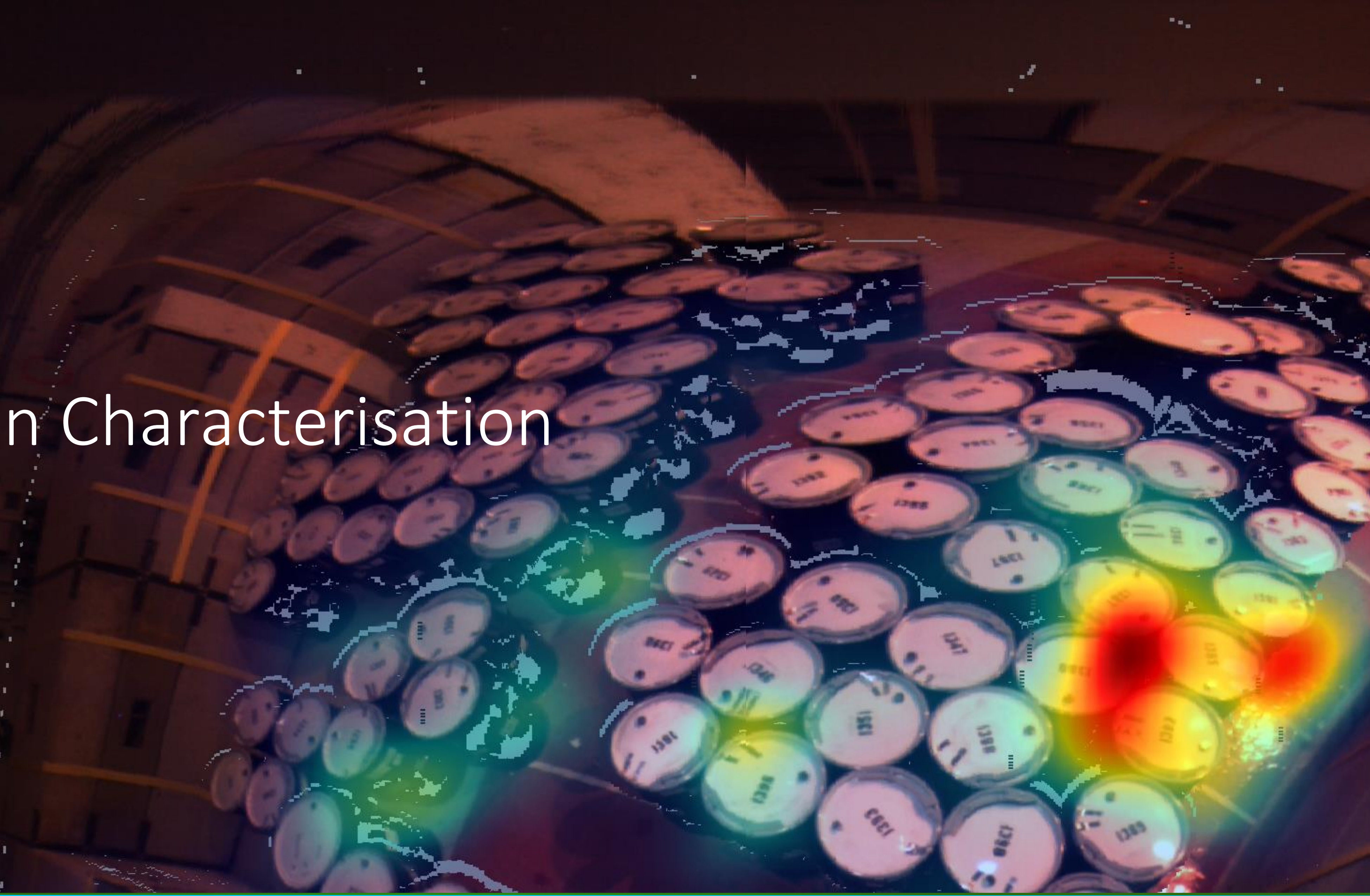


N-Visage 3D Radiation Characterisation

Matt Mellor
2019



