Canadian Nuclear Safety Commission
Commission canadienne de sûreté nucléaire

Technology Neutral Licensing Requirements: Have We Been Successful?

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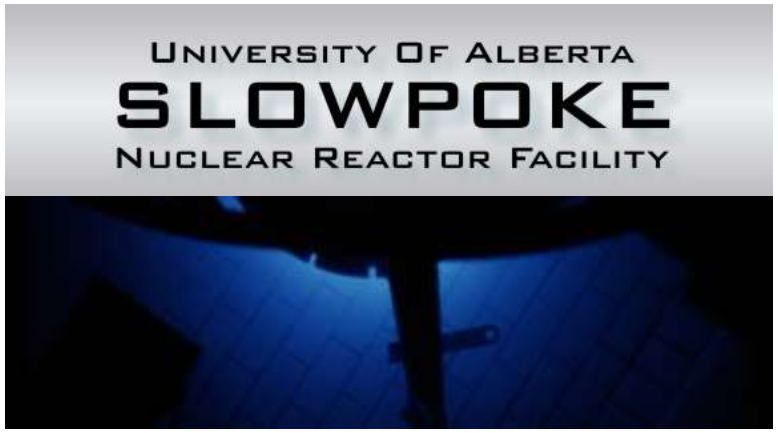
Outline

- Overview of Western nuclear industry
- The CNSC–Who we are and what we do
- CNSC approach to licensing of NPPs
- Some aspects of our technology neutral approach
- Lessons learned

Western Canada nuclear industry is vibrant

- **Nuclear Substances/ Radiation Devices**
  - Well-logging
  - industrial radiography
  - nuclear medicine
  - other applications
- **Nuclear Physics**
  - Canadian Light Source
  - TRIUMF
  - SLOWPOKE-II nuclear research reactors
    - University of Alberta
    - Saskatchewan Research Council



Western Canada nuclear industry is vibrant – Uranium mining

6 active projects

- Key Lake Mill - Cameco
- McArthur River Mine - Cameco
- Cigar Lake Mine - Cameco
- Rabbit Lake Mine/Mill - Cameco
- McClean Lake Mines/Mills - AREVA

The industry's source for fuel

Western Canada nuclear industry is vibrant - Assuring environmental protection

Saskatchewan

Beaverlodge Mine / Mill

- historical mine
- decommissioned

Cluff Lake Mine / Mill

- decommissioned
- seeking licence renewal in 09

Lorado and Gunnar Mines / Mills

- non-licensed legacy sites
- to be remediated
- Lorado EA in progress
- Gunnar EA in progress

And Western interest is growing – Alberta

- **Bruce Power Alberta**
  - 2007 Application for licence to prepare a site in Peace River area submitted by Energy Alberta Corporation
    - withdrawn by Bruce Power Alberta in January 2009
  - Recently selected Whitemud site, 30 km north of Peace River, as preferred location
    - Application is pending
- **Nuclear Power Expert Panel**
  - Appointed in 2008 by Government of Alberta to gather information and present facts on nuclear energy
  - Released report on March 26, 2009
  - Public consultations will be conducted to gather views of Albertans on nuclear power in the context of the province's electricity system

And Western interest is growing – Saskatchewan

- Uranium Development Partnership (UDP) released report on April 3, 2009 which recommends 4-pronged strategy:
  1. Enhance core activities in uranium mining and exploration
  2. Actively pursue commercial power generation and waste repository
  3. Build long-term capabilities for laser enrichment and research reactor
  4. Establish centre of excellence for research and training
- Uranium Mines
  - Shea Creek – AREVA
  - Millennium Project – Cameco
- Bruce Power actively pursuing new builds in Saskatchewan:
  - Signed agreement w/ International Brotherhood of Electrical Workers union to advocate for two 1100 MWe nuclear reactors
  - Union would assume the 1000-2000 new jobs

And Western interest is growing – British Columbia

- TRIUMF/MDS Nordion
  - Accelerator production of medical radio-isotopes (e.g. Mo-99)

With all this interest, you should know who is regulating the nuclear show in Canada

Canadian Nuclear Safety Commission

- Canada's nuclear watchdog
- Quasi-judicial body independent of, but not isolated from, government
- Regulates the use of nuclear energy and materials to protect the health, safety and security of persons and the environment; and to respect Canada's international commitments on the peaceful use of nuclear energy
- The CNSC regulates the nuclear industry; it does not promote it
- The CNSC is neutral on the relative merits of nuclear power

Why do we need a strong regulator?

