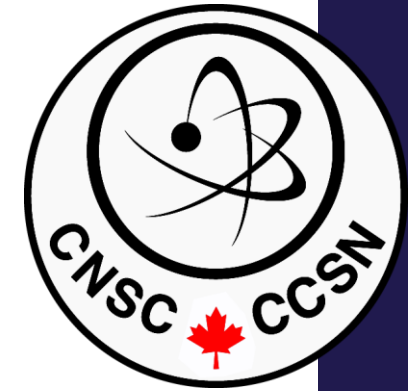




Canadian Nuclear  
Safety Commission

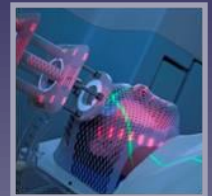
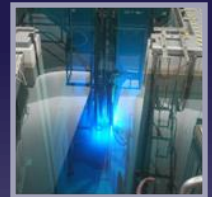
Commission canadienne  
de sûreté nucléaire

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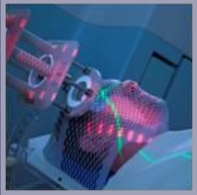
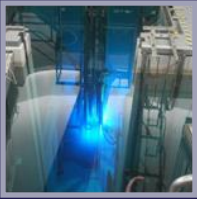


# Disruptive, Innovative and Emerging Technology (DIET) and the Canadian Nuclear Safety Commission

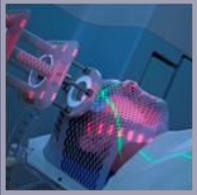
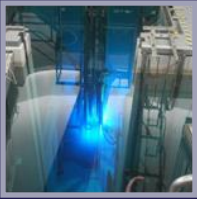
## Canadian Nuclear Society October 4, 2021



# What is Disruptive, Innovative and Emerging Technology (DIET)?



	<b>DEFINITIONS</b>
<b>DISRUPTIVE</b>	Technologies that displace or radically reconfigure established technologies, significantly altering how organizations operate.
<b>INNOVATIVE</b>	The use of new technology or modified strategies, capabilities, products, services, or processes.
<b>EMERGING</b>	Technologies under development or exploration for use in the near future.



# Why Focus On DIET Now?

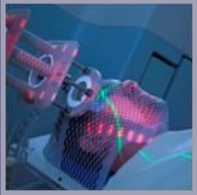
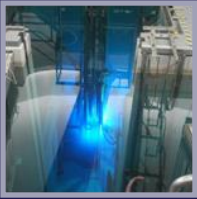
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- Innovation has always been a part of the nuclear industry, what has changed is the pace
  - Technology continues to evolve rapidly
- All sectors of the nuclear industry evaluating DIET; Licensees already using it for:
  - Parts and components made by 3D printers
  - Drones for “visual” inspections
  - Maintenance history stored on phones and accessed on location via scans
  - Medical isotopes developed locally by hospitals and at NPPs
- Advanced reactor technologies embracing DIET for improved life cycle safety, efficiencies and savings

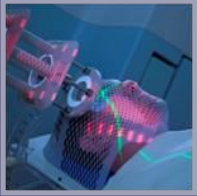
**CNSC's goal is to stay as far ahead of the curve as practicable**

# DIET: CNSC's Approach

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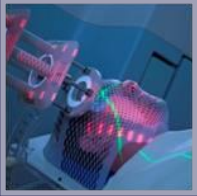
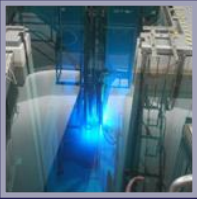
- Cross functional team representing all parts of the organization
- Focus on implications to the CNSC's Regulatory Framework with mandate to:
  - meet with industry and other stakeholders to identify DIET they are considering
  - establish criteria to determine if a technology falls under DIET
  - establish criteria to determine if a given DIET is relevant to CNSC
- Four Sub-Groups:
  - Forward DIET
  - Staff Procedure for Technical Neutrality in REGDOCs
  - Regulatory Framework
  - Communications
- The Forge
  - Looking at DIET in how we conduct regulatory activities



# DIET Game Plan

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- Focus work on implications to the CNSC's Regulatory Framework
- Terms of reference to focus the scope of the work, formalize the deliverables and secure management approval
- DIET includes:
  - external workshops with industry and other government departments both domestic and international as well as regulatory and non-regulatory
  - internal workshops
  - communication
  - benchmarking
  - links with relevant CNSC groups/committees and those responsible for implementing DIET findings



