



Summary of NIOSH Presentations during the September 2024 SRS Work Group Meeting

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Overview

- Intent of ORAUT-RPRT-0092
- Purpose of Job-Specific Sampling during the 1990s
- SRS Self-Assessments of Job-Specific Bioassays in 1997
- Purpose and Use of the TRACK Database
- Comparison of subCTWs to other workers
- Conclusions

Intent of RPRT-0092

Evaluation of Bioassay Data for Subcontracted Construction Trade Workers at the Savannah River Site

Intent of ORAUT-RRPT-0092

- The original intent of RPRT-0092 was to determine *representativeness*. (Did unmonitored workers work in the same environment as monitored workers?)
 - RPRT-0092 demonstrated that subCTWs worked alongside monitored subCTWs. Supported by Radiation Work Permits coupled with bioassay data
 - Unmonitored workers were represented by monitored workers.
 - NIOSH concluded there is sufficient data to reconstruct doses using a co-exposure model.

Purpose of Job-Specific Sampling during the 1990s

Purpose of Job-Specific Bioassay Sampling (1/2)

- “Document” SRDB 167757: Corrective Action Report (CAR) 97-CAR-07-001 (U) PDF p.15
 - *“The purpose of the job-specific bioassay sampling program is to collect bioassay samples from workers whose routine bioassay program does not include some or all of the radionuclides present at the work site or who are not on a routine program. For example, a mechanic who may be routinely sampled for plutonium and enriched uranium may be assigned to work on a neptunium system. A job-specific bioassay sample for neptunium would be required to be submitted at the end of the task.”*
- Therefore a “non-routine” sample in this context, is a “job-specific” sample. These samples were used to supplement the routine requirements.

Purpose of Job-Specific Bioassay Sampling (2/2)

- “Document” SRDB 167757: Corrective Action Report (CAR) 97-CAR-07-001 (U) p. 32
 - *“Job-specific sampling has been implemented because currently there is not a way of modifying the prospective bioassay program and RQB [radiological qualification badge] in the field. **A worker must come to the IVC [in vivo counting] Facility to have the bioassay program and RQB modified. This is an inefficient use of time and thus the current job-specific sampling program was created.**”*
 - *“A routine bioassay program can be established after the fact based on where the individual actually worked and what he/she actually did. This is referred to as retrospective scheduling.”*

Prospective vs. Retrospective Sampling (1991 – 1997)

- Prospective Sampling (“routine”)



Work area
known in
advance



RQB



Work
Performed
normal ops



ROUTINE
bioassay



95%

- Retrospective Sampling (“non-routine”)

