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Analysis on Occupational Exposure of Radiation Workers in Korea by KISOE

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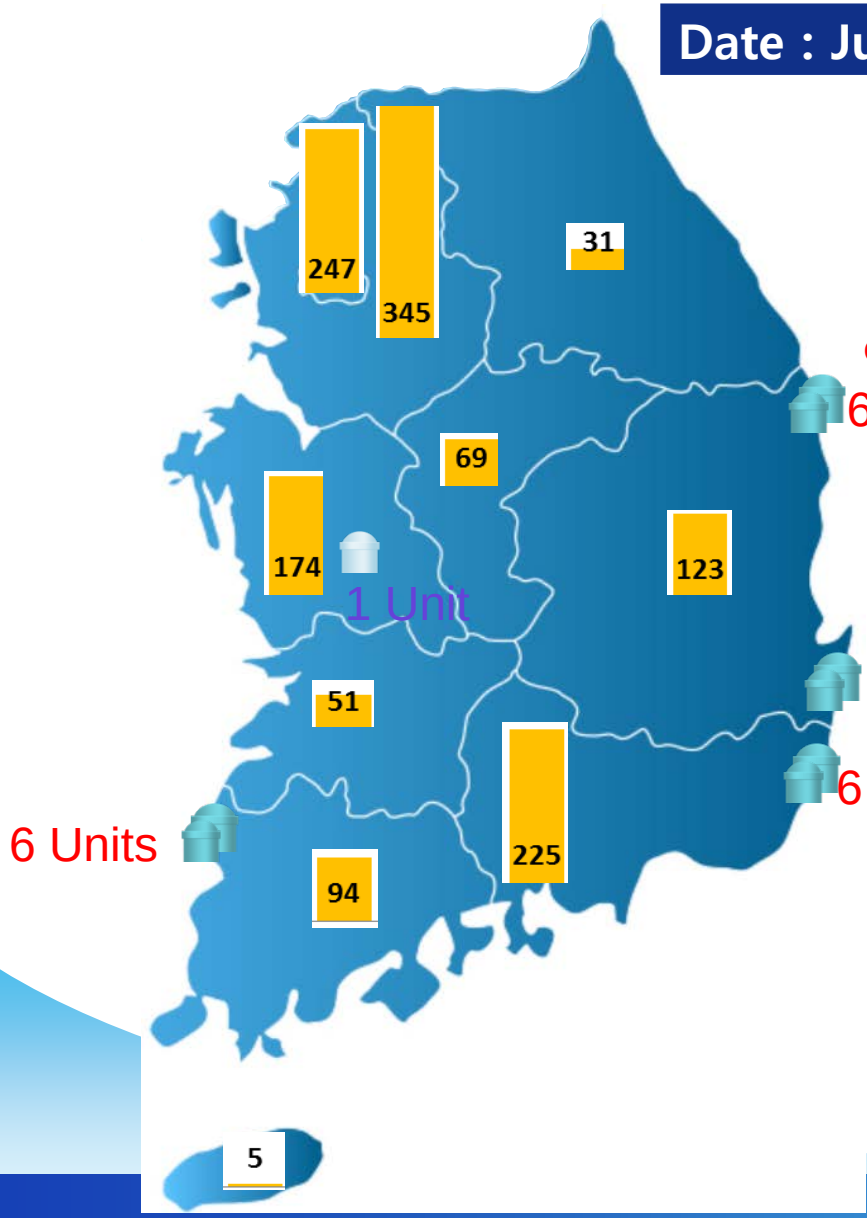
1. NPP & Licensees of Radiation Sources in Korea