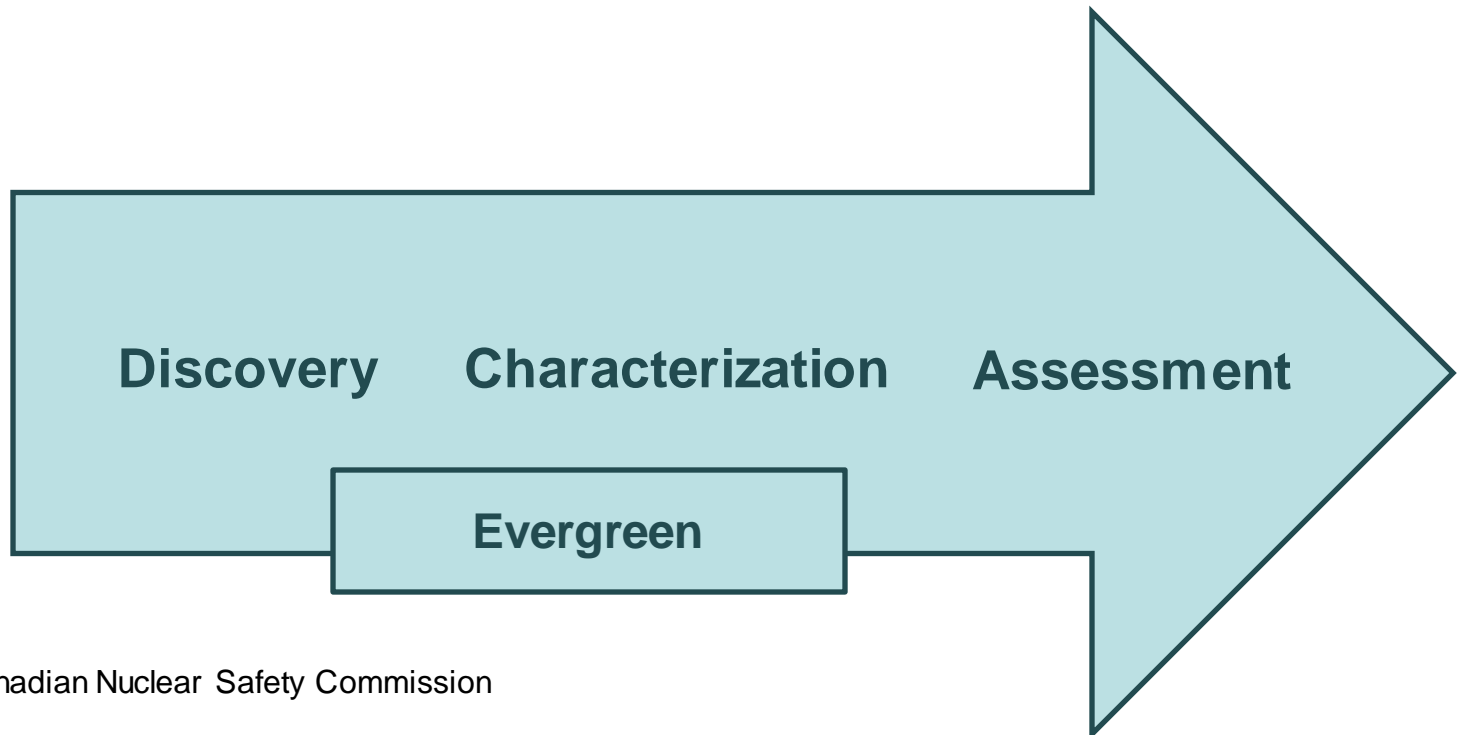
# DIET Engagement with Industry

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- In dealing with industry DIET has:
  - established a method for timely engagement with industry on DIET and methodologies
  - allowed CNSC to assess if there is established criteria or not to regulate the DIET
    - DIET of Interest list is an indicator of what will likely be coming our way
  - developed and provided industry with a list of supporting evidence needed for new innovation
    - will help provide a consistent review for innovations not explicitly covered by CNSC's regulatory framework

# Forward looking sub-group

- To identify, collect and characterize DIETs to make recommendations on:
  - technology neutrality of the CNSC Regulatory Framework
  - CNSC's capability and capacity to evaluate the potential impact of the new technology or methodology

