

Beryllium Sampling at Sandia National Laboratories Albuquerque, NM

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Types of Sampling

- Personal Breathing Zone
- Wipe Sampling
- Witness Plates

Personal Breathing Zone Sampling

- NIOSH Manual of Analytical Methods (NMAM)
 - 7300-Elements by ICP
- Sample Air-flow Rates
- STELs vs 8-hr TWA

Wipe Sampling

- Wet vs Dry
- Ghost Wipes™
 - Originally Intended for Lead Sampling
 - Found to be Acceptable for Beryllium Sampling
 - Not Acceptable for Arsenic, Chromium, Copper, Iron, Magnesium, Manganese, Titanium, Vanadium, or Zinc

Wipe Sampling-cont'd

- NIOSH Method 9100
 - 10CFR850 Preamble
 - Wet method
 - Ghost Wipe™
 - 100 cm²
 - Not bulk!
- NIOSH 7300
 - ICP
 - AIHA Lab
- Radiological Concerns



Wipe Sampling-cont'd

- Housekeeping Wipes
 - Taken at High Risk Areas
 - Beryllium Contamination Control Areas
 - PPE Donning/Doffing Stations
 - Taken Routinely





Witness Plates

- Why do we use?
- Glass vs Plastic Petri Dishes
- Filter size
- Collection frequency
- Side by side wipe and witness plate sampling
- Collection method

Beryllium/Aluminum Ratio

- Removable beryllium surface contamination during a remodel
- Update of beryllium inventory started with other accelerator buildings
 - Copper gaskets, finger stock
 - Cross contamination
- Be levels not always consistent with activities or location of activities
 - Large older high bays, roll-up doors

Ricky's Dirty 30

- Student Intern collected 30 samples
 - Separate Technical Area
 - Non-Beryllium use areas
 - Offices
 - Mobile Offices
 - Trailers
 - Window sills
 - Doorways
 - Tables