Date : July, 2013



Operation : Construction

6 Units + 2 Units

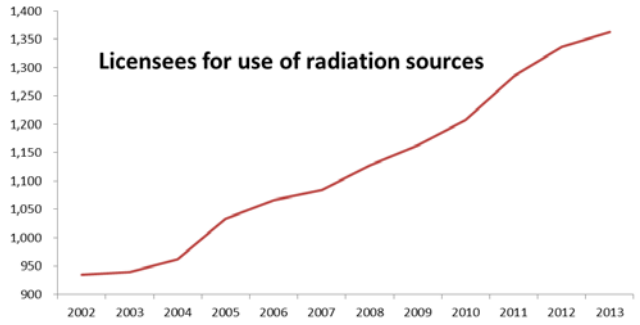
5 Units + 1 Units

6 Units + 2 Units

	Operation	Construction
NPP	23	5

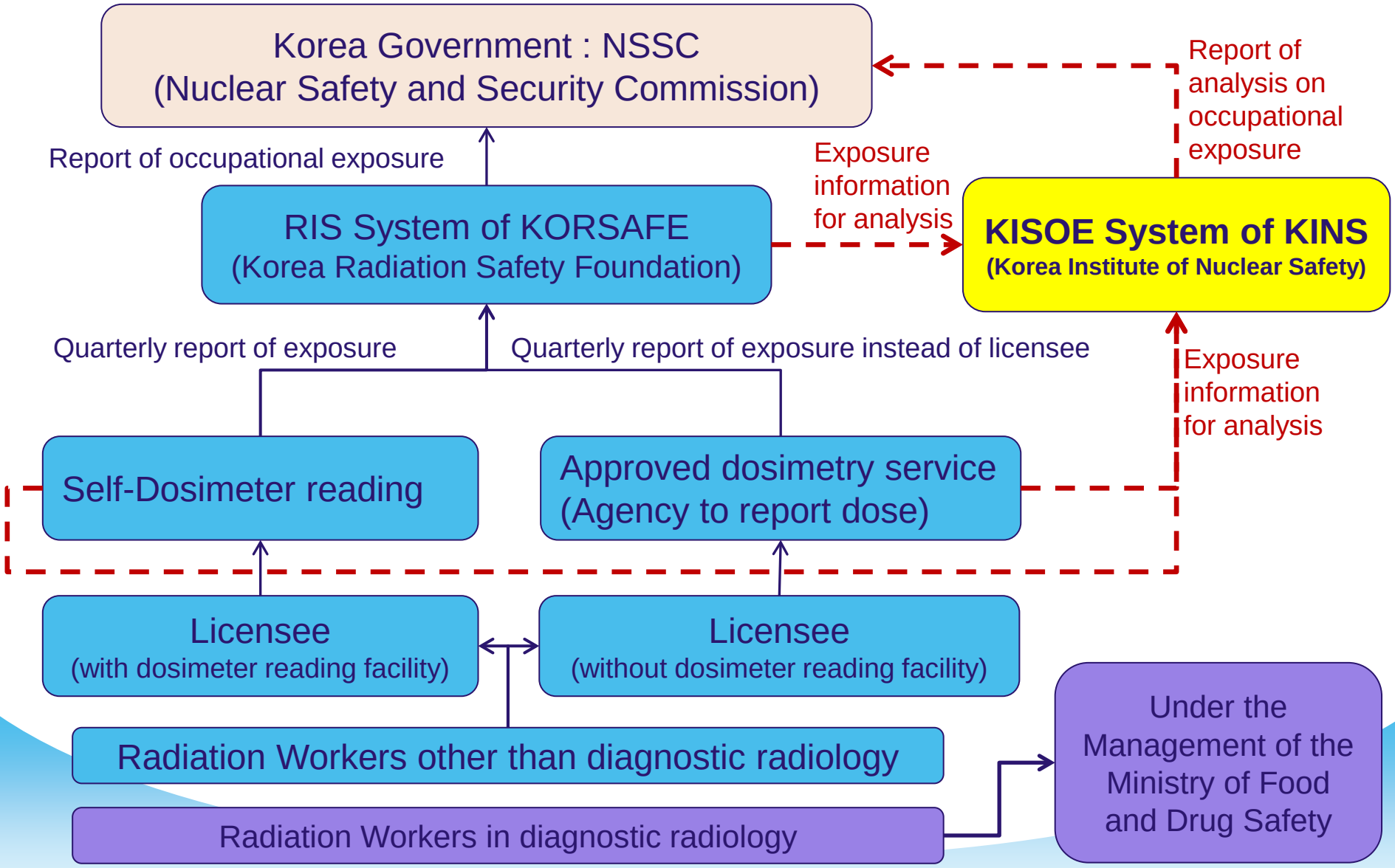
	Operation
Research Reactor	1

	Total Facilities
Licensees for Use of Radiation Sources	1364



The Number of Licensees for Use of Radiation Sources in Korea is Gradually Increasing Every Year.