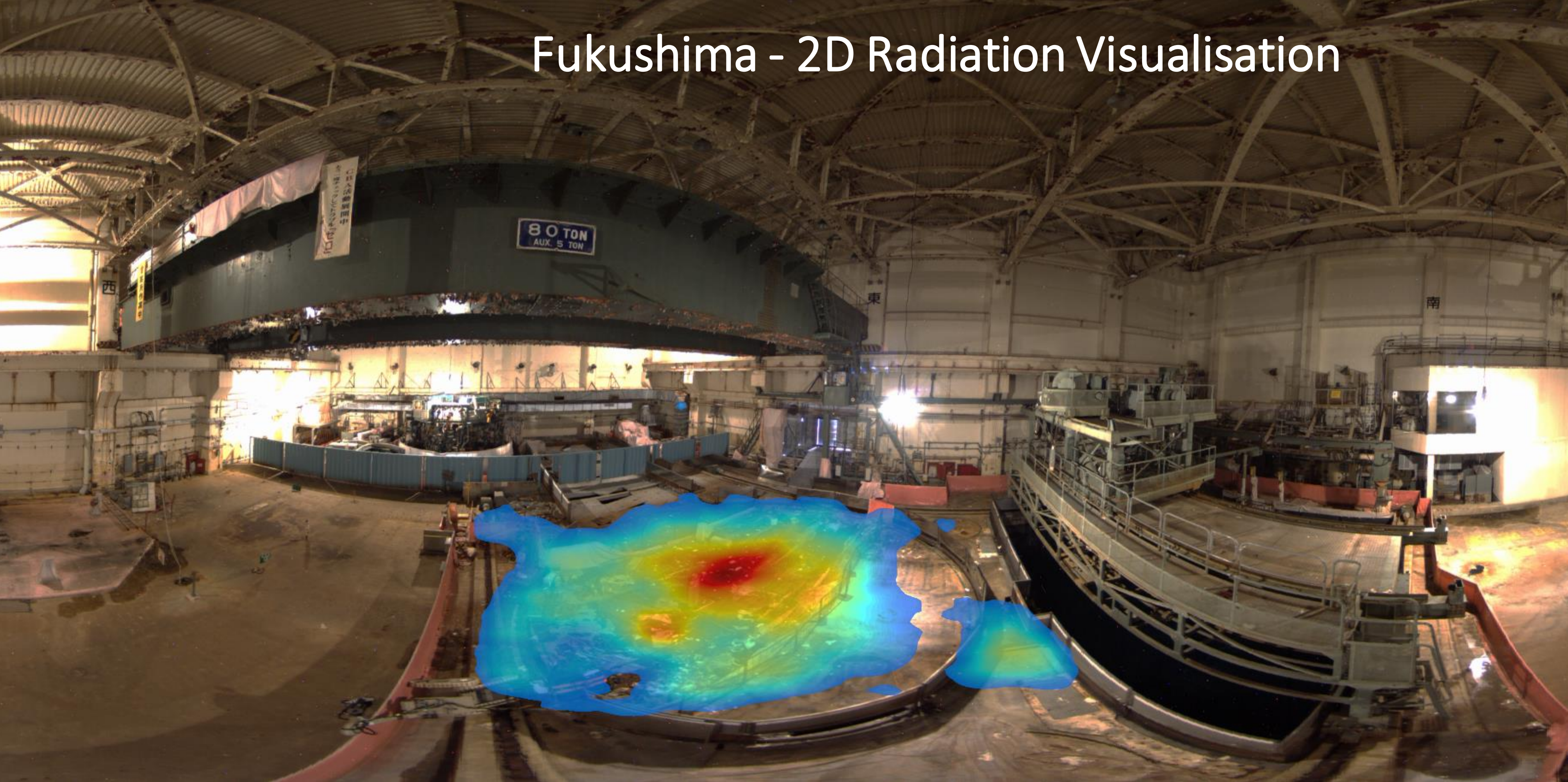
3D Radiation Imaging

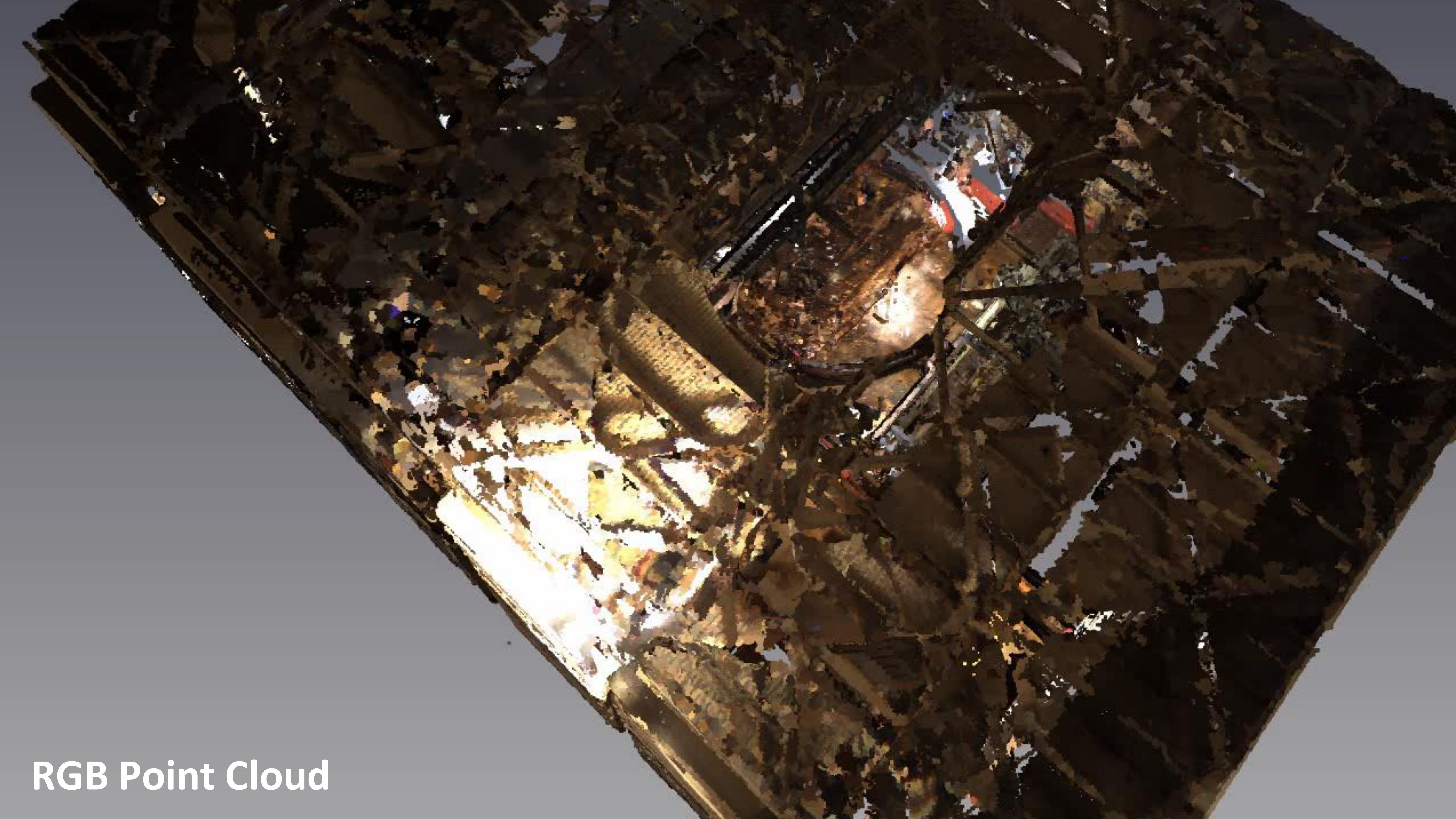
System Composed of 3 parts:
3D radiation imaging sensors
Radiation data fusion software
Radiation simulation software