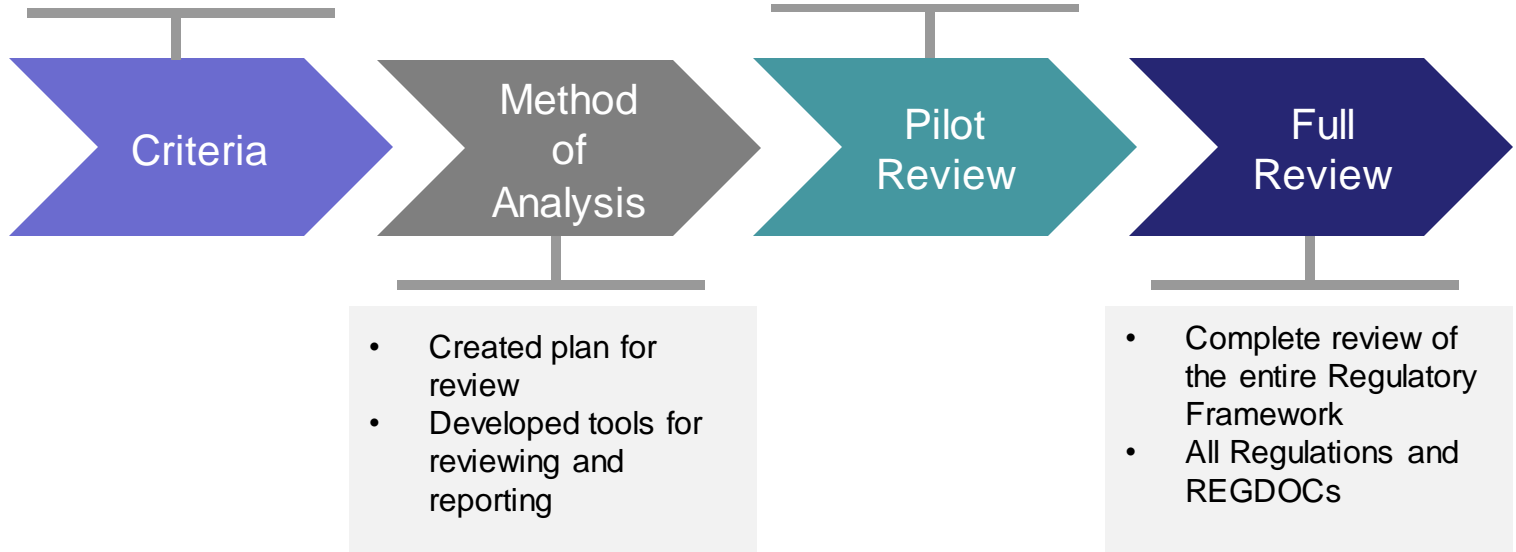


# Regulatory Framework Review

Planning and developing a methodology for reviewing the Regulatory Framework

- What questions to ask?
- What makes a document DIET-ready?

- Selected a sample of 3 REGDOCs
- Conducted a test review utilizing the developed tools





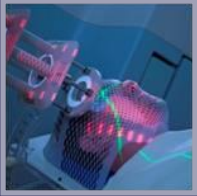
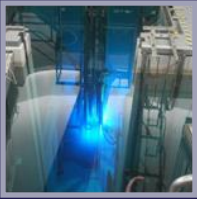
# CNSC's Management System



CNSC's management system continuously evolves by considering and adopting to changes in its environment which includes DIET

# Communications

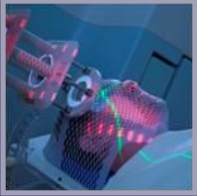
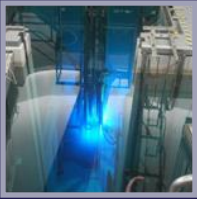
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## Examples of outreach and workshops activities:

- Canadian Nuclear Association
- CSA Group
- COG
- Organization of Canadian Nuclear Industries
- Community of Federal Regulators
- Office for Nuclear Regulation (UK)
- USNRC
- Academia
- Nuclear Innovation Institute

