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Central Radiological Computer System

Radiological Surveillance and Emergency Preparedness During Normal Operation and Within Accident Situations

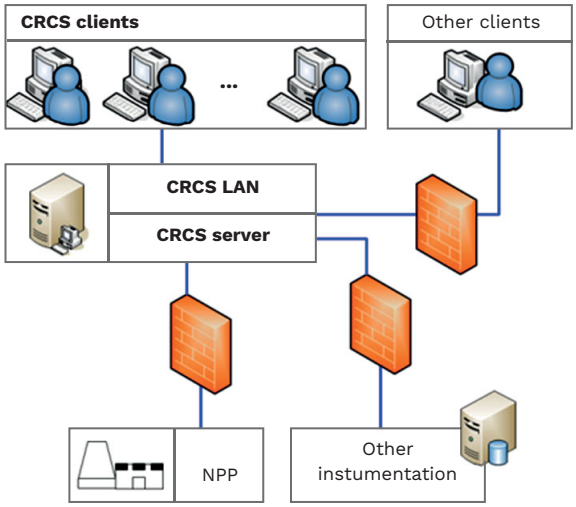
A real life accident will not follow a fixed scenario and will deviate from conservative / covering analyses.

Challenge

In radiological emergencies, nuclear power plant (NPP) operators require tools to assess and minimize any radiological risk to the public and potential dose to workers and emergency response personnel. Real time plant simulations enable operators to limit access to specific plant areas with elevated dose levels. The associated main questions are:

- What is the radioactive source term of a design exceeding accident?
- What is the impact of such accident on the surrounding area?
- How can those impacts on the population be assessed and at least minimized?

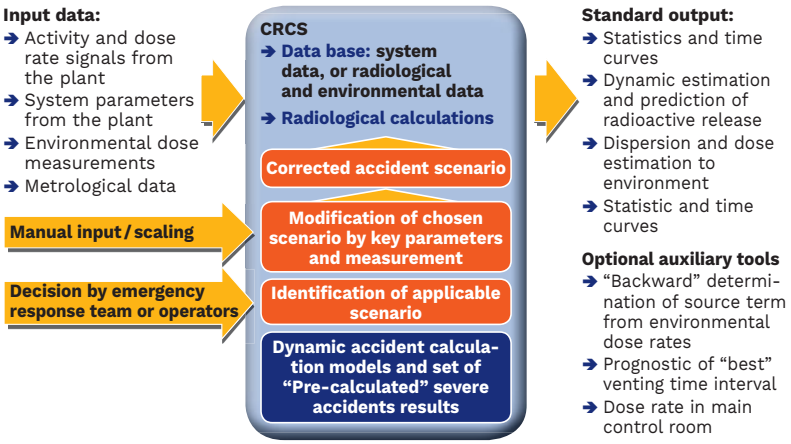
Radiological tools for emergency preparedness and emergency response tools must provide answers in real time, must be versatile and easy-to-use.



Software runs on the standard computer system LINUX

Solution

The Central Radiological Computer System (CRCS) supports your radiological staff during normal operation and within accident situations in order to improve your NPP's emergency preparedness and response. CRCS is a tool which predicts radioactive releases (source terms) to the environment. It is coupled to the process and information system of the plant and is performing automated analyses based on current process value data.



CRCS system characterization

Customer benefits

- Provides support to your NPP's radiological staff during normal operation and within accident situations
- Modular and easily adaptable to site-specific needs and instrumentation and control of plant
- Software runs on the standard computer system
- Improves your NPP's emergency preparedness and response
- Dynamically adaptable tool for prognosis and determination of radioactive releases (source terms) to the environment taking into account real-time measurements
- Machine-learning algorithm to enhance prediction accuracy

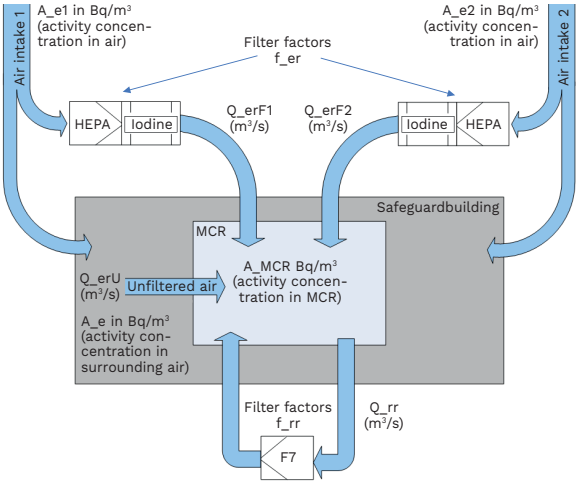
Technical information

CRCS:

