Radionuclides Implementation Strategy

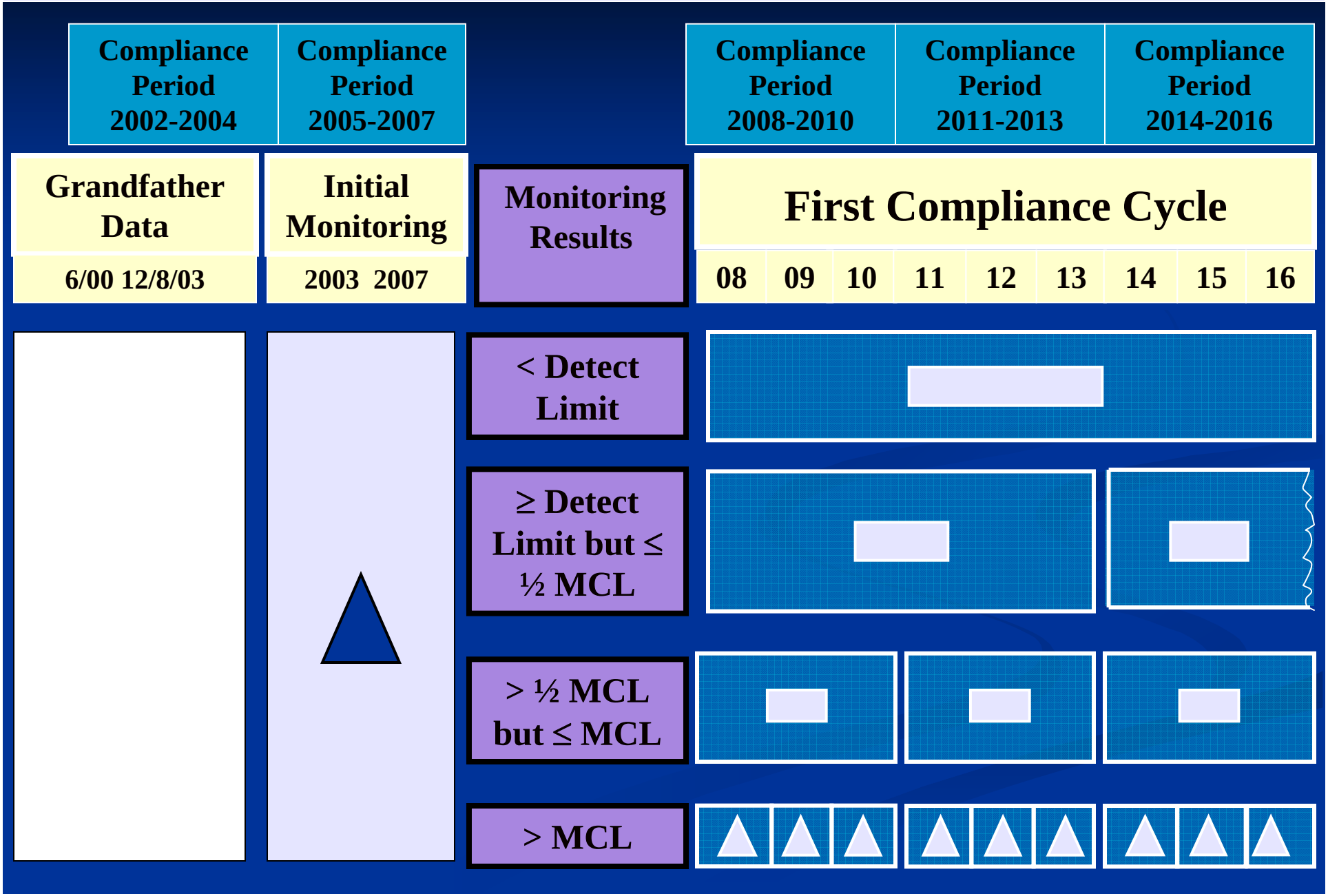
Radionuclides Rule Review

- Sets a new MCL for:
  - Uranium (30 µg/L)
- Retains the existing MCLs for:
  - Radium-226/228
    - 5 pCi/L
  - Gross alpha particle radioactivity
    - 15 pCi/L
  - Beta particle and photon activity
    - 4 mrem/yr
- Revises monitoring requirements
  - Standardized monitoring framework

Features of the New Rule

- For the first time, there is an MCL for uranium. While it is listed as a mass unit (µg/L), a conversion to pCi/L must be used to relate it to the activity of gross alpha particle activity.
- Radium-228 must be tested separately during the initial monitoring phase (12/8/03-12/31/07).
- Each entry point to the distribution system (EPTDS) must be monitored in the New Rule instead of a “representative” point.

Standardized Monitoring Framework - Radionuclides



Disposal of Water Treatment Plant Waste Containing Radionuclides

Options for Disposal are Influenced by. . .

- Concentration of radionuclides and co-occurring contaminants in the waste stream
  - Hazardous Waste
  - Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)
  - Low-Level Radioactive Waste (LLRW)
  - Mixed Waste
- Federal, State, & Local Regulations
  - Disposal facility policies
- Type of residuals
  - Liquid or solid

Definitions for Waste

Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)

Low-Level Radioactive Waste (LLRW)

TENORM

Regulated by numerous federal regulations

- Defined as naturally occurring materials whose radionuclide concentrations or potential for exposure is enhanced as a result of human activities
  - Includes waste streams generated by water treatment plants
  - Also includes mining, fertilizer production, and oil and gas production.

