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### 3S Integration: Role of Radiation Measurements in 3S

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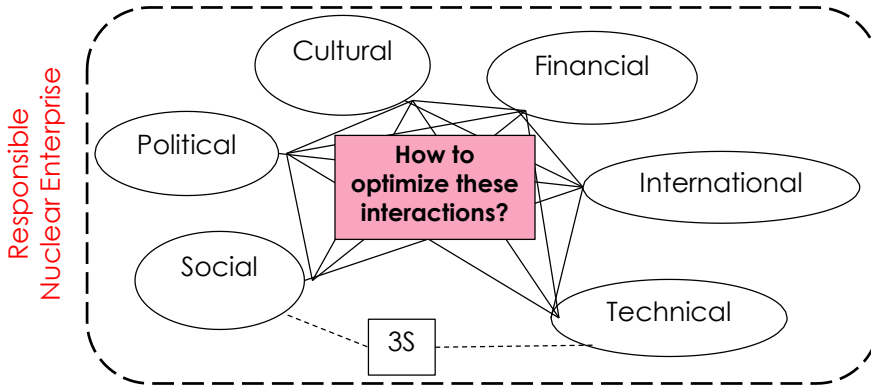
## Role of Nuclear Safety, Security, and Safeguards at Nuclear Power Plants (NPP)



- Operation of Nuclear Power Plant (NPP) results in generation of tremendous amount of radiation and radioactive material. These have to be contained
  - Protection of workers, public, and environment is a major part of the NPP operation and management (Nuclear Safety and Security)
- Material and experience can be abused, hence
  - Material safeguards is of critical importance (Nuclear Security and Safeguards)
- Development of human resources and expertise in Safety, Security, and Safeguards is crucial

# Understanding Responsible Nuclear Energy

What elements or factors affect or influence decisions related to the RNEP?

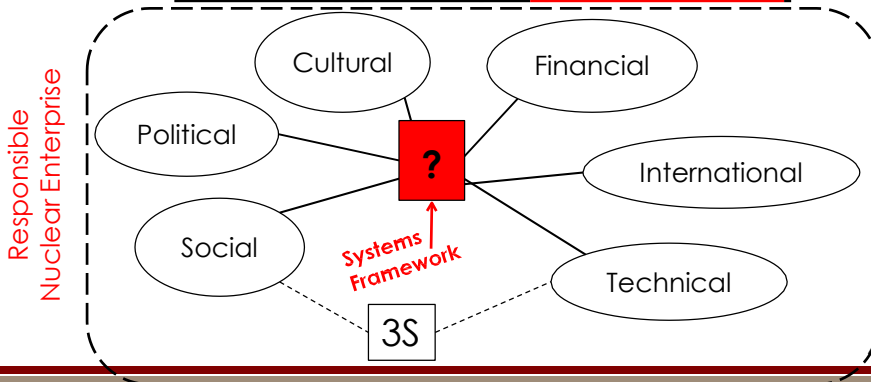


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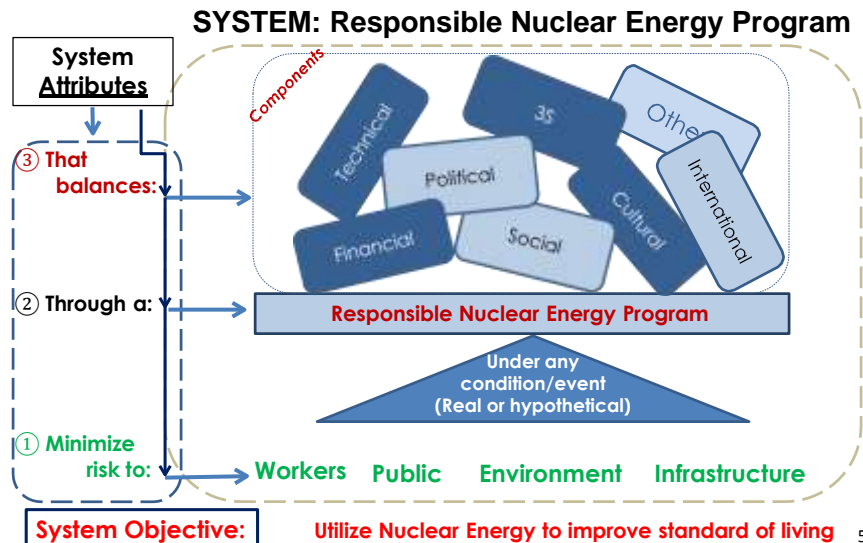
## Understanding Responsible Nuclear Energy Enterprise

All of these elements are related, is there is a clear method for understanding these complex, adaptive relationships?

Our Answer (Hypothesis) is: **Systems Framework**.



## Our Systems Framework – Model



## What is the 3S Role?



### *Connection of 3S to RNEP*

- Per our RNEP Model, technical solutions and human (social) behaviors combine to operate the RNEP, which should:
  - Pose minimum additional risk to the **safety** of the workers, public, or environment
  - Reduce additional risk to the **security** of the public or infrastructure
  - Meet its **safeguards** obligations under its international agreements



## What is the 3S Role?

### Connection of to the RNEP Attributes

- What role do safety, security, and safeguards (3S) play in a responsible nuclear energy program (RNEP):
  - Minimize the risk to the workers, public, environment and infrastructure? **Yes**
  - In isolation from other components of RNEP? **NO**
  - As an integrated framework? **Yes**
- The **RNEP** can best meet its goal of **minimizing risk** to the workers, public, environment and infrastructure through a **balanced integrated nuclear safety, security, and safeguards (3S) framework**.

