

Use of Model Forecast Products for Environmental Application at Nuclear Power Corporation of India Ltd. (NPCIL)



SANJAY RANA
NPCIL

Requirement of Decision Support System (DSS)

- Nuclear power plants are sited, designed, constructed, commissioned and operated as per stringent requirements and regulations to ensure health and safety of the plant and personnel as well as members of the public
- Nevertheless, in spite of all the care and precautions that are taken, a remote possibility of some failure of equipment or error in operation or evolution of natural calamities resulting in accident condition leading to a nuclear emergency situation cannot be ruled out
- This may involve unacceptable release of radioactive material or radiation exposure having adverse effect on personnel in the public domain
- The accident at Fukushima site at Japan and the related experience of emergency response further highlighted the importance of a reliable Decision Support System (DSS) to facilitate the decision making and timely implementation of optimum protective measures

Use of Numerical Weather Prediction (NWP) data

Use of NWP data

- **NWP data is used in Decision Support System (DSS) to predict radiological forecast for 72 hours, in public domain in the area 80 km x 80 km around Nuclear Power Plant (NPP) site in accident scenario**

It includes:-

- **Estimation of radionuclide concentrations by using atmospheric dispersion models like Gaussian Puff Model**
- **Estimation of radiation doses**
- **Identification of protective actions**
- **Identification of affected areas around NPP to implement protective actions**

NWP data description

PARAMETERS

- **Single level fields**

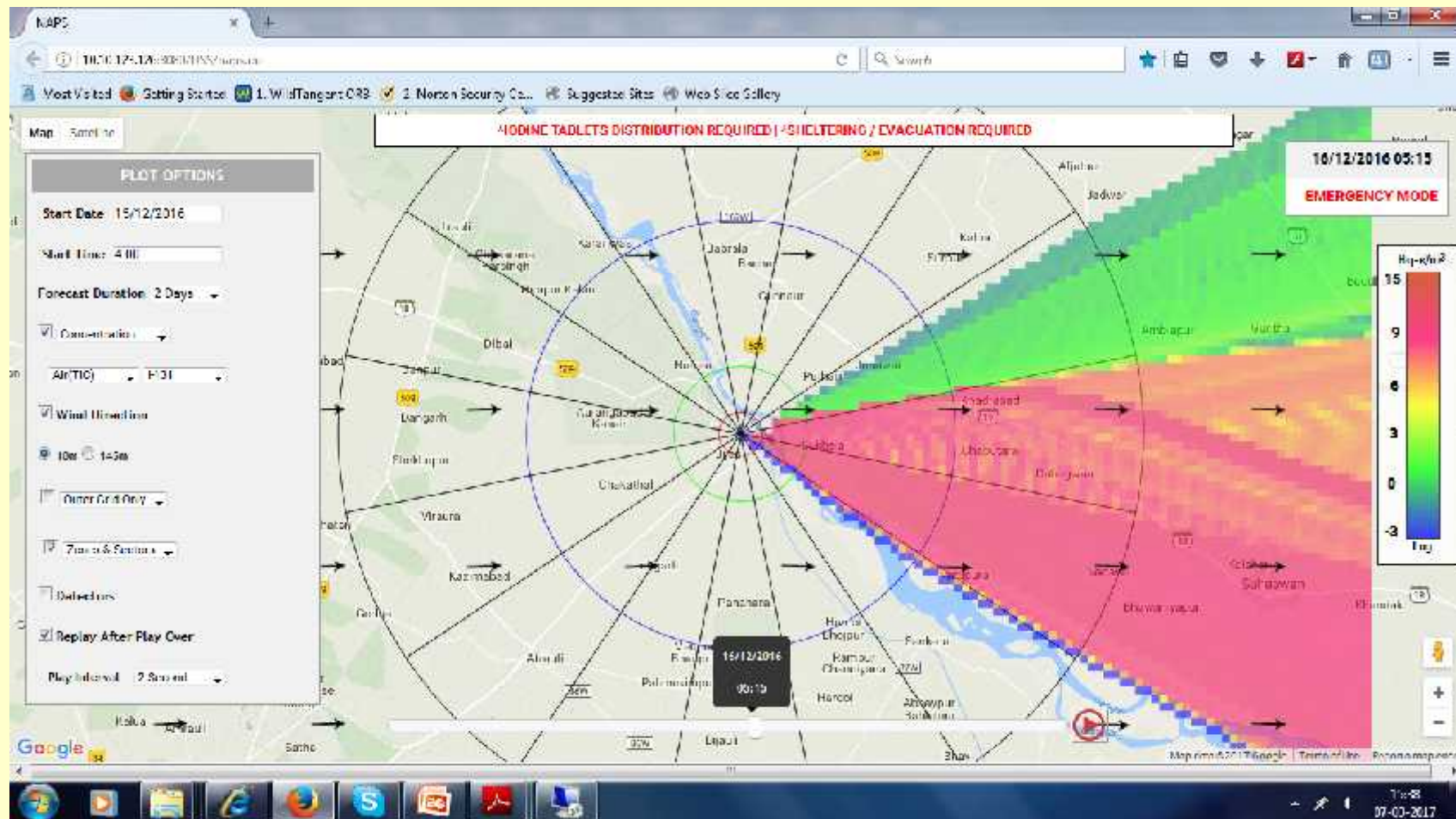
- Longitude (decimal degree)
- Latitude (decimal degree)
- Precipitation Intensity (mm/hour)
- Atmospheric Boundary Layer (ABL) height (m)
- Surface sensible heat flux (W/m²)
- Surface momentum flux (Kg/m*s²)
- Fraction of Land
- Roughness (m)