Guarding against the rare but possibly catastrophic accident requires eternal vigilance and a never-ending fight against complacency

Mr. Richard A. Meserve, Chairman
International Nuclear Safety Group (INSAG)

Pickering Nuclear Generating Station

A strong, competent regulator is an important part of the defence in depth against undesirable events occurring

Nuclear regulation is a federal responsibility

CNSC regulates all nuclear facilities and activities in Canada including:

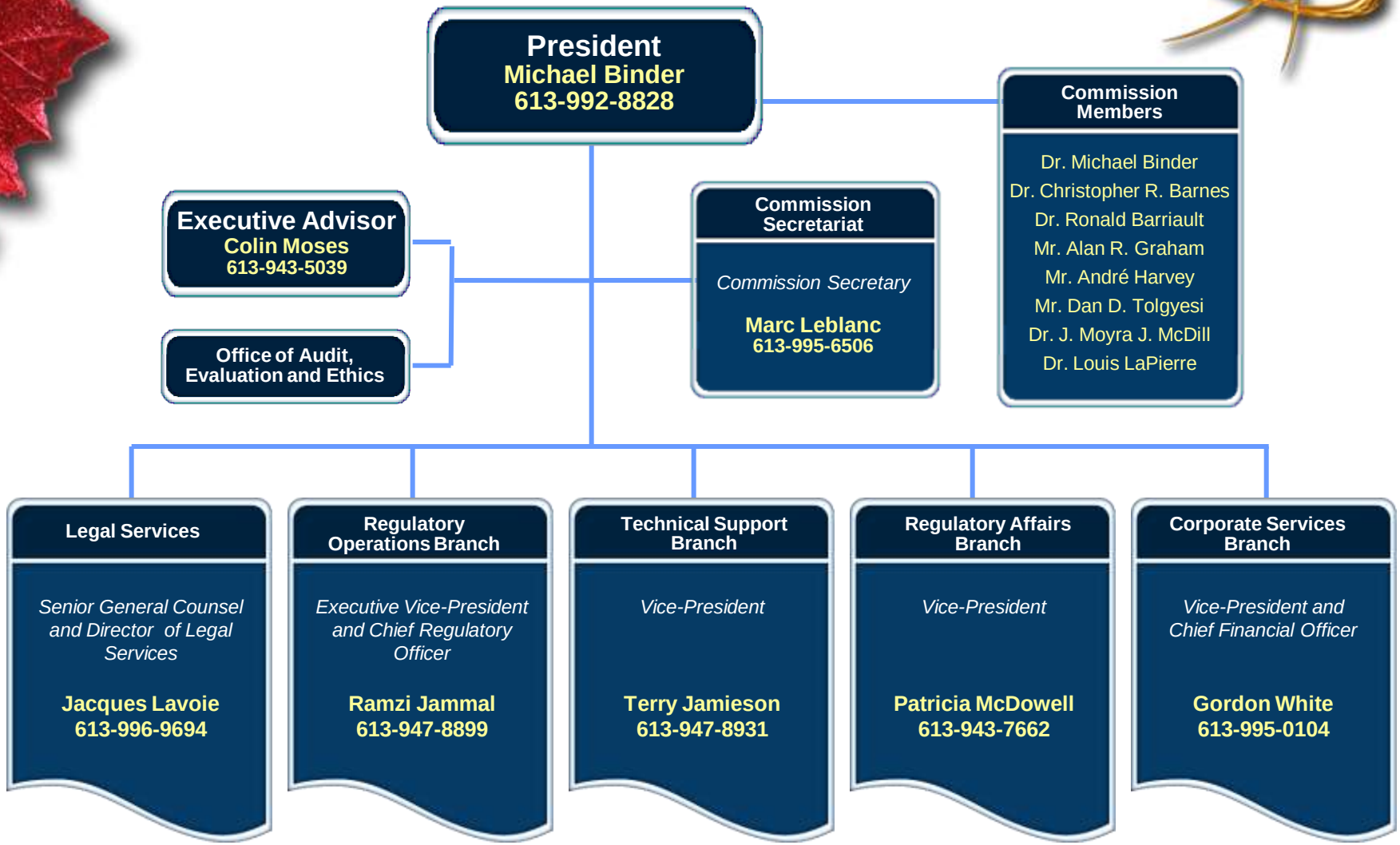
- Nuclear power plants
- Uranium mines and mills
- Uranium fuel fabricators and processing facilities
- Nuclear substance processing facilities
- Industrial and medical applications of nuclear substances, such as nuclear medicine and cancer treatment centers
- Research and educational facilities
- Export/import of controlled nuclear substances, equipment and technology
- Waste management facilities

