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Viet Nam National Network for Environmental Radiation Warning & Monitoring

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Legal and regulatory framework

- Law on Environmental Protection No. 72/2020/QH14 approved on 17 November 2020;
- Atomic Energy Law No. 18/2008/QH12-2008 approved on 03 June 2008;
- Decree No. 07/2010/ND-CP of the Government detailing and guiding the implementation of some articles of the Atomic Energy Law;
- Decree No. 70/2010/ND-CP, 22/6/2010 of the Government detailing and guiding the implementation of some articles of the Atomic Energy Law on NPP;

Legal and regulatory framework

- Decision 1636/2010/QD-TTg (August 31, 2010) of the Prime Minister (PM) on approving the planning of the national environmental radiation monitoring and warning network up to 2020;
- Decree No. 95/2017/ND-CP (dated 16 August 2017) of the Government stipulating functions, duties, powers and organizational structure of Ministry of Science and Technology;
- Decision 265/2012/QD-TTg (5/3/2012) of PM on Strengthening of research, development and technical support capability for application of nuclear energy;

Legal and regulatory framework

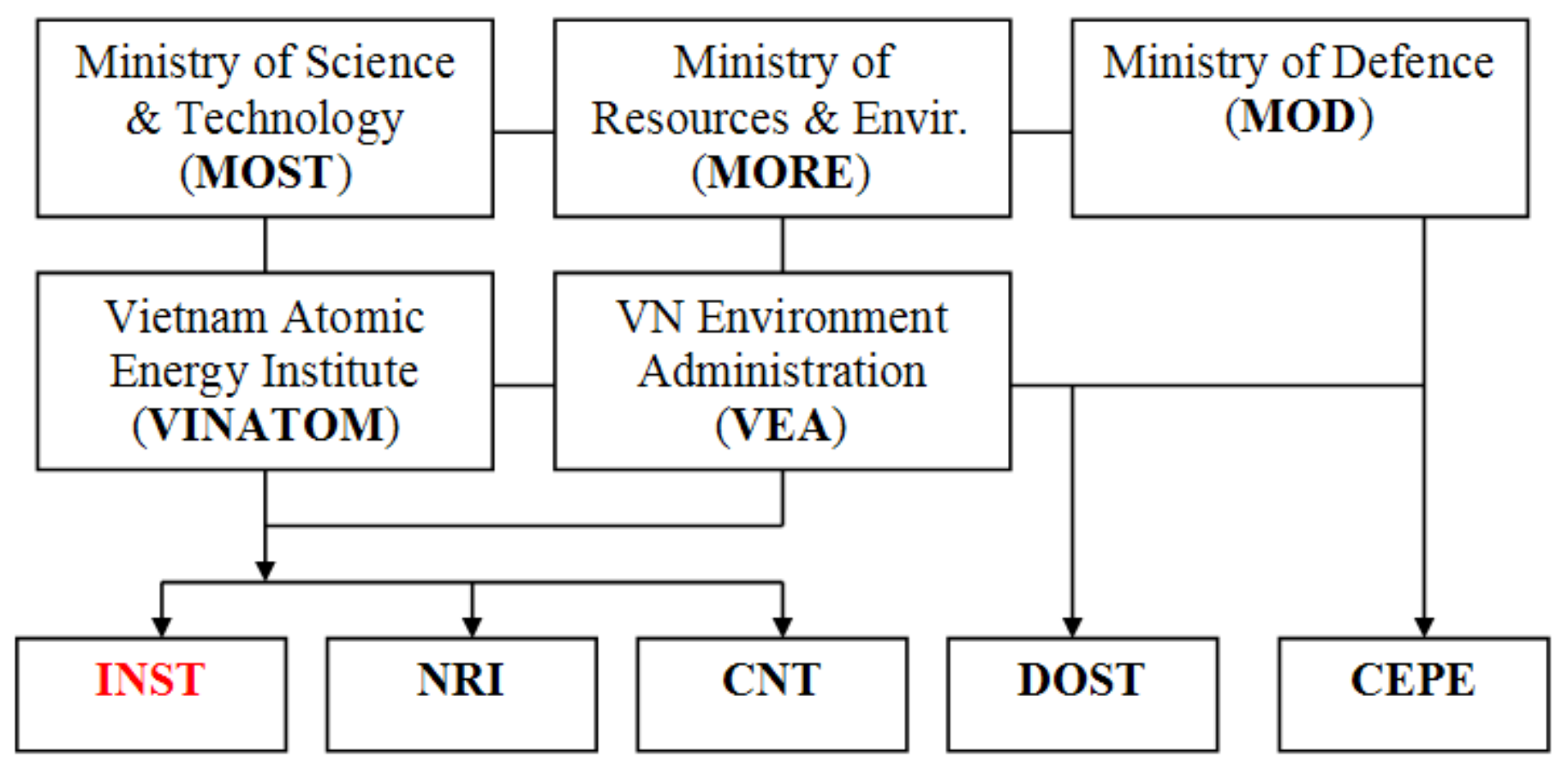
- Circular No. 27/TT-BKHCN-MOST (30/12/2010):