Not on
RQB



Work
Performed
normal ops



JOB-SPECIFIC
bioassay



5%

RQB = Radiological Qualification Badge

SRS Self-Assessments of Job-Specific Bioassays in 1997

1997 Q2 SRS Self-Assessment of Job-Specific Bioassay Program

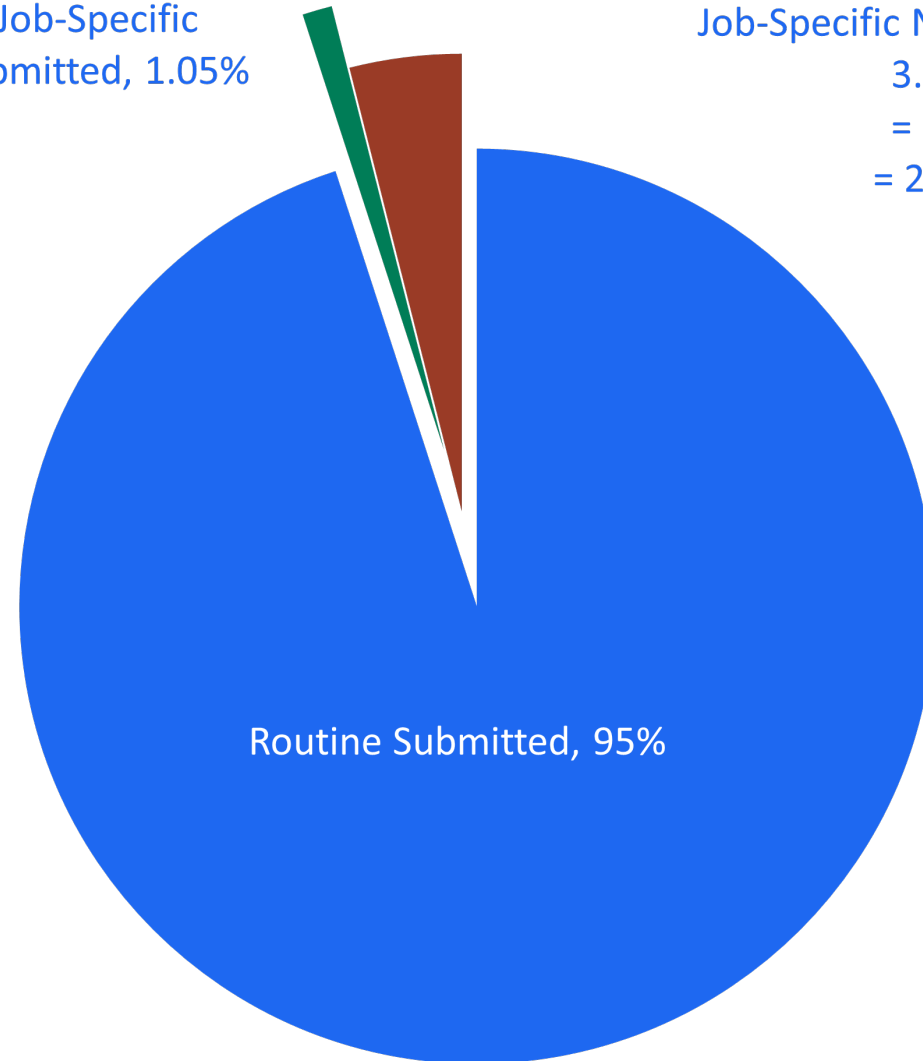
Job-Specific Submitted, 1.05%

Job-Specific Not Submitted, 3.95%

3.95%/5.0%

= 79% value

= 256 workers



Each section contains:

1. subCTWs,
2. CTWs,
3. Others.

