

NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORM) IN THE OIL AND GAS INDUSTRY - MANAGEMENT AND CHALLENGES

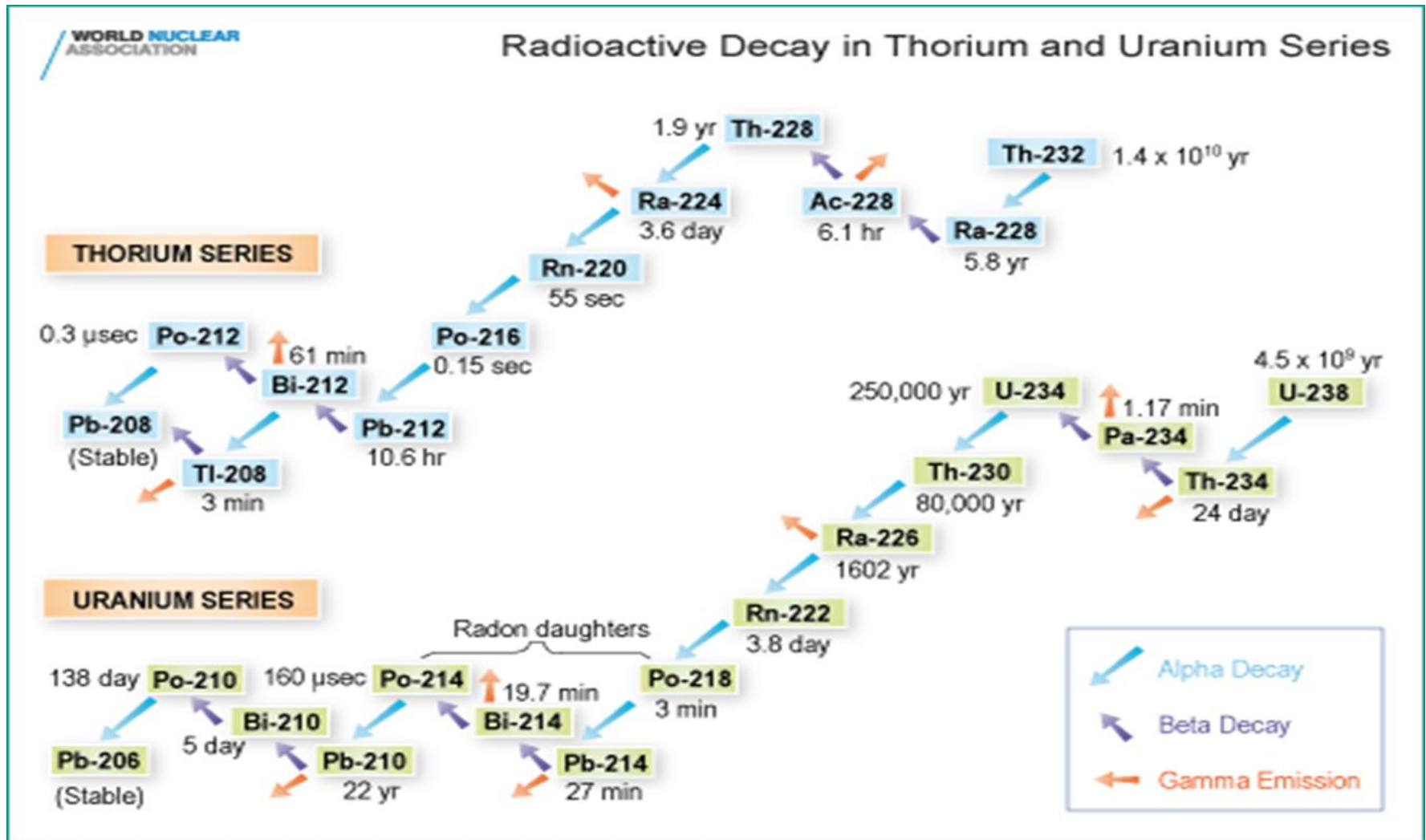
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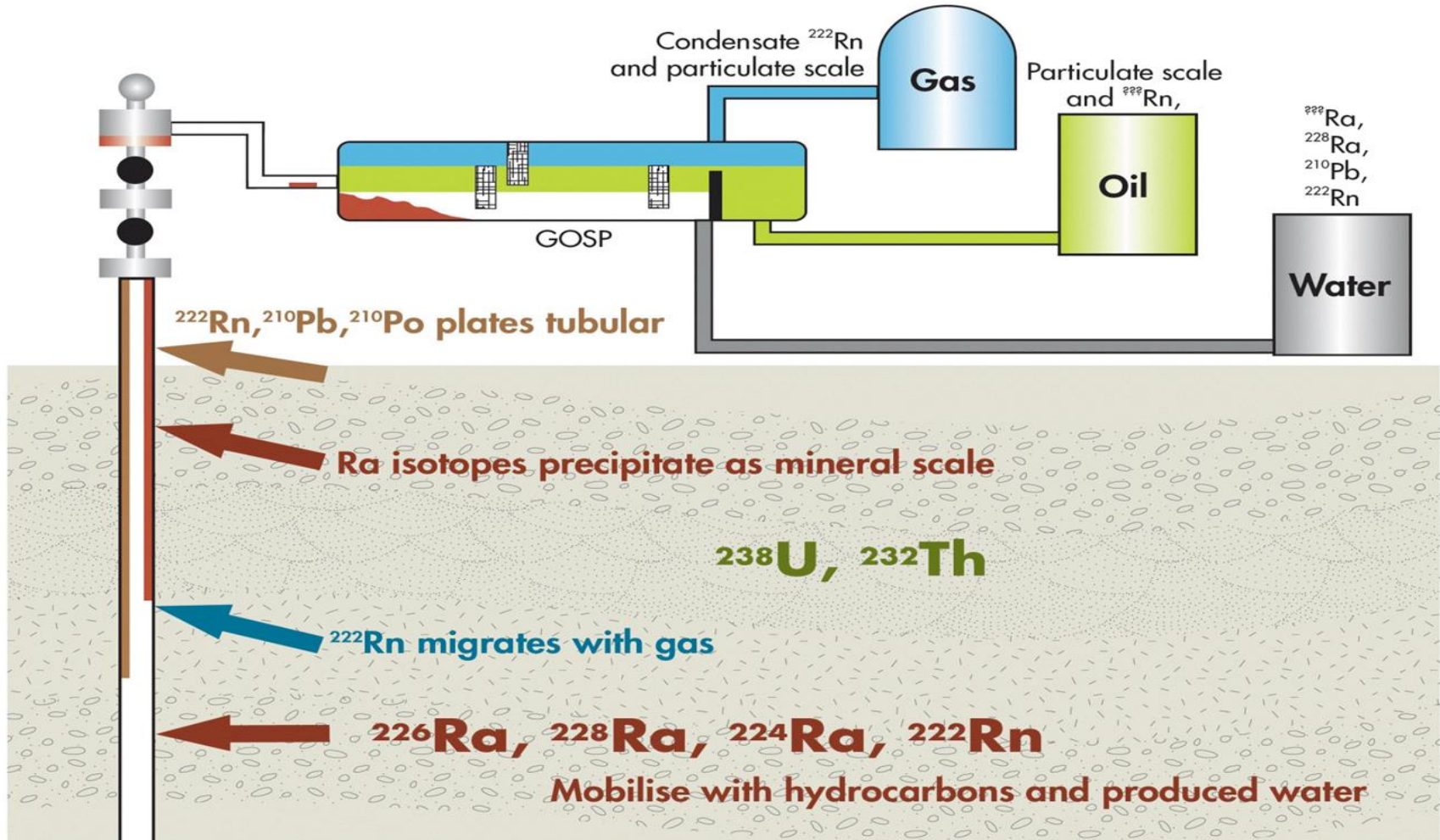