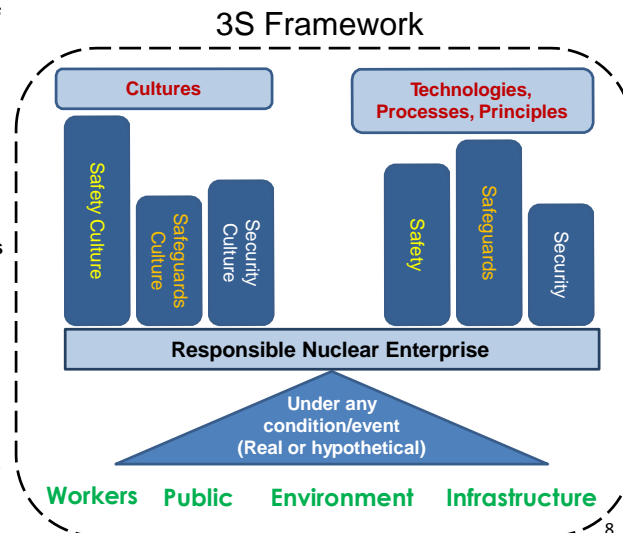
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## Current (Traditional) 3S Framework



- Stove-piped areas of expertise
  - Separated S's
    - Separate Cultures
    - Separate Operations
- Prescriptive
  - Based on individually established policies
- Descriptive
  - Focuses on interface between existing cultures and tools
- Reactionary

Do you see a similar framework in your organizations?



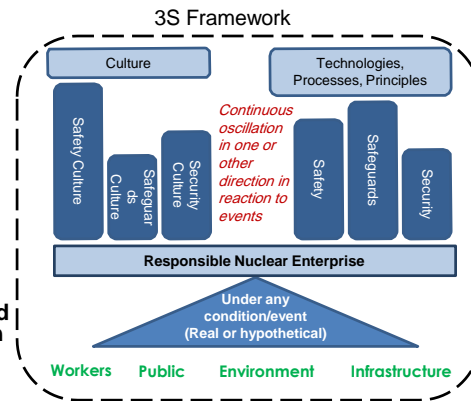
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## Challenge with Current (Traditional) 3S Framework



### Examples:

- A first constructed NPP in a new nuclear country experiences a radioactive leak due to an operator error – Labeled as a “Safety” accident
- An IAEA inspection indicates missing nuclear material – Labeled as a “Safeguards” incident
- Recent attacks on a critical infrastructure prompt a national requirement for 10 foot reinforced concrete barriers around all such facilities – Labeled as a “Security” accident



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## Why Integrated 3S? Potential Objectives for Integration of 3S



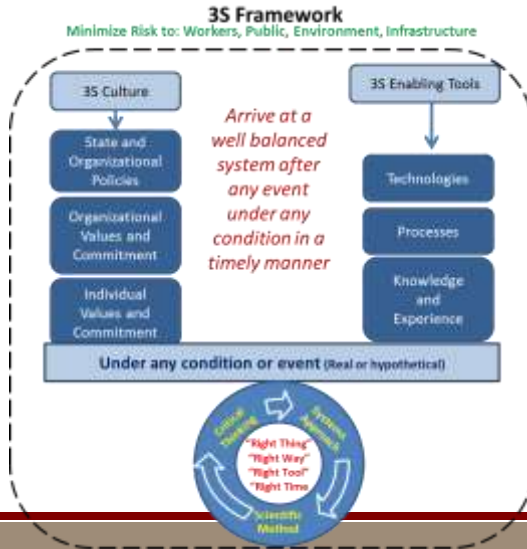
- Integrate 3S in the RNEP
  - Assure consideration of impact on 3S in decision making process regarding the nuclear power program in the country
- Promote Sustainability
  - Reduction in operating cost of NPP
- Increase Reliability
  - Increase the collective focus on development, implementation, and improvement of 3S
- Opportunity for Cross Training of Workforce
  - Enhances worker morale and retention
- Promote “System” analysis and solution approach
  - Results in effective and efficient outcome

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# Attributes of Our Proposed Model for Integrated 3S Framework

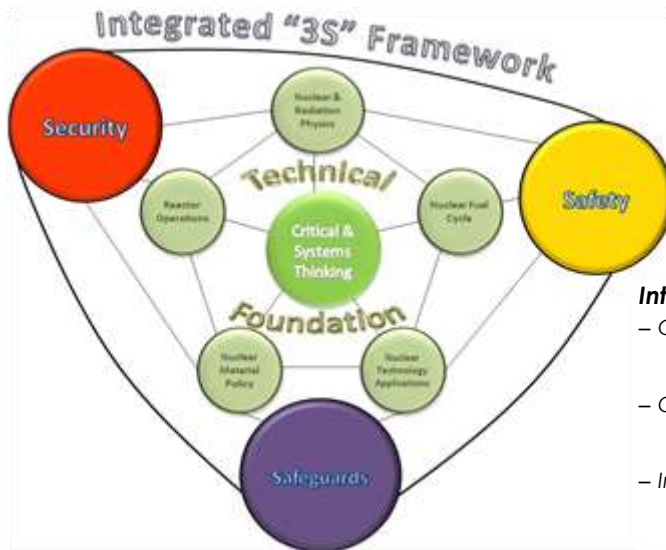
## Attributes of Our Integrated 3S Framework Model System

- **Dynamic**
  - Flexible,
  - Adjust to Changes in the Conditions
- **Adaptive**
  - Able to easily (and dynamically) find the balance; focuses on integrating necessary components of culture/tools
  - Feedback capable
- **Proactive**
- **Comprehensive understanding across areas of expertise**
  - **Arrive at a Well Balanced System after any Event Under any Condition in a Timely Manner**



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## A "3S" Framework



### Integrated 3S

- Components
  - Technical
  - Operational
- Objectives
  - Technical
  - Operational
- Interactions
  - Direct
  - Indirect