Total Submitted = 96.05%
Total Not Submitted = 3.95%

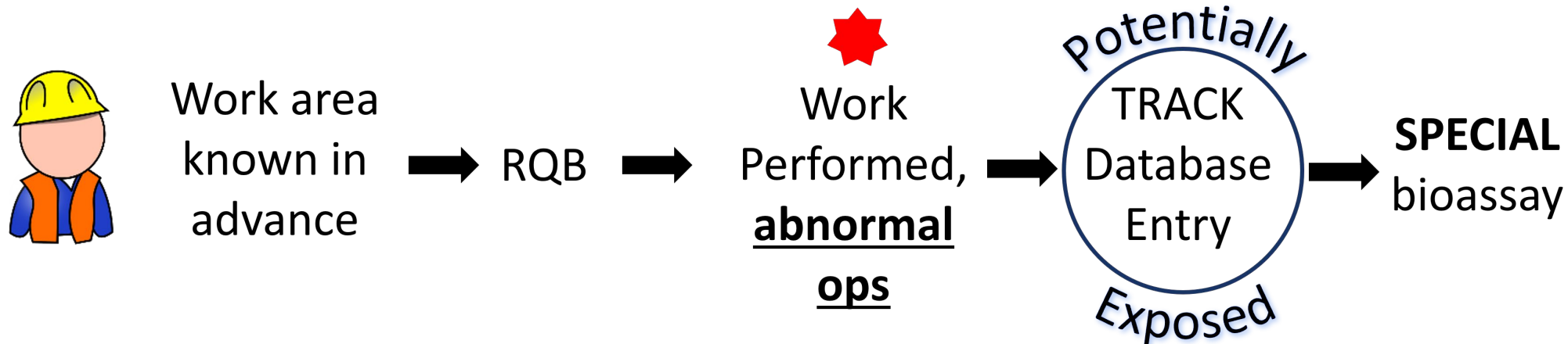
Full Calendar Year Assessment 1997

- Approximately 10,889 samples were requested in 1997. [SRDB 167851]
- By the end of 1997, WSRC had compared all 1997 RWPs and sign-in sheets to the bioassay laboratory sample database and determined that 256 individuals did not comply with job-specific bioassay requirements. WSRC subsequently directed those individuals still employed at the Site to submit bioassay samples. [SRDB 196226]
- None of these workers had an identifiable uptake of radioactive material. [SRDB 167497]

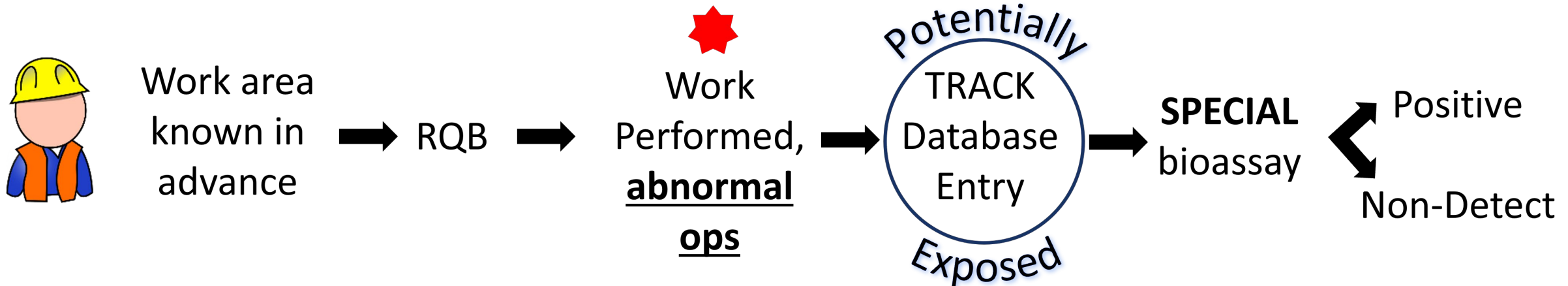
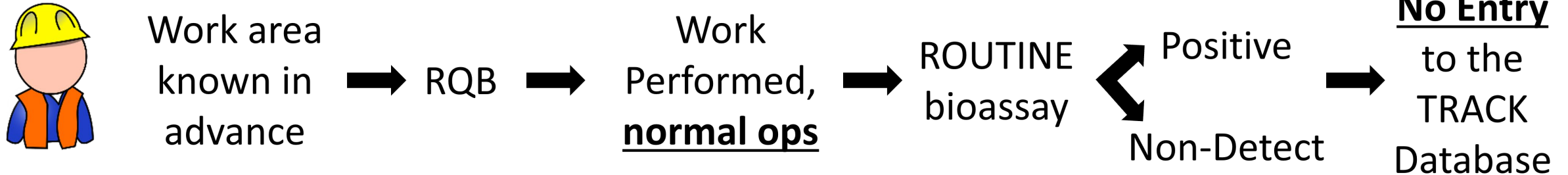
Purpose and Use of the TRACK Database

