



RIC 2010

Overview of the  
U.S. Nuclear Regulatory Commission's  
Initiatives on the Use of Cesium-137 Chloride Sources

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Current Status

- CsCl radiation sources perform critical functions in blood sterilization, in medical and industrial research, and in instrument calibrations
- The security and control of radioactive sources has been significantly enhanced
- Integrated and comprehensive program is in place for management and control of radioactive sources
- NRC continues to work closely with domestic and international partners to improve security

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Significant Accomplishments

- Risk-informed requirements in place to ensure security (Large Irradiators, Manufacturers/Distributors, Transportation, Increased Controls, and Fingerprinting)
- Deployed National Source Tracking System
- Revised pre-licensing guidance
- Leads/participates in Radiation Source Protection and Security Task Force activities

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**Radiation Source Protection and Security Task Force**

- Established by Energy Policy Act of 2005
  - 15 federal agencies and two state organizations
  - Called for the NAS study
- Objective: evaluate and provide recommendations on security of radiation sources to the President and Congress
- Outputs:
  - Report not later than 1 year from Act, and
  - Reports not less than once every 4 years

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**Radiation Source Protection and Security Task Force (cont'd)**

- Task Force issued 1<sup>st</sup> report, August 15, 2006
- Recommendations:
  - Cesium-137 Working Group
    - to "...assess the feasibility of phasing out the use of CsCl in highly dispersible form..."
    - Report completed, September 2008
  - Radiation Sources Working Group
    - Report completed, February 2009
    - Considers list of nuclides meriting protection
    - Social and economic disruption aspects of RDD
  - Alternative Technologies Working Group
    - Report completed, January 2010
- Next Task Force report due to Congress in 2010

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**Conclusions of CsCl Working Group's Report**

- Immediate phase-out would not be feasible
- Step-wise phase-out could be feasible
- Challenges would have to be overcome
- Sufficient time would be necessary for replacement technologies to be established and for disposal pathways
- Sequences and time-frames would be critical
- Interim security measures are important

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**Overview of Alternative Technologies  
Working Group's Report**

- Objective: evaluate financial incentives; research needs for both alternative technologies and alternative designs, including financial support; and cost-benefit of potential alternatives for Category 1 and 2 radioactive sources
- Limits: viable technologies to Co-60, Cs-137, Ir-192, and Am-241 sealed sources in seven technology areas
- Applications considered and their alternatives:
  1. Blood irradiators
    - Cs-137, Co-60 radionuclides
    - X-ray devices

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**Overview of Alternative Technologies  
Working Group's Report (cont'd)**

- Applications considered and their alternatives (cont'd):
  2. Calibration irradiators
    - Cs-137, Co-60 radionuclides
  3. Research irradiators
    - Cs-137, Co-60 radionuclides
    - X-ray devices
  4. Well-logging
    - Am-241Be, Cf-252 radionuclides
    - Neutron generators

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**Overview of Alternative Technologies  
Working Group's Report (cont'd)**

- Applications considered and their alternatives (cont'd):
  5. Industrial radiography
    - Ir-192, Co-60 radionuclides
    - X-ray devices
    - ultrasonic devices
  6. Industrial irradiators (panoramic)
    - Co-60 radionuclide
    - Electron beam device
    - x-ray device
  7. Teletherapy (stereotactic radiosurgery)
    - Co-60 radionuclide
    - Linear accelerators
    - Proton beam accelerators

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**Commission Paper, SECY 08-184 (ML083030593)  
"Strategy for the Security and Use of Cesium-137 Chloride Sources"**

Application	IAEA Category	# of Licensees	# of Devices	% of Total Curies
Blood Irradiators	1-2	327	575	33.65
Research Irradiators	1-2	265	526	66
Calibrators	2	61	104	0.35

*Option 1:* Enhance security and issue a Commission Policy Statement

*Option 2:* Rulemaking to ban CsCl in soluble/dispersible form for blood irradiators, and maintain use of CsCl for research and calibration

*Option 3:* Rulemaking to ban soluble/dispersible form of CsCl (for all applications)

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**Commission Decision**

- On 4-15-2009, the Commission reached a decision with respect to the staff paper SECY-08-0814 (decision is in ML091050314)
- Commission agreed with staff paper (Option 1) that near-term replacement of CsCl sources in existing application is not practicable and would be harmful to delivery of medical care, research, and emergency response capabilities
- The Commission directed the staff to
  - Define criteria for dispersibility
  - Encourage further research, with Federal partners, for alternative forms of Cs-137

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**Commission Decision (cont'd)**

- The Commission directed the staff to (cont'd):
  - Develop, with Federal partners, a strategy for end-of-life management of CsCl sources
  - Develop a Policy Statement on CsCl source security and on the Commission's vision for future developments
  - Continue implementing, with Federal partners, voluntary security enhancements
  - Report to the Commission on the progress of the Radiation Source Protection and Security Task Force

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### Next Steps

- Implement Commission direction
- Assess implementation of the Global Threat Reduction Initiative (GTRI) voluntary security enhancements (see NRC Regulatory Issue Summary 2010-02):
  - Large number of initiatives
  - CsCl sources are included
- Continue to
  - Monitor the threat environment
  - Work cooperatively with Federal and State Partners
  - Issue new security requirements as may be necessitated by emerging risks

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### CsCl Source Security

- CsCl sources are widely used and safely secured in medical, industrial, and research applications
- Several initiatives have been implemented already to improve security of these sources
- Various initiatives are being considered to further enhance security for these sources

**NOTE:** The NRC has not made any decisions regarding the suspension of the use of high-activity Cesium-137 chloride sources

- Strengthening domestic/international collaboration is a top priority for further enhancing security of CsCl sources

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