Data Driven Decision Making:
Reduce uncertainty
Reduced cost
Reduced risk

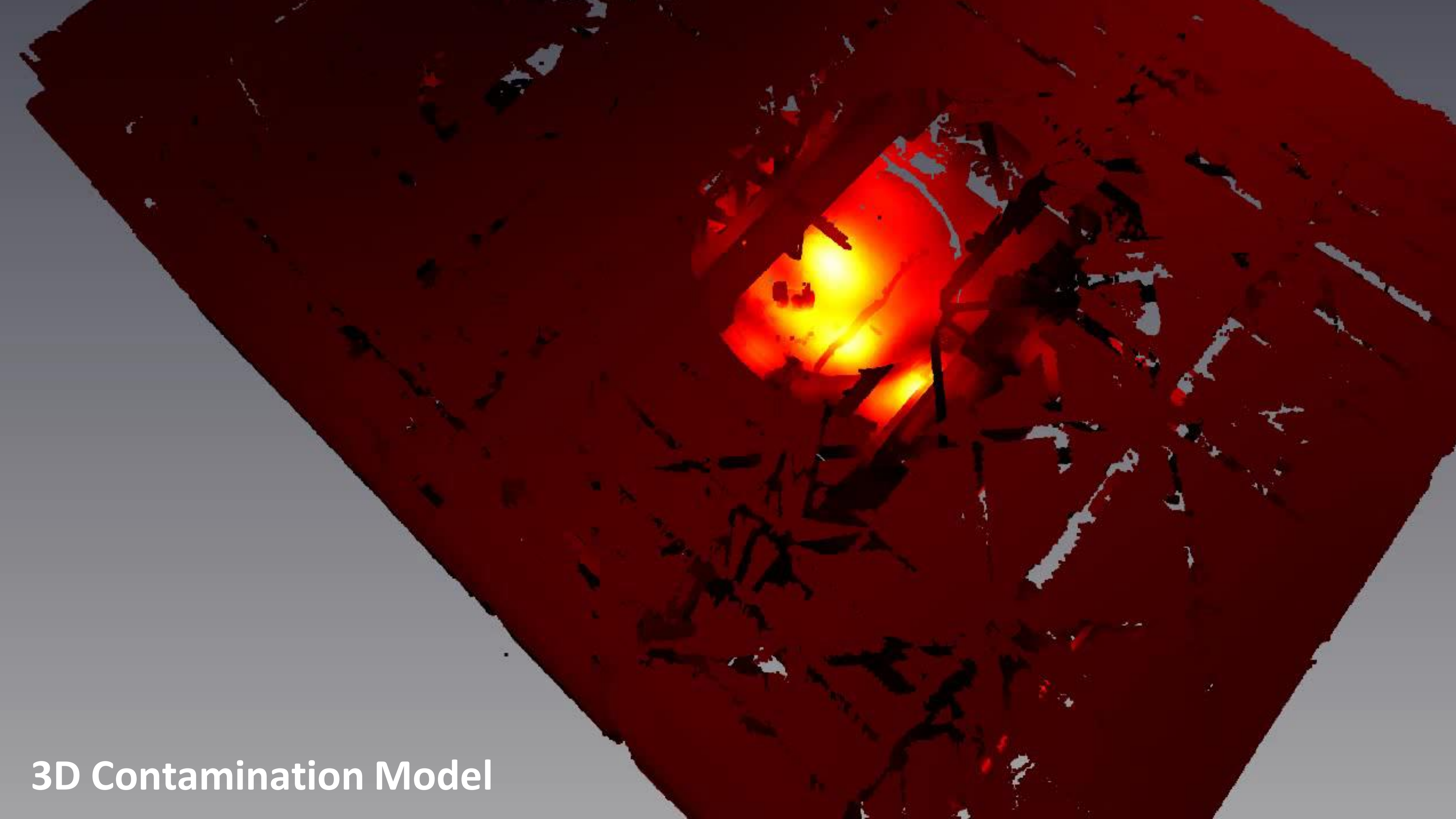


Fukushima - 2D Radiation Visualisation

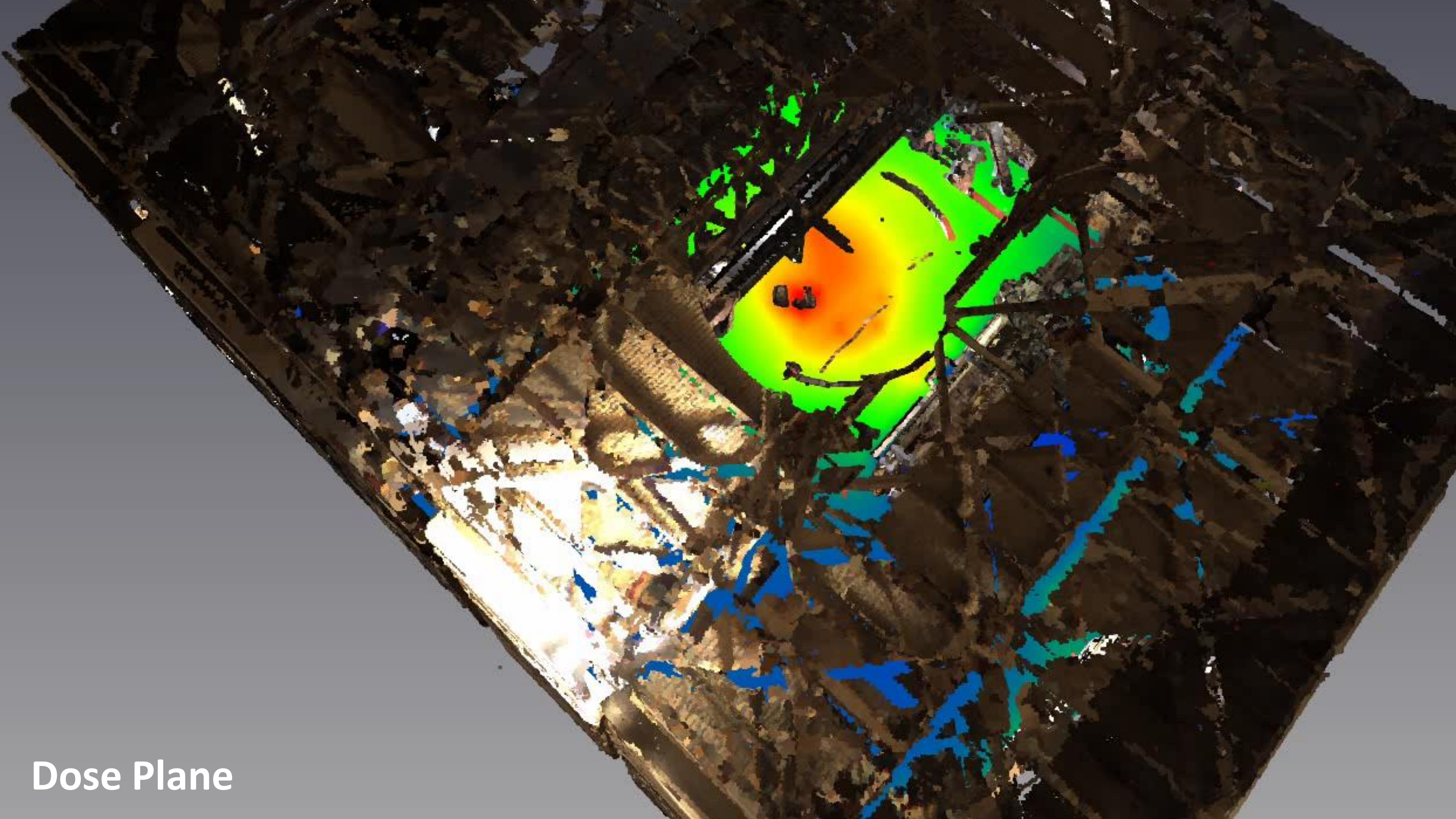




RGB Point Cloud



3D Contamination Model

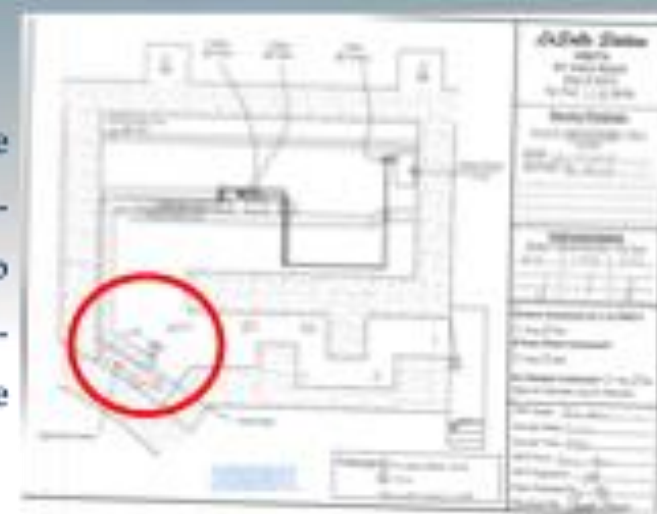


Dose Plane

Case 1: LaSalle Generating Station—RT Valve Room Shielding Optimization