Purpose of the TRACK Database

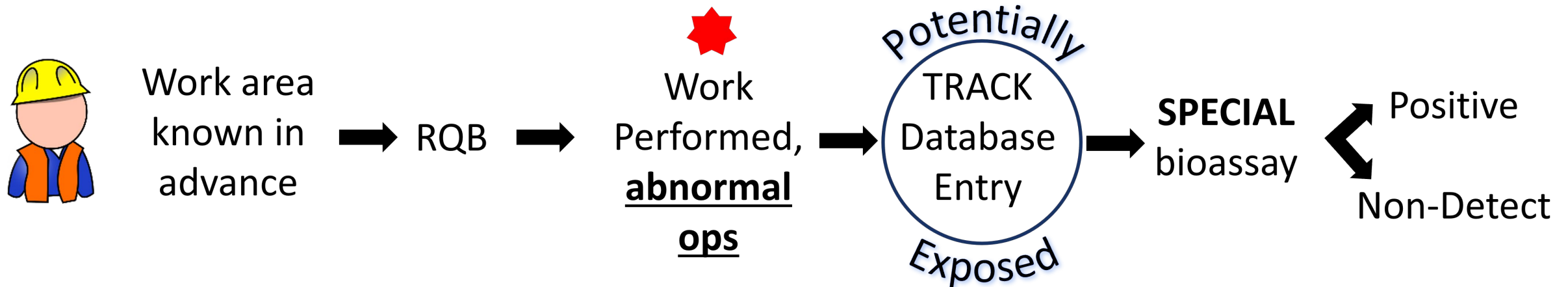
- The TRACK database was created to track samples related to an abnormal situation that may cause a **potential uptake** (e.g., special samples).
 - Includes any incidents that warrant a **special** sample
 - Contains workers with the highest **potential** for exposure
- **Prospective Sampling**



What data are included in the TRACK Database?



Workers with the highest potential for exposure



- Workers who experienced some abnormal operation during the work shift that called for a special bioassay sample are ***potentially*** exposed.
- Workers with ***positive bioassay results*** (e.g., routine, job-specific, or specials) represent the ***highest exposed*** workforce.

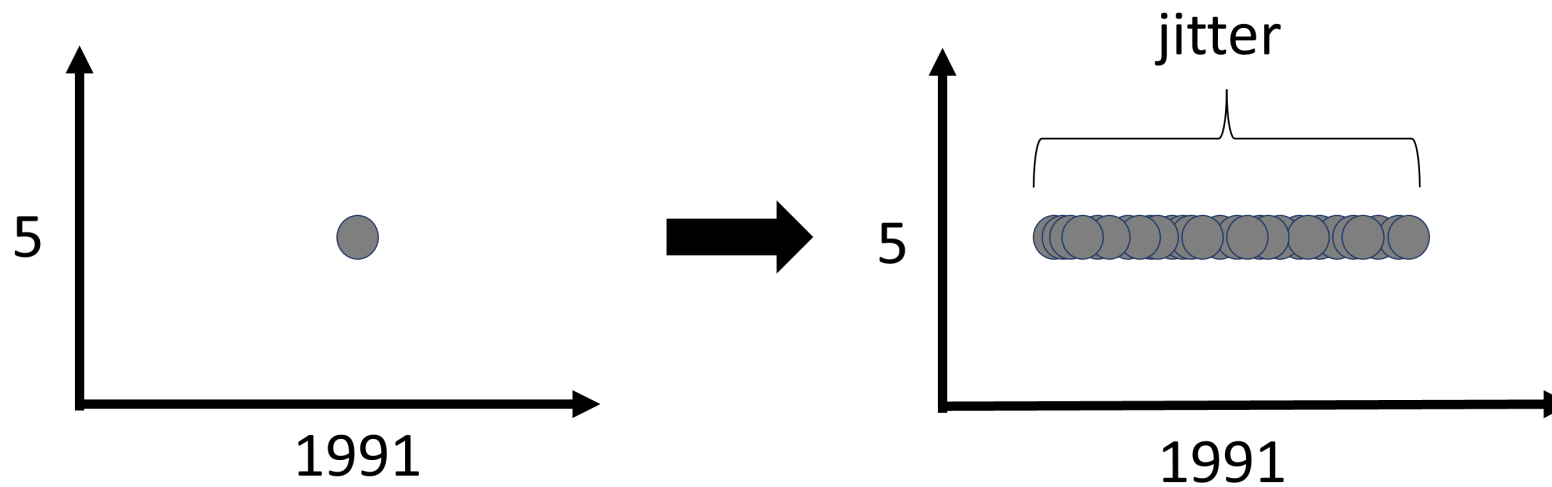
Comparison of subCTWs to other workers

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.