- VINATOM will be responsible for building and managing the National Control Center and the Areal Monitoring Stations. Annually, VINATOM reports the environmental radiation status to the MOST and reports immedietly when there is abnormal phenomenon of radiation

- The Departments of Science and Technology (DOST) of the provinces and cities belong to the Government will be responsible for building and managing Local Stations.

- Organizations and individuals operate the nuclear facilities (NPP, research reactors, uranium enrichment facility, nuclear fuel fabrication, disposal facilities, storage and burial of radioactive waste and energy nuclear materials used) will build and manage their own monitoring stations.

Organizations Related to ERM in Vietnam



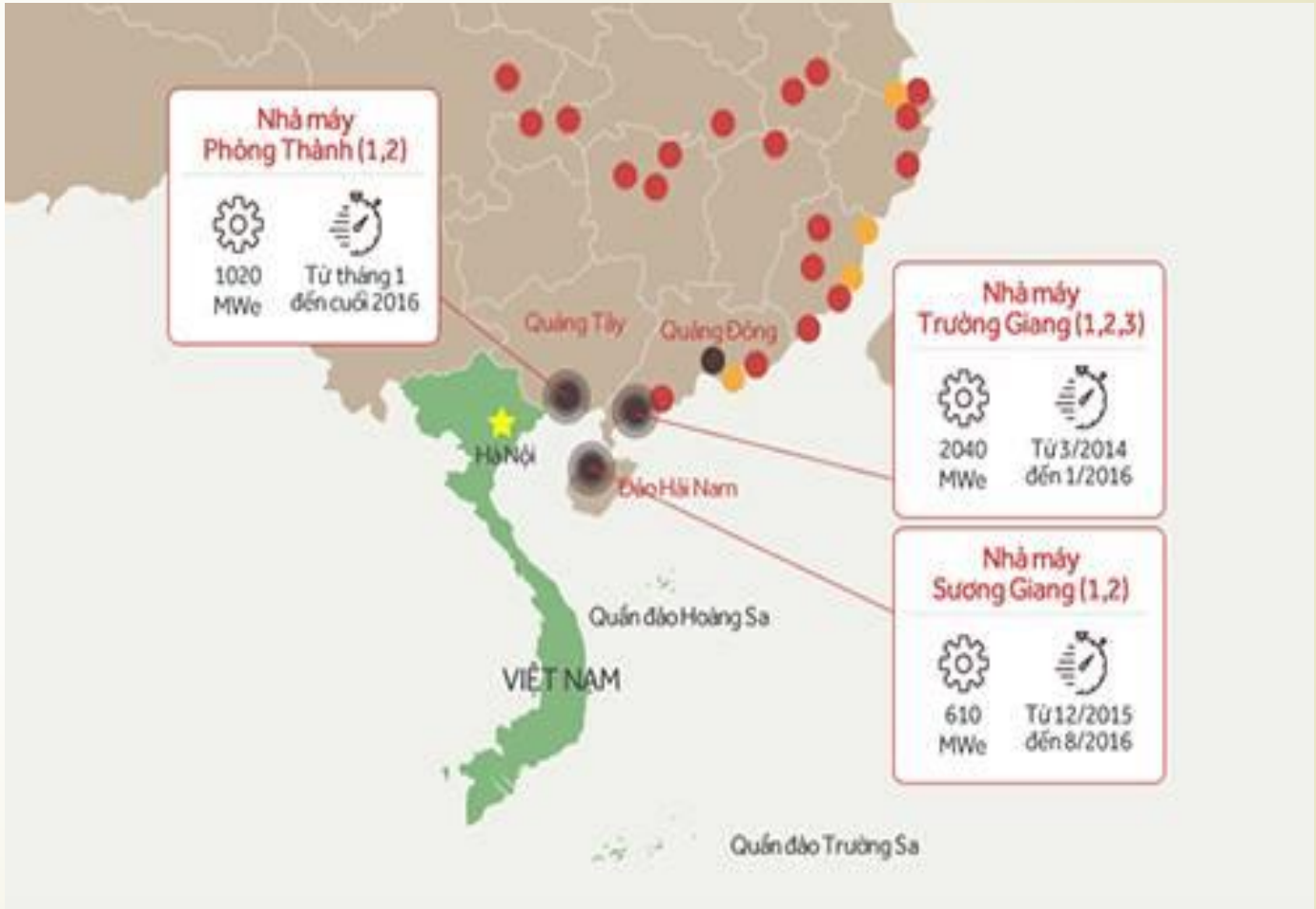
Objectives of ERM

- Timely detect any unusual variation of radiation on the whole territory of Vietnam; Provides systematically data on ambient levels of radiation in the environment for managers (during routine as well as emergency conditions).
- Provide data to support nuclear emergency response and assessment (making decisions necessary to ensure the protection of public health).
- Provide national database of environmental radiation to serve the national management in the field of atomic energy and nuclear safety
- Provide data for professional studies and for the general public.