LLRW

- Defined by The Low-Level Radioactive Waste Policy Act
  - NOT high level radioactive waste, spent nuclear fuel, or byproduct material; and,
  - Anything the Nuclear Regulatory Commission (NRC)…classifies as LLRW

LLRW

- Can contain source or special nuclear material
  - Radium (Ra) is not source or byproduct material by definition
  - Uranium (U) & thorium (Th) are source material and may be subject to NRC licensing requirements

HOWEVER. . .

LLRW: Uranium & Thorium

- If U or Th makes up <0.05% by weight (totaling less than 15 lbs.), it is source material an “unimportant quantity” and exempt from NRC Regulations
  - Approximately 335 pCi/g for natural U

Residual Type

Solid Residuals

Liquid Residuals

Waste Streams

- Liquid Residual Stream
  - Brine
  - Backwash Water
  - Rinse Water
  - Acid Neutralization Water
  - Concentrate
- Solids
  - Spent Resins
  - Spent Filter Media
  - Spent Membranes
  - Sludges

Solid Residuals by Treatment Type

Treatment	Spent Resins/ Media	Spent Membranes	Sludge
IX	X		
RO		X	
AA	X		
Coagulation/Filtration	X		X
Lime Softening	X		X
Green Sand Filtration	X		X
Co-Precipitation w/Barium Sulfate	X		X
Electrodialysis/Reversal		X	
Pre-formed Hydrous Manganese Oxide Filtration	X		X

Liquid Residuals by Treatment Type

Treatment	Brine	Backwash	Rinse Water	Acid Neutral Water	Concentrate
IX	X	X	X		
RO					X
AA		X	X	X	
Coagulation/Filtration		X			
Lime Softening		X			
Green Sand Filtration		X			
Co-Precipitation w/Barium Sulfate		X			
Electrodialysis/Reversal					X
Pre-formed Hydrous Manganese Oxide Filtration		X			

Disposal Options

Direct Discharge
Discharge to POTW
Underground Injection
Landfill

Disposal Options

Residual Waste	Disposal Options				
	Direct Discharge	Discharge to POTW	Recycle	Underground Injection / Discharge Plan	Landfill
Liquids	X	X	X	X	
Sludge					X
Spent Media					X
Spent Membranes					X

New Mexico Regulations & Regulatory Agencies

New Mexico Radiation Control Act (74-3-1 through 74-3-16 NMSA)

- **Radiation Control Bureau**
  - All regulatory requirements regarding NORM resulting from drinking water sources are currently regulated under 20.3.3.3 NMAC (Licensing of Radioactive Material).
  - Source Material – Uranium – exempt when concentration is by weight less than 0.05 percent of the mixture.
  - By-Product Material – Radium – No exemption. Generation of radium in any quantity must be under the scope of a Specific License.

RCRA
42 USC 6901 et. seq.

- **Hazardous Waste Bureau**
  - The identification, management, and disposal of solid wastes (including sludge)
  - If you generate solid waste, you must determine whether the waste is hazardous
    - Exhibits toxicity, corrosivity, reactivity, or ignitability criteria listed under 40 CFR 261.3(a)(2) and (b)
  - Presence of radionuclides does not *ITSELF* make the waste hazardous
  - “Cradle to Grave” liability

Clean Water Act (CWA)
33 USC 1251 to 1387

- **Surface Water Quality Bureau**
  - Direct discharges under a National Pollutant Discharge Elimination System (NPDES) permit
  - Discharges to a publicly owned treatment works (POTW)
  - Federal NPDES regulations do not set specific limits on radionuclides in discharges
  - EPA regulations on the use and disposal of the sewage sludge produced by POTWs currently do not cover radioactive material

Water Quality Control Commission 20.6.2 NMAC

- **Groundwater Quality Bureau**
  - Regulate all discharges to groundwater
    - Land Application
    - Underground Injection (UIC)
    - Surface impoundments
  - Goal is to protect the environmental quality of New Mexico's ground water resources as mandated by the Water Quality Act

Environmental Improvement Board
Solid Waste Act, NMSA 1978.

- **Solid Waste Bureau**
  - There are currently no regulatory guidelines for the disposal of NORM waste materials at local solid waste disposal facilities in the State of New Mexico.
  - A minimum value has not been established for radioactive material.
  - All “radioactive material” is prohibited at solid waste facilities.

LLRW Landfills

- Licensed by NRC or by a state under agreement with NRC
- Barnwell - South Carolina
  - After June 30, 2008, will accept waste only from organizations in South Carolina, Connecticut, and New Jersey
- Richland - Washington
  - Accepts certain types of TENORM (although not hazardous or mixed) wastes from all states
- Envirocare - Utah
  - Has dedicated TENORM disposal and is the only LLRW landfill authorized to accept certain kinds of mixed waste

Other Agencies

- Occupational Health & safety Bureau
- NM Department of Transportation
- Rocky Mountain Low Level Radioactive Waste Board

STATE STRATEGY

- 95% of Initial Sampling Completed.
- Drinking Water Bureau developing Implementation Strategy.
  - Targeting Completion by December 2007
  - Working with other NMED Bureaus.
    - Already completed Coordination with Radiation Control Bureau
  - Incorporating Identified Impacts in Engineering Reviews for new construction.
  - As of June 2007 sampling indicates 27 affected Public Water Systems
  - Stakeholder Input

Questions

State Drinking Water Contact:
Damian Luna
(505) 222-9579
damian.luna@state.nm.us