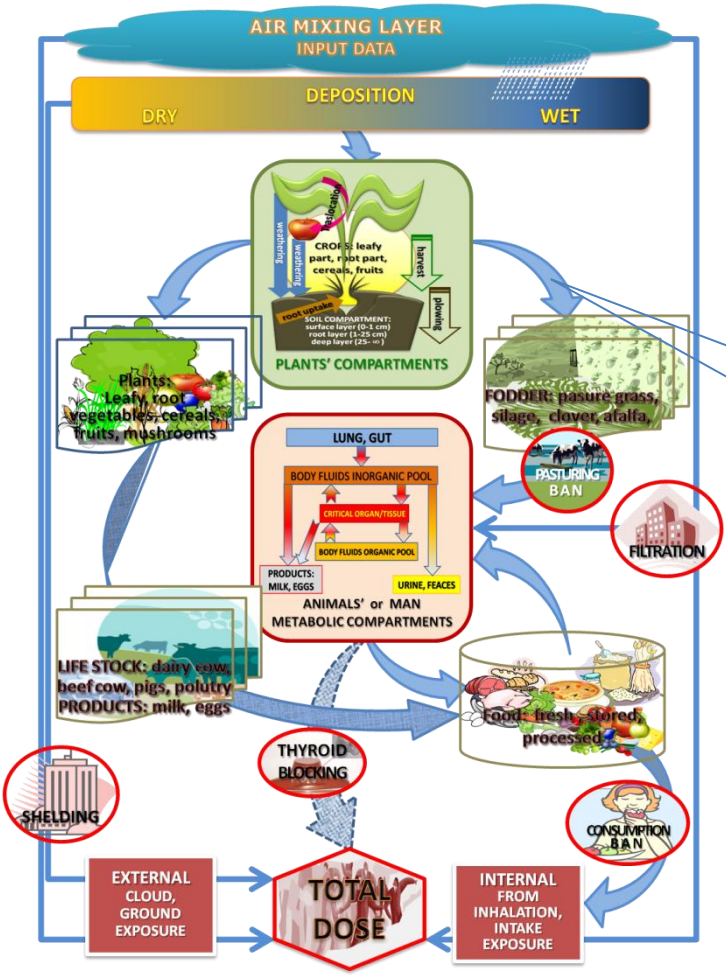
SCENARIO A SIZEWELL

How far from reality

Paweł Krajewski, Grażyna Krajewska



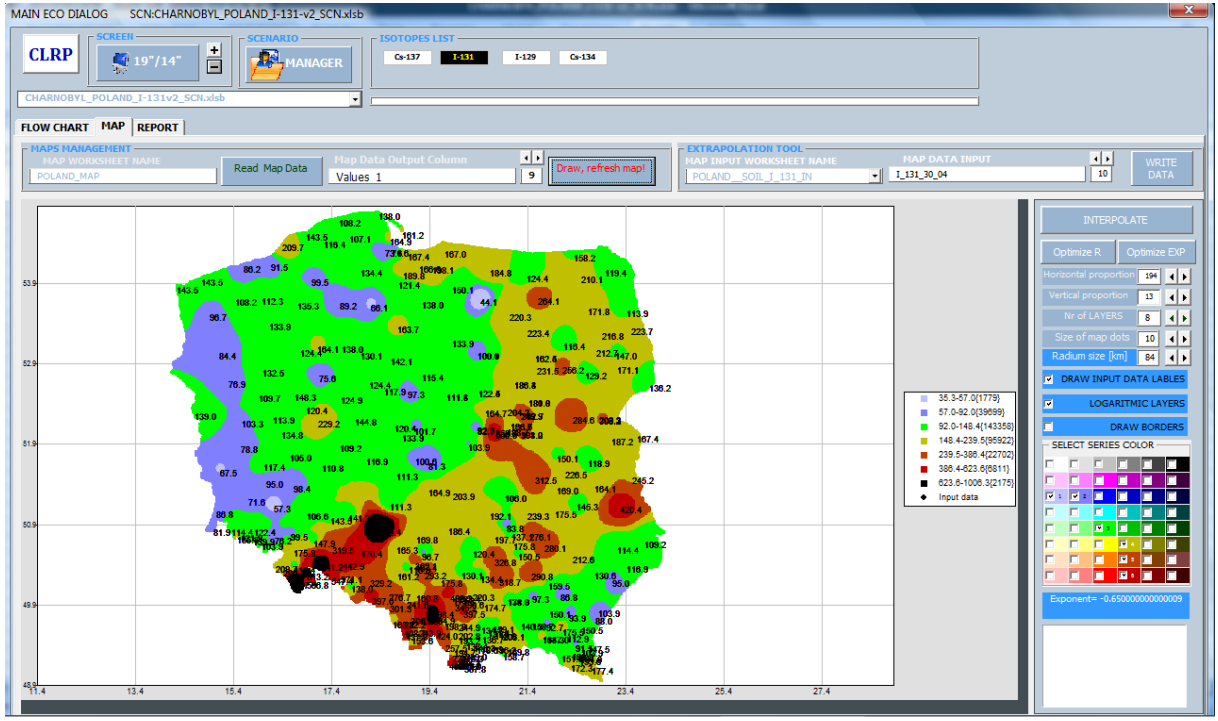
CLRP

Concentrations Levels Rapid Prediction

2009

Flowchart of CLRP calculation sequence. Blue arrows show an order of calculations in the particular compartments, where the results obtained in one compartment (**output data**) are used as **input data** in the next compartment