2. Collection System of Dose Records in Korea



3. Brief Introduction of KISOE

2002~2004 Establishment of KISOE

- **Korea Information System on Occupational Exposure (KISOE) in KINS**
- Development of KISOE for three years of 2002 ~ 2004
- Evaluation of Trends in Occupational Radiation Exposure for Assessment of the Effectiveness of Radiation Protection Program

2005 ~ KISOE in Operation

- Annual Collection of Dose Records from Licensees or Approved Dosimetry Services
- Annual Analysis on Occupational Exposure of Radiation Workers in Korea
- Publication of Annual Reports

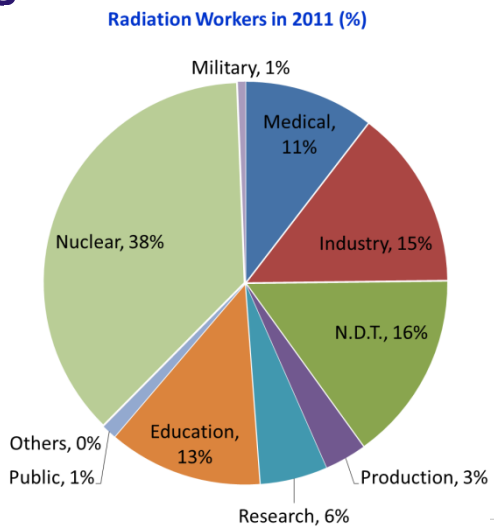
2002~2011 Analysis for 10 years by KISOE

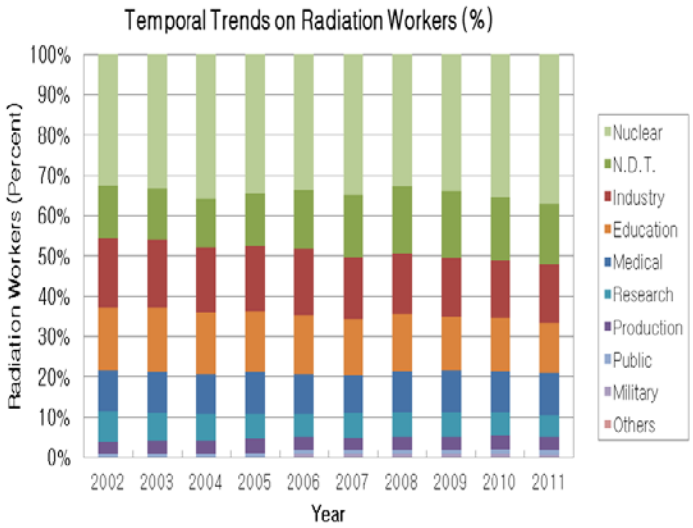
- In this presentation, analyses on occupational exposure in Korea are summarized for 10 years from 2002 to 2011.

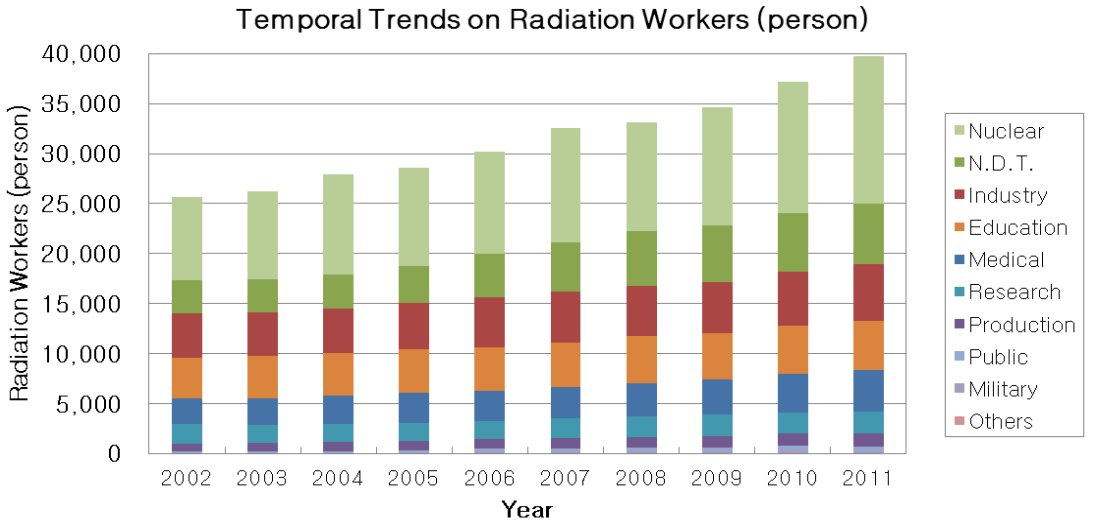
4. Radiation Workers in Korea (2002~2011)

- **Radiation workers works for Licensees that are classified into 10 types.**
  - Nuclear energy
  - Non-Destructive Testing (NDT)
  - General industry
  - Education institute
  - Medical use
  - Research institute
  - R.I. Production and distribution
  - Public institute
  - Military activity
  - Others

- **Number of Radiation Workers**
  - has increased about 5% annually.