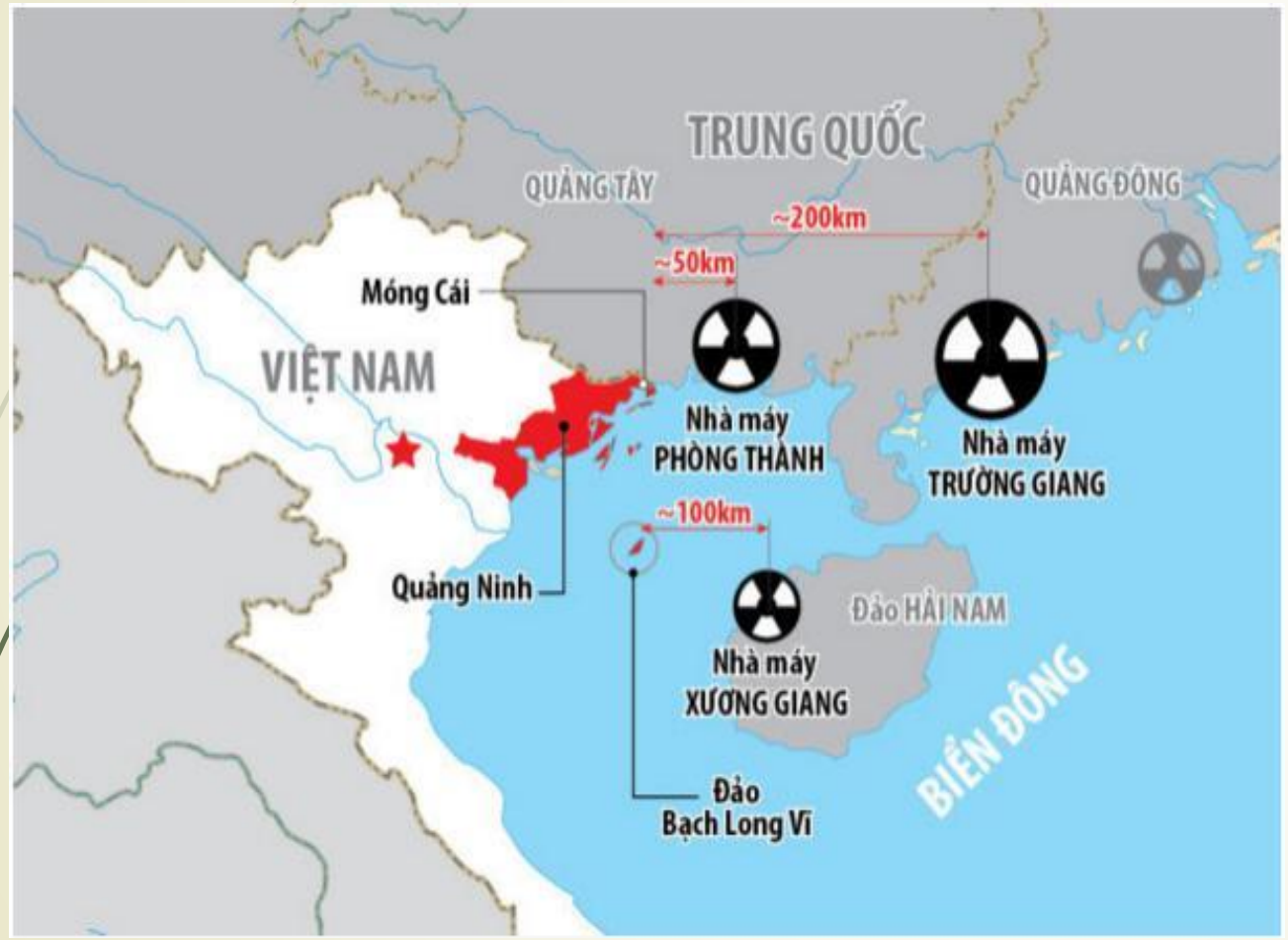

Sites of Nuclear Power Plants in China
Jingyu
Liaoning Donggang
Xudabao
Hongyanhe
Luoyang
Xianning Dafan
Ganshu Baiyin
Rongcheng
Rushan
Haiyang
Tianwan II, Jiangshu II
Tianwan
Jiyang
Anhui Wuhu
Qinshan II
Qinshan I
Qinshan I,II,III
Sanmen, Sanmen II
Pengze
Ningde
Nanqing
Sanming
Fuqing I
Putian
Zhangzhou
Lufeng
Ling'ao II
Daya Bay, Ling'ao
Taishan
Yangjiang
Hainan Changjiang
Guangxi Fangchenggang
Tachuajiang
Xiaomoshan
Changde
Chongqing Shizhu
Fuling
Peng'an
Planned
Under Construction
In Operation
Source: Research Institute of Tepia
(as of Nov. 2008)

NPPs in the Region

- ✓ Many NPPs are building or operating in the southeast of China…
- ✓ Floating NPPs will be also operating in the East sea



