



Analysis of Subcontractor CTW Data at SRS 1991-2007

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Overview

- SRS WG Discussion (March 2023)
- Purpose of the Analyses
- Data Sources
- Definition of Subcontractor Construction Trade Worker (CTW)
- Data Analyses
 - Scatterplots with jitter
- Conclusions

SRS WG Discussion

March 23, 2023, SRS WG (PDF page 131, emphasis added)

*Let me -- suppose you look at the bioassay data of these short-term workers where data does exist. And the -- and the point estimate and distribution is way out of hand of what the overall cohort is. That tells me something. If it falls right in the middle, that also tells me something. **The question is -- that Joe keeps raising, which I completely understand -- that short-term workers could have been brought in to do the most hazardous jobs, the most abysmal -- under the most abysmal working situations, and they were never -- never monitored.** I can't be sure that the ones that were monitored reflect that worst-case situation, but at least I can look at the data, the bioassay data, and see where it falls, how representative it is of the cohort as a whole.*

Purpose

- To determine if subcontractor Construction Trade Workers (subCTWs) were among the most highly exposed workers at SRS between 1991 – 2007.
- March 2023 SRS Workgroup Meeting
 - The SRS WG requested that SC&A compare bioassay data from subCTWs to bioassay data from all workers to determine whether the subCTWs exposures tend to fall into the upper end of the results for all workers.
 - NIOSH independently performed a similar assessment.

Data Sources

File	Contents	Years	Rows
IND	Personnel data – name, SSN, employee ID numbers, employer name, job title	Not Applicable	165,022
EDL	External legacy data – dosimetry	1973 – 2003	2,071,482
EDC	Current external dosimetry results	2004 – 2023	774,409
TL	Tritium legacy data	1989 – 2003	857,050
NTL	Non-tritium legacy data	1990 – 2004	434,061
IVC	Current tritium & non-tritium results	2003 -2023	332,390

Differences between SC&A and NIOSH analyses

- Definition of subcontractor CTW
- Data
 - Baseline samples
 - Results with units of micro-grams per liter
 - SC&A ends in 1997, NIOSH ends in 2007
- SC&A Recommended Analyses
 - Time Weighted One Person One Statistic (TWOPOS)
 - Multiple Imputation

NIOSH Definition of a subCTW

Any record in the IND file where any of the following is true. Otherwise, the record was marked “other.” See Appendix B of the report for specifics.

1. COMPANY_NM is “BECHTEL SAVANNAH RIVER INC”
2. ORG_TL is any of the 19 listed companies, and
3. ORG_TL starts with, ends with, or contains 14 unique job titles, and
4. EMP_UNION_CRAFT_CD is not null.

SC&A Definition of a subCTW

Any record in the IND file where COMPANY_NM is equal to “SUB”.

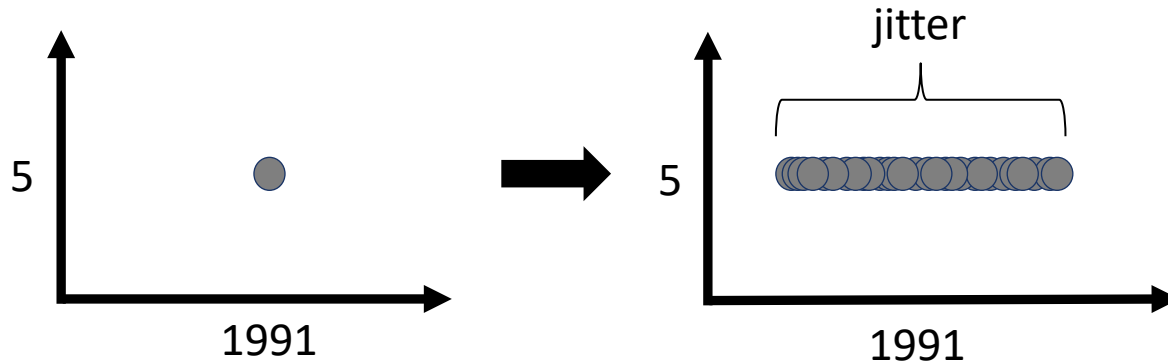
If a worker is not designated as a “SUB” that worker was assumed to be employed by the prime contractor.

NIOSH Data Analyses (1991 – 2007)

- Scatterplots were generated due to:
 - Censored results
 - Results containing zero
 - Large number of results near zero
- By subCTW and “other” (mutually exclusive comparison)
- External Dosimetry Results
- Bioassay Results
 - Tritium
 - Non-tritium

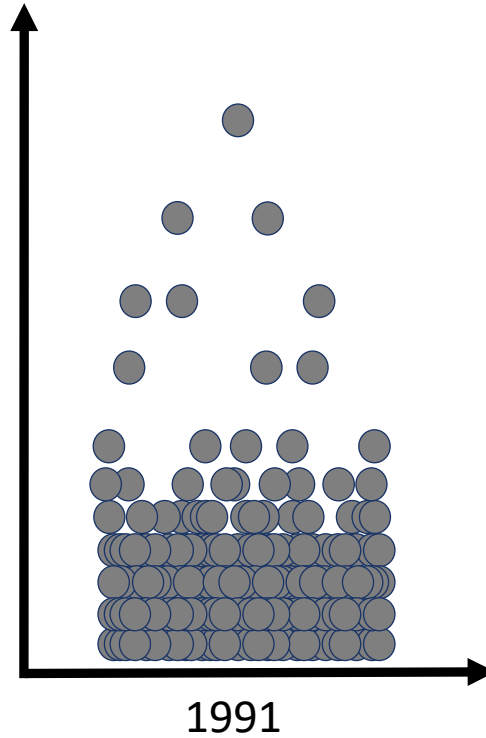
Scatterplot with jitter example (1 /3)