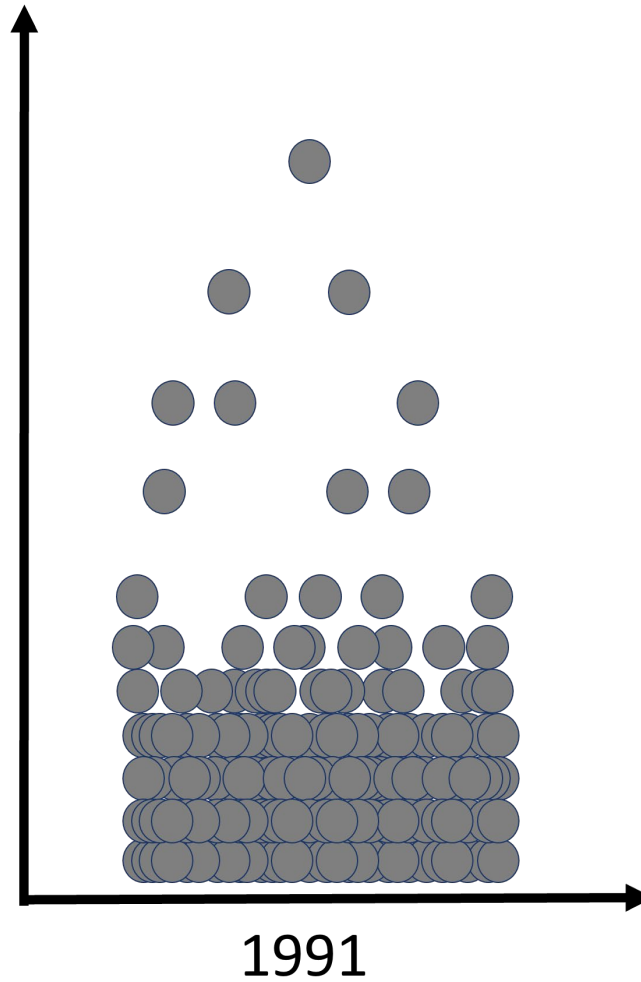
Scatterplot with jitter example (1 / 3)