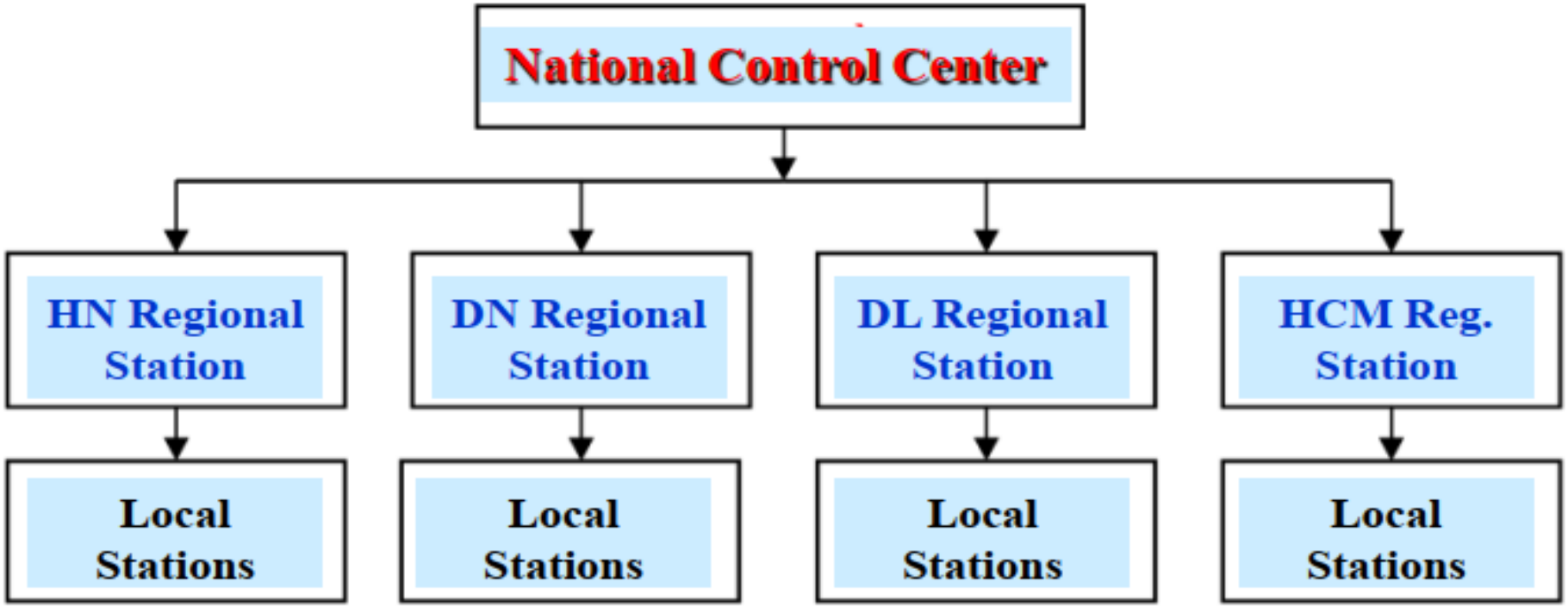
NPPs in the Region



While, according to IAEA Guidelines:

- ✓ Ingestion & Commodities Planning Distance (ICPD) is 300 km;
- ✓ Extended Planning Distance (EPD) is 100 km

Structure of the National Network



Distribution of the Stations

Construction & Management of the network

- Perform online connection data collected from the stations, the monitoring points in the network and alert of environmental radiation for the whole territory of Vietnam;
- Handling results of monitoring, constructing national database of environmental radiation;
- Technical Support for analysis, evaluation of any variation of radiation; and for response of nuclear and radiological accidents.

