



Beryllium Surface Swipes Wet vs. Dry?



***James S. Johnson, CIH, Ph.D., QEP
and
Rohit K. Shah, CIH, CSP***

October 17, 2001

Beryllium Health & Safety Committee





To Change, or Not To Change?

- **Dry vs. Wet**
- **LLNL has a history of using Dry swipes**
- **This also parallels our Rad. surface evaluation process which is required by 10 CFR 835**

A surface swipe is a qualitative evaluation technique

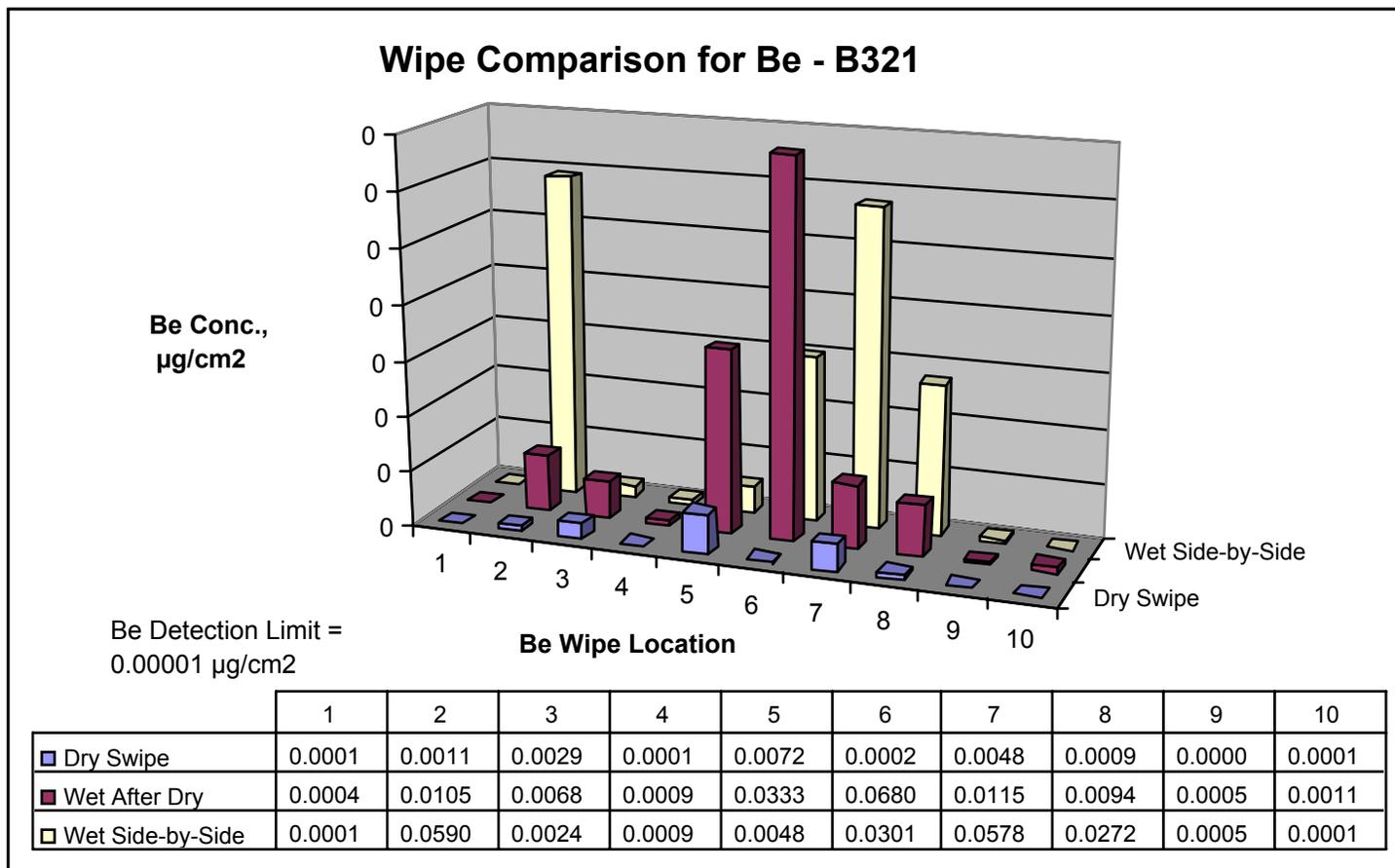
Evaluation of Dry vs. Wet



- **Designed a field experiment to evaluate the differences in the two techniques**
 - **Swipe material**
 - Whatman 50 swipe tab (dry, distilled H₂O)
 - Ghost wipe - (web, air-dried)
 - **Swipe condition**
 - Dry 100 cm²
 - Wet 100 cm² (same location)
 - Wet 100cm² (side-by-side)
 - **Material swiped**
 - Different beryllium work area locations
 - Various weapons parts
 - Beryllium sheet - aged