**DIET team is always looking for outside parties we can meet with to increase our knowledge and awareness of DIET.**

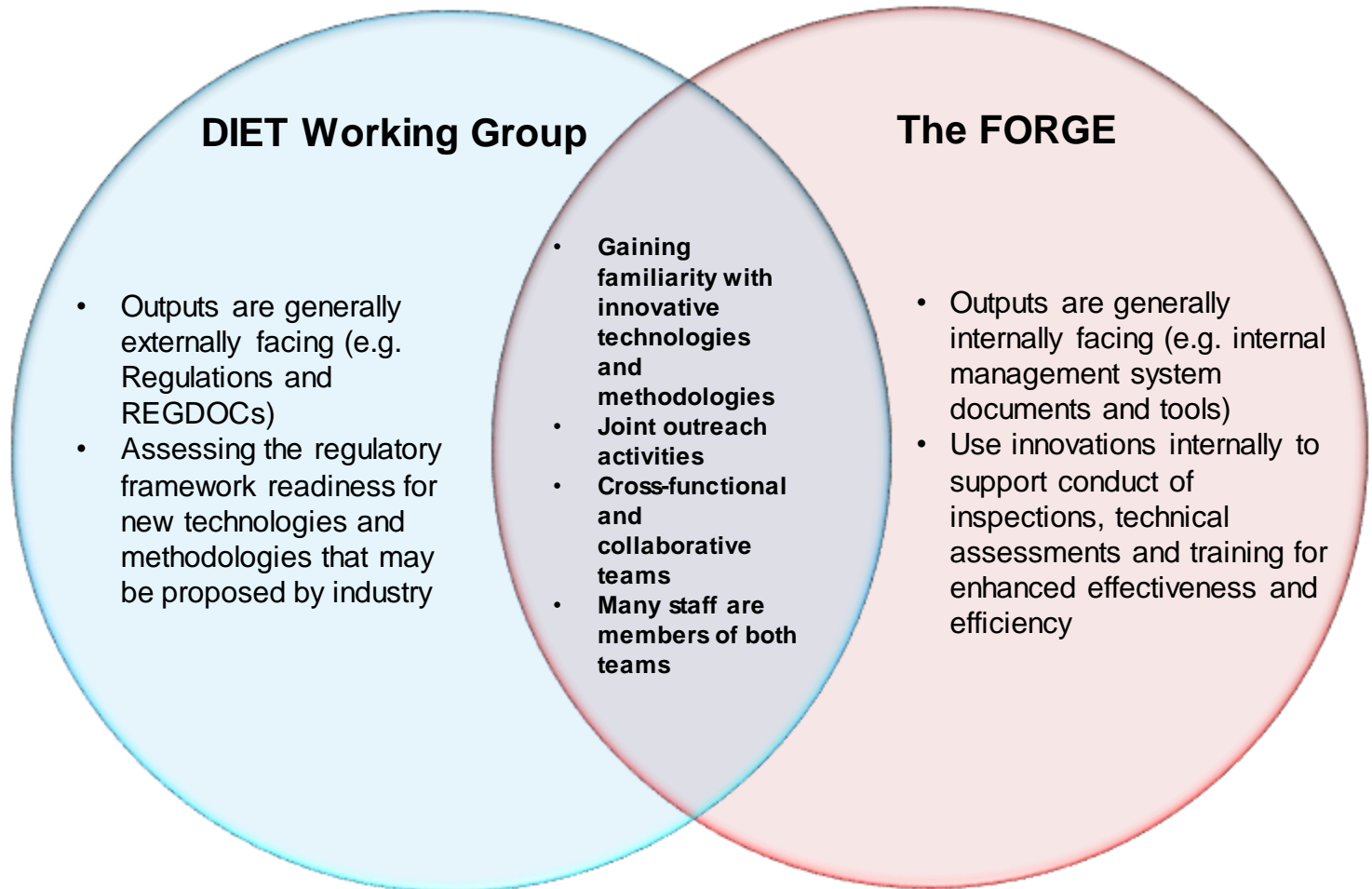
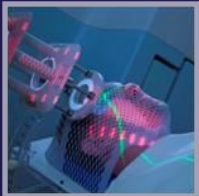
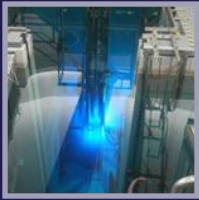