N = 500 results all equal to 5 for the year 1991

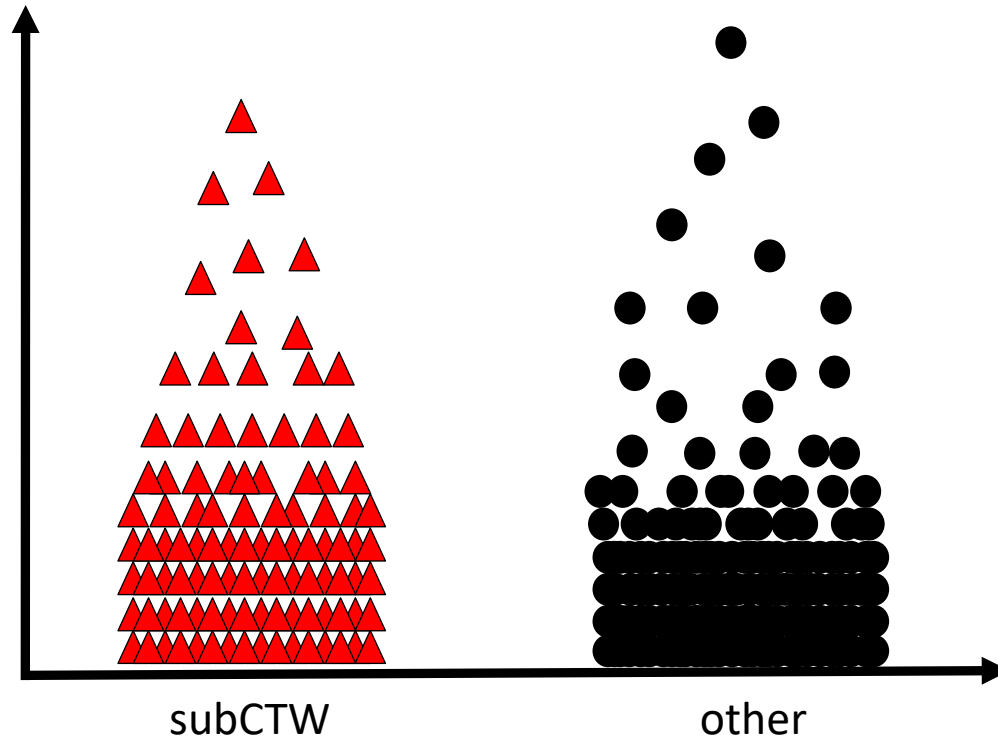


Scatterplot with jitter example (2/3)

N = 5,000 for 1991

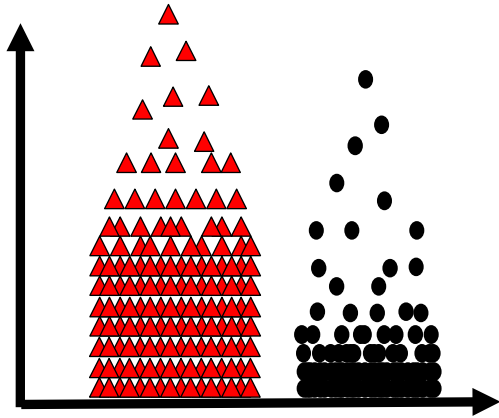


Scatterplot with jitter example (3/3)