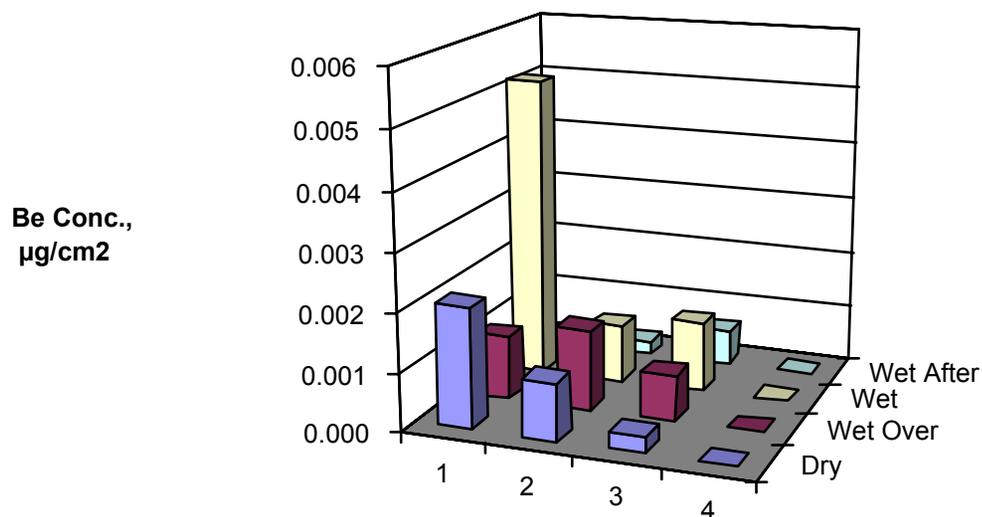
Dry Swipe Tab and Wet Ghost Wipe



Dry Swipe Tab and Wet Ghost Wipe, and Wet Ghost Wipe After Cleanup



Wipe Comparison for Be - B321 Part 1

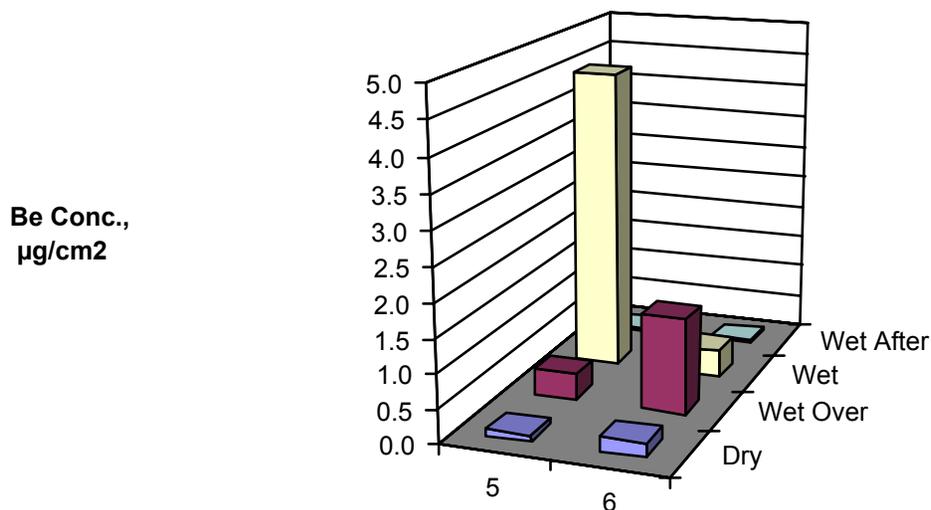


	1	2	3	4
■ Dry	.0021	.0010	.0003	.0000
■ Wet Over	.0011	.0014	.0008	.0000
■ Wet	.0052	.0010	.0012	.0000
■ Wet After	.0000	.0002	.0006	.0000