Background

LaSalle Generating Station in LaSalle County, Illinois is a 2 unit GE BWR site with Units 1 and 2 beginning operation in August 1982 and April 1984 respectively. During the Unit 1 outage in February of 2018 the Reactor Water Cleanup Valve, an Anchor Darling valve, needed to be breached and have internals replaced. The scope of work was performed in the area circled on the map to the right—general area dose rates prior to shielding were 600–1300 mRem/h.

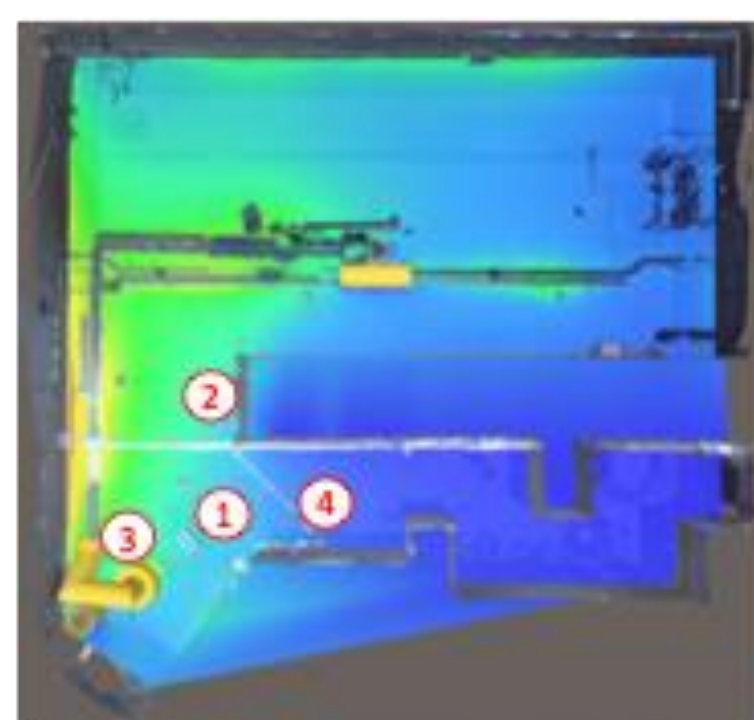


Objective

LaSalle's goal for the project was to obtain an optimized shielding package which reduced dose rates in the area of concern by 50% while minimizing cost and complexity.