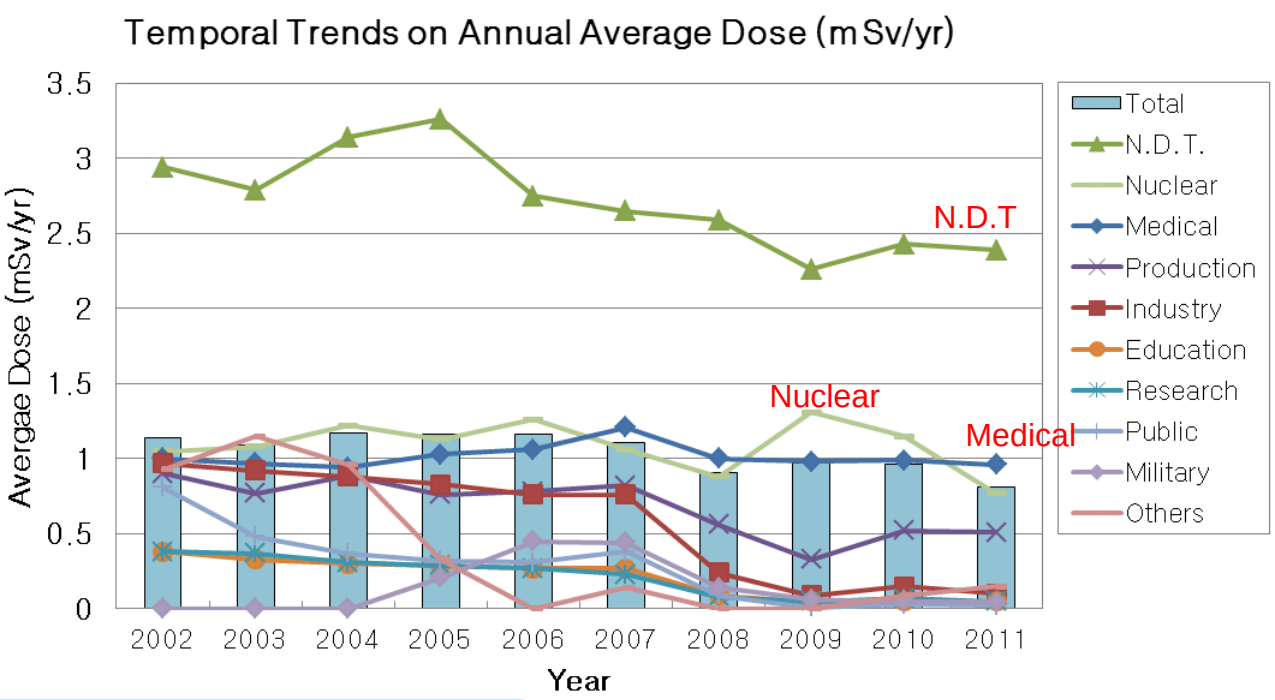


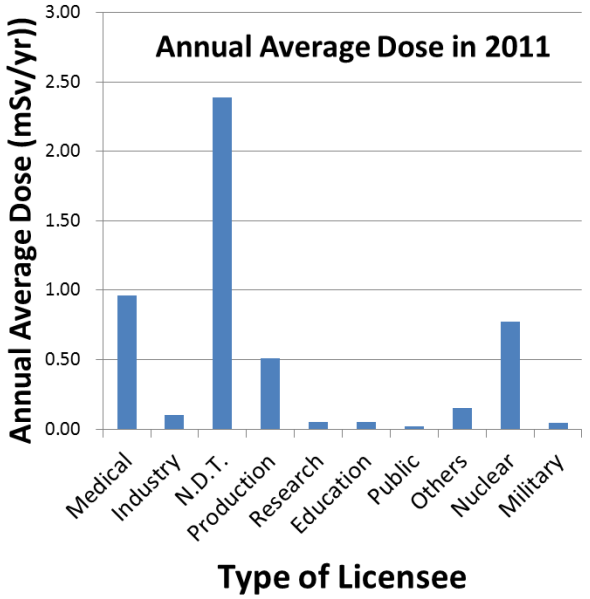


5. Annual Average Dose (2002 ~ 2011)

- **The Highest average dose is in N.D.T.**
  - 2~3 times higher than the Total Averaged dose.