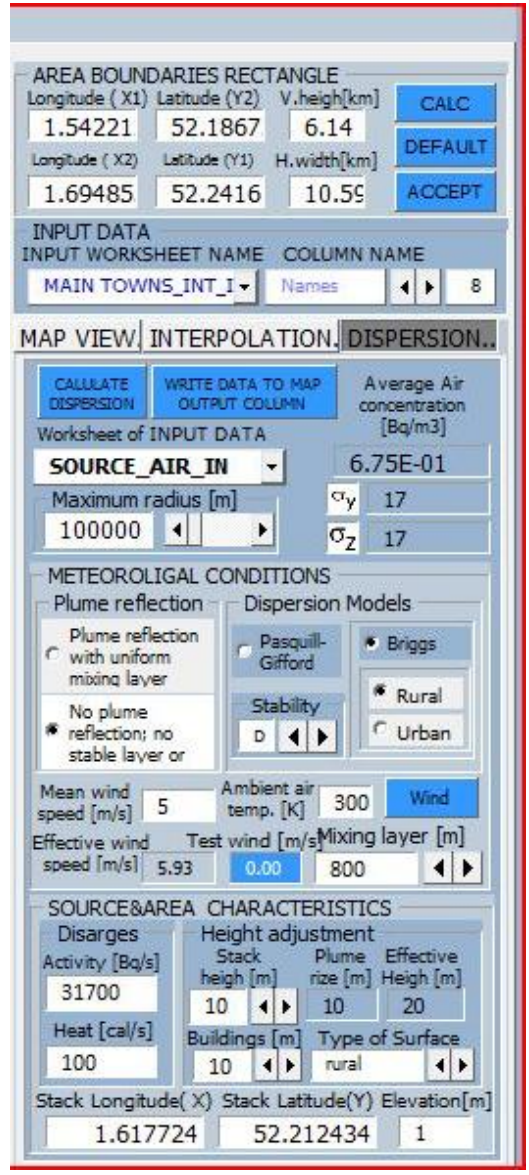
CLRP
Concentrations Levels Rapid Prediction
2009



GIS User Form driver installed in CLRP – example of map of 137Cs concentration in soil – the study zones were calculated by IDW Shepard interpolations from 370 measured point in 1km×1km grid.

2009

Atmospheric dispersion module in installed in CLRP – Gaussian plume modified Pasquill Gilford Briggs parameters