CNSC regulatory philosophy

The CNSC regulatory philosophy stems from the *Nuclear Safety and Control Act* (NSCA), and is articulated in P-299, *Regulatory Fundamentals Policy* (available on the CNSC Web site)

- **Licensees are responsible** for managing regulated activities in a manner that protects health, safety, security and the environment while respecting Canada's international obligations.
- **CNSC is responsible to the public**, through Parliament, for regulatory policies and programs which assure that licensees properly discharge their responsibilities.

Executive structure



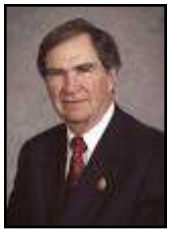
Members of Commission Tribunal

Dr. Michael Binder
President and Chief Executive Officer

Dr. Christopher R. Barnes
Professor, School of Earth and Ocean Sciences, University of Victoria,
Victoria, British Columbia

Dr. Ronald J. Barriault
Practising physician and member of the Canadian Medical Association, the College of Family Physicians of Canada and the New Brunswick Medical Society
Charlo, New Brunswick

Mr. Alan R. Graham
Businessman and former Minister of Natural Resources and Energy in New Brunswick
Rexton, New Brunswick



Mr. André Harvey
Former President of the Bureau d'audiences publiques sur l'environnement (BAPE)
Québec, Québec

Mr. Dan D. Tolgyesi
President of the Québec Mining Association
Québec, Québec

Dr. J. Moyra J. McDill
Professor, Department of Mechanical and Aerospace Engineering, Carleton University,
Ottawa, Ontario

Dr. Louis LaPierre
Professor Emeritus in Biology at the Université de Moncton,
Moncton, New Brunswick

Commission Tribunal

- Quasi-judicial administrative tribunal
- Key decision drivers are health, safety, security and the environment
- Holds public hearings on licensing matters for major nuclear facilities
  - Affected parties and members of the public have opportunity to be heard
  - Usually held during 2 hearing days about 60 days apart

Transparent decision-making

CNSC staff

Scientific, technical and other professional staff, responsible for:

- implementing the decisions of the Commission
- verifying compliance with licences and regulations
- reviewing licence applications and performing EA review work
- developing regulatory guidance
- advising on regulatory policy and options
- engaging citizens and communities through outreach

Located across Canada

Staff: ~ 800
Resources: $150 M

- HQ in Ottawa
- 5 site offices at power reactors
- 1 site office at Chalk River
- 4 regional offices

Ongoing operations

Non-power reactors
- NRU – operating safely
- 8 others also operating safely

Uranium mines and mills
- 6 active projects

Radioactive waste management
- Nuclear fuel waste stored safely on site
- Mine/mill tailings are well managed

Nuclear substances
- Form majority of our licensees and licences
- Administer approximately 2900 licences

International obligations
- Imports, exports and safeguards that assure safe and peaceful trade

Nuclear power reactors
- 18 in operation; all operating safely

New nuclear plants proposed for Canada

Bruce Power

Tiverton, ON

- Application for licence to prepare site (August 2006)
- Environmental Assessment in progress
- Joint Review Panel (JRP) in place

Nanticoke, ON

- Application for licence to prepare site (October 2008)

Ontario Power Generation

Darlington, ON

- Application for licence to prepare site (September 2006)
- Final Environmental Impact Statement Guidelines and Joint Review Panel Agreement published (March 2009)

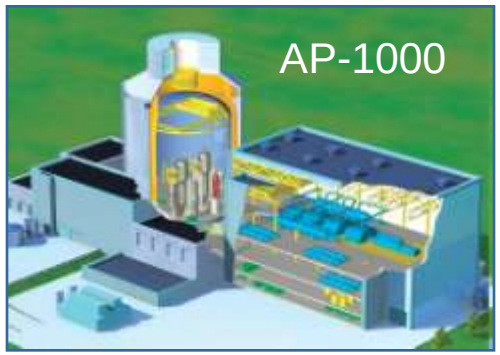
The first in almost 30 years!