- **Trends between Nuclear Energy and Medical Use are similar.**
  - Those are Around the Total Averaged dose.

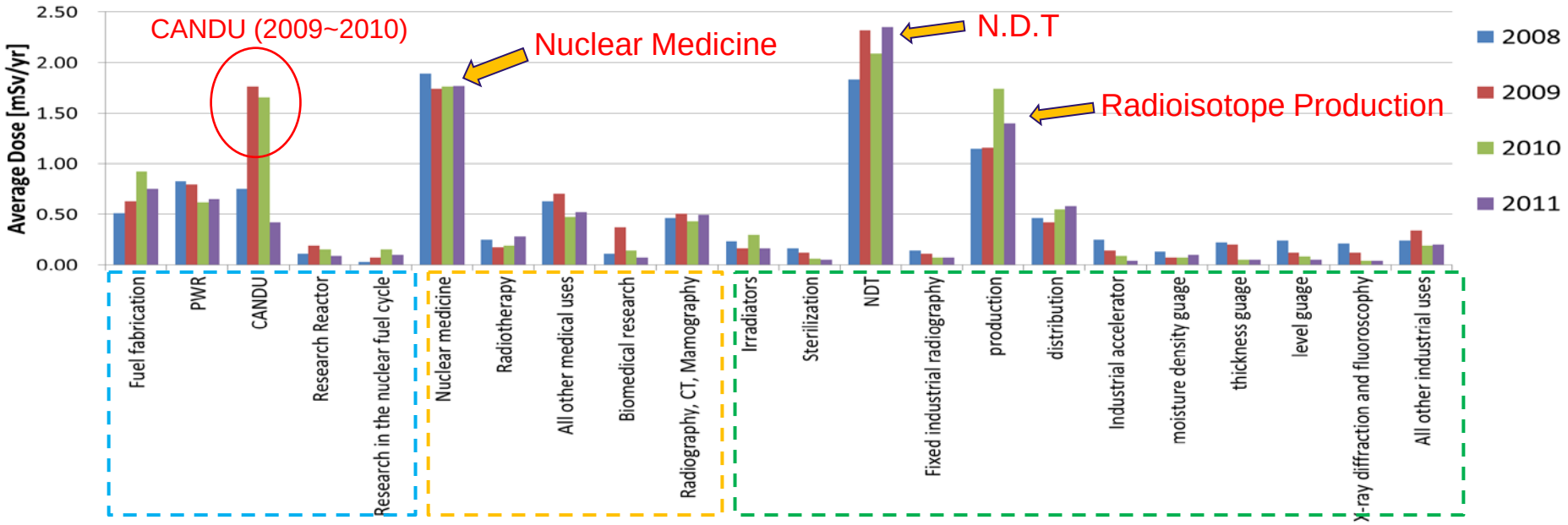




5.1 Detailed Annual Average Dose (2008~2011)

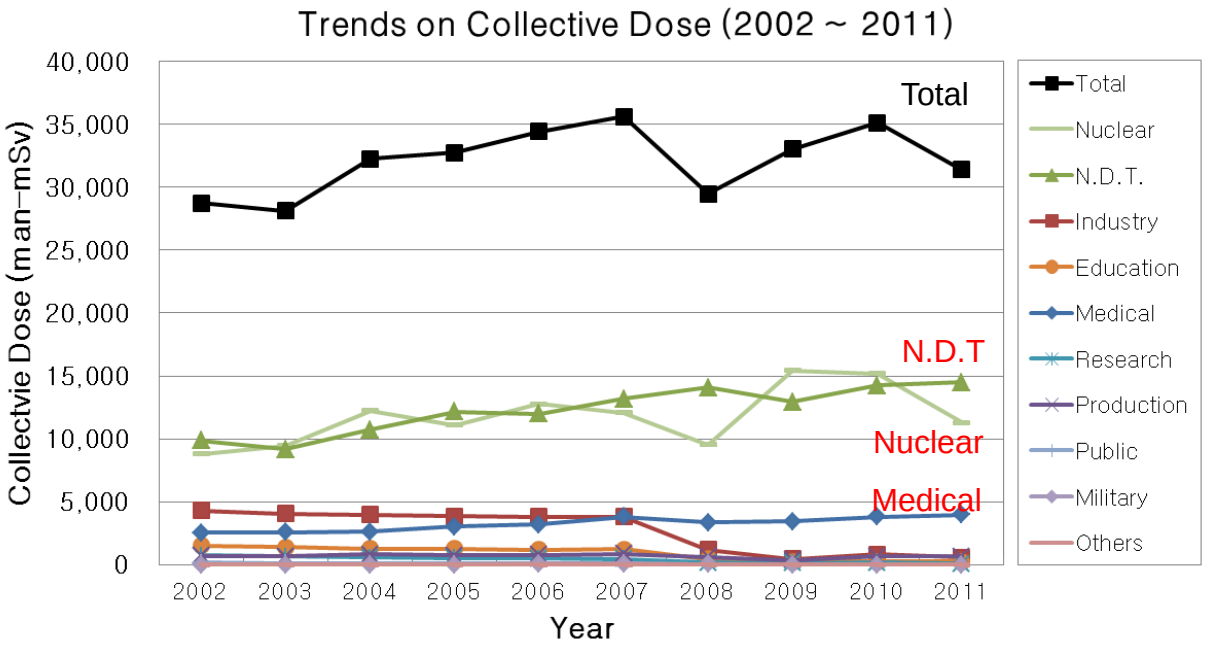
- **Higher than 1 mSv/yr during (2008 ~ 2011)**
  - CANDU, Nuclear Medicine, NDT & Production of Radioisotopes.
