



**Westinghouse**

A BNFL Group company



# Potential Licensing Issues Associated with Decommissioning the Hematite Site – Open Session

Presentation to USNRC  
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# Meeting Purpose

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- Describe issues and discuss Westinghouse plans
- Obtain Initial NRC Staff Feedback on Safety, Accountability, Criticality, Security and Regulatory Issues associated with decommissioning the Hematite site
- Obtain guidance for next steps on exemption requests

# Agenda – Open Session

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- Introduction of participants
- Background
- Revisions to Chapter 4 (Nuclear Criticality Safety) of License
- Technical approach to nuclear criticality safety during remediation
- NRC feedback
- Closing remarks

# Hematite - Background

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- Processing of uranium for fuel for various government and civilian projects
- Pre-1974 - Handled uranium up to fully enriched
- Post 1974 – Limited to LEU
- Burial pits
- Westinghouse purchased in 2000
- Operations ceased 2001
- Rev 2 of Decommissioning plan tendered in August '05

# Revisions to Chapter 4 of License Application

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- Chapter 4 of license provides nuclear criticality safety provisions
- Presently based on operational considerations
- Text will be simplified to reflect decommissioning status
  - Editorial changes
  - Eliminate detailed parameter listings vs. enrichment
  - Remove poison and moderator control provisions
  - Eliminate process equipment information

# Revisions to Chapter 4 (continued)

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- Additions
  - Specify acceptable methods to determine mass
  - Add safe individual units and array spacing parameters for HEU
  - Waste material that meets concentration limit based on 10CFR71 definition of “fissile exempt” would not be subject to other nuclear criticality safety requirements
- Maintain present provisions to have Criticality Safety Evaluations by specialists to cover unanticipated conditions

# Safe Unit Limits - Decommissioning

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	w/o $^{235}\text{U}$	Parameter
Mass (kg $\text{UO}_2$ )	100%	0.795
Volume (liters)	100%	5.5
Cylinder Dia. (inches)	100%	7.3
Slab Thickness (inches)	100%	1.3
Concentration	100%	"fissile exempt"

# Minimum Spacing Areas

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## Minimum Spacing Areas<sup>(1)</sup> for Mass, Geometric and Concentration Limits

	Spacing Area (ft <sup>2</sup> )
Mass	3.5
Volume	9.0
Cylinder (per foot of cylinder height)	5.0
“Fissile Exempt” concentration	Unlimited

(1) Subject to a minimum edge-to-edge unit separation of 12 inches.

# Licensing Issues

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- Exemption from 10CFR70.24(a), “Criticality accident requirements”
- Bulk material that meets 10CFR71 definition of “fissile exempt” does not require single unit and spacing parameter restrictions

# Material Control Methods

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- Use of portable survey instruments (i.e. 2X2 NaI detector) can easily distinguish when soil-like materials approach “fissile exempt” concentrations
- Instrument set on  $^{235}\text{U}$  peak will register  $\sim 72,000$  cpm for material at  $1,070$  pCi  $^{235}\text{U}/\text{g}$
- Anticipated soil concentrations are much less
- Will be able to set conservative survey criteria to assure that concentration limit is not exceeded

# Detection Capability

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- Instrument choice example
  - 2X2 NaI(Tl) Detector
  - Spectral Analysis, ROI (170 keV to 210 keV)
  - Compton Scattering subtraction
- Calibration Factor = 67.5 cpm per pCi  $^{235}\text{U}/\text{g}$   
(demonstrated by field measurements)
- Background =  $0.6 \pm 28.2$  cpm
- Signal = 72,000 cpm @ 1,070 pCi  $^{235}\text{U}$  per gram of waste material
- MDA approximately 6 pCi  $^{235}\text{U}$  per gram of soil

# Conclusion

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- Westinghouse's plans for assuring nuclear criticality safety for material during decommissioning are reasonable and result in assurance of the public health and safety
- The exemptions are justified and meet criteria for granting of exemptions
- Westinghouse will document the basis for these exemptions in the application
- Schedule – Approvals required at the same time as Decommissioning Plan is approved



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