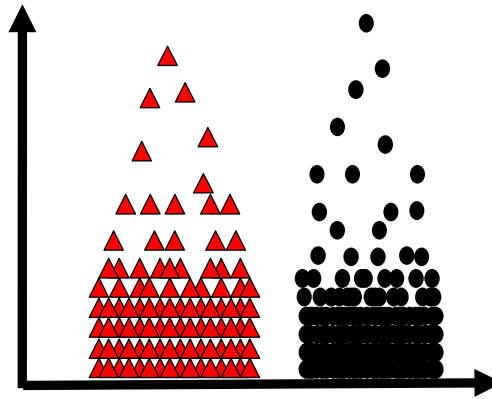


1991

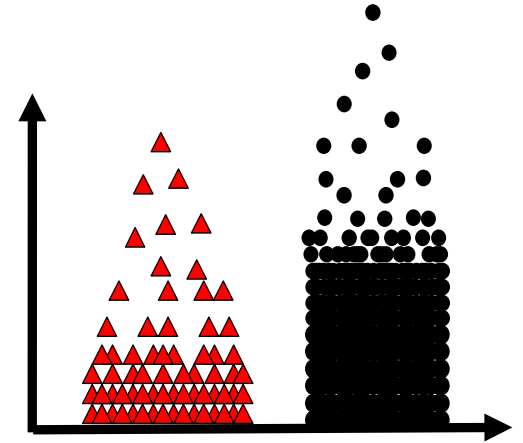
Scatterplot interpretations



subCTWs tend to be HIGHER exposed

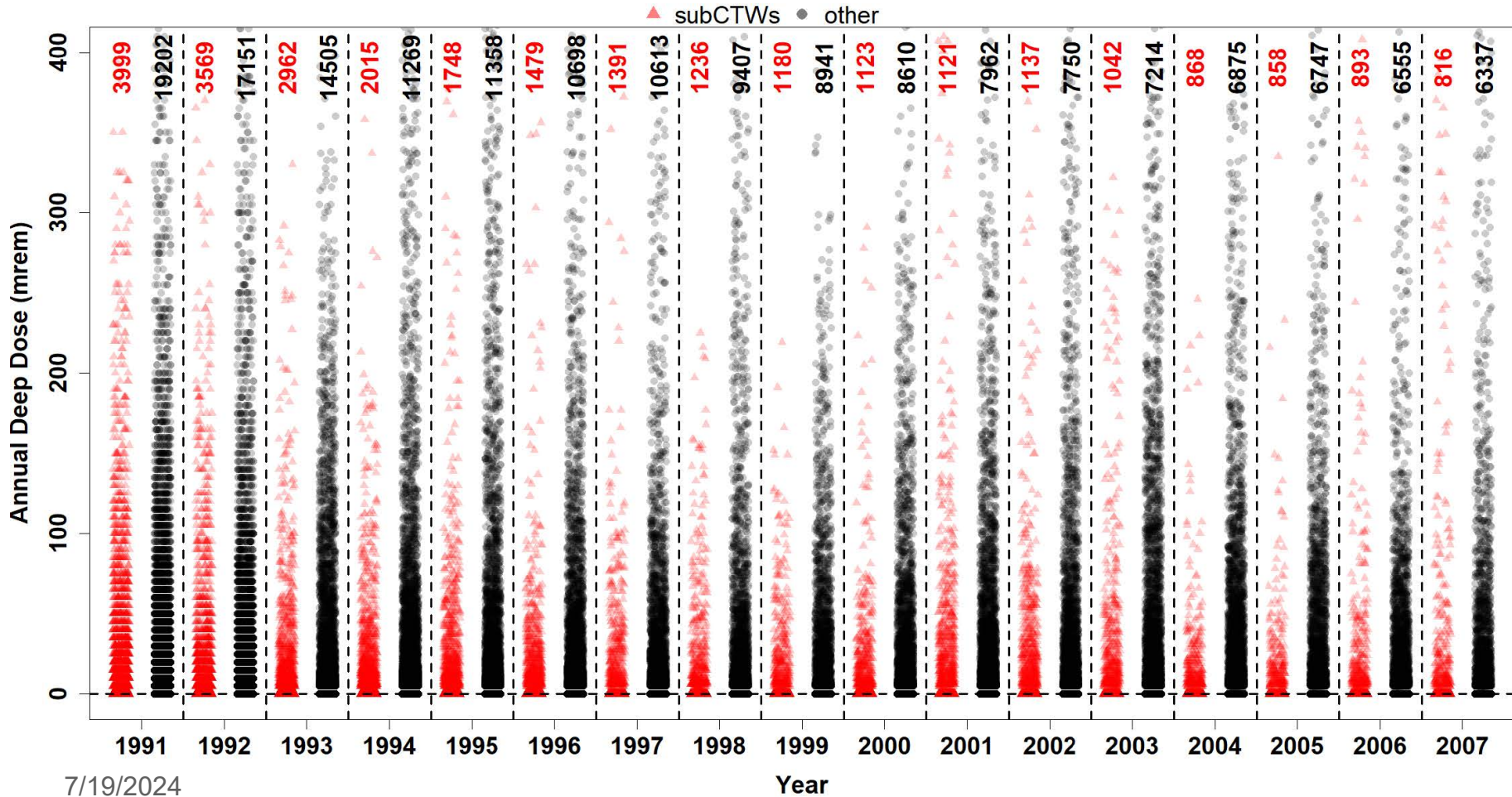


No difference
between groups

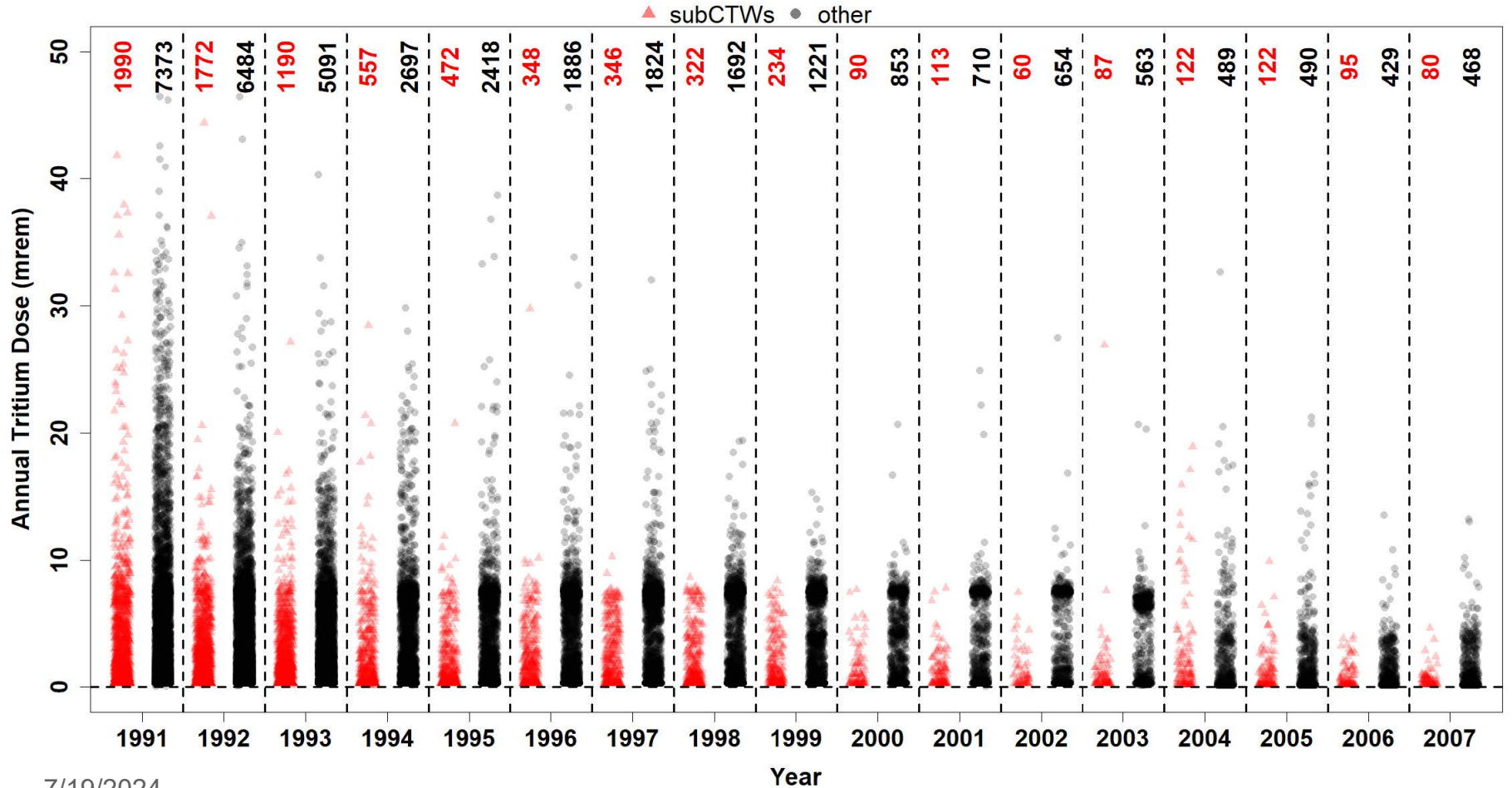