    - Replacement of pressure pipes in Wolsung Unit 1 (CANDU) was made during (2009~2010).
    - Radiation workers in Nuclear Medicine receive the highest dose in Medical Use area.
    - In Industrial Use, the highest doses are received in N.D.T.
      The 2nd highest dose in Radioisotope Production.

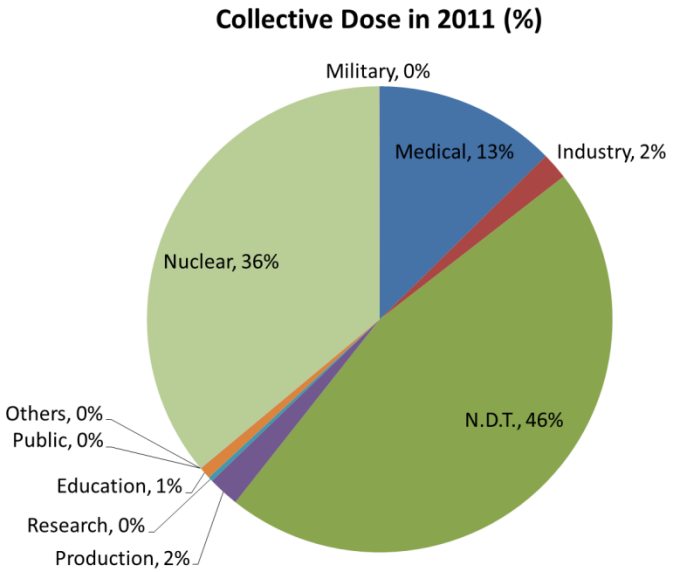
Annual Average Dose (2008~2011) in [Nuclear Energy, Medical Use, Industrial Use]



