Cesium -137 contamination at STUK’s premises in March 2016

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Initial events (1)

• On Monday, March 7, 2016, abnormally high airborne Cs-137 concentration was detected in laboratory measurements from a filter collected in March 3 –4, 2016 by an air sampler located at the roof of STUK’s premises. Concentration was three orders of magnitude higher than the normal range of concentration. No other nuclides were detected.

• Backtracking showed that air masses to Finland had arrived from south-southeast during the collection time of the sample.

• Change of filters from all air samplers in the Southern Finland was performed and they were sent to measurement.

• The results of airborne concentration in Helsinki was published on Monday evening => great media interest in Finland
**Initial events (2)**

- In analysis of filters from other air samplers, no abnormal amounts of Cs-137 was found => source of cesium must be in Helsinki
- Samples from air ventilation system of STUK’s premises revealed that cesium was released from the same building where STUK is located.
- The origin was traced to the rooms of a private company operating in the same building. The company collects old radiation sources from the Finnish licensees for final disposal.
- The leaking source was identified in co-operation with the licensee and STUK, and it was immediately isolated.
The cesium source itself

- The cesium source, activity approx 350 MBq, had been used in a factory as level gauge; no contamination was found in the factory => cesium was released when handling the source
- The source was manufactured in 1970’s
- The source was in a form of cesium chloride facilitating the spread of contamination in the building; STUK estimated that 10 MBq of cesium - about 3% - was released
- There are thousands of similar type of cesium sources in industrial use in Finland

⇒ STUK sent a letter to all licensees owning similar type of old level gauge from the same manufacturer, about 60 cesium sources, with the instruction to take swipe samples for STUK’s gammaspectrometric analysis: so far, no contamination has been detected

⇒ There are plans to investigate thoroughly the damaged source to find out why it was broken
Lots of efforts to locate areas /spots where cesium had spread
Access control and requirements for protective clothing in contaminated areas despite that no health risk existed
Decontamination of STUK’s premises

• Decontamination was conducted in STUK’s premises and included the contaminated garage, corridors, rooms etc.

• A lower criteria than 4 Bq/cm² is used in decontamination due to STUK’s spectrometry laboratory needs for surveillance and analysis programme including measurements of samples containing very low concentrations of radionuclides.

• As a result of decontamination waste containing cesium was (and still is) generated; waste is isolated pending final disposal.
Decontamination of STUK’s garage
Decontamination of sewer gully in STUK’s garage
Contamination of persons; results of whole body counting

- So far, all persons involved in decontamination or who had been in the garage before contamination was detected were monitored by whole body counting: 17 from STUK’s staff and 13 persons from other employers; no contamination detected.

- The person who opened the cesium source was monitored, too: no abnormal levels of internal cesium was detected.

- A slight increase of internal cesium was detected in a person who had cleaned the garage before contamination was detected; the amount of cesium can not be explained by her diet.

Note: Some persons of STUK’s staff had been in the garage before detection of contamination; approx 15 pairs of shoes used during those visits were slightly contaminated; new shoes were provided.
Present situation, June 2016

• STUK’s premises cleaned; well more than one person year of STUK’s resources used so far into the incident; in addition service of a private company was used in decontamination

• Special monitoring (e.g. airborne cesium inside STUK’s premises) ongoing

• The premises of the company was sealed until decontamination started at the beginning of June. STUK has reviewed the decontamination plan of the licensee and STUK supervises the cleaning process, which will take about 20 days.

• Cleaning of ventilation system has not yet been planned
Investigations ...

- Questionnaire to the whole STUK’s staff for getting feedback of STUK’s response to the incident as well as provision of internal information and instructions
- Self-assessment of regulatory actions before and during the incident
- On STUK’s request, an external investigation on the incident and STUK’s response to it will be done by the Finnish Safety Investigation Authority
Some results of STUK’s internal evaluation of response to the Cs incident

• Important to synchronize information delivery to
  – domestic and foreign authorities, and
  – media, including social media

• Important – in advance – to develop easily understandable comparisons for describing severity of the situation

• Need to update STUK’s internal procedures and arrangements for
  – rapidly collecting all information related to detection of abnormal airborne radioactivity
  – response to contamination incident including relevant training
  – timely provision of information to media and the public in English, too.
Thank you for your attention!

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NRC Information Exchange in an Emergency

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8th Meeting of the Representatives of Competent Authorities Identified under the Early Notification Convention and Assistance Convention
6 – 10 June 2016, IAEA Headquarters, Vienna, Austria
Emergency Communications

• NRC’s expected emergency communication exchanges
  – Nuclear Power Plants (NPP)
  – State
    • Accident State(s) / local authorities
    • Non-accident States
  – National level / Federal response communications
  – International community
  – Industry Partners
Initial Communication Flow Path

15 minutes

1 hour

If required
Hostile Action Based (HAB) Event Response Progression
NRC receives incoming notification –

Operations Officer 1

Blast dial decision makers
NRC Leadership

Minor Event

Follow as needed
Typically managed by Region

Significant Event

Response Mode Decision
Staff Centers accordingly

Operations Officer 2

Notify Federal stakeholders
DHS/DOE/EPA

Minor Event

Follow as needed

Significant Event

Deploy NRC liaisons to Federal Response Centers
Hostile Action Based Event Progression

NRC receives incoming notification –

Operations Officer 1

HAB Specifics

- Licensee notification (<15 min) to NRC
- Authenticate the call
- Key details provided by NPP
  - Facility
  - Classification of Emergency
  - Nature of attack (armed assault, vehicle bomb)
  - Attack status (Imminent, in-progress, repelled)
- Unlike a typically progressing safety related emergency, normally relied upon communication channels may not be immediately available