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

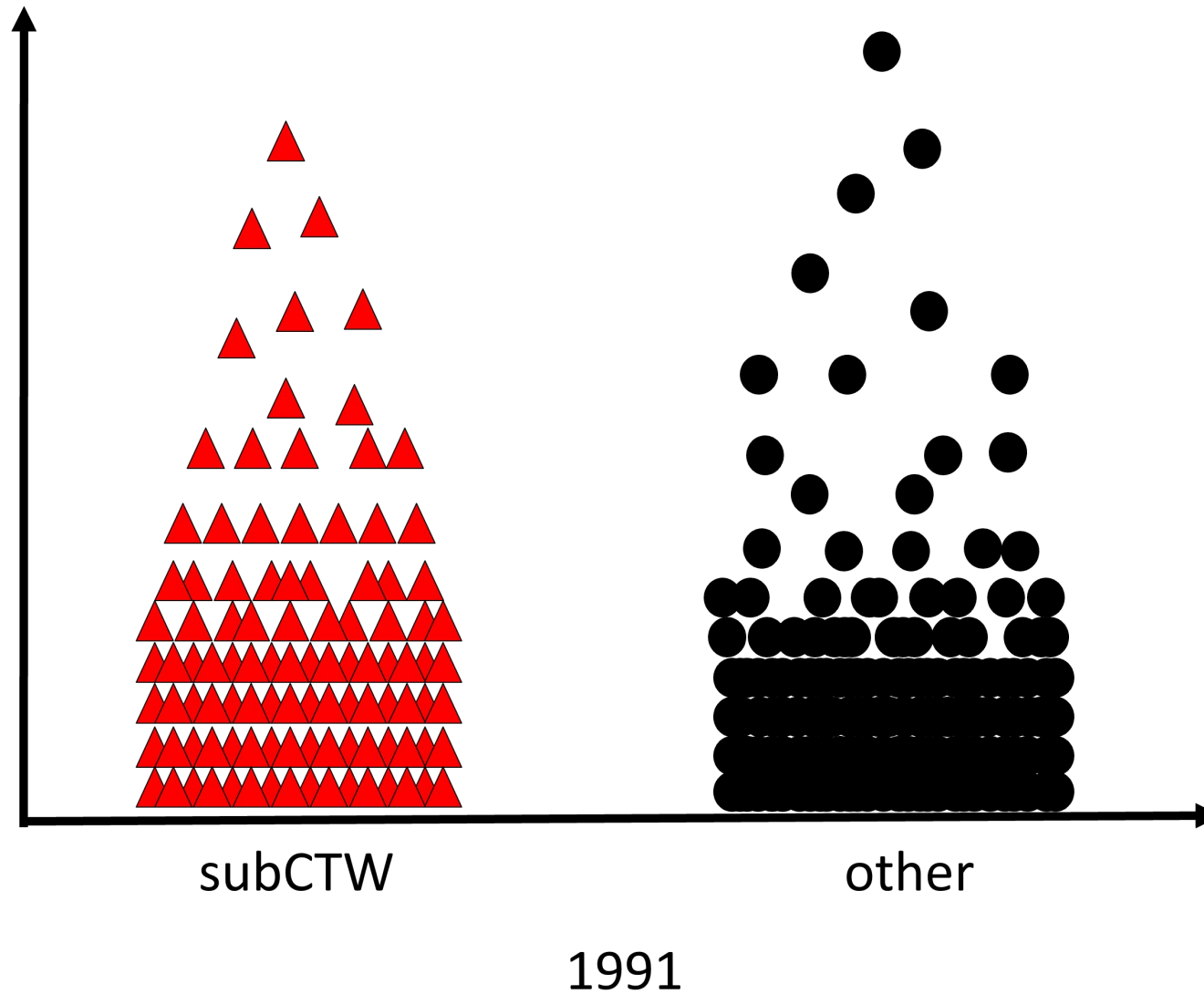


Scatterplot with jitter example (2/3)