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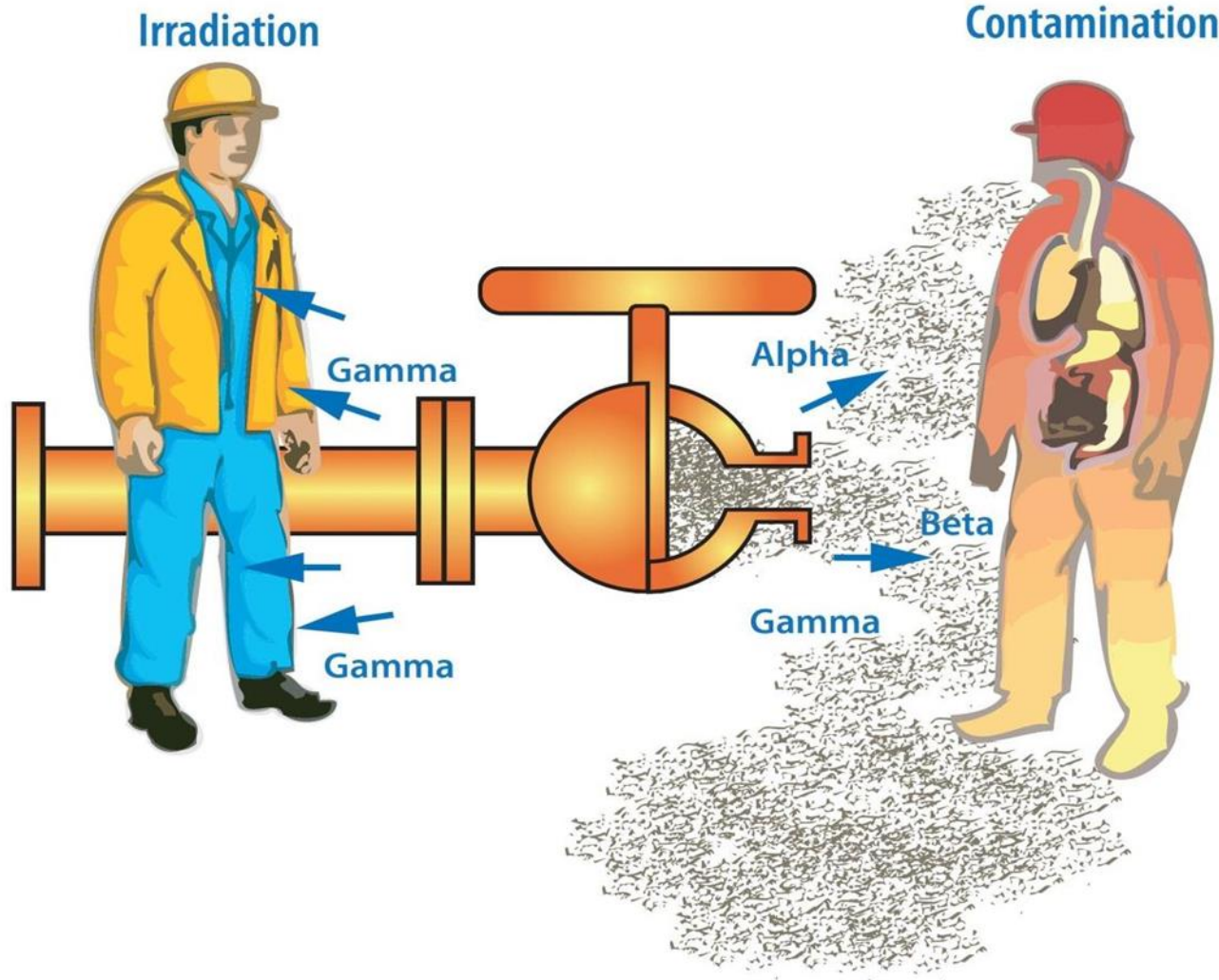
^{232}Th and ^{238}U decay series



The origins of NORM, indicating where it may accumulate in oil and gas industry (OGP 2008)



External and Internal exposure



Classification of workplaces

Class	NORM VI, IAEA proceedings - 2011	OECD -2011 publication
Normal area	< 0.5 $\mu\text{Sv/h}$	
Supervised area	0.5 – 3 $\mu\text{Sv/h}$	Unlikely that annual dose equivalents outside the supervised area would exceed 1/10 of the limits
Controlled area	3 – 10 $\mu\text{Sv/h}$	Expected maximum permissible dose limit is greater than 3/10 of occupational dose limit (ODL) i.e., >6 mSv/year
Restricted area	>10 $\mu\text{Sv/h}$	

Challenges in NORM management

- Personnel should have basic understanding on formation of scale and sludge in oil and gas industry
- Selecting monitoring instrument
- Periodic calibration
- Choosing the right location of measurements
- Frequency of monitoring
- Alleviating the fears of employees

Conclusion

- Training with practical “hands-on” session on ionizing radiation safety
- Knowledge, skills and abilities (KSA) of concerned personnel is vital
- Knowledge of country specific regulatory requirements is essential
- Information flow on radiation protection between employer and employee is essential

Thank You

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