subCTWs tend to be LOWER exposed

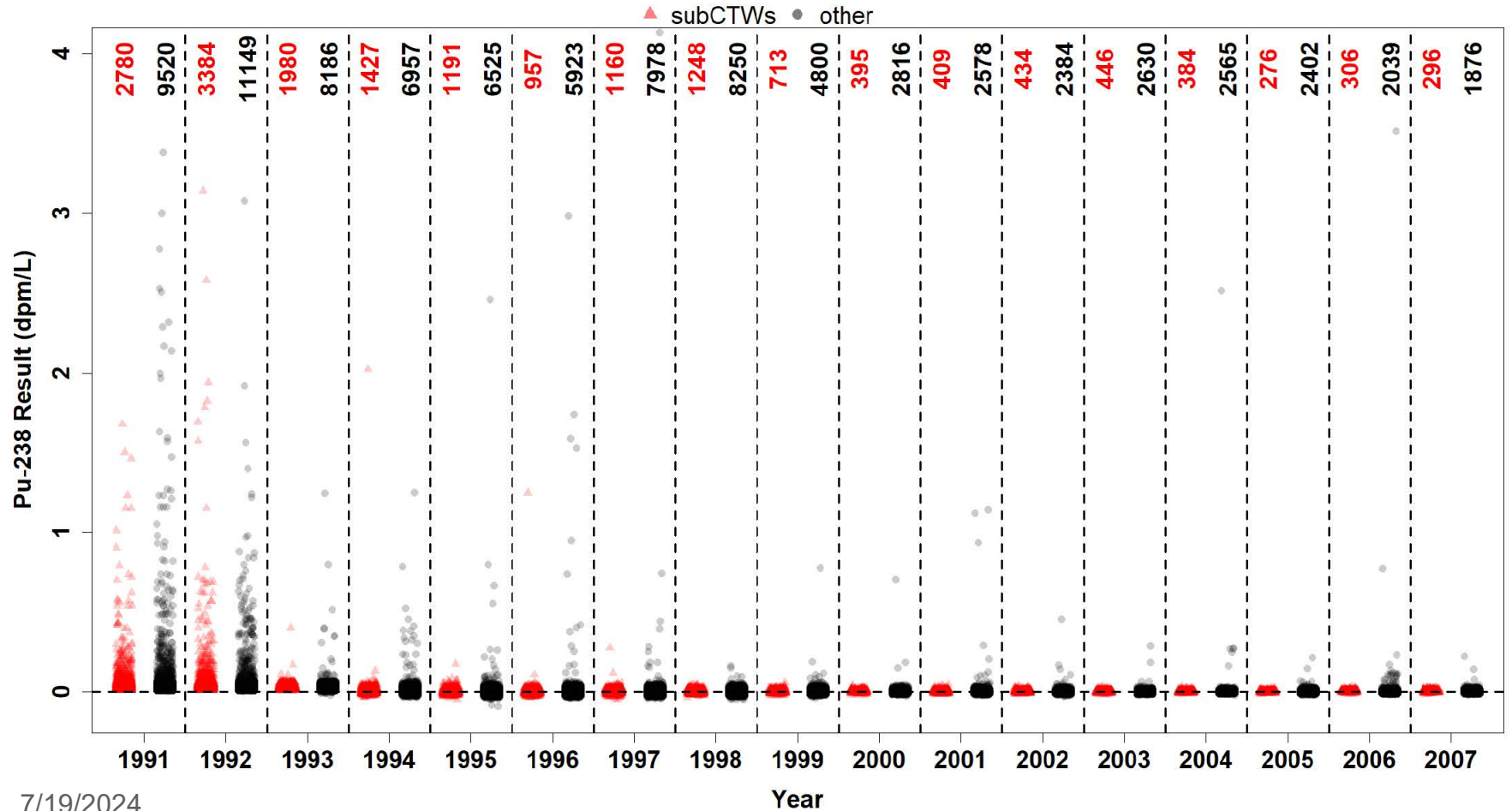
NIOSH Scatterplot of Annual External Deep Doses, N = 198,631



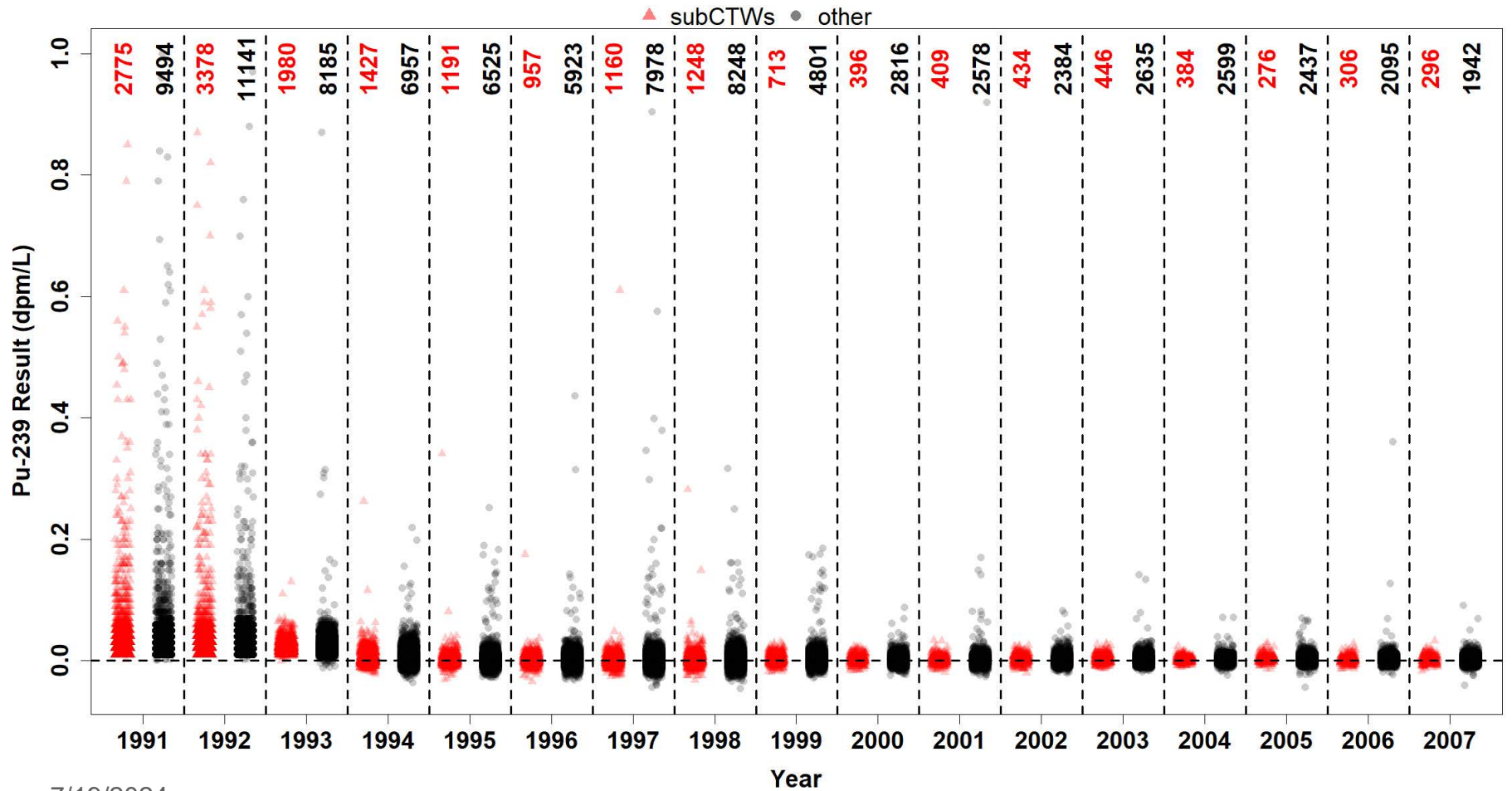
NIOSH Scatterplot of Annual Tritium Doses, N = 43,342



