

<p>ORAU Team Dose Reconstruction Project for NIOSH</p> <p>Technical Information Bulletin: Savannah River Site Tritium Dose Assignment</p>	<p>Document Number: ORAUT-OTIB-0003 Effective Date: 10/03/2003 Revision No.:00 Controlled Copy No.: _____ Page 1 of 6</p>
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RECORD OF ISSUE/REVISIONS

ISSUE AUTHORIZATION DATE	EFFECTIVE DATE	REV. NO.	DESCRIPTION
Draft	09/23/2003	00-A	New document to provide guidance on the assignment of tritium dose for dose reconstructions at the Savannah River Site. Initiated by Fred Duncan.
10/03/2003	10/03/2003	00	Approved Issue of Revision 00. Initiated by Fred Duncan.

PURPOSE

This Technical Information Bulletin provides guidance on the assignment of tritium or H-3 dose for dose reconstructions at the Savannah River Site (SRS), and is based on information provided in the Technical Basis Document for the Savannah River Site to be used for EEOICPA Dose Reconstructions, ORAUT-TKBS-0003 Rev. 01.

1.0 **BACKGROUND**

At the SRS, the whole body dose equivalent for tritium was evaluated from urinary excretion of tritiated water and was typically added to the whole body dose equivalent from external sources. As discussed in ORAUT-TKBS-0003 Rev. 01, the minimum detectable activities (MDA) and reporting levels for tritium have decreased several times since start-up in 1953. The MDA was initially 1 $\mu\text{Ci/L}$, and has decreased over time to the current level of 0.02 $\mu\text{Ci/L}$. Similarly the reporting level has dropped from 1 $\mu\text{Ci/L}$ to 0.1 $\mu\text{Ci/L}$ (ORAUT 2003). Additional guidance on assignment of tritium dose was needed to address the changing MDAs and reporting levels, along with the specific information recorded in radiological records for each case.

3.0 **GUIDANCE**

Flowcharts that provide the logic for the assignment of tritium dose are presented in Figures 1 and 2. These apply to dose reconstructions at the SRS for the periods of 1953 through 1983, and 1984 to the present, respectively. Decision criteria are provided to identify when it is appropriate to: use tritium doses as recorded in individual case records; assign tritium doses based on the potential missed dose (NIOSH 2002); or to evaluate the dose using recorded tritium bioassay results and internal dosimetry models.