Dry Swipe Tab and Wet Ghost Wipe, and Wet Ghost Wipe After Cleanup



Wipe Comparison for Be - B321 Part 2

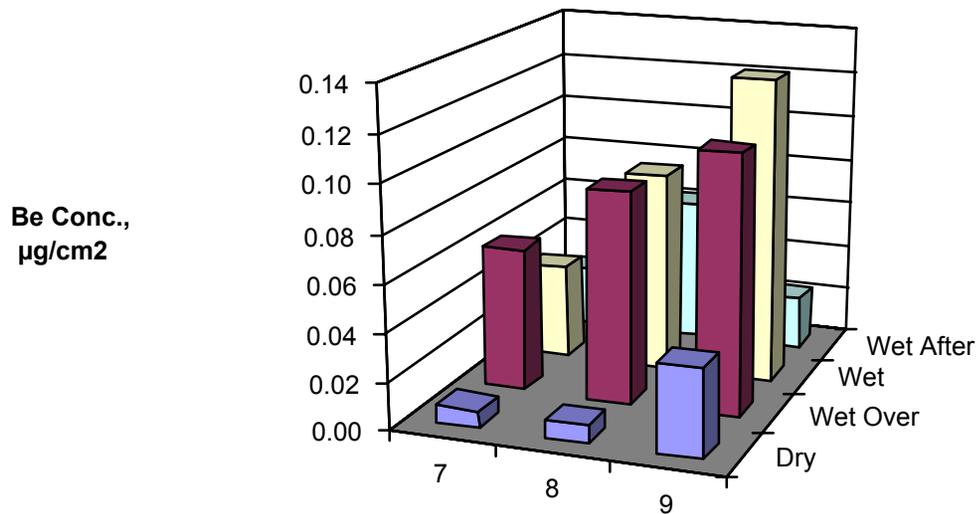


	5	6
■ Dry	.0901	.2060
■ Wet Over	.3930	1.4300
□ Wet	4.5100	.3960
□ Wet After	.0315	.0368