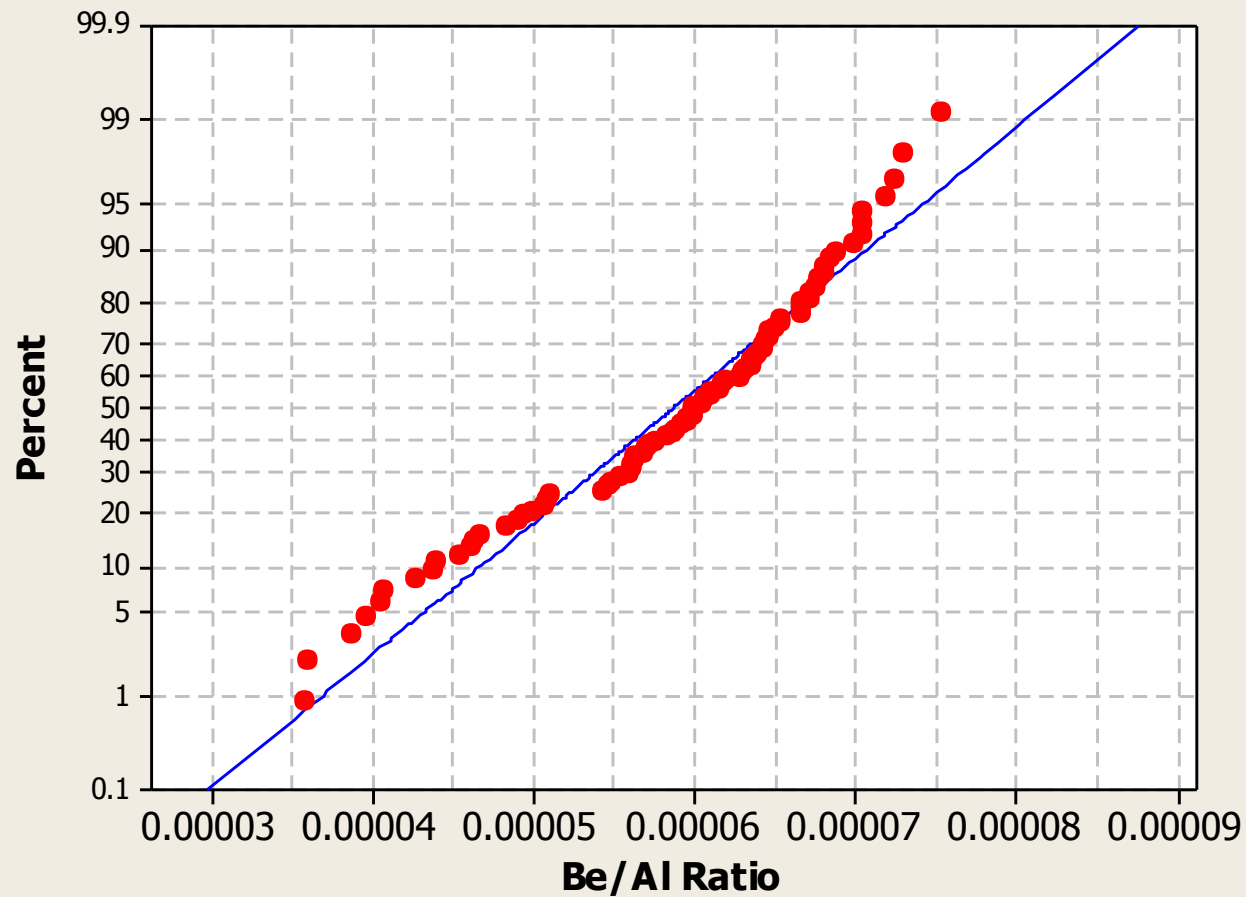


Results

- 89 Samples total
- Minimum 0.010 $\mu\text{g}/100\text{cm}^2$
 - 1/2 MDL of 0.020 $\mu\text{g}/100\text{cm}^2$
- Maximum 1.5 $\mu\text{g}/100\text{cm}^2$
