



EPRI Perspective on BTP Direction

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BTP - US NRC Branch Technical Position on Concentration Averaging and Waste Form

2011 BTP Process

- **NRC engagement** with industry and stakeholders has been very positive
- **EPRI research** used to inform the process through:
 - NRC public meeting/workshop attendance and comment
 - Responses to staff questions
 - Direct comment letters to NRC
- **Positive Outcomes:**
 - BTP Issuance delayed into 2012
 - Part 61 Limited Rulemaking scope expanded
 - Concentration averaging

BTP - US NRC Branch Technical Position on Concentration Averaging and Waste Form

Concentration Averaging BTP Status

- Branch Technical Position (BTP) Draft Revision 1:
 - Averaging constraints based on class limit rather than package average
 - 2 times greater than class limit for gamma emitters
 - 10 times greater than class limit for beta emitters
 - Other
 - Higher class C limit for Cs-137 sources
 - MicroCurie level sources to be treated as DAW
 - Absorbed liquids being considered as a homogenous
- Although EPRI research finds that the Part 61 basis for concentration averaging should be over a much larger volume – **these changes are reasonable and practical for implementation**

Areas Where Further Changes Are Warranted

1. Realistic well drilling intrusion scenario
2. Impractical homogeneity test
3. Cartridge filters remain as individual items and are not considered homogeneous
4. Activated hardware averaging
5. Waste to binder ratio not specified for solidified/encapsulated waste

BTP Intrusion Scenario Analysis (NRC) – Challenges to ‘Reasonableness’

- Intrusion on day 1 after 100 yrs
- New NRC drilling intrusion scenario uses Hollow Auger
 - Not considered a practical* method for water well drilling
 - Spreads dry cuttings over the ground
 - Lacks depth ability
 - Prone to strike rejection
- NRC drilling scenario does not provide credit to the Class B and C waste barriers