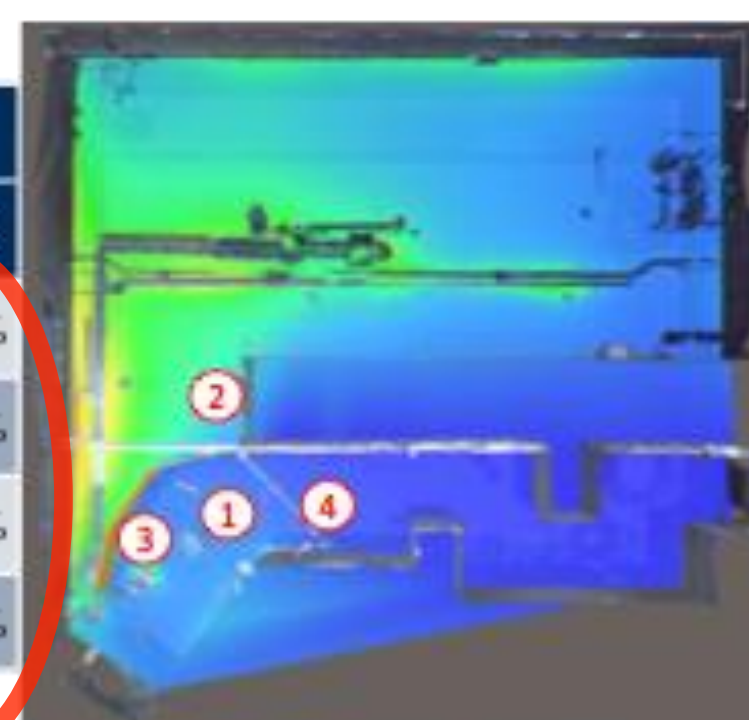
Output

Several iterations of shielding interventions were performed to evaluate different options, the results shown below compare the traditional "spot" shielding LaSalle would have used with the optimal solution found using RadVision^{3D}.



"Hot Spot" Shielding Solution

Location	Hot Spots	Optimized Shielding	
	mRem/h	mRem/h	% Reduction
1	756	422	45%
2	901	824	10%
3	1242	414	68%
4	286	169	42%