CNSC response to new builds

- Pre-project vendor design reviews
  - any fundamental barriers to licensing in Canada?
  - ACR-1000 – Phase 2 in progress
  - EPR/AP-1000/EC-6 – Phase 1 in progress
- Review guides
  - standardize reviews
- Implementation of Joint Review Panels

AECL

Westinghouse



AREVA

Clarity of licensing framework

- **Integration of EA and site licensing processes**
- **Parallel processes for licence applications**
- **Regulatory framework**
  - **INFO-0756**, *Licensing Process for New NPPs in Canada*
  - **RD337**, *Design of New Nuclear Power Plants (NPPs)*
  - **RD346**, *Site Evaluation for New NPPs*
  - **RD360**, *Life Extension of NPPs*
  - **RD310**, *Safety Analysis for NPPs*
  - **RD204**, *Certification of Persons Working at NPPs*

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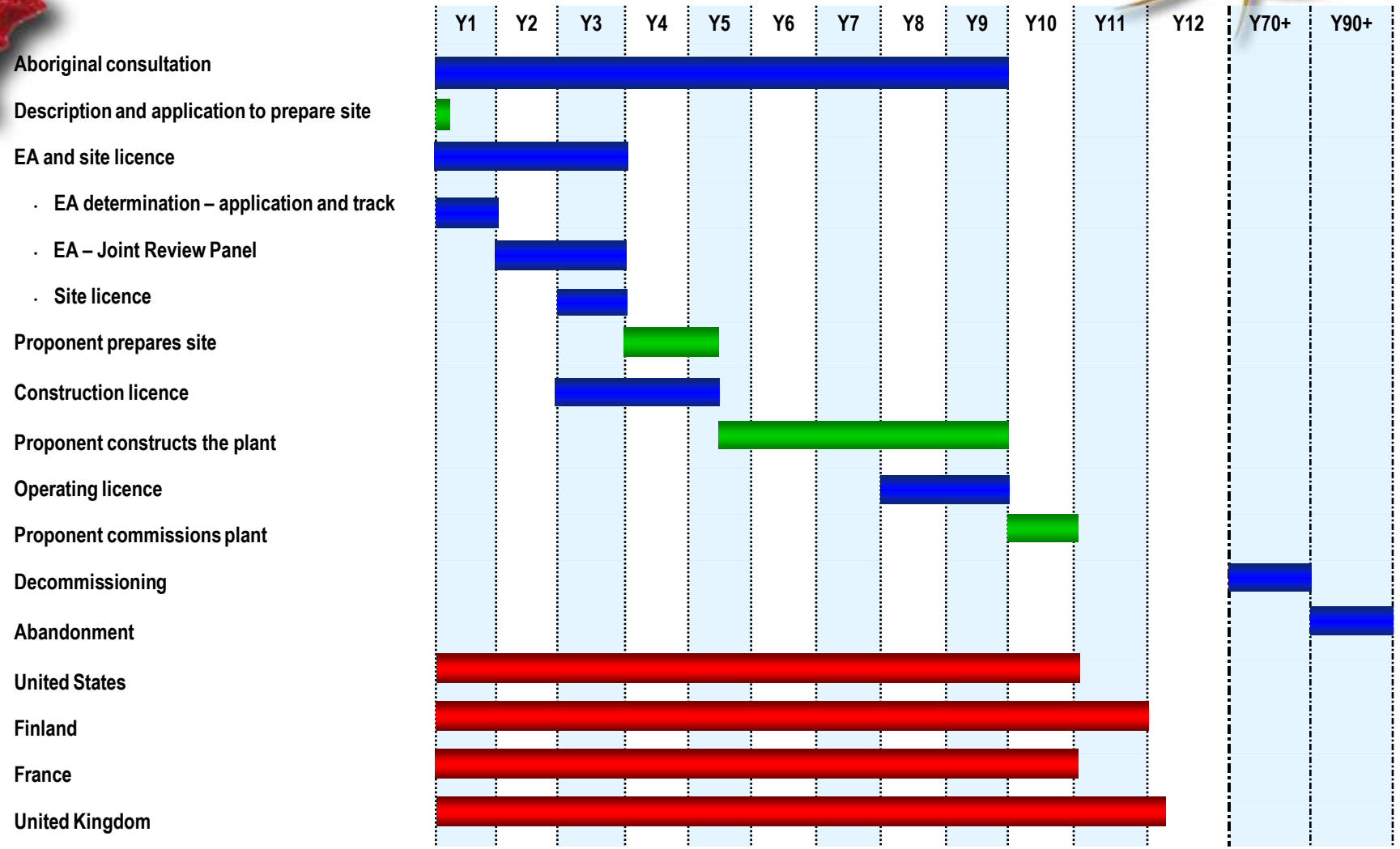
Generic Environmental Assessment and licensing process for new nuclear power plants