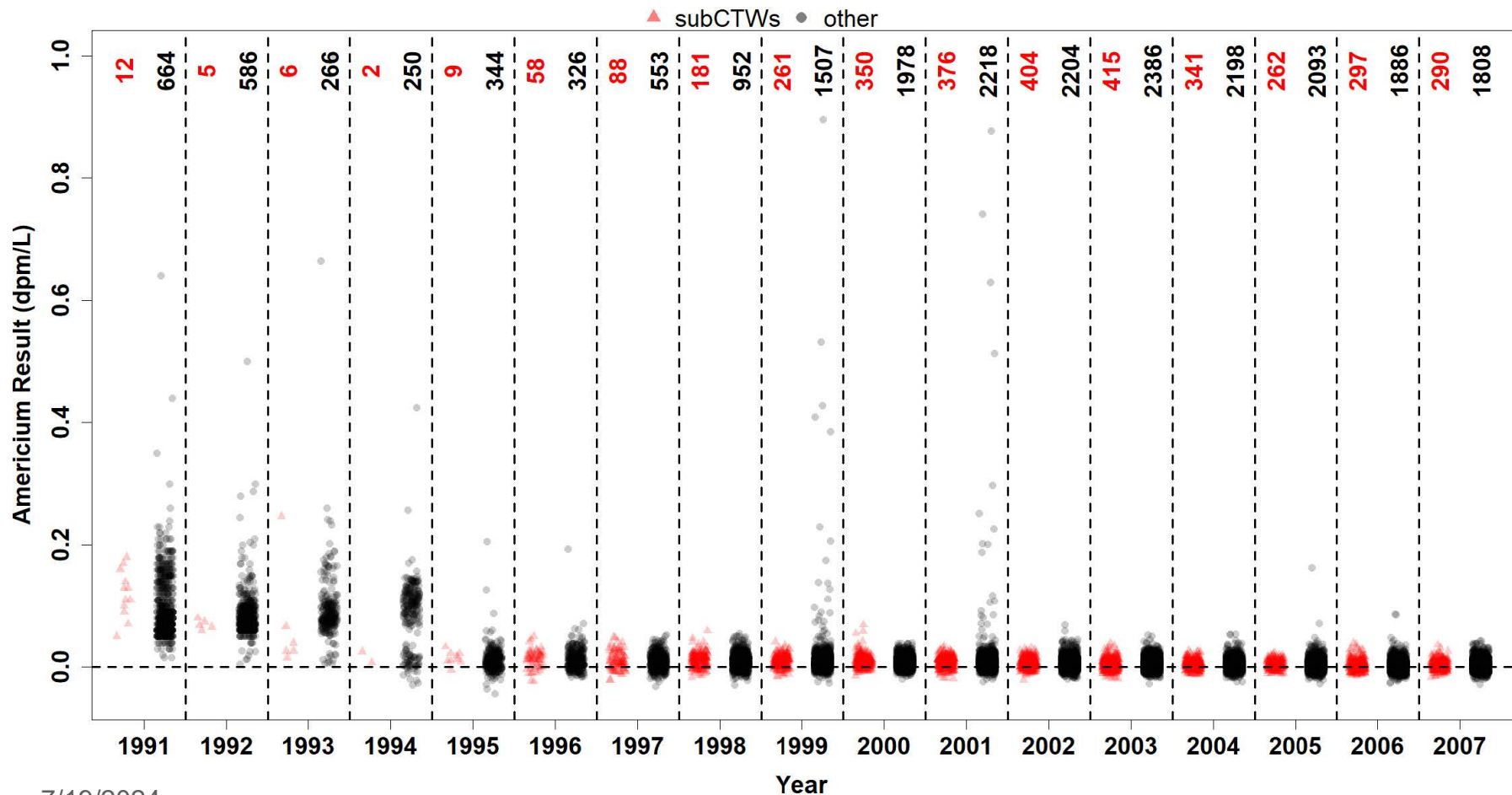
NIOSH Scatterplot of Pu-238 Results, N = 106,364