- Processes the site- and situation-related input signals:
  - NPP's activity and dose rate signals (systems, rooms, etc.)
  - NPP's system parameters (flows, temperatures, etc.)
  - Environmental dose measurements
  - Meteorological data
- Provides detailed information about:
  - Activity releases into the environment
  - Activity in rooms and systems
  - Atmospheric dispersion and dose assessment
- Continuously assesses:
  - Dynamical estimation and prediction of radioactive releases
  - Dispersion and dose estimations
  - Database for radiological samplings
  - Statistics and time curves.

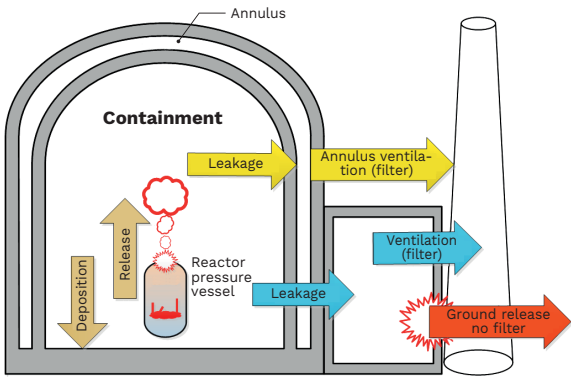
Optional auxiliary tools can be implemented, e.g.:

- "Backward" determination of source term from environmental dose rates
- Prognosis of "best" containment venting time interval
- Dose rate in main control room
- Core damage estimation
- Steam generator leak rate estimation.

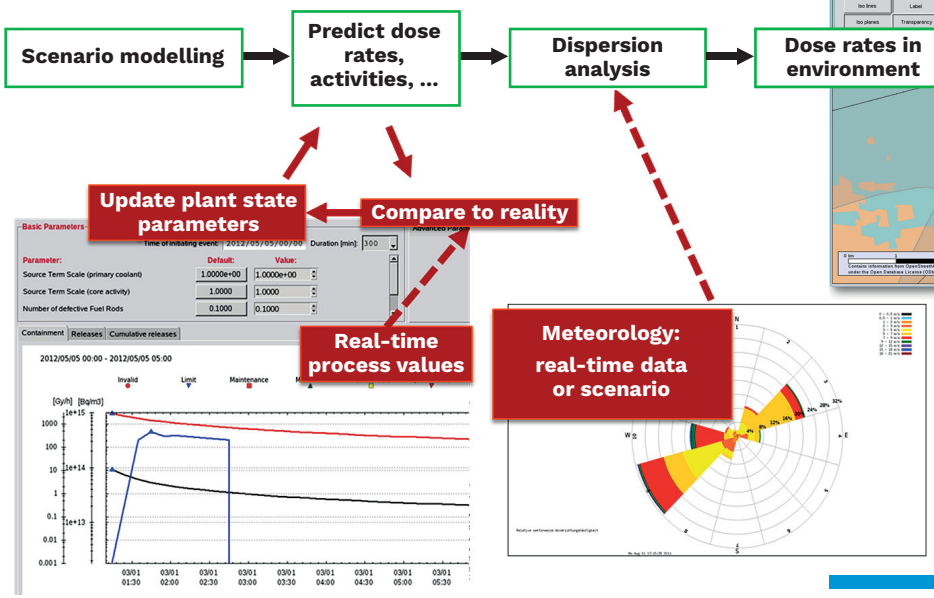


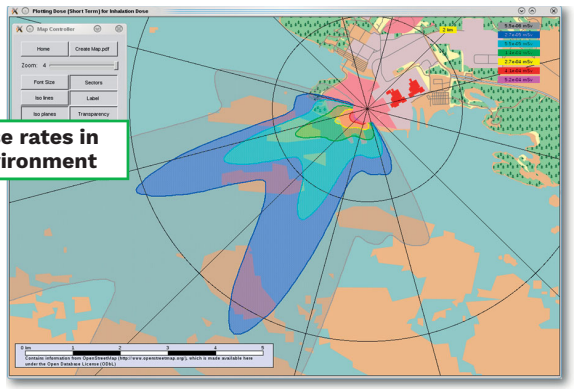
HEPA: high efficiency particulate air

Dose rate determination in rooms (main control room, MCR)



Transport calculation of venting and leakage into the annulus





FSAR: final safety analysis report
MDEQ: matrix differential equation

Accident scenario modelling

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