Dry Swipe Tab and Wet Ghost Wipe, and Wet Ghost Wipe After Cleanup



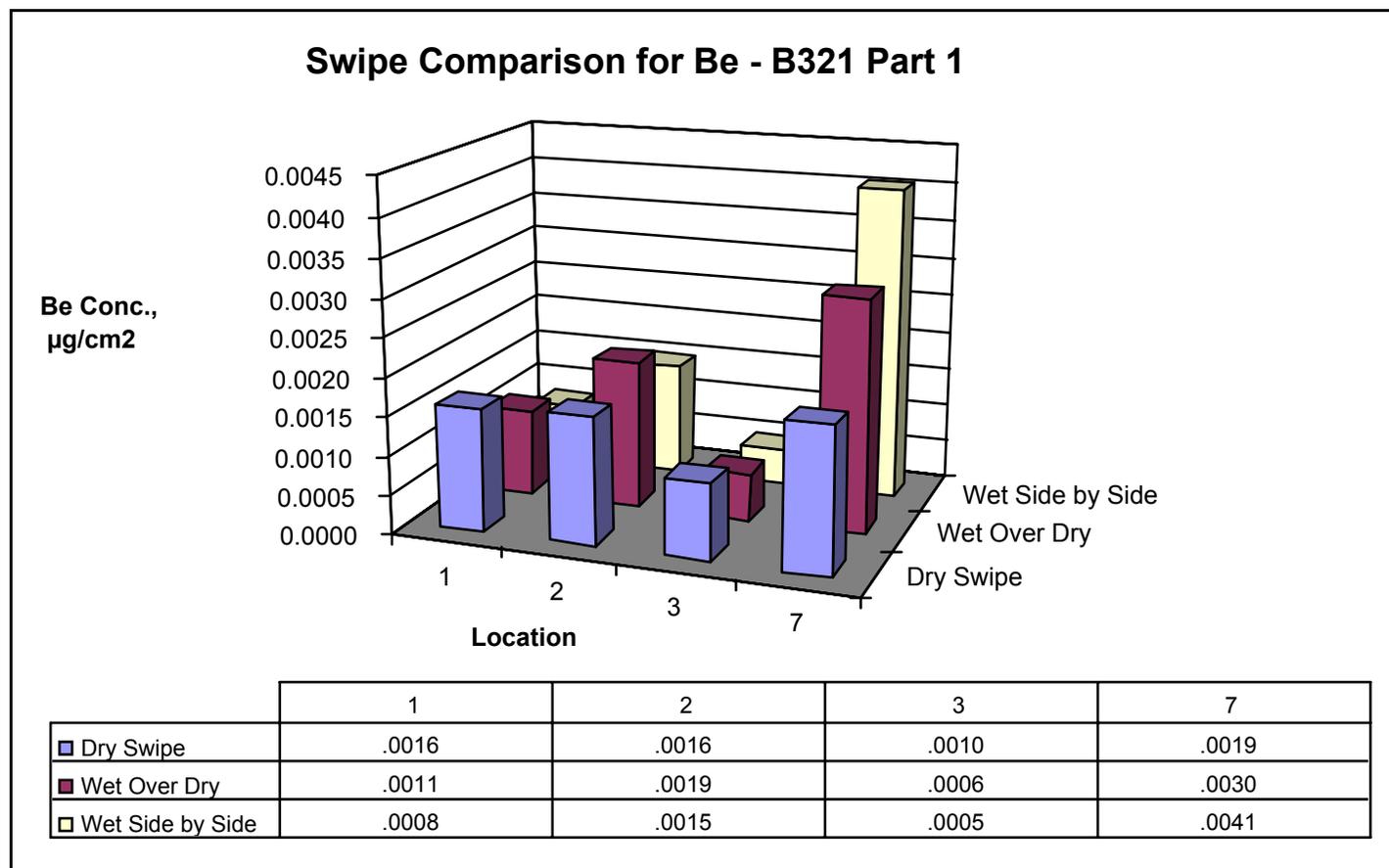
Wipe Comparison for Be - B321 Part 3



	7	8	9
■ Dry	.0073	.0076	.0370
■ Wet Over	.0606	.0896	.1090
■ Wet	.0402	.0856	.1300
■ Wet After	.0259	.0614	.0225