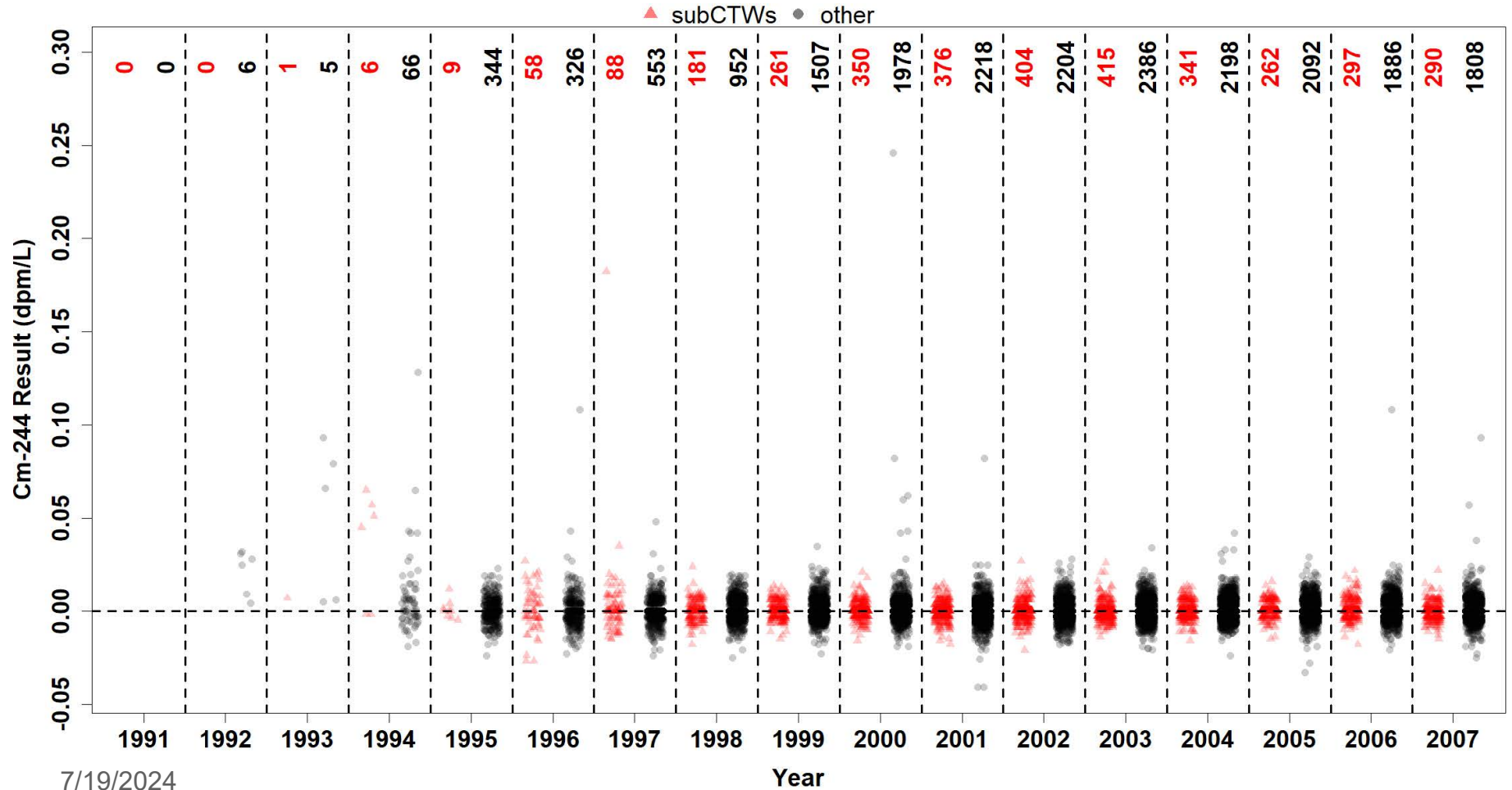
NIOSH Scatterplot of Pu-239 Results N = 106,514



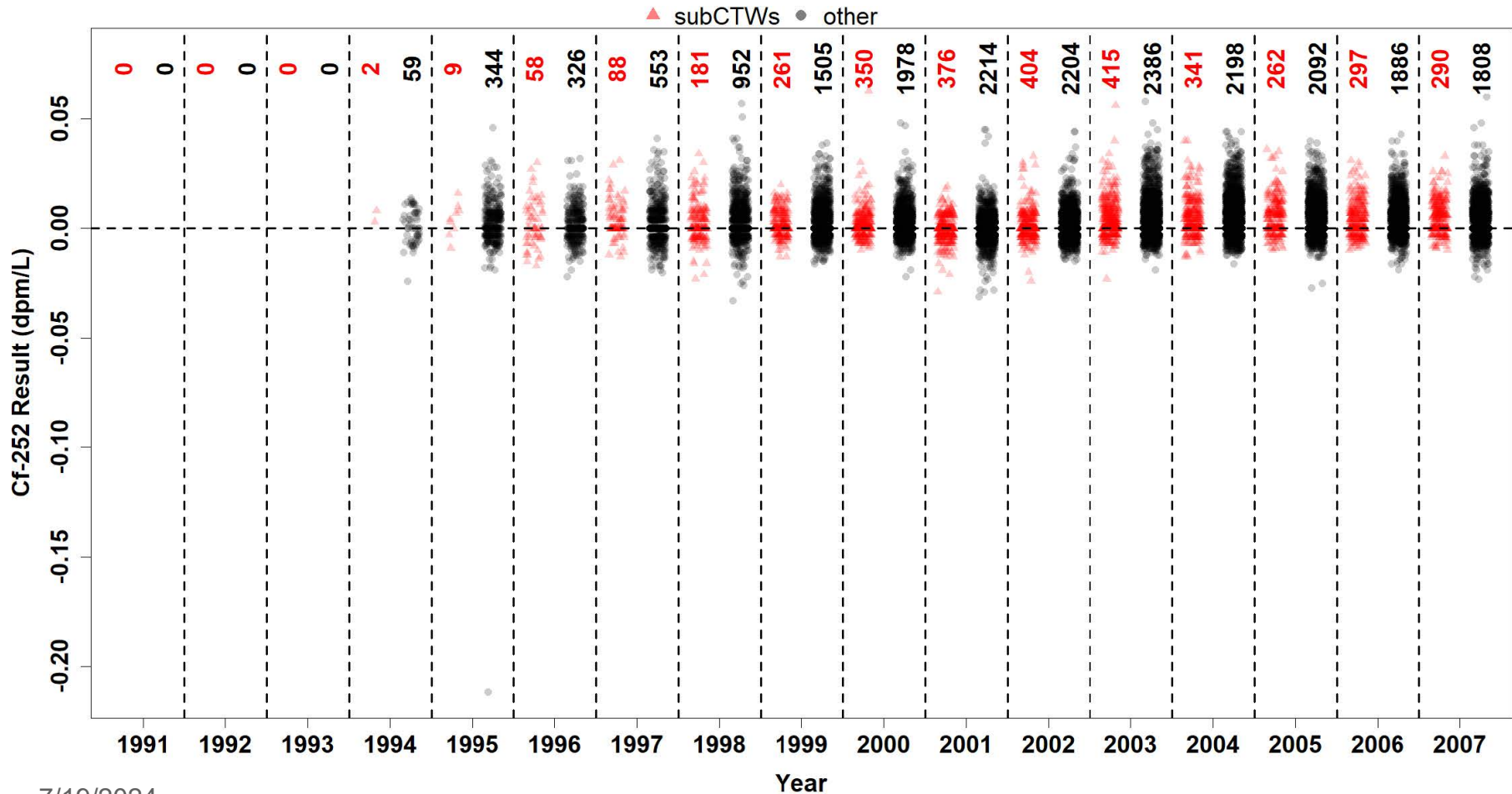
NIOSH Scatterplot of Americium Results, N = 25,576