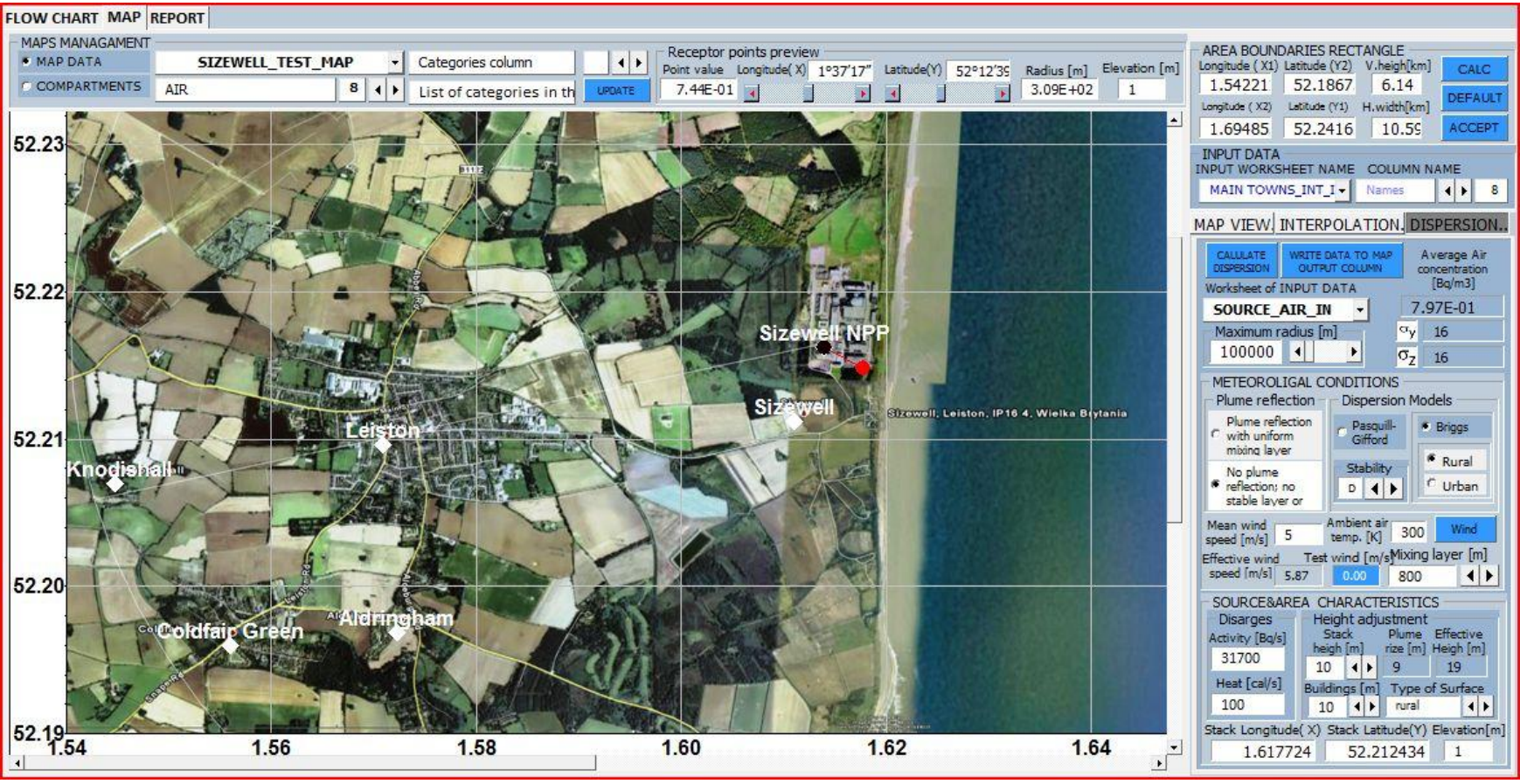
SCENARIO A SIZEWELL How far from reality

Metrological data: wind blow frequency table,
mixing layer 800 m ???, no rain

Sectors	A	B	C	D	E	F	G
1	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
2	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
3	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
4	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
5	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
6	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
7	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
8	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
9	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
10	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
11	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
12	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%