# Forge: Background and Purpose

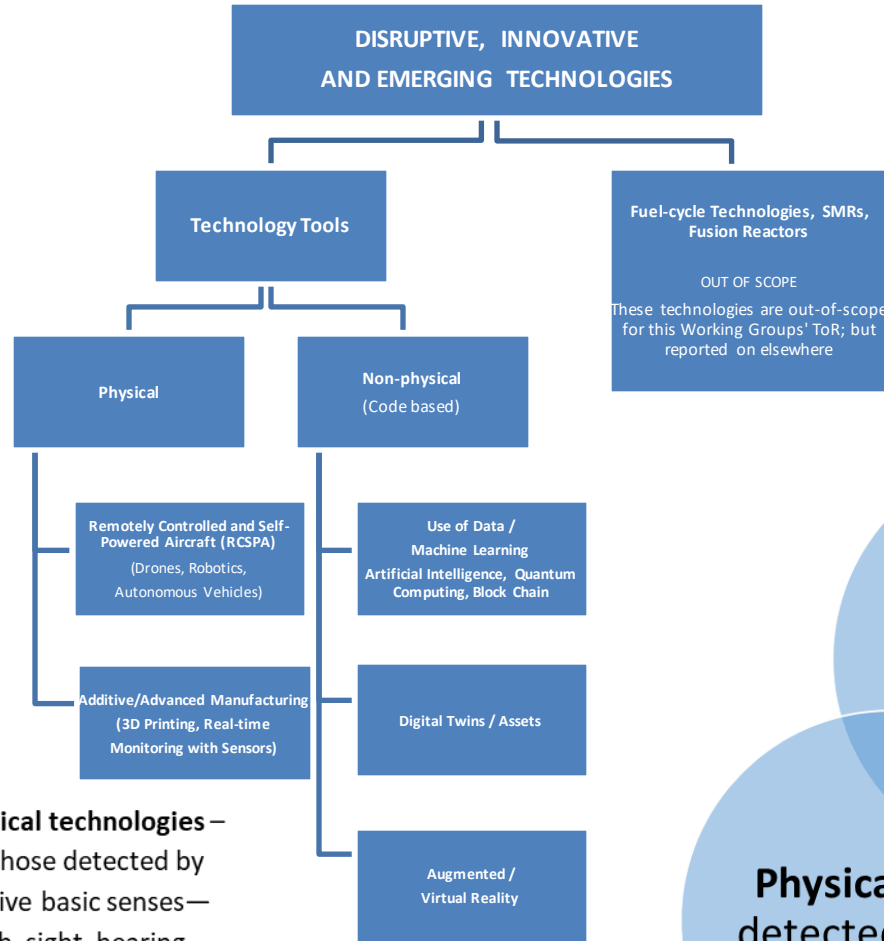
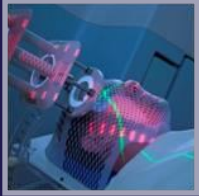
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- Formed September 2020 to develop recommendations to bring innovations into practices and tools for regulatory oversight
- Objectives:
  - Identify existing or novel technologies and approaches that CNSC can adopt/adapt to improve inspection efficiency and diversify inspection practices
  - Examine how artificial intelligence could be used by CNSC to support staff in conduct of regulatory activities
- Establish principles for promoting regulatory innovation while respecting core values of the organization