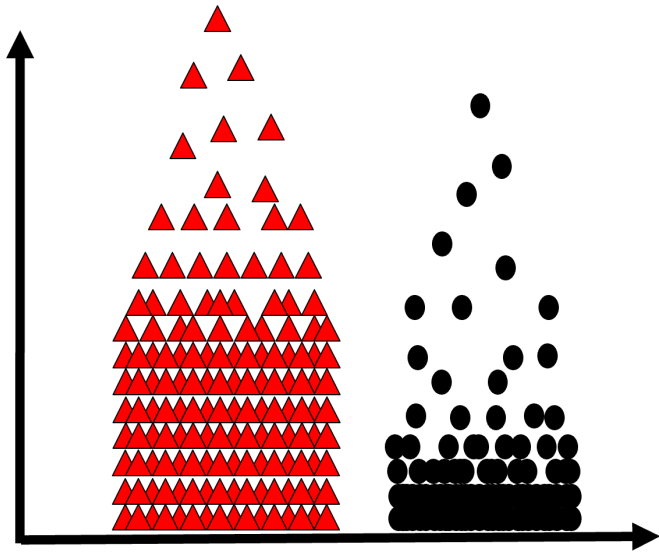
N = 5,000 for 1991



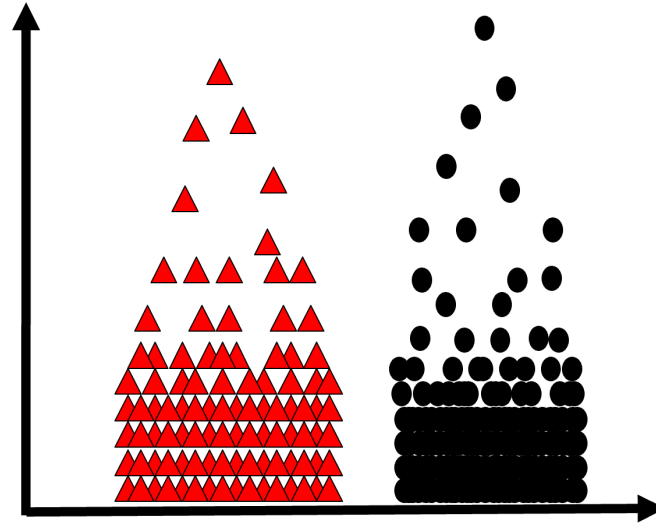
Scatterplot with jitter example (3/3)



