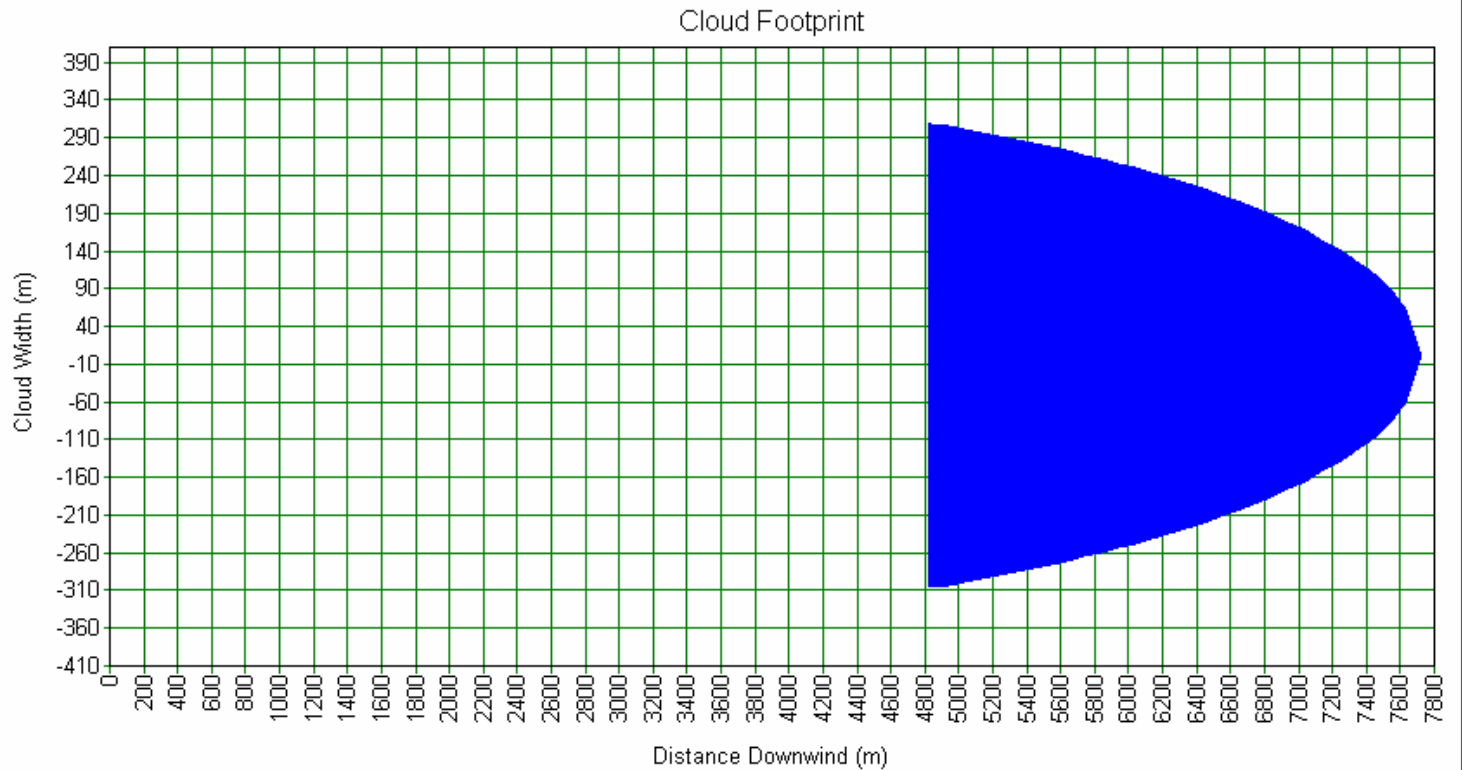


Dispersion of ammonia vapour cloud near ground

73 min. after pipe interruption

Study Folder: scen1 prez
Audit No: 536
Model: Wizard Model
Weather: Category 2/F
Material: AMMONIA
Averaging Time: Toxic(600 s)
Height: 0 m
Concentration
Time: 4382 s

■ 1,26118e+006m2 @ 25pt



Dispersion of ammonia vapour cloud near ground

**Thank you for
your
attention !**



**Herd of deer under ammonia storage tanks
in ZAK**

Winter 2006.