- **Multi level fields**

- Geo potential height (m)
- Wind speed (m/s)
- Wind direction (degree)
- Virtual potential temperature (K)

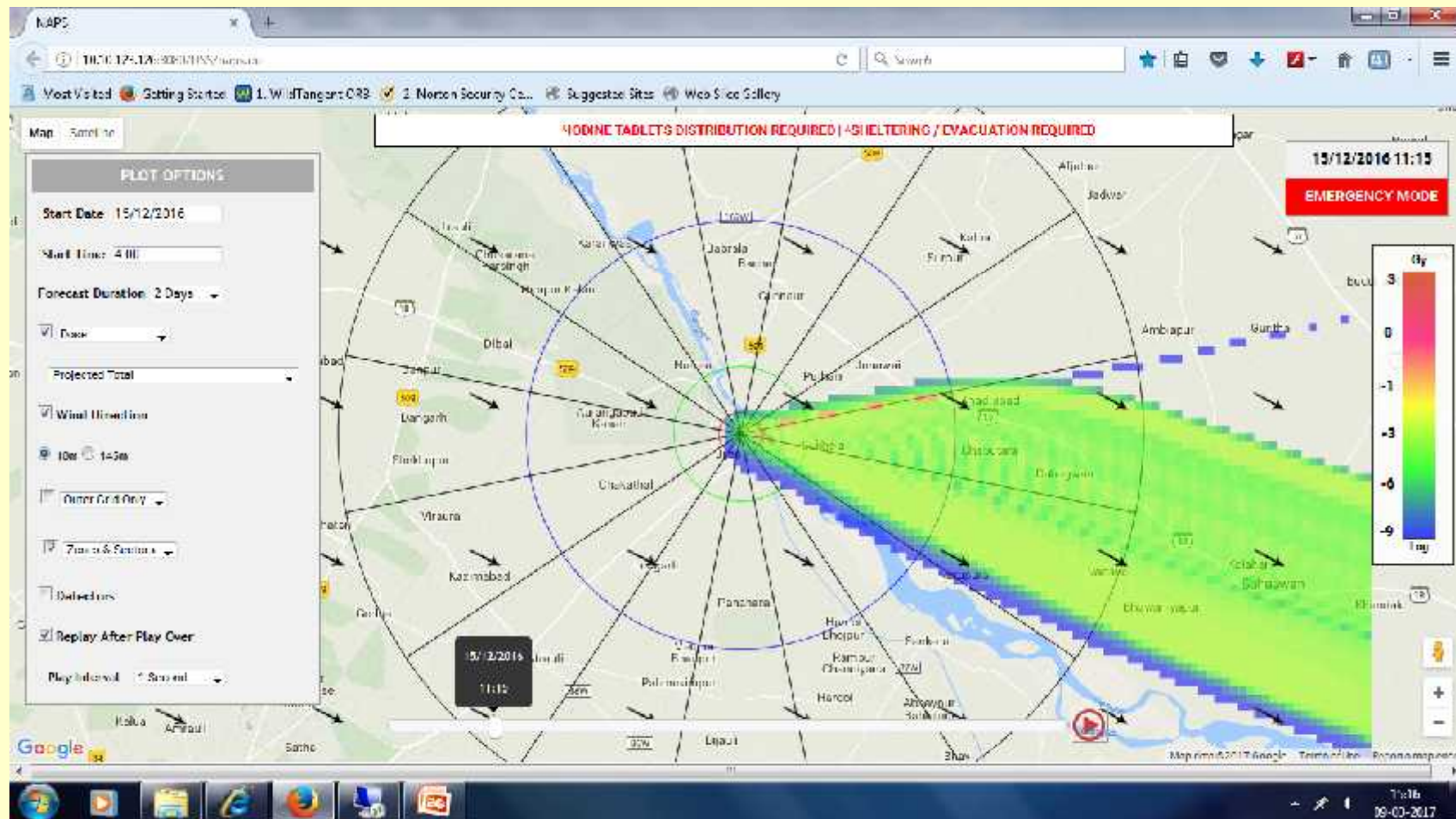
DSS output

Projected I-131 concentration after 24 hrs of accident