SCENARIO A SIZEWELL How far from reality

Sizewell raster registered in 50m×50 m grid

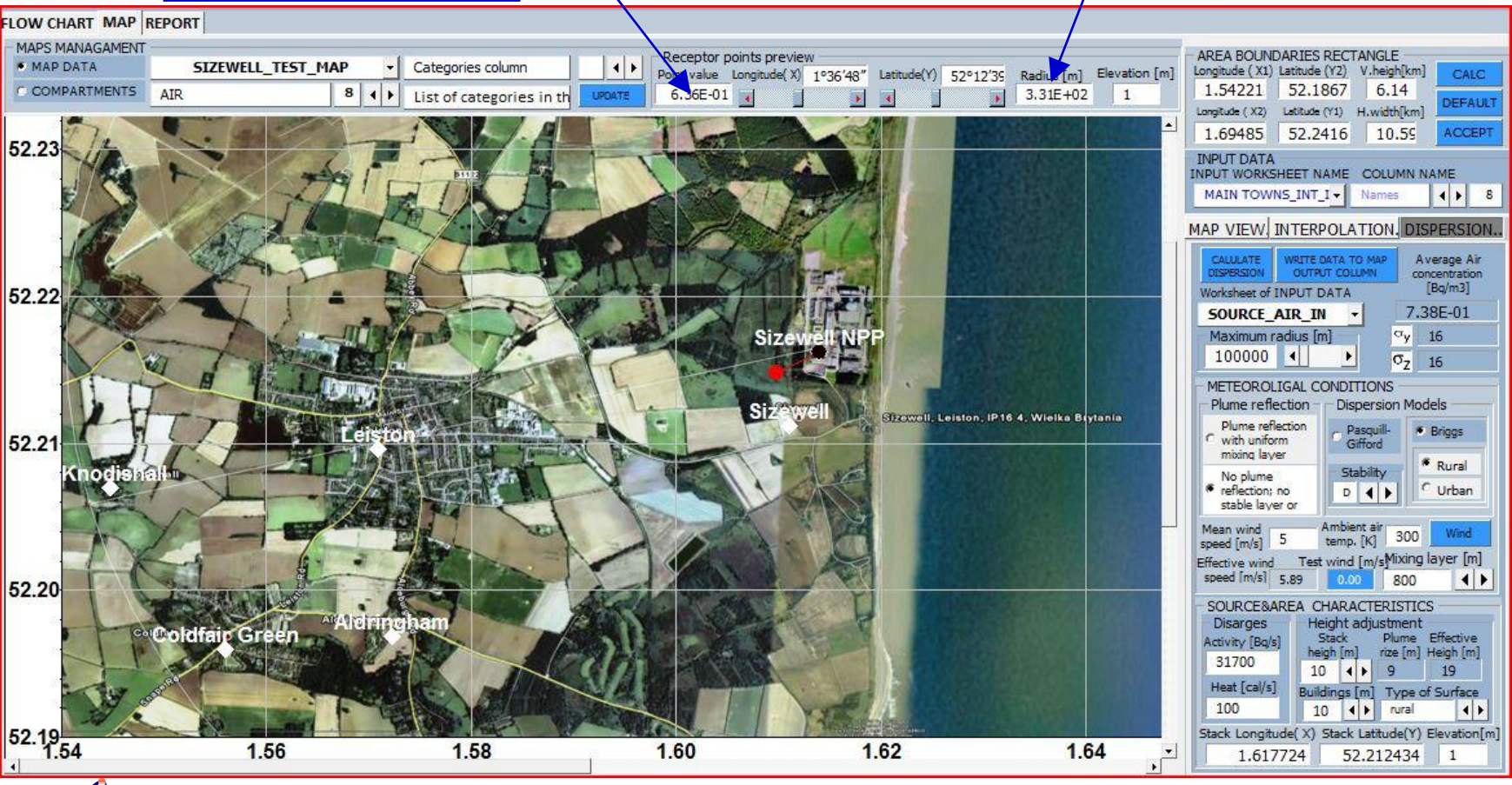


SCENARIO A SIZEWELL

How far from reality

Air Concentration
0.64 Bq·m^{-3}

Radius
330 m

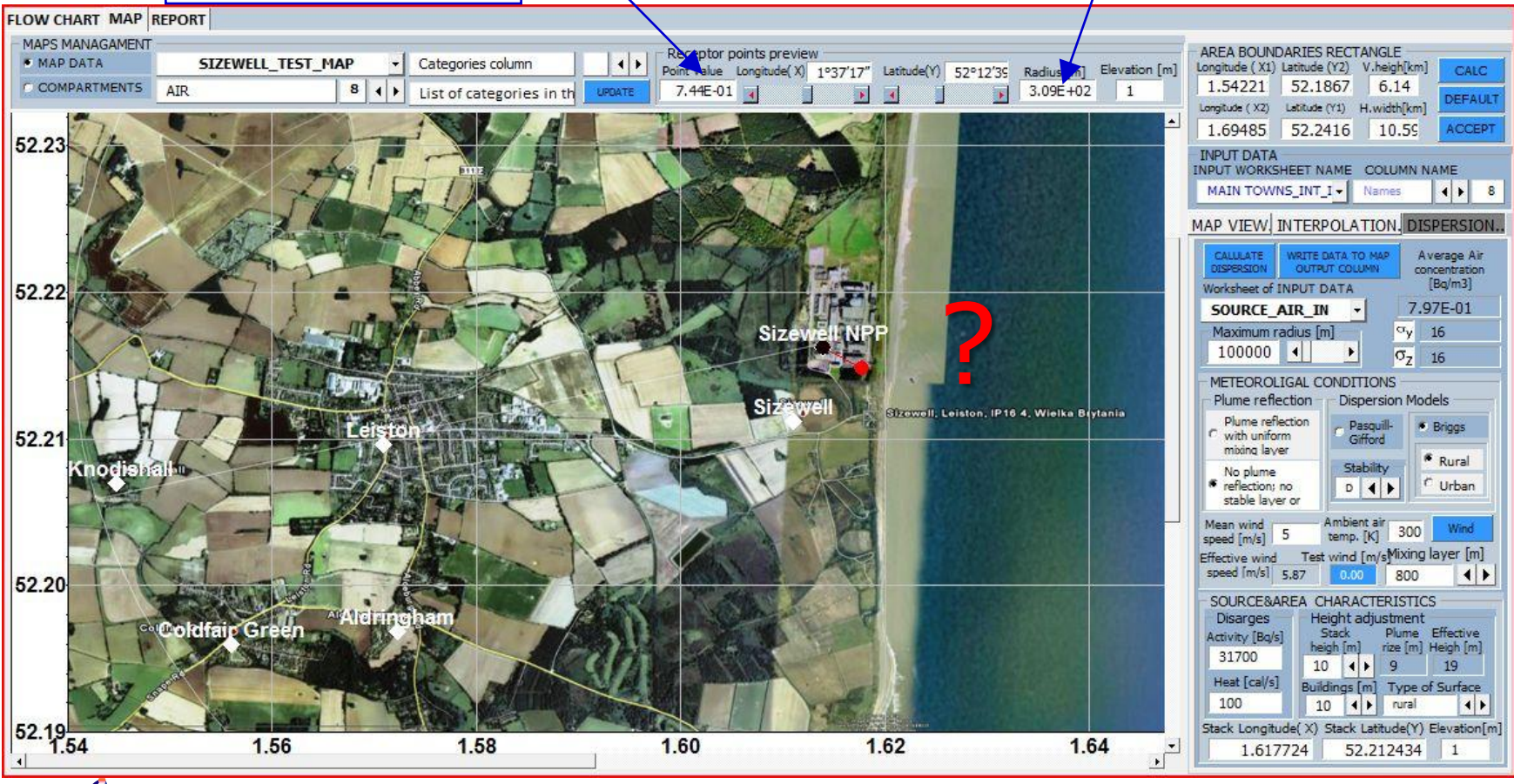


SCENARIO A SIZEWELL

How far from reality

Air Concentration
0.74 Bq·m^{-3}

Radius
309 m

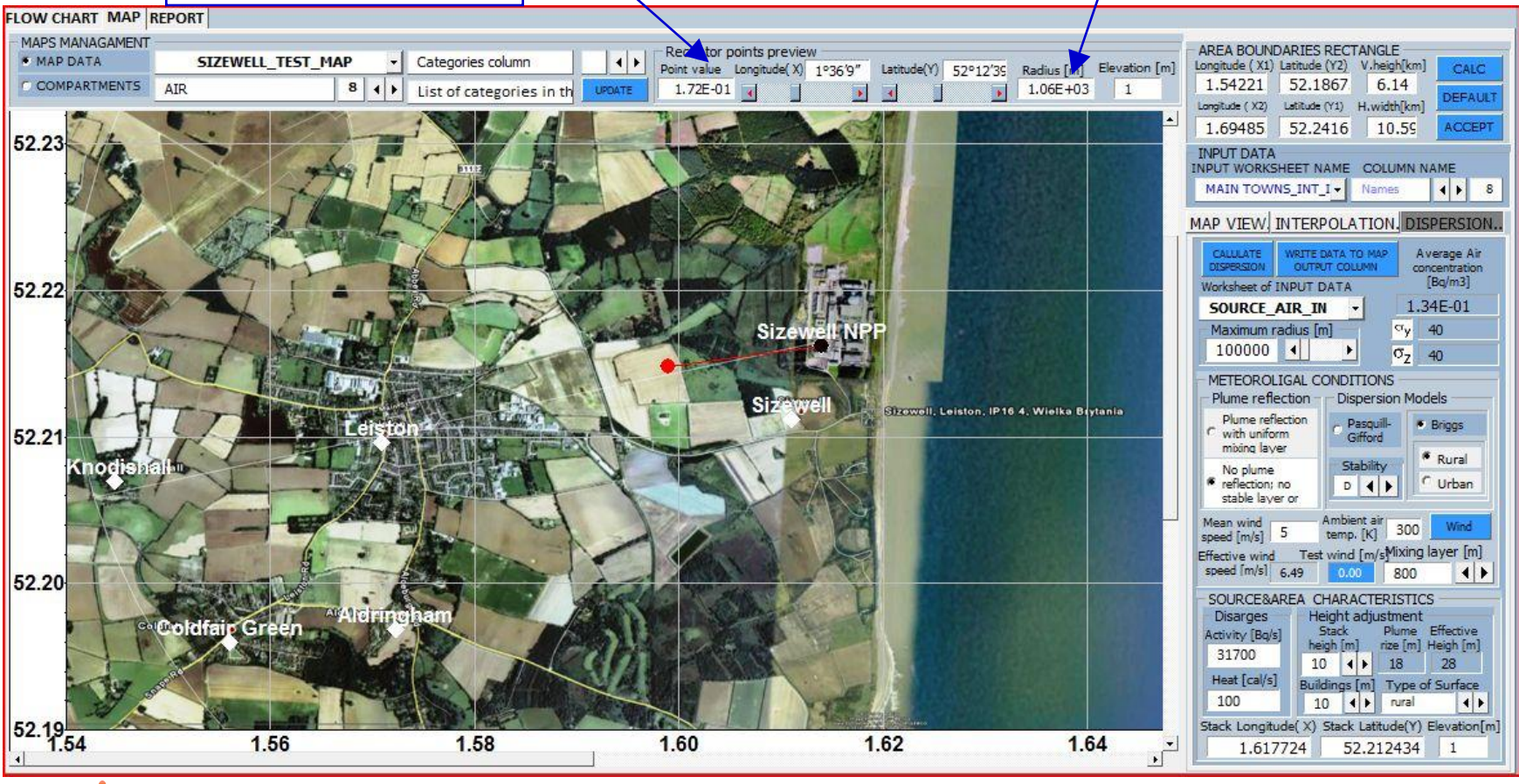


SCENARIO A SIZEWELL

How far from reality

Air Concentration
0.174 Bq·m^{-3}

Radius
1006 m

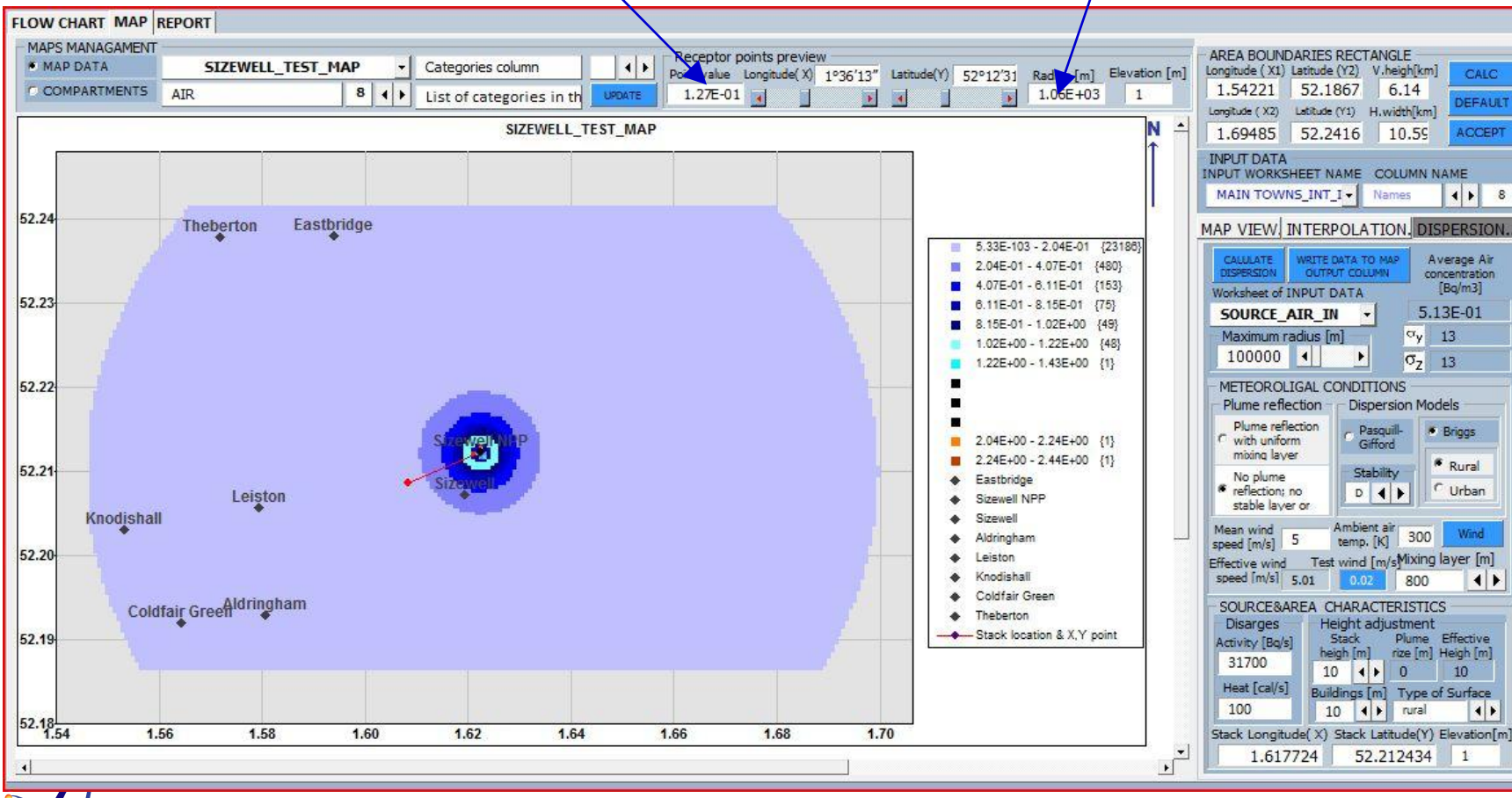


SCENARIO A SIZEWELL

How far from reality