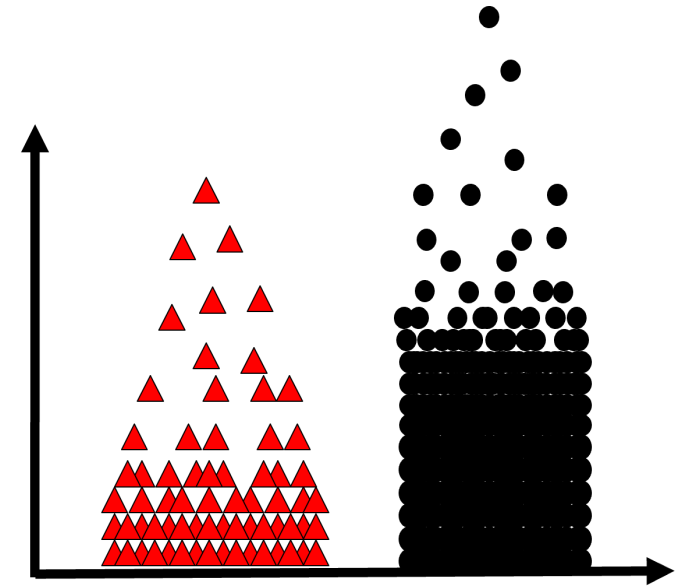
Scatterplot interpretations



subCTWs tend to be HIGHER exposed

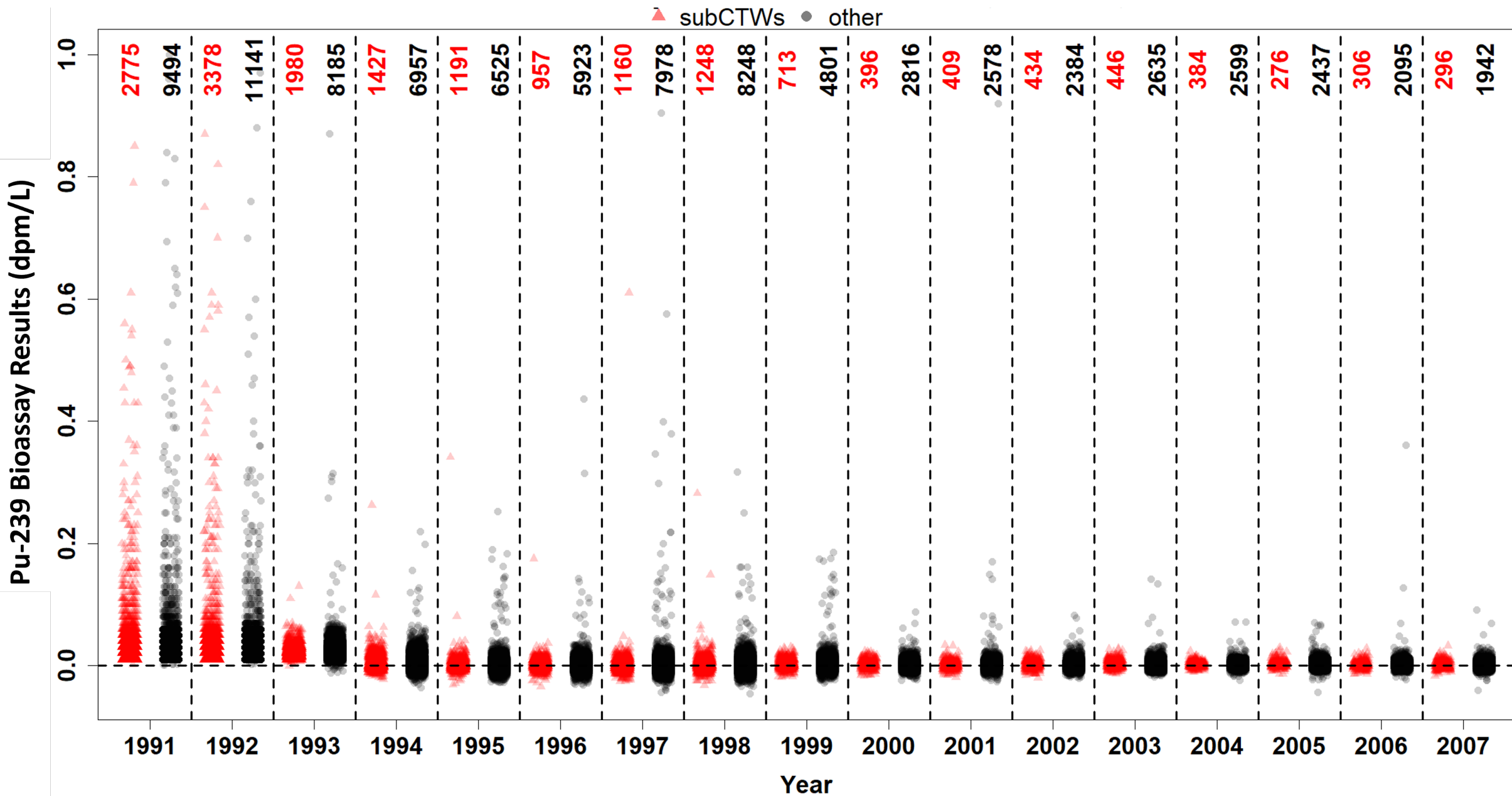


No difference
between groups



subCTWs tend to be LOWER exposed

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



Concluding Slides

Conclusions (1/4)

- RPRT-0092 demonstrated that unmonitored workers worked alongside monitored workers meeting the original intent to determine *representativeness*. A key criteria necessary to develop co-exposure models.
- Job-specific samples served the same purpose as routine samples and were implemented as part of routine bioassay sampling program. This has been corroborated in
 - SRS communications,
 - SRS procedures (confusing language clarified in 1997), and
 - Interviews with former SRS Subject Matter Experts.

Conclusions (2/4)

- Unreturned job-specific samples from 1997 represented a very small percentage of the overall bioassay samples requested. All 256 workers with unreturned job-specific bioassays were followed-up on and none had positive results.
- The purpose of the TRACK analysis was to determine whether special samples included in the TRACK database were included in the co-exposure files. The NIOSH analysis concluded that 97% of TRACK entries have a corresponding entry in the co-exposure dataset.

Conclusions (3/4)

- 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
 - Tritium
 - Pu-238
 - Pu-239
 - Americium
 - Curium
 - Californium
 - Uranium
 - Neptunium
 - Strontium
- 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.

Conclusions (4/4)

- The 1998 DOE Notice of Violation does not impact NIOSH's ability to reconstruct doses to any workers (including subCTWs) who participated in the job-specific bioassay program from 1991 to 1998.

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.