# CNSC Innovation Initiatives

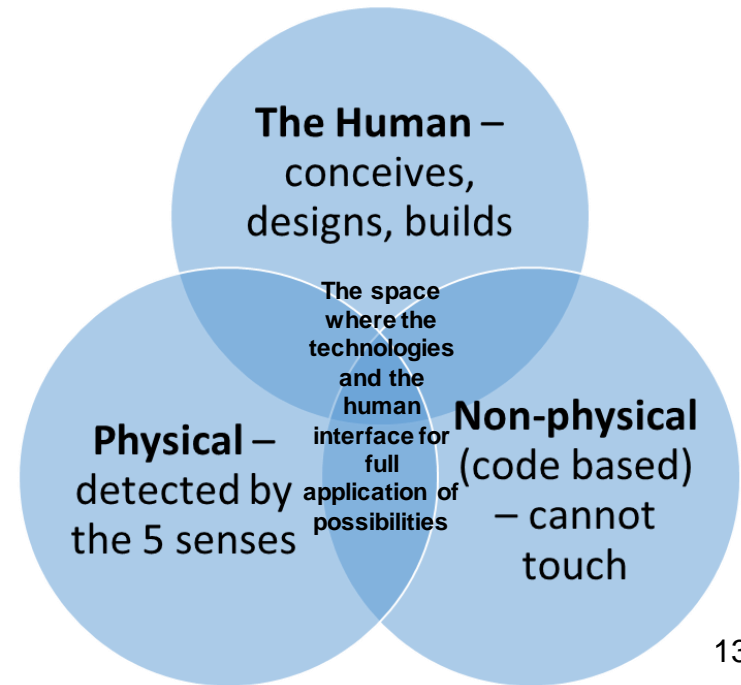


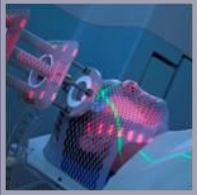
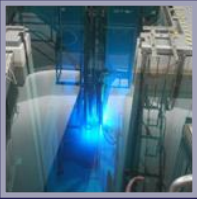
# DIET to Keep an Eye On



**Non-Physical (Code based) technologies**—are those you cannot detect by the five basic senses, or unable to ‘kick-the-tires’.

**Physical technologies**— are those detected by the five basic senses— touch, sight, hearing, smell and taste—and able to ‘kick-the-tires’.

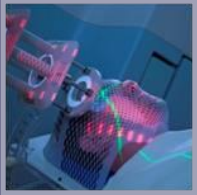
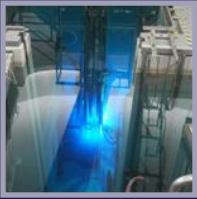




# Fusion

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- DIET leading the Fusion project with funding from Treasury Board Secretariat
- Third-party contactor examining:
  - Risk Assessment for Fusion Technologies
  - International Benchmarking
  - Readiness Review of the Regulatory Framework
  - Recommendations for the CNSC
- Plans being made to share the findings with external stakeholders
- CNSC participating in the IAEA Consultancy on a Safety Framework for Fusion Design Safety, Safety Assessment and Regulation (October 11 to 14)



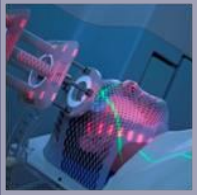
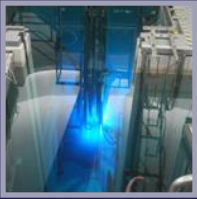
# Artificial Intelligence

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- CNSC is currently focused on exploration and assessment of readiness of AI solutions
- Will be issuing an RFP for a research contract with experts
- Potential applications include:
  - GOC testing tool to search and assess regulations across Canadian Framework
  - Assessment of licensee data and KPIs
  - Automated system for event classification
- Members of the DIET team active on the organizing committee for the CNS' 2nd Annual AI/ML and DIET Conference (Nov 29 to Dec 1)

# Innovation Hub

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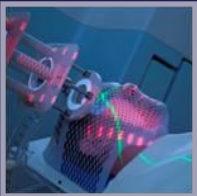
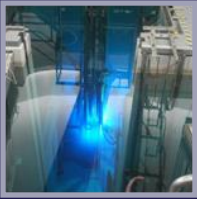


- Newly created CNSC division (August 3<sup>rd</sup>)
- Reports directly to Peter Elder – VP Technical Support Branch and Chief Science Officer for the CNSC
- Working on a vision and framework to coordinate all CNSC Innovation work, including, but not limited to:
  - DIET
  - Forge
  - Regulatory Research Team
  - CNSC's collaboration approach for TerraCanada Science and Innovation Hub



# Closing Thoughts

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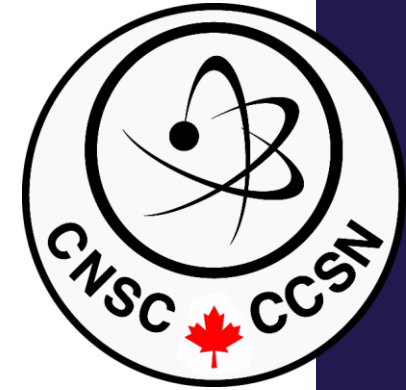


- Work being advanced by teams across the CNSC contributes to it being recognized nationally and internationally as a regulator that:
  - encourages innovation
  - builds and maintains a technology neutral regulatory framework
  - strives to be on the cutting edge of DIET, thereby enabling, not hindering, DIET adoption by those it regulates



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# Thank You

[nuclearsafety.gc.ca](http://nuclearsafety.gc.ca)