Air Concentration
0.127 Bq·m^{-3}

Radius
1006 m



SCENARIO A SIZEWELL How far from reality

Isotope	AGE GROUP/SPECIFICATION	CLOUD EXTERNAL EXPOSURE	GROUND EXTERNAL EXPOSURE	INHALATION INTERNAL EXPOSURE	INGESTION EXPOSURE	TOTAL DOSE	DOSE TO CTITICAL ORGAN
					[mSv]		
I-131	A1 [green vegetable consumers] (I-131)	2.86E-07	1.55E-06	7.88E-05	9.69E-04	1.05E-03	1.65E-02
Cs-137	A1 Green vegetable consumers (Cs-137)	4.54E-07	1.24E-03	2.42E-05	3.89E-04	1.65E-03	5.05E-04
Xe-135	A1 Green vegetable consumers (Xe-135)	2.14E-06					
						2.70E-03	
I-131	B1 [root vegetable consumers] (I-131)	2.86E-07	1.55E-06	7.88E-05	9.89E-04	1.07E-03	1.68E-02
Cs-137	B1 Root vegetable consumers (Cs-137)	4.54E-07	1.24E-03	2.42E-05	5.38E-04	1.80E-03	6.98E-04
						2.87E-03	
I-131	C1 [domestic fruit consumers] (I-131)	2.86E-07	1.55E-06	7.88E-05	1.13E-03	1.21E-03	1.92E-02
Cs-137	C1 Domestic fruit consumers (Cs-137)	4.54E-07	1.24E-03	2.42E-05	9.55E-04	2.22E-03	1.24E-03
						3.43E-03	
I-131	D1 [milk consumers] (I-131)	2.86E-07	1.55E-06	7.88E-05	3.13E-04	3.94E-04	5.32E-03
Cs-137	D1 Milk consumers (Cs-137)	4.54E-07	1.24E-03	2.42E-05	1.34E-03	2.60E-03	1.74E-03
						2.99E-03	
I-131	E1 [sheep meat consumers] (I-131)	2.86E-07	1.55E-06	7.88E-05	3.13E-04	3.94E-04	5.32E-03
Cs-137	E1 Sheep meat consumers (Cs-137)	4.54E-07	1.24E-03	2.42E-05	1.34E-03	2.60E-03	1.74E-03
						2.99E-03	
I-131	F1 [occupants for plume pathways (inner area)] (I-131)	4.74E-07	3.30E-06	1.18E-04	2.23E-04	3.45E-04	3.80E-03
Cs-137	F1 Occupants for plume pathways (inner area) (Cs-137)	7.51E-07	2.65E-03	3.63E-05	4.18E-04	3.11E-03	5.42E-04

SCENARIO B SIZEWELL

Metrological data: wind blow frequency table ?,
mixing layer 800 m ?, no rain ?