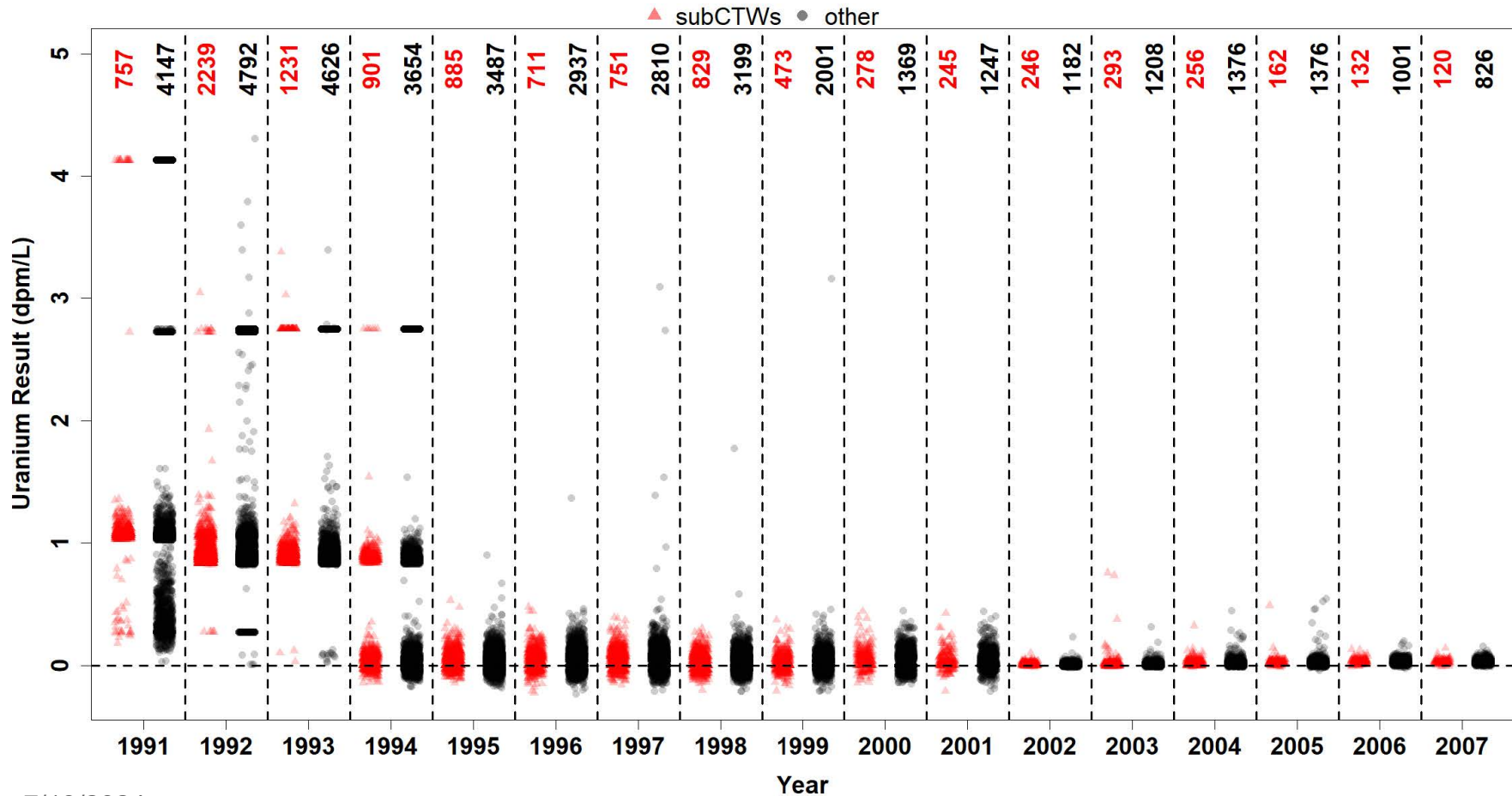
NIOSH Scatterplot of Cm-244 Results, N = 23,868



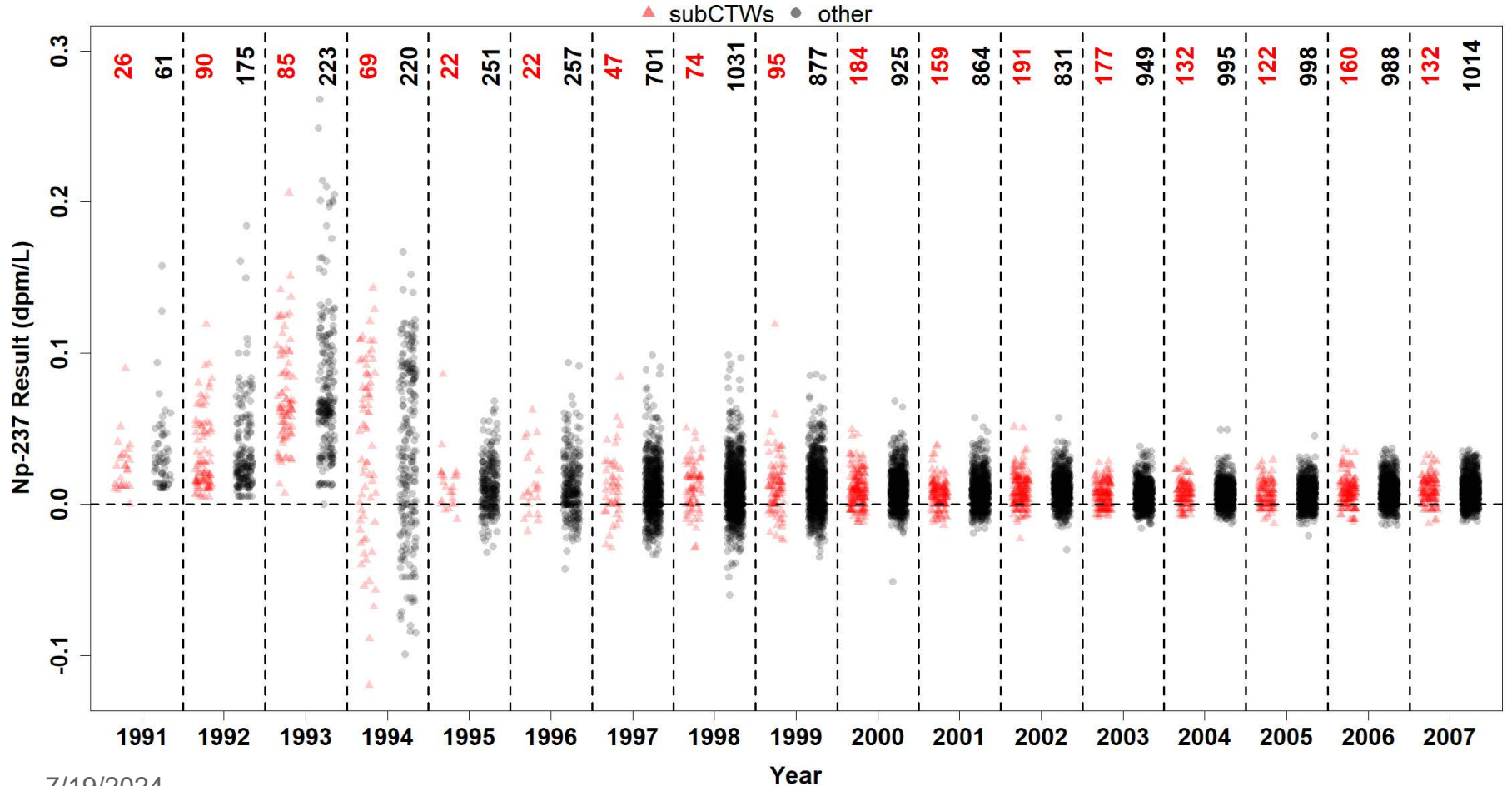
NIOSH Scatterplot of Cf-252 Results, N = 23,839