The Network will consist of:

- Natonal Control Center
- Local Station (16)
- Regional Station (4)

Functions of the National Control Center

- Perform online connection data collected from the stations, the monitoring points in the network and alert of environmental radiation for the whole territory of Vietnam;
- Handling results of monitoring, constructing national database of environmental radiation;
- Technical Support for analysis, evaluation of any variation of radiation; and for response of nuclear and radiological accidents.

Functions of the Regional Stations

- Coordinate activities of the local stations and base stations in the regions;
- Regional Stations are responsible for monitoring data collected online from the local stations;
- Data collection, processing and analysis of radionuclides in environmental samples;
- Directly involved in the assessment of the nuclear & radiological response plan at provincial or local level.

Functions of the Local Stations

- Built in some central provinces and cities where there is no regional station or possibly influenced by the incident radiation and nuclear incidents.
- Local stations make regular monitoring tasks, continuity in the points and the nuclear facilities in the province;
- Connect online with the regional stations

Objects and Frequency of Monitoring (1/2)

- Gamma exposure dose rate in the air will be monitored continuously.
- Cumulative dose in the air: every 3 months.
- Total beta radioactivity of the fallout: every month.
- Gamma spectral analysis to determine radioactivity of the isotopes in fallout samples: every 3 months.
- ^{3}H radioactivity in air and rain water is usually measured monthly.

Object and Frequency of Observation (2/2)

- Radioactivity of the main radionuclides such as ^{134}Cs, ^{137}Cs, ^{90}Sr, ^{238}Pu, $^{239+240}Pu$, ^{54}Mn, ^{58}Co, ^{60}Co, ^{65}Zn, ^{14}C, ^{40}K, ^{226}Ra, etc. in different environmental samples (surface soil, sediment, plants, food and foodstuffs samples…) – once per six months.
- Activity of the radioisotopes in aerosol sample is often continuous monitoring in order to promptly detect abnormal radiation.
- The meteorological parameters like wind direction, wind speed, temperature, humidity, rainfall, solar radiation intensity, atmospheric stability ... to be monitored regularly.

In 2019

- Installed and put into operation online equipments:
  - ✓4 gamma spectrometer systems (SARA): MongCai, NgheAn, CaoBang and DaNang
  - ✓3 systems for ambient gamma dose rate: BachLongVi island , HN, BaiChay and SonLa
  - ✓4 systems of aerosol sampler: MongCai, BaiChay, HaiPhong and LaoCai
  - ✓2 systems of fallout sampler: MongCai & LangSon

11 online radiation monitoring stations

Aerosol sampler at Mong Cai, Jun. 2019

SARA System at DaNang, Jun. 2019

Gamma spectrometer systems

Realtime dose measurement System (FUJI- Japan)

- gamma dose rate

Automatic Wet&Dry sampler

Conclusion

- Vietnam National Networks for Environmental Radiation Warning & Monitoring are used for the enhancement of early warning of radioactive incidents and assist management agencies in tracing the radioactive release as well as predicting the direction of radiation spread in the locality.

- Vietnam has installed and put 12 systems into operation, including 7 Fuji systems (Japan) and 5 Sara systems (Envinet, Germany) at 11 online environmental monitoring stations in Lang Son, Hai Phong, Mong Cai, Bai Chay, Lao Cai, Cao Bang, Nghe An, Son La, Da Nang, Hanoi and on Bach Long Vi island..

Conclusion

- The networks are typically designed with one or more radiation detectors which have high sensitivity and the ability to measure gamma dose rates over a wide range. They can be connected and transmit data wirelessly to users via the internet. The data is commonly processed and displayed on a web platform with high security.

- The networks to ensure the control of environmental radiation safety, promptly detect any strange happenings related to radiation in Vietnam, support for the proactive response to nuclear and radiation incidents and provide a national environmental radiation database for the atomic energy and nuclear safety management.

Thank you very much for your attention !