Overview of nuclear power plant licensing

CNSC *Class I nuclear facilities Regulations* require separate licences for each of the five phases in the lifecycle of an NPP:

Licence to prepare a site	Preparing land for future construction • The receipt of the application and accompanying project description initiates the federal environmental assessment process.
Licence to construct	Construction of NPP and some commissioning of systems
Licence to operate	Reactor allowed to go critical, commissioning completed, plant begins production
Licence to decommission	NPP production stopped, reactor defuelled, NPP disassembly
Licence to abandon	NPP gone, long-term monitoring of site in progress

Public involvement in the licensing process for NPPs

- In the event of an application to build a new nuclear power plant, stakeholders will have opportunities to participate at various points, including:
  - the Environmental Assessment process, especially through a Joint Review Panel process;
  - the Commission Tribunal's public hearings on applications for licences; and
  - the pre-application communications activities by licence applicants

Timeframe considerations

- Factors that may influence the duration of licensing process include:
  - the completeness and comprehensiveness of information provided by the proponent/applicant;
  - the Environmental Assessment process
    - including completeness and comprehensiveness of proponent's project description and Environmental Impact Statement
  - the time required for the applicant to carry out activities; and
  - whether any major safety issues require resolution
    - design readiness
    - outstanding R&D

Our technology neutral approach

- Based on IAEA NS-R-1(2000) standard
  - Updated to include quantitative safety goals and to be more comprehensive (explicit requirements for security, safeguards and environmental protection)
- Current framework was developed for PHWR and LWR technologies
- No “CANDU legacy” requirements
- A hierarchy of expectations
  - High level safety objectives and criteria including safety goals
  - Design Principles and system generic design requirements such as defence-in-depth, designing for high reliability
  - System specific requirements for systems common to many reactor types (core, fuel, shutdown systems, ECCS, containment, etc)

Approach to other reactor types

- Non-water cooled reactors
  - GCRs
  - LMFBRs
- Small and medium sized reactors
  - Distributed heating
  - Research reactors
  - Isotope production
- The generic design requirements in RD-337 would be applicable
  - Proven engineering practices
  - Defence-in-depth principle
  - Design for high reliability
  - Multiple barrier approach

Approach to other reactor types

- Other high level requirements would need to be met
  - Security considerations including robustness
  - Safeguards
  - Application of ALARA to radiation protection
  - Minimising radioactive waste
  - Emergency planning
- Staff would consider whether alternative (more restrictive) safety goals would be needed for small reactors

Lessons learned (1 of 2)

- Aggressive schedules can be met provided that
  - The design is complete, with all R&D for the safety case completed
  - Submissions are timely, complete and of good quality
- Experience being gained from major projects in other countries
  - Finland and France
- Some of the key challenges are
  - Project management experience
  - Construction experience
  - Adequate over-sight of contractors
  - Timely completion of design documentation

Lessons learned (2 of 2)

- Project risks must be actively managed
  - Our goal is to minimise that associated with licensing
  - CNSC will provide clear and timely direction, but that the risk is really within the control of the applicant and vendor in providing timely submissions ➔ “execution risk”
  - Our goal is to make “licensing risk” a thing of the past
- Clarity and communications are the key