6. Trends on Collective Dose (2002 ~ 2011)

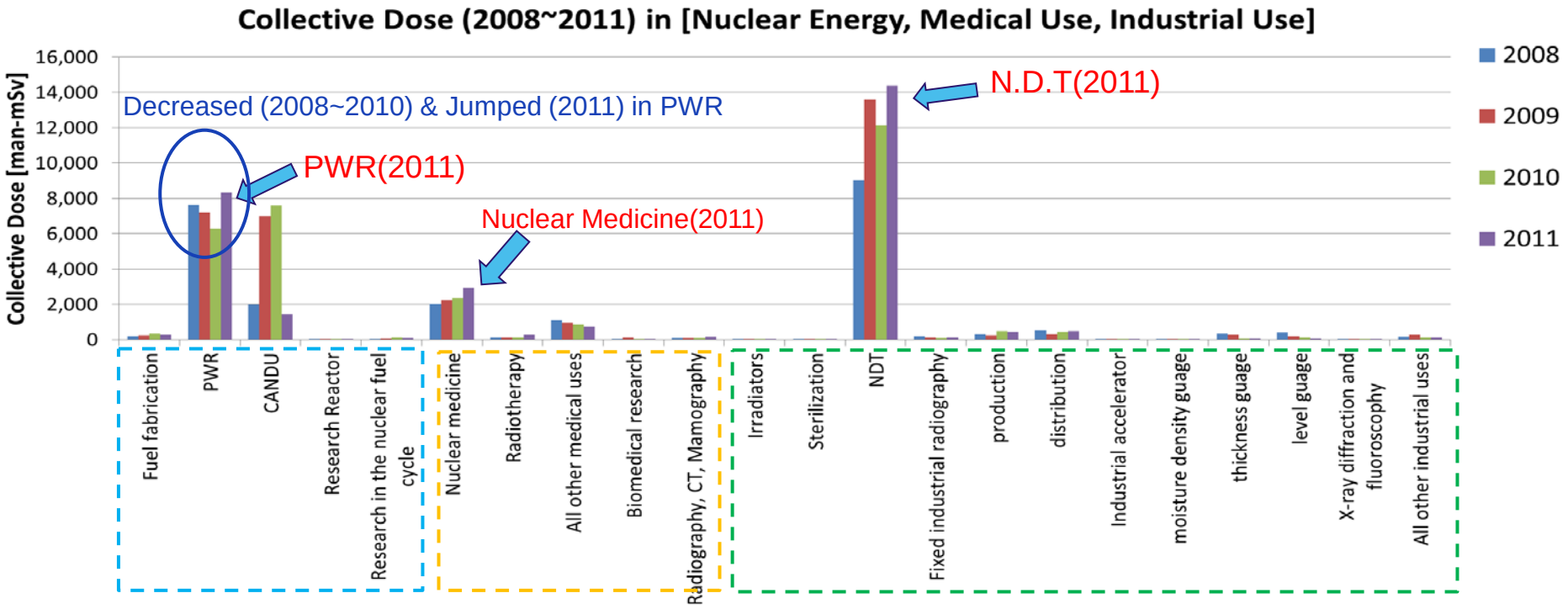
- **Three types of licensees (Nuclear Energy, N.D.T & Medical Use) constitute the large majority of collective dose (beyond 90%).**
  - Workers in those licensees (38%, 16% & 11%, respectively) are many and annual average doses (0.77, 2.39 & 0.96 mSv/yr, respectively) are higher than other type of licensees.
- **Collective doses of other types of licensees are very small due to the low annual average doses, although workers are not a few.**





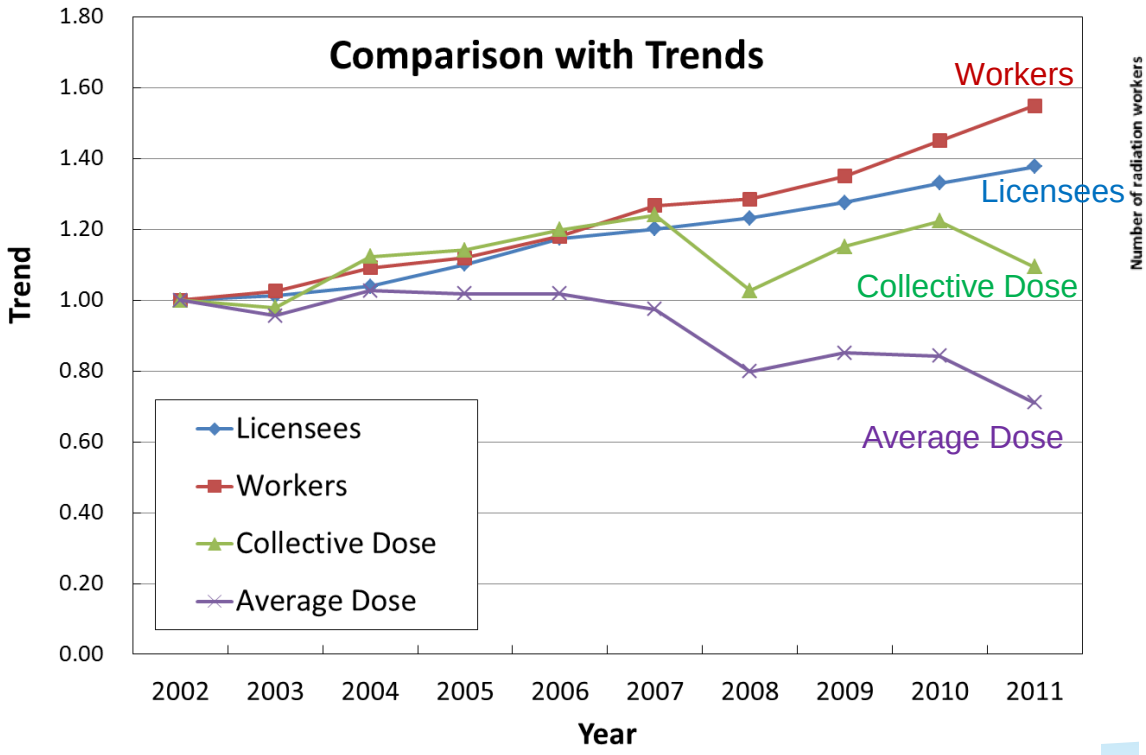
6.1 Detailed Collective Dose (2008 ~ 2011)