Sectors	A	B	C	D	E	F	G		SUM
1	0.00%	0.23%	1.30%	7.11%	0.90%	0.43%	0.17%	0.94%	11.09%
2	0.01%	0.30%	1.41%	9.01%	1.15%	0.56%	0.19%	1.19%	13.81%
3	0.01%	0.29%	1.15%	6.52%	0.63%	0.50%	0.15%	0.86%	10.11%
4	0.01%	0.29%	1.06%	5.16%	0.67%	0.41%	0.14%	0.70%	8.44%
5	0.01%	0.27%	0.99%	4.28%	0.51%	0.34%	0.13%	0.58%	7.12%
6	0.01%	0.31%	1.05%	4.12%	0.53%	0.34%	0.14%	0.56%	7.07%
7	0.02%	0.33%	1.21%	4.41%	0.68%	0.44%	0.17%	0.62%	7.87%
8	0.02%	0.35%	1.32%	3.04%	0.68%	0.46%	0.20%	0.45%	6.52%
9	0.02%	0.29%	1.08%	2.06%	0.66%	0.41%	0.17%	0.33%	5.02%
10	0.01%	0.29%	1.09%	3.23%	0.61%	0.44%	0.16%	0.47%	6.30%
11	0.02%	0.24%	0.99%	4.40%	0.60%	0.39%	0.14%	0.60%	7.37%
12	0.01%	0.21%	1.15%	5.95%	0.74%	0.31%	0.15%	0.78%	9.30%
									100.01%

SCENARIO B SIZEWELL CRITICAL GRUP

Summarised from Radiological Habits Survey Sizewell, 2005
Summary of adults' profiled habits data in the Sizewell area

Exposure group - adult profiles		Pathway Name										
		Total green vegetables	Total root veg inc potatoes	Total fruit	Milk	Meat - Cattle	Meat - Sheep	Fish - Sea	Crustacea	Mollusca	Gamma ext - Sediment	Plume (IN; 0-0.25km)
		kg	kg	kg	l	kg	kg	kg	kg	kg	h	h
1. Atmospheric pathway exposure groups												
A1	Green vegetable consumers	65.6	93.5	8.7		0.9		1.8	0.1		7	
B1	Root vegetable consumers	68.9	110.9	5.4		1.3		1.4	0.1		198	
C1	Domestic fruit consumers	64.4	84.8	42.4				4.7	0.3		123	
D1	Milk consumers	4.1	19.1	0.5	208.4	15.8	2.4	1.5				
E1	Sheep meat consumers	4.1	19.1	0.5	208.4	15.8	2.4	1.5				
F1	Occupants for plume pathways (inner area)	18	11.3	5.9				0.5	0.5			7150
2. Aquatic pathway exposure groups												
A2	Sea fish consumers	1	3.4	0.6				23	2.1	0.5	81	
B2	Crustacean consumers							26.7	11.2	1.6	83	
C2	Mollusc consumers							16.2	9.3	5.1	50	
D2	Occupants for exposure - Sediment		4.2	0.6				8.8	0.5		731	751
Notes											occupancy over mud, slat marsh, sand, stone	internal & external occupancy

Atmospheric pathway
Critical group is exposure group with highest dose including direct shine
A1 - individuals with the top consumption of locally produced green vegetables
B1 - individuals with the top consumption of locally prodcued root vegetables
C1 - individuals with the top consumption of locally produced fruit
D1 - individuals with the top consumption of locally produced milk
E1 - individuals with the top consumption of locally produced sheep meat
F1 - individuals with the highest occupancy 0 - 0.25km from the site (occupants for plume pathways same as for direct radiation)

Aquatic pathway
Critical group is exposure group with highest dose (i.e. not including direct shine)
A2 - individuals with the top consumption of locally caught fish
B2 - individauls with the top consumption of locally caught crustaceans
C2 - individauls with the top consumption of locally caught mollusc
D2 - individuals with the highest occupancy over sediment