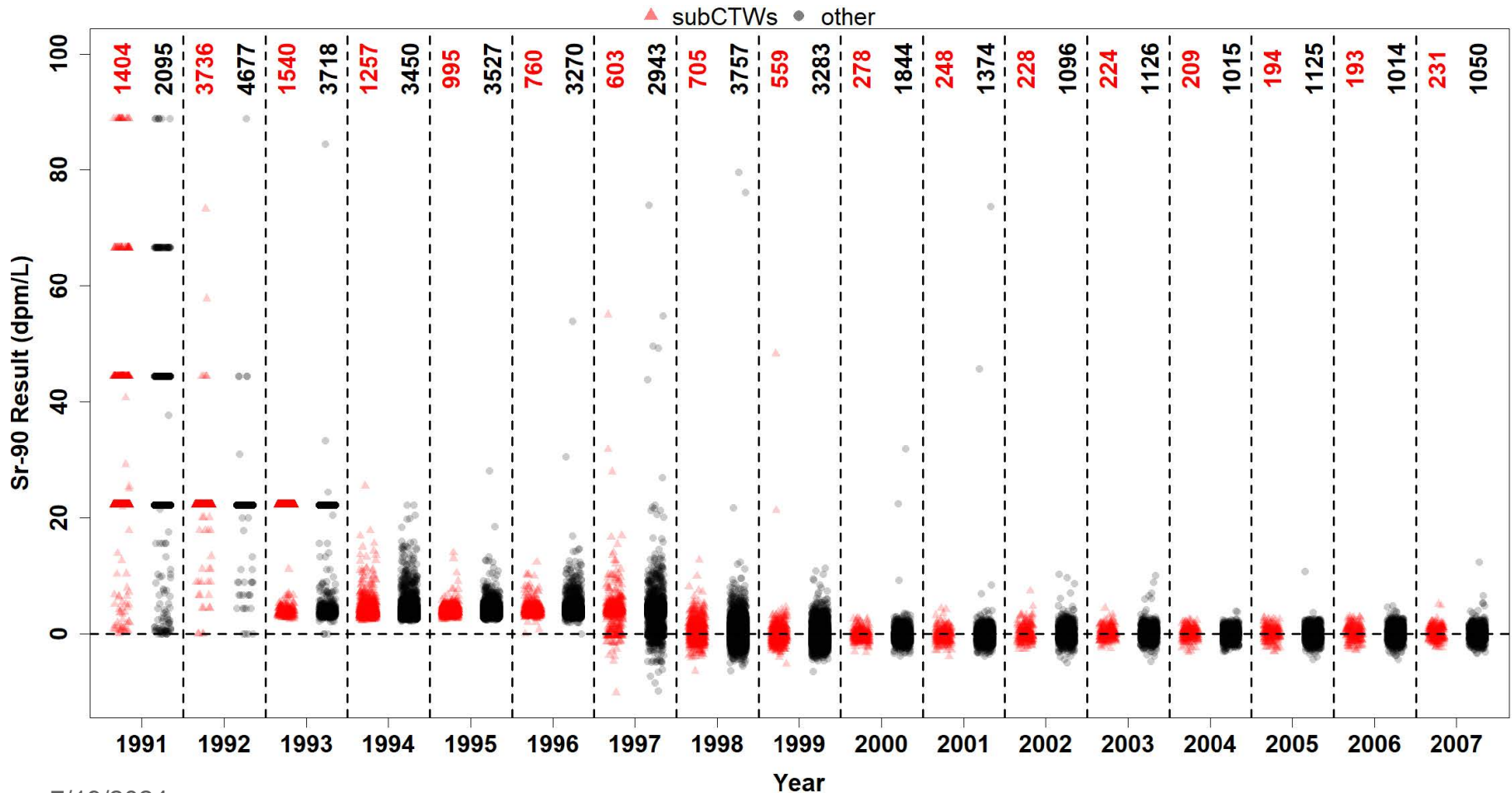
NIOSH Scatterplot of Uranium Results, N = 51,747



NIOSH Scatterplot of Np-237 Results, N = 13,147



NIOSH Scatterplot of Sr-90 Results, N = 53,728



Conclusions

- Subcontractor CTW annual dosimetry results and bioassay samples do not tend to be higher than the other workers at SRS from 1991 – 2007.
 - External Deep Dose
 - Americium
 - Neptunium
 - Tritium
 - Curium
 - Strontium
 - Pu-238
 - Californium
 - Pu-239
 - Uranium
- No evidence was found in the data that subCTWs were among the most highly exposed workers at SRS.
- The same conclusion can be made using SC&A definition for subCTWs.
- It is not necessary to conduct TWOPOS or Multiple Imputation analyses.

Questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.