Figure 1. SRS H-3 Dose Assignment Logic

1953-1983

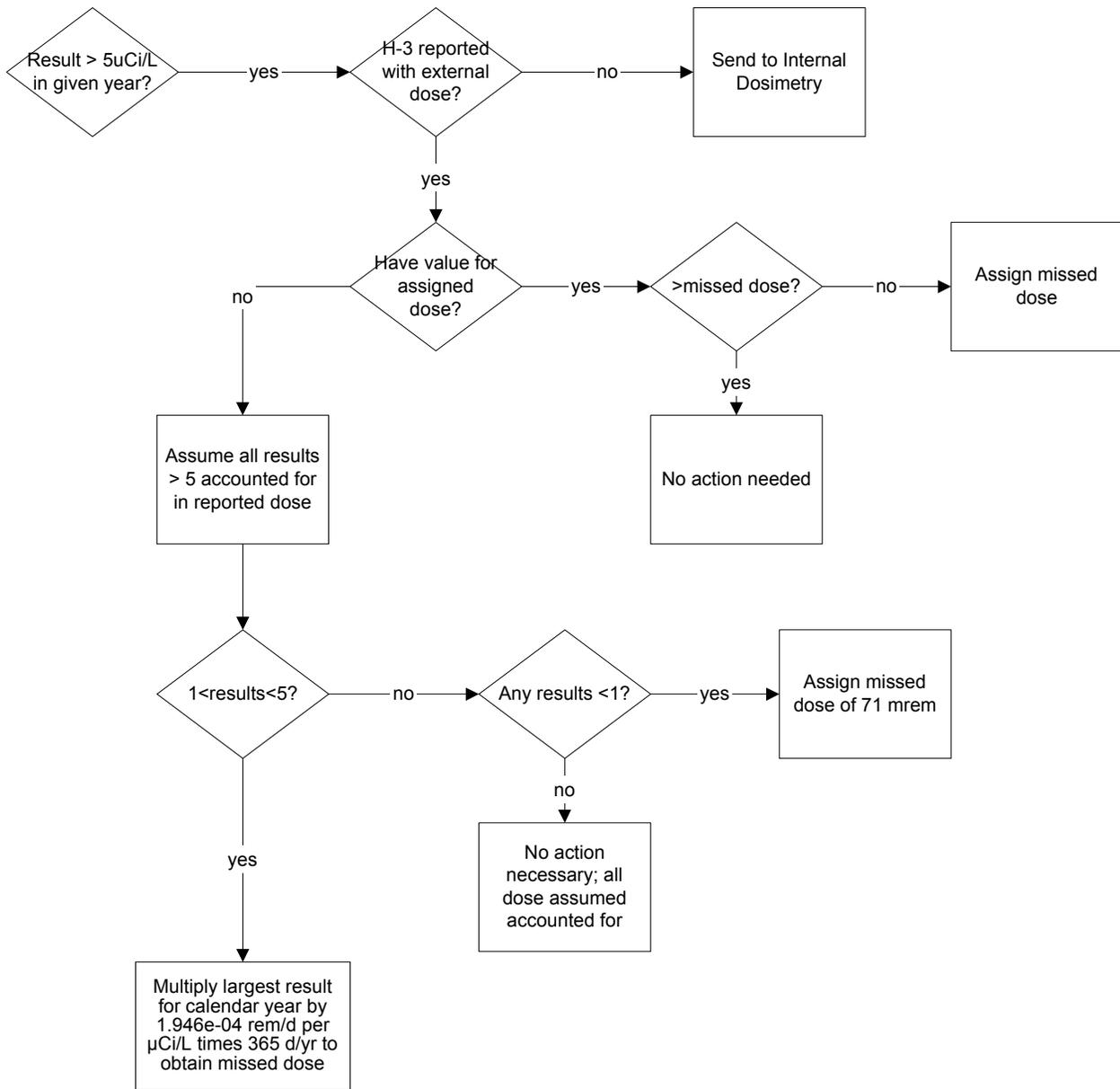
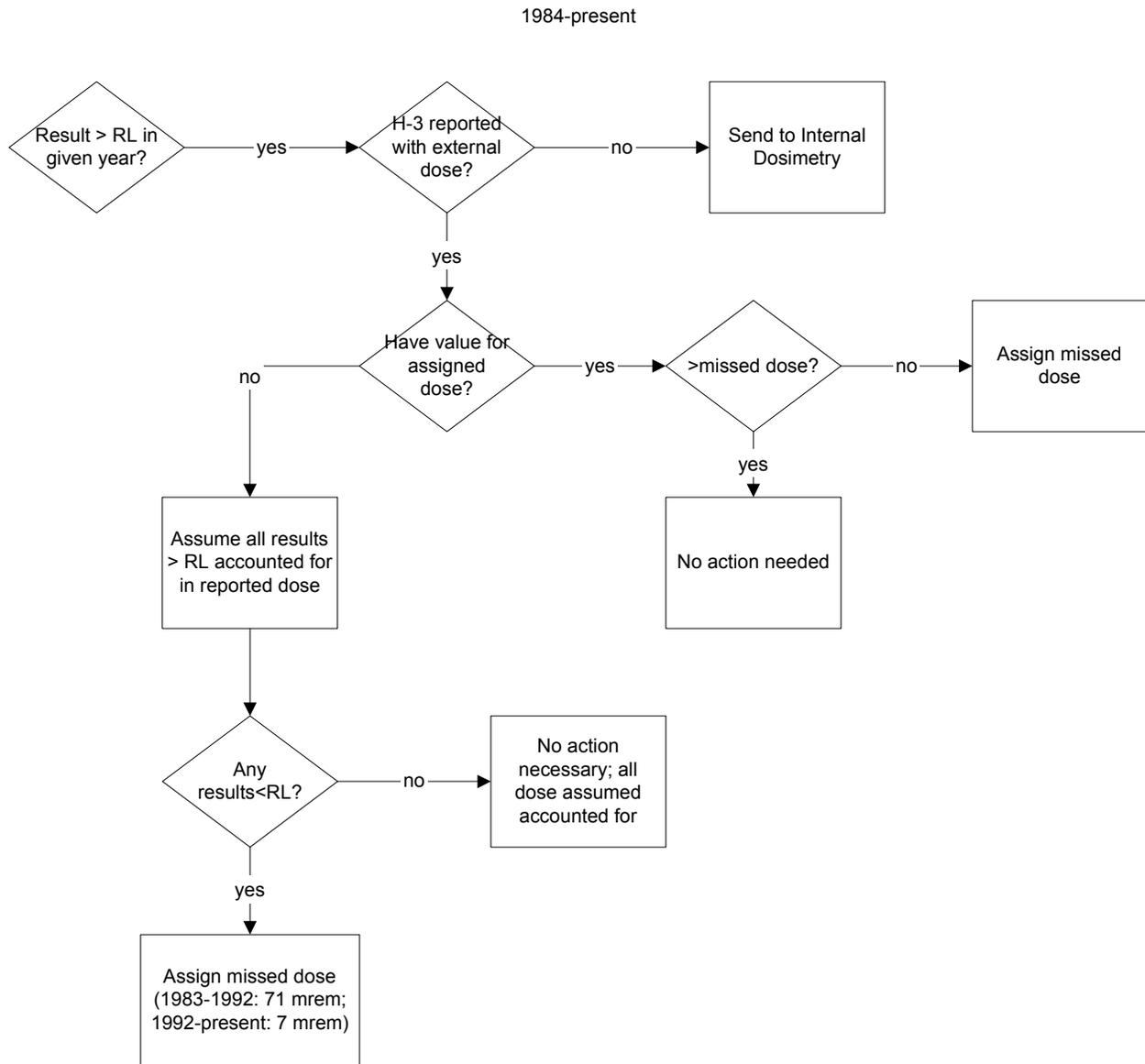