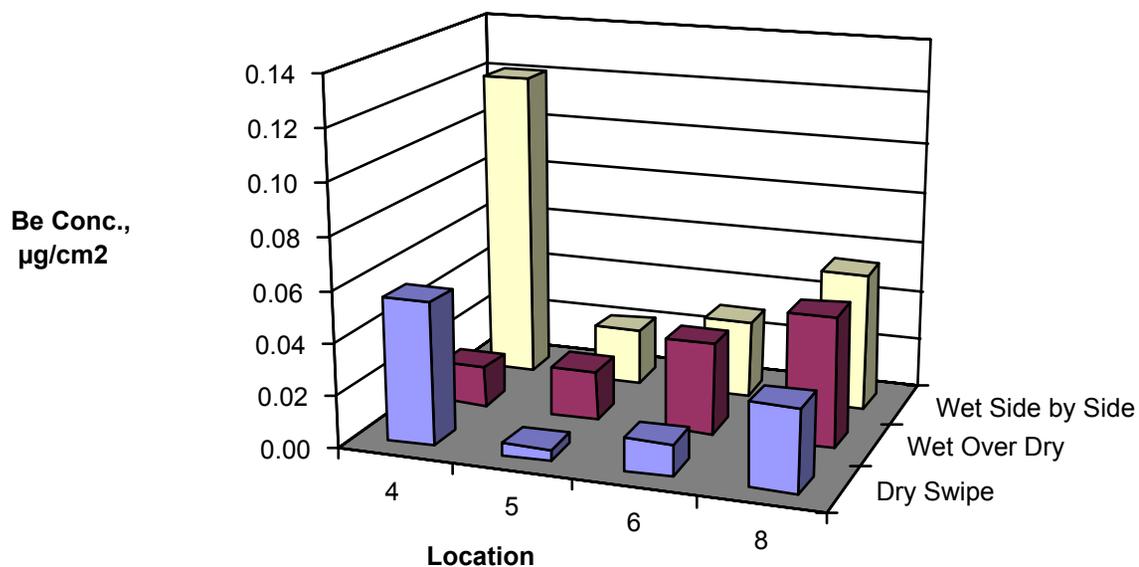
Dry and Wet Whatman Swipe Tab





Dry and Wet Whatman Swipe Tab

Swipe Comparison for Be - B321 Part 2

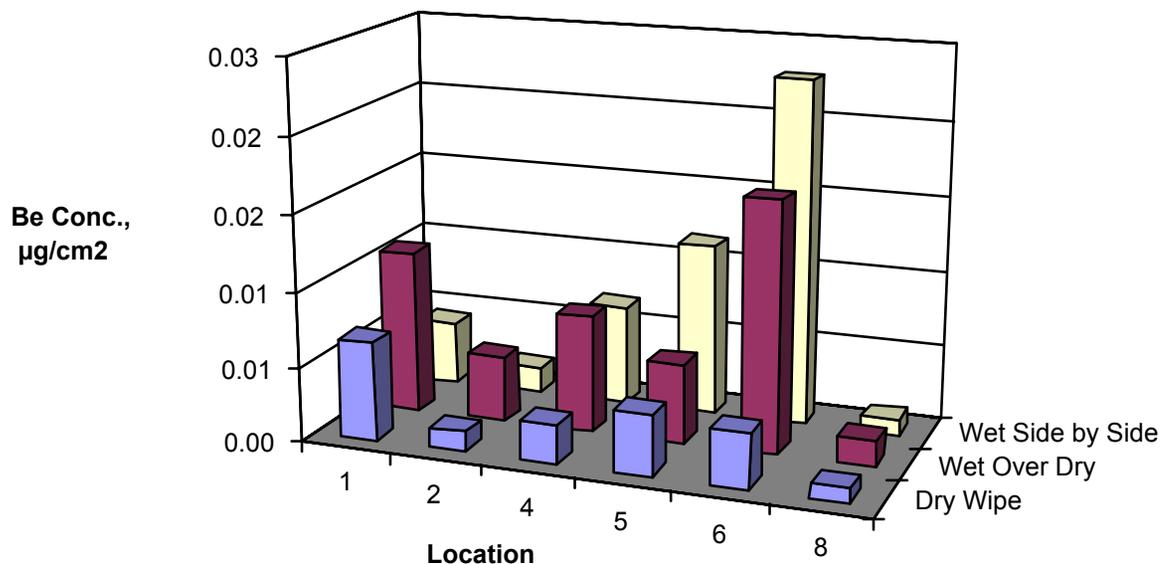


	4	5	6	8
■ Dry Swipe	.0548	.0044	.0123	.0315
■ Wet Over Dry	.0155	.0190	.0351	.0506
■ Wet Side by Side	.1209	.0213	.0297	.0540



Dry and Wet Ghost Wipe

Ghost Wipe Comparison for Be - B321 5/21/01 Part 1

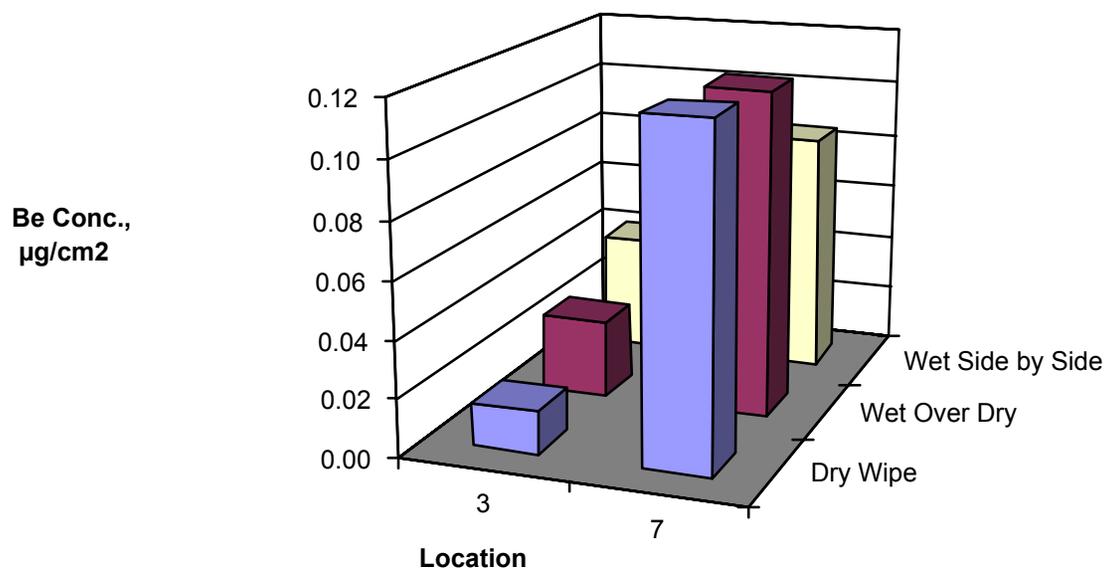


	1	2	4	5	6	8
■ Dry Wipe	.0066	.0013	.0025	.0040	.0036	.0009
■ Wet Over Dry	.0108	.0043	.0078	.0053	.0165	.0018
■ Wet Side by Side	.0042	.0018	.0067	.0114	.0228	.0010



Dry and Wet Ghost Wipe

Ghost Wipe Comparison for Be - B321 5/25/01 Part 2



	3	7
■ Dry Wipe	.0150	.1169
■ Wet Over Dry	.0274	.1144
■ Wet Side by Side	.0411	.0846



Conclusions

- **Surface swipes don't quantitatively remove all surface contamination**
- **No clear correlation between Wet and Dry sampling**
- **No large, consistent differences between the two methods were demonstrated**
- **LLNL will continue with Dry swipe sampling**