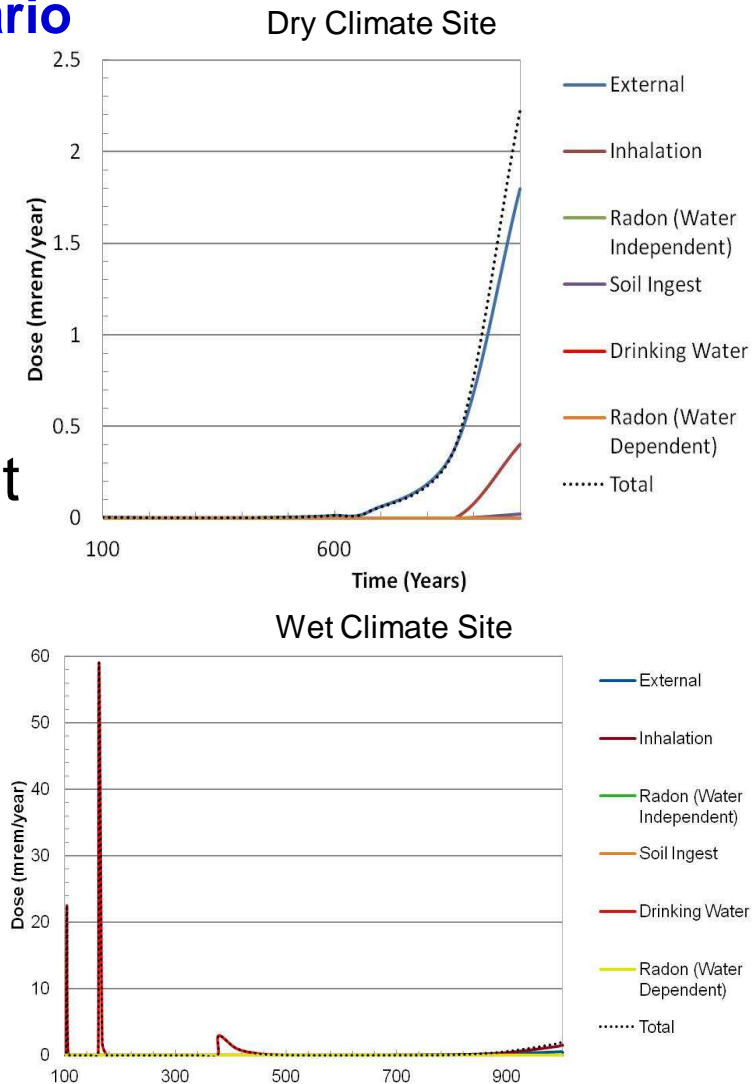
*source – well driller interviews



BTP Intrusion Scenario Analysis

EPRI Reasonable Well Drilling Scenario

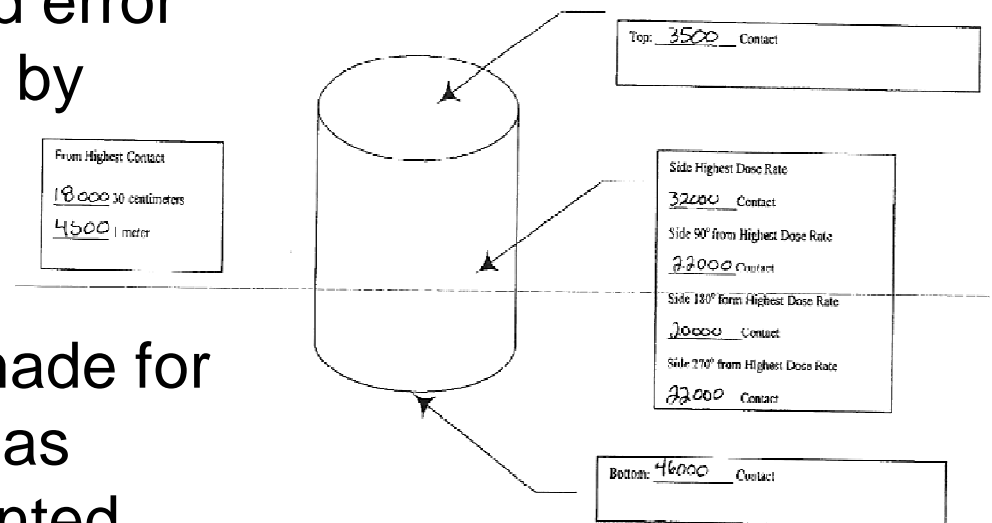
- Same intrusion date as NRC (day 1 after 100 yrs)
- Most likely drilling method* (rotary mud) results in homogenous cuttings in a mud pit
- Class B and C waste barriers still intact
 - Presence of barrier would cause rejection and drilling would be moved or stopped
- Dose projections assume 99% of a Class A limit



Approach remains deterministic, but is 'reasonable' and very conservative assessment of the potential hazard

Homogeneity Tests

- Waste layering in resin tanks and liners is inherent by design and will have varying dose rates.
- These layered dose rates will not pass the proposed standard error test and cannot be avoided by design
- To imply that additional considerations should be made for wastes that are predefined as homogenous are not warranted and are driven by an unrealistic well drilling scenario



Analysis of Cartridge Filter Nuclide Content

Nuclide	Per Filter Class A Limit*	Per Filter Class B Limit*	Per Filter Class C Limit*	2002-2006 Industry Average Filter
Co-60	140	No Limit	No Limit	0.0564
Nb-94	0.001	0.001	0.001	0.0000005
Cs-137	0.0072	0.72	130	0.0029

EPRI analysis indicates in **~50,000** filters shipped over 4 years there was only **171 Ci of Cs-137 in total**

Filters pose no greater of a carry away hazard than other metal items in DAW

*Gamma Limits applied to filters by NRC are new gamma source values from draft BTP Rev 1 and are in addition to Part 61 waste classification

BTP Cartridge Filter Comparison to Sources

- The issues related to the treatment of cartridge filters treated as individual items:
 - Stricter management than other homogeneous waste
 - Filters don't meet discrete size limitations
 - The gamma activity of concern to the NRC is not present
 - Creates unnecessary burden on sampling, characterization, and packaging
 - Results in additional dose to real people

Exclusion of cartridge filters from the definition of homogenous waste is not justified from a risk perspective as the gamma source term of concern is not present

Activated Hardware (Single Component Constraint)

Averaging over a single component does not consider overall risk

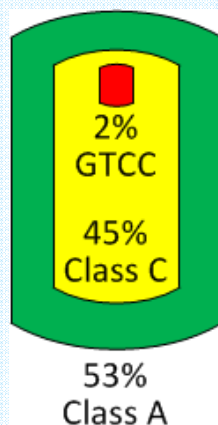
Rowe Example (% Vol.):

35 Shipments and 35 disposal containers

Total activity

~1,000,000 Ci w/
only 20% disposed
and 80% stored

**~100 Rem dose to
real workers – due
to segmentation**



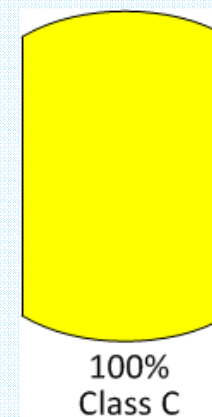
Trojan Example (% Vol.):

1 Shipment and 1 disposal container

Total activity

~2,000,000 Ci w/
100% disposed

**~100 Rem dose (or
more) to real
workers averted –
No Segmentation**



Averaging Should be the Rule not the Exception

Activated Hardware Recommendation

Allow averaging over similar and adjacent components when all pieces are $>0.01\text{ft}^3$ and placed in the same package

- Reduces Real Dose
- Reduces Orphaned Waste
- Eliminates Disparate Treatment
- Consistent with Part 61 EIS

Encapsulation Guidance

Waste to Binder Ratio and Source Encapsulation

- **Specify waste to binder ratio in percentage independent of container size**
- The minimum 14% waste to binder in the BTP Appendix C 55 gallon drum scenario has been endorsed in larger container topical reports and should be openly endorsed regardless of container size in the body of the BTP
- Source encapsulation and waste encapsulation have different primary functions and should be separate guidance in the BTP:
 - Sources: Isolation and shielding
 - Waste: Prevent dispersion and averaging for waste

Current BTP Timeline

SECY-10-0043 directs revision to BTP 10/2010
BTP Public Meeting Rockville MD 2/2011

Draft Rev. 1 BTP made publically available 9/2011
ACRS Subcommittee BTP Meeting 10/2011

BTP Public Workshop Albuquerque NM 10/2011
NRC Revises BTP revision schedule 11/2011

EPRI 2011 Research Complete 12/2011
EPRI 2011 Research (Key Points) to NRC 2/2012

Draft BTP for Public Comment April 2012
Final BTP Issuance TBD



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