10.   Problems to be Solved

The flow toward the NORM/TENORM solution could be summarized as following steps.

[Step 1]

The Conceptual Understanding is Essential for a Stable Solution of NORM/TENORM Problem

In case of the practice, like radioactive waste disposal, the base is a dose limitation to general public as 1mSv/y based on ICRP Publ. 60.   As a dose constraint for a practice of radioactive waste disposal, the recommended value of 0.3 mSv/y is given in the ICRP Publ. 77[10].   But as a free release value for radio-nuclide contained consumer goods, an exemption value; 10 μSv/y is used for a measure of safety.   Nearly the same situation appears in IAEA-RS-G-1.7 as a clearance level for a big volume, but extremely low level radioactive waste from a decommissioning of nuclear facilities.

On the other hand, in case of NORM/TENORM discussion, exclusion and intervention concepts are inevitable for making-up guideline of NORM/TENORM.   The exclusion is based on an uncontrollability of sources, and the intervention guidelines (1mSv/y: intervention exception level, 10mSv/y: intervention start line, 100 mSv/y: intervention obligation line) are based on ICRP Publ. 82 for the protection guideline under a long term public exposure.

[Step 2]

Fact Finding of NORM/TENORM based on the Scientific Data

Generic information is important for the real understanding of nature and making up a classification of radioactivity and radiation level for NORM/TENORM. These generic information are collected in UNSCEAR report under worldwide surveys. Data collection based on the documents is also important for the purpose of incorporating an each region and country's situation.

[Step 3]

Measurement of Radioactivity and Radiation

A specific data collection of radioactivity (Bq/g or MBq/t) and radiation（μSv/h or mSv/y）through real measurements is valuable. These on site measurements give us a direction to the next step.

[Step 4]

Characterization of NORM/TENORM and Categorization of Levels

Depending on a form of existence, a purpose of use and a level of radiation, a characterization or a categorization is possible on NORM/TENORM. One side end has a strong trend of exclusion for the reason of unamenability of control. On the other end has a strong trend of practice for the reason of usual application as consumer's goods. To these continuous changing situations, Japanese radiation council has already given of 6 categories based on the consideration of practice and intervention as mentioned before for the guideline of NORM/TENORM.

[Step 5]

Indication of Countermeasures and Setting Regulations if necessary

Several countermeasures are conceivable; a simple shielding of stockyard, a soil cover of repository site, a preparation of simple mask for the protection of workers. All of these are countermeasures for the extreme condition of NORN/TENORM. If necessary, a guideline, a regulation or a law should be prepared depending on the situations based on the categorization by dose (Sv) or activity (Bq).

[Step 6]

Application to the Real Scene

The application of countermeasures based on the categorization should be easy to understand. For an administrative management, a checklist system listing requirements will be helpful for an on-site application of these countermeasures.