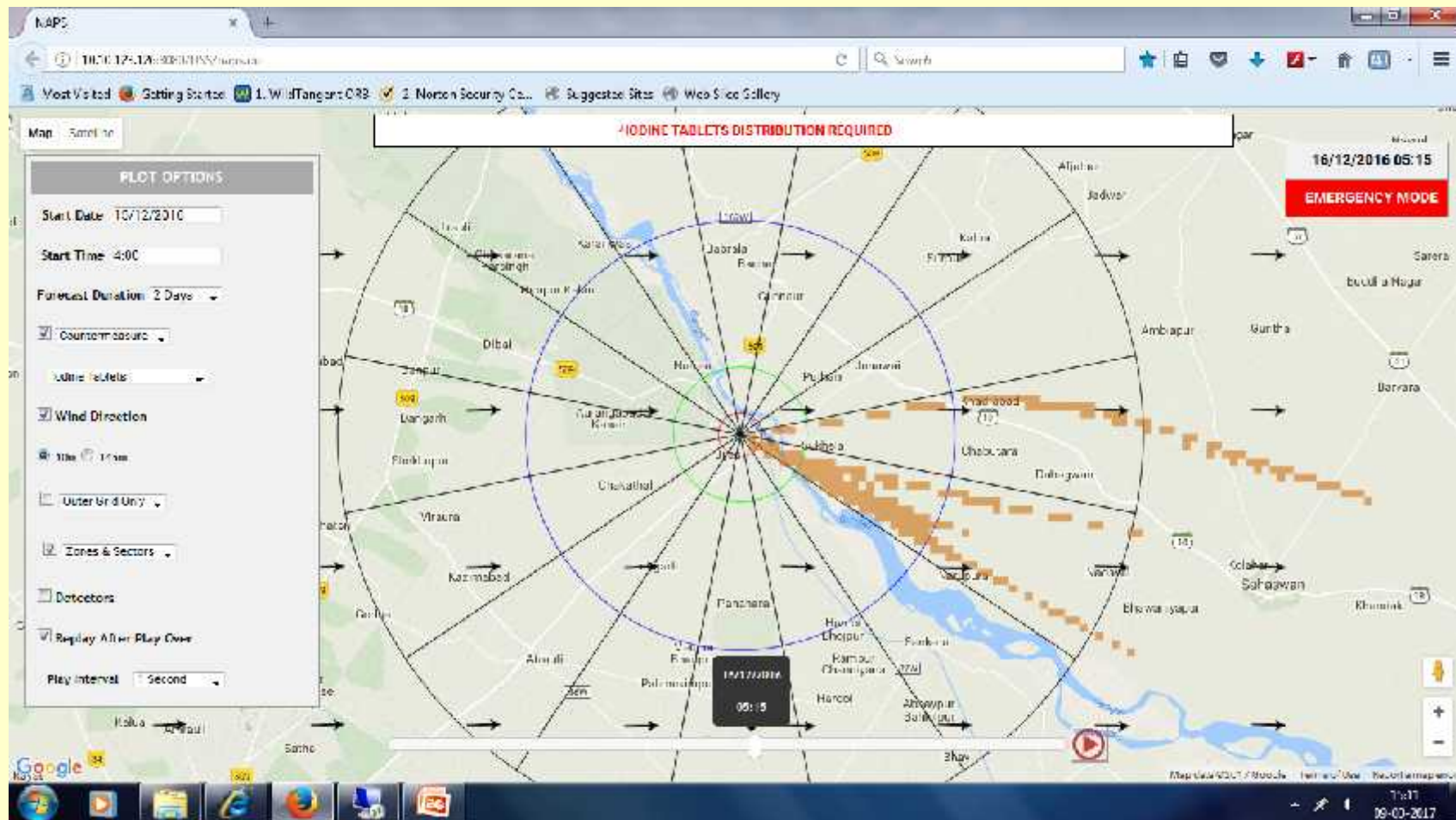
DSS output

Projected whole body dose after 24 hrs of accident



DSS output

Affected areas where Iodine tablets administration is required



THANK YOU