- Mean 0.16 $\mu\text{g}/100\text{cm}^2$
- Median 0.21 $\mu\text{g}/100\text{cm}^2$
- 95% Confidence Level
 - 0.015 to 1.6 $\mu\text{g}/100\text{cm}^2$

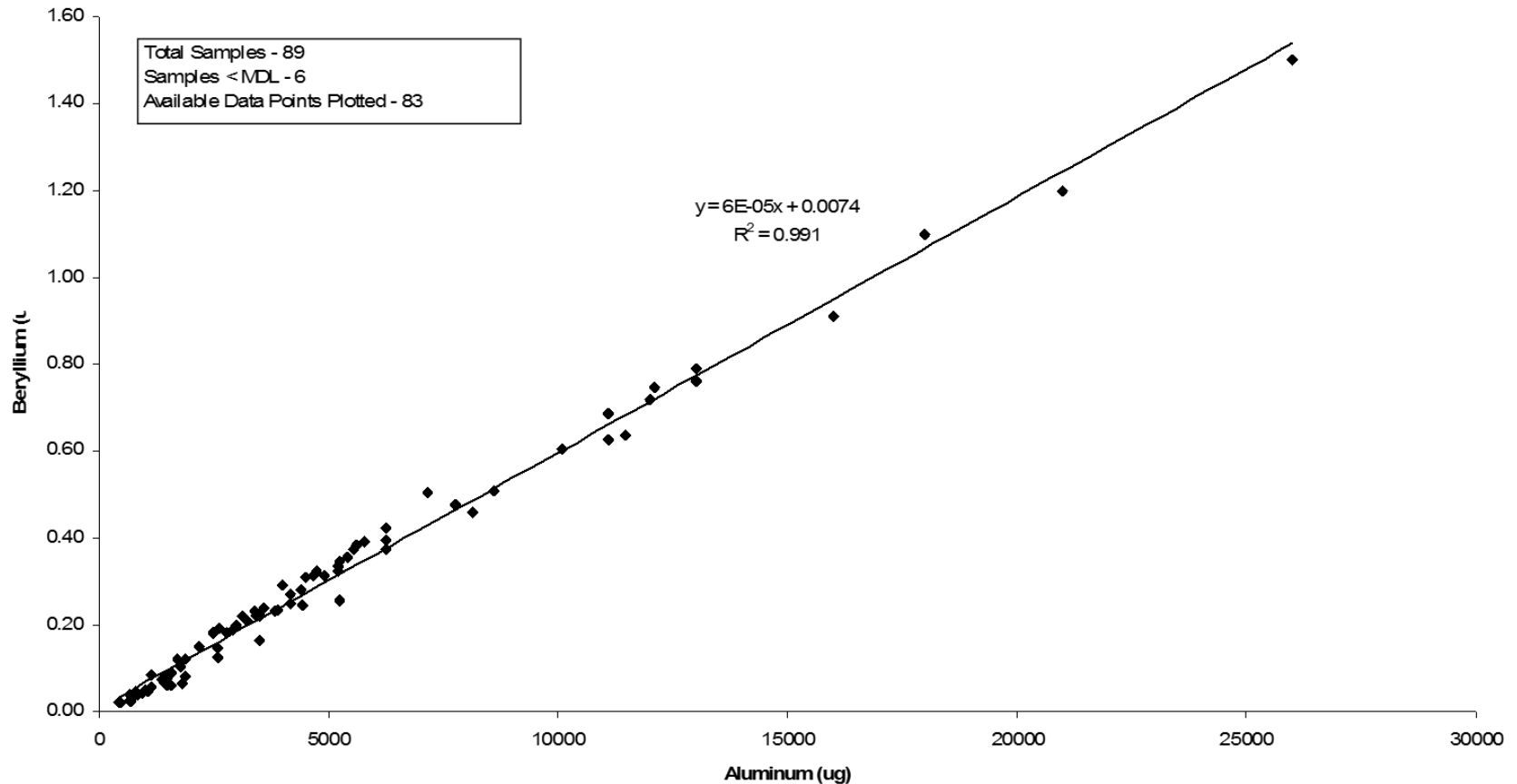
Probability Plot of All Non-Be Area Data Sets(3)