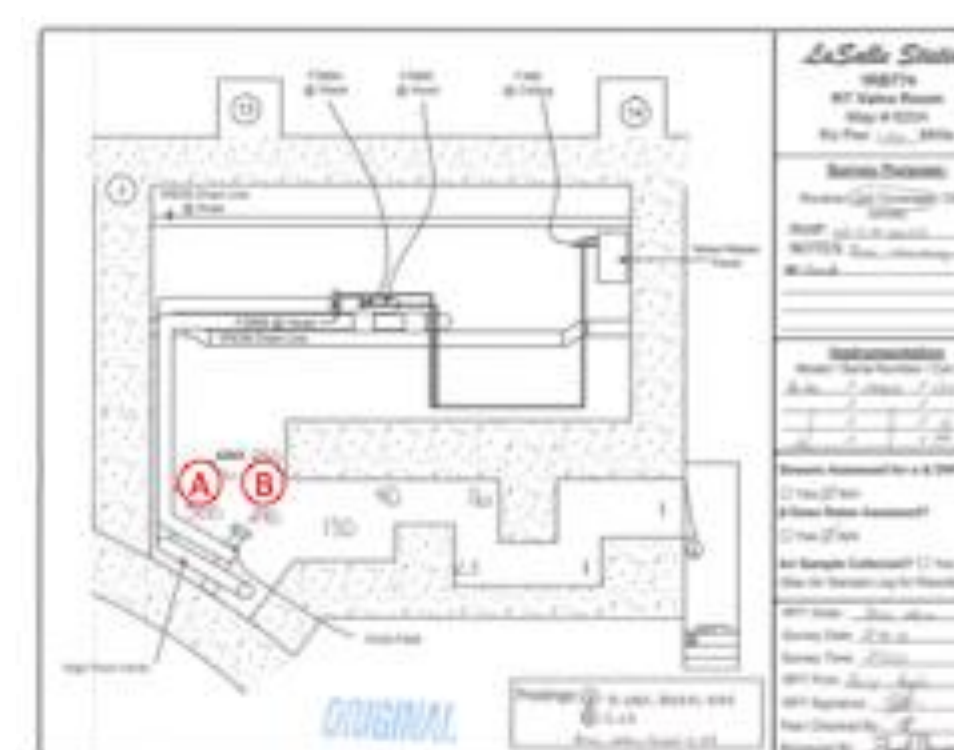
Optimal Shielding Solution

Case 1: LaSalle Generating Station—RT Valve Room Shielding Optimization

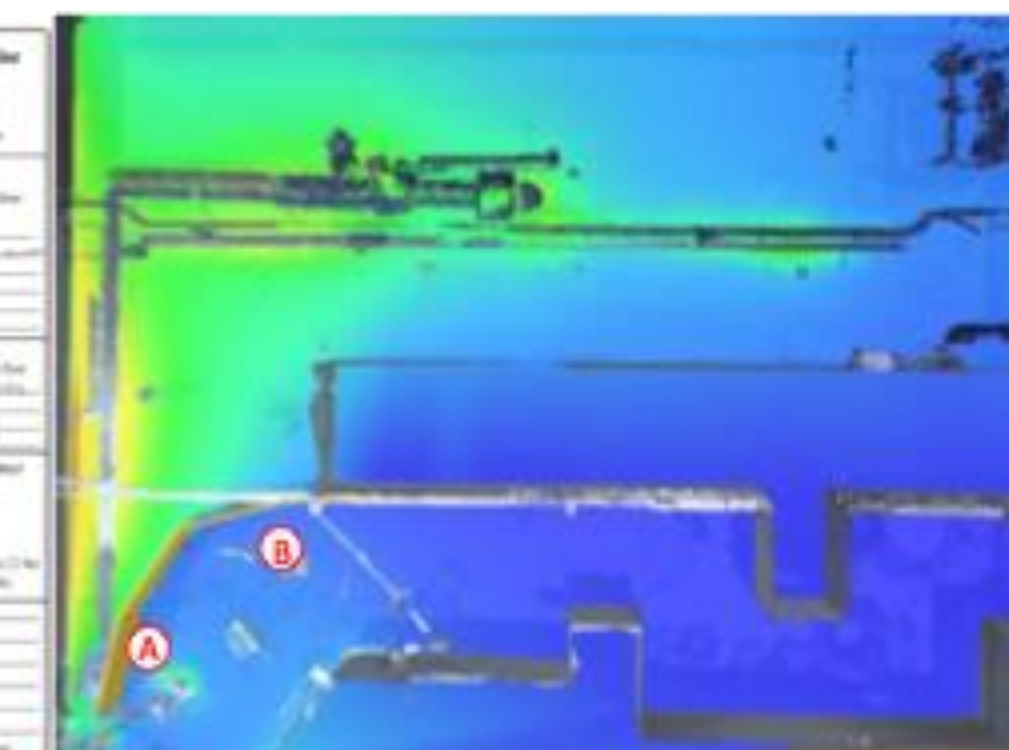
Results

LaSalle installed NPO Serpentine Racks with 1" solid lead equivalent shielding in the optimized configuration shown below. The projected dose reduction using RadVision^{3D} was 55% - detailed results were as follows:

- RadVision^{3D} Scan Dose: 30 mRem
- Shielding Installation Time: 20 minutes
- Shielding Installation Dose: 163 mRem
- Total Job Dose: 11,900 mRem
- Total Dose Savings: 12,000 mRem**



Shielding Post-Install Survey from LaSalle



RadVision^{3D} Shielding Calculation

Survey Location	Survey Data	RadVision ^{3D} Data	% Error
A	500 mRem/h	483 mRem/h	3.5%
B	290 mRem/h	270 mRem/h	7.4%