Striving to be best nuclear regulator in the world

- **Committed to ongoing improvements**
- **Clarity of requirements**
- **Capacity for action**
- **Communications**

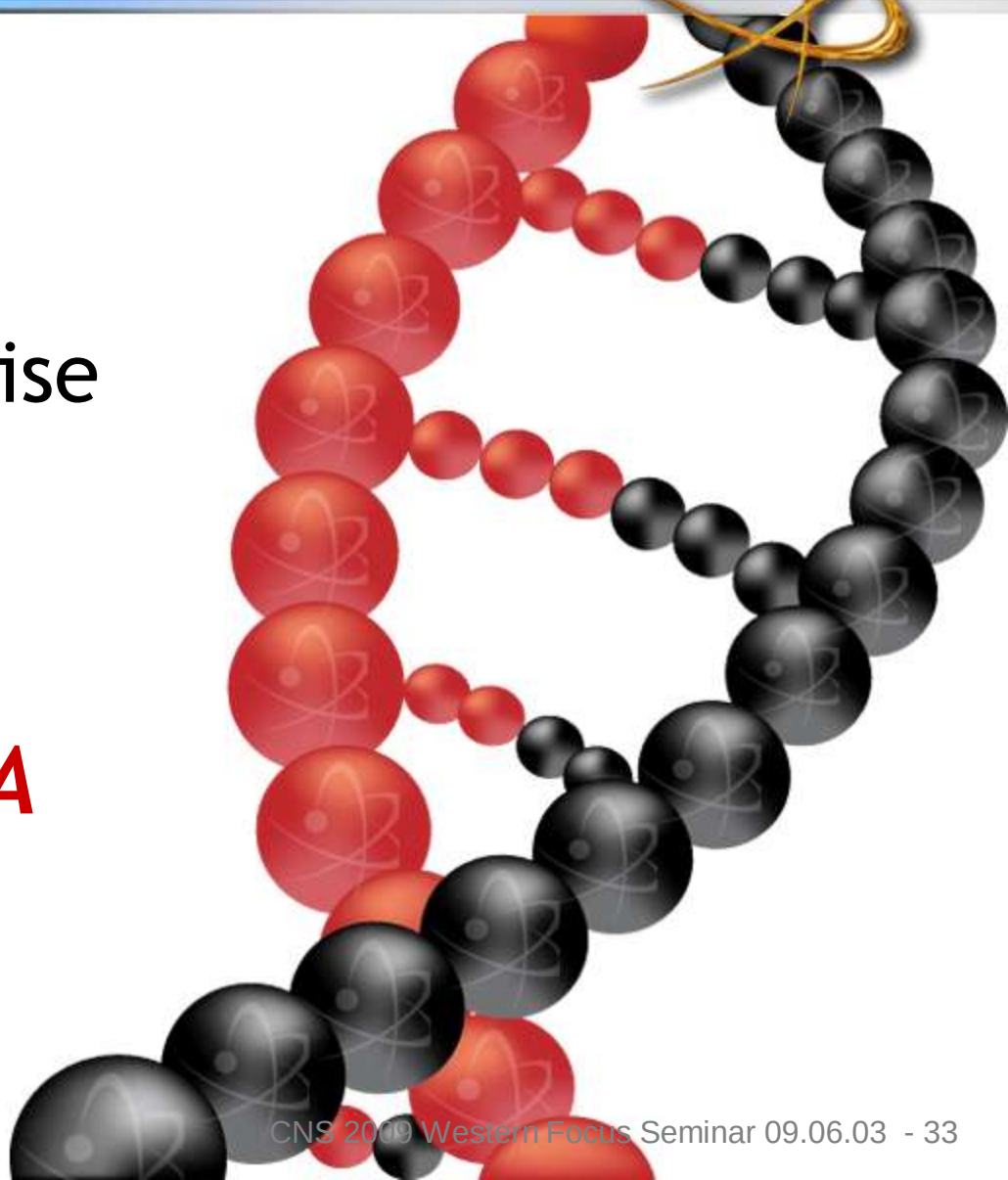
And, don't forget!

The CNSC

<u>will not</u> compromise

safety

It's in our DNA



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