Normal

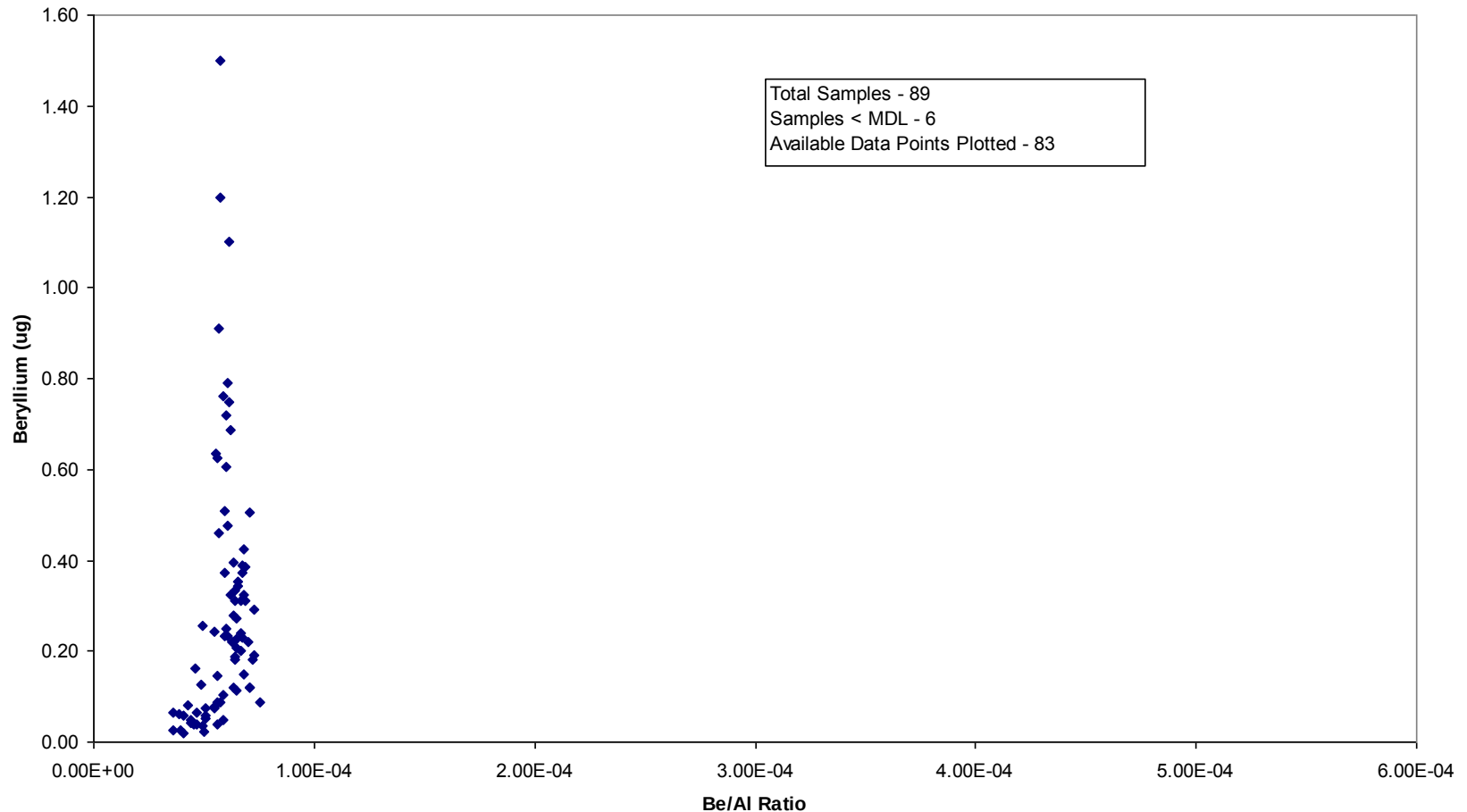


Mean	0.00005870
StDev	0.000009355
N	83
RJ	0.978
P-Value	<0.010

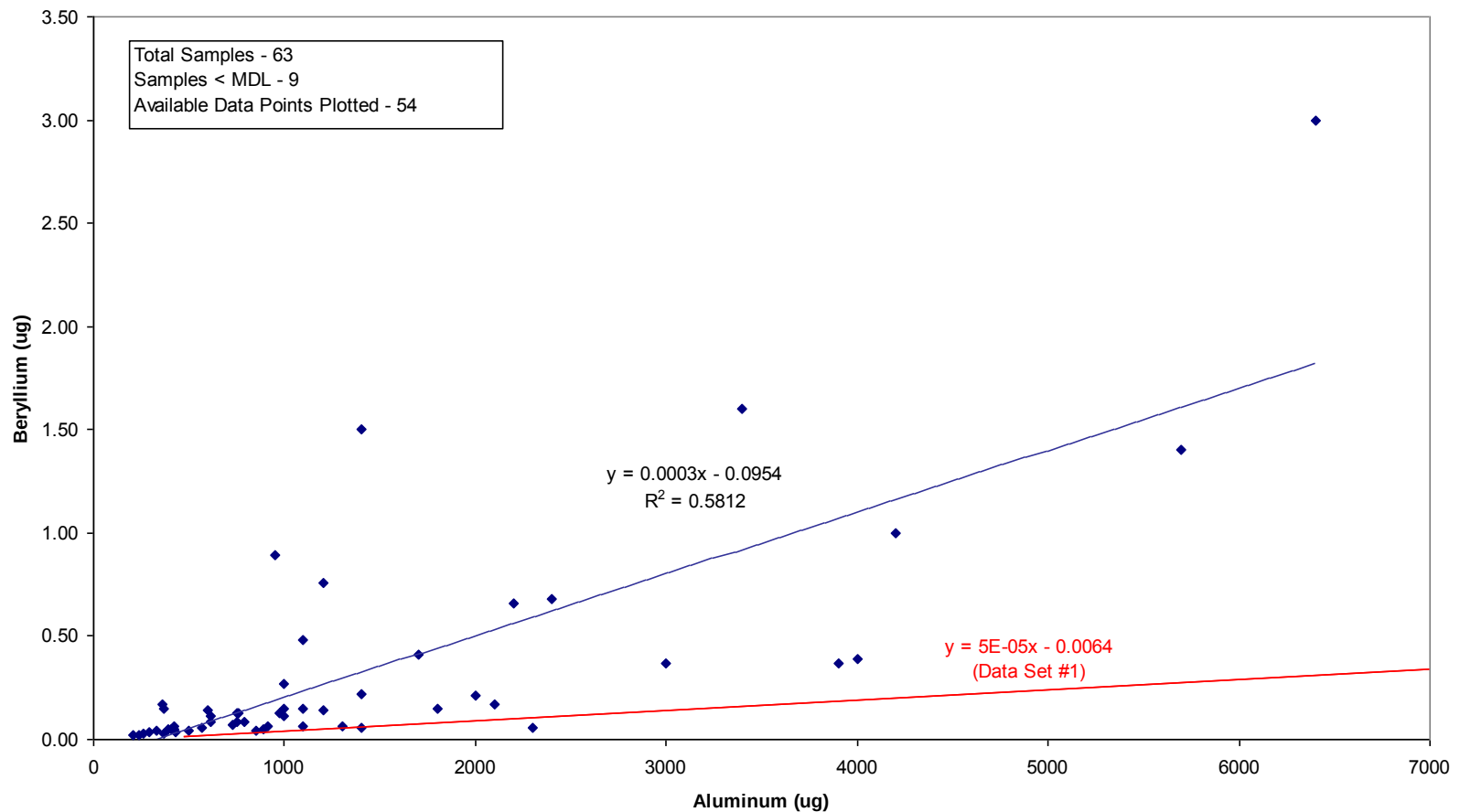
Non-Be Area Wipe Samples All Samples



Non-Be Area Wipe Samples All Samples



Anthropogenic Beryllium Contamination



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