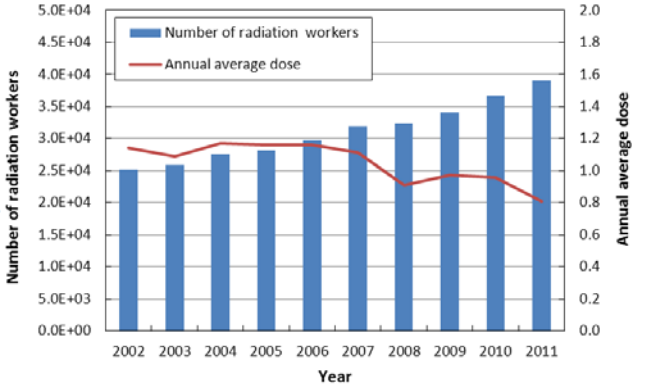
- **Top 3 categories of collective dose in 2011**
  - N.D.T > PWR > Nuclear Medicine
    - Workers in N.D.T are fewer than PWR, but average dose much higher.
    - Workers in Nuclear medicine receive a rather high level of average dose.
- **Collective dose in PWR continued to decrease but jumped in 2011**
  - Due to an increase of workers in new PWRs that began operation.

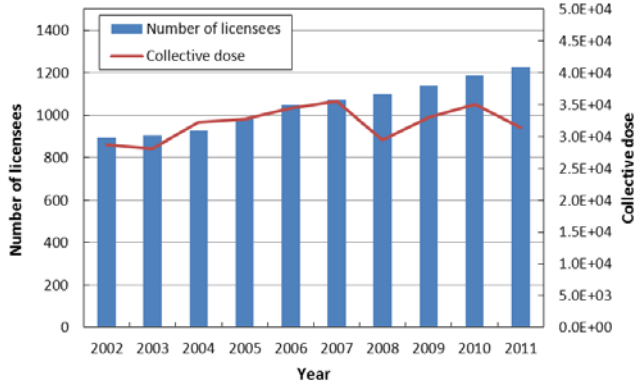


7. Overall Analysis on radiation protection program

- **Numbers of licensees & radiation workers have increased.**
  - Annual collective doses have been kept at the same level.
  - Annual average doses have continuously gradually decreased.
- **These trends imply the continuous improvement of radiation protection programs in Korea.**







8. Conclusion

- **Analyses on Occupational Exposure of Radiation Workers in Republic of Korea were performed.**
  - By use of KISOE system that collects dose records of radiation workers in various fields in Republic of Korea.

- **Based on the analyses for (2002~2011), it is implied that radiation protection programs have been continuously improved in Korea.**
  - Number of radiation workers has increased about 5% annually.
  - Nonetheless, annual average dose has continuously gradually decreased and annual collective doses been kept at the same level.
  - More concerns are needed for radiation workers in N.D.T. due to the highest average dose & collective dose.

- **It is necessary to continue to improve KISOE system,**
  - By collecting more detailed data about jobs of radiation workers.
  - By developing more sophisticated method for data analysis.

Thank You.