Operations Officer 2

Internal
- NRC Senior Leadership – determine NRC Response posture

External
- Alert all US NPPs and Fuel Facilities

Federal Agencies
- DHS National Operations Center
- FBI Strategic Information and Operations Center
- DHS National Infrastructure Coordination Center

Internal
- HQ’s and All Region’s Information Assessment Teams (IAT)

External
- NPPs and Fuel Facilities
NRC Internal Communications

• Technical assessment, prognosis, oversight
  – Dedicated conference lines for continuous exchange
  – Teams dedicated to developing a common emergency communication information – NRC’s situation report
  – Continuous briefings / information exchanges with response leadership
  – Emergency Response Data System (ERDS)
  – WebEOC – Crisis Management Tool
NRC External Communications

• Team(s) dedicated to communicating with response partners and stakeholders
  – Deployed staff to the State/Local response centers and senior response officials information exchanges
  – Federal Coordination Team dedicated to coordinating /communicating with Federal partners
  – Deployed staff to the INPO
  – Technical exchanges with International community
  – Harmonized public communications through a common Joint Information Center
Response Structure (Offsite)

- **State EOC**
  - Local Response (Incident command)
  - National Guard
  - Other Federal Partners (NORTHCOM)

- **FEMA (JFO)**
  - DOE FRMAC
    - DoD
    - FBI
    - HHS
    - EPA
    - USDA
    - NRC
    - Advisory Team
    - Other Federal Partners (NORTHCOM)
QUESTIONS?
Response Structure (Onsite)

- State EOC
- Communication
- NPP Owner Operator
- Industry Response
- Local Response (Incident command)
- NRC (Oversight)
Acronyms

• FEMA – Federal Emergency Management Agency
• USDA – U.S. Department of Agriculture
• HHS – Department of Health and Human Services
• DHS / NOC – Department of Homeland Security / National Operation Center
• DHS / NICC – Department of Homeland Security / National Infrastructure Coordination Center
• DOE – Department of Energy
• EPA – Environmental Protection Agency
• HAB – Hostile Action Based
• FBI / SIOC – Federal Bureau of Investigation / Strategic Information and Operation Center
• NRC IAT – Information Assessment Team
• ERDS – Emergency Response Data System
• INPO – Institute of Nuclear Power Operation
• JFO – Joint Field Office
• JIC – Joint Information Center
Czech Republic
Information Exchange in an Emergency

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Competences and responsibilities

• „Radiation“ emergency preparedness is a part of preparedness to all „general“ crisis
• Act No 18/1997 Coll., Atomic Act
• Act No 239/2000 Coll., on Integrated Rescue System
• Act No 240/2000 Coll., on Crisis Management

• Details on emergency preparedness are given in:
  – Decree No. 318/2002 Coll., on Details of Emergency Preparedness of Nuclear Facilities and Workplaces with Ionising Radiation Sources and on Requirements on the Content of On-Site Emergency Plan and Emergency Rule
  – Government Order No. 11/1999 Coll., on Emergency Planning Zone
  – Decree No. 307/2002 Coll., on Radiation Protection
Exchange of Information in Case of Radiological Event - SUJB

- NPP
  - Operation and Information Center
  - Regional Fire Rescue Services

- IAEA
- EC
- Neighbouring countries

SÚJB Crisis Staff

- Recommendation of protective action

- Central Crisis Staff
- Regional Crisis Staff

- Operation and Information Center
  - Ministry of Interior
  - Fire Rescue Services

- Radiation Monitoring Network
- Czech Hydrometeorological Institute
Exchange of Information in Case of Radiological Event - NPP
Reporting Licencee → SUJB

- Form „Report about the extraordinary event“
- Form „Report about the radiation situation“

- Based on the EMERCON - GENF, MPA

- initial notice - phone
- Primary - email, back up - fax
7 INSTALLATION CONDITIONS
CRITICALITY

\[ \checkmark \] hh:mm (24h) \hspace{1cm} UTC \hspace{1cm} \checkmark \] hh:mm (24h)

SEVERE DAMAGE TO FUEL

8 RELEASE

Description of actual or projected release conditions:

Release to atmosphere:

Start date / time: yyyy/mm/dd / hh:mm UTC
End date / time: yyyy/mm/dd / hh:mm UTC
Release base height: \( m \)
Release top height: \( m \)

Release to water:

Water body affected:

Start date / time: yyyy/mm/dd / hh:mm (24h) UTC
End date / time: yyyy/mm/dd / hh:mm (24h) UTC

9 METEOROLOGY at date/time: yyyy/mm/dd / hh:mm (24h) UTC

Wind from: \( \circ \)
Wind speed: \( m/s \)
Wind measured at height: \( m \)
Pasquill stability class: \( \checkmark \)
Local temperature: \( ^\circ C \)
Precipitation: \( \checkmark \)
Reporting SUJB → international

- EMERCON forms
- IAEA → USIE
- EC → WebECURIE
- Neighbouring countries – fax, email
Monitoring of Radiation Situation

- According to Act No. 18/1997 Coll (the Atomic Act):
  - SÚJB manages and coordinates activities of the RMN
  - SÚJB provides monitoring of radiation situation in the Czech republic

- **MonRaS** – monitoring of radiation situation:

- **tool** – collection, evaluation and publication of radiation monitoring data in the Czech Republic

Exercises / drills

- Different types of exercises / drills
  - Internal - SW tools, exchange information
  - Nationwide - eg. ZONA 2015
  - International - ConvEx
Before everything else, getting ready is the secret to success.

Henry Ford