Figure 2. SRS H-3 Dose Assignment Logic



4.0 **DISCUSSION**

4.1 SRS Dose Assignment Logic 1953-1983

For each year of covered employment at SRS during the period 1953 through 1983, tritium dose should be evaluated and assigned according to the flowchart in Figure 1. As reported in ORAUT-TKBS-0003 Rev. 01, only tritium bioassay results greater than 5 $\mu\text{Ci/L}$ were evaluated prior to computer evaluation of data. It is believed that tritium results prior to 1984 were not evaluated by computer. For results that were evaluated, it is expected that tritium dose will be listed separately in the external dosimetry record and summed with the external dose

Based on the above, the first decision criterion is whether there are tritium bioassay results greater than 5 $\mu\text{Ci/L}$ for a given year. If there are results greater than 5 $\mu\text{Ci/L}$ for a given year and external dosimetry records do not include the H-3 dose for that year, then the tritium dose needs to be evaluated and assigned by the Internal Dosimetry Group. If there are results greater than 5 $\mu\text{Ci/L}$ for a given year and a tritium dose is recorded in external dosimetry records, then the greater of the recorded dose or the missed dose is assigned for the dose reconstruction.

If it is not clear what tritium dose was assigned in the radiological record, it is assumed that any results greater than the recording level were included in the tritium dose assessment. A missed dose is assigned based on the remaining results. If all tritium results are less than 1 $\mu\text{Ci/L}$ for a given year, then the missed dose of 0.071 rem is assigned. If there are any results between 1 $\mu\text{Ci/L}$ and 5 $\mu\text{Ci/L}$ then multiply the largest result for the calendar year by $1.946\text{e-}04$ rem/day per $\mu\text{Ci/L}$ times 365 days/year to obtain the missed dose

4.2 SRS Dose Assignment Logic 1984 - Present

The flowchart for the period 1984 through the present is presented in Figure 2 and is similar to that for the preceding period; however, the first decision criterion is whether there are tritium bioassay results greater than the reporting level (instead of 5 $\mu\text{Ci/L}$) for a given year. Reporting levels are assumed to be 1 $\mu\text{Ci/L}$ for the period 1984 to 1991, and 0.1 $\mu\text{Ci/L}$ for the period 1992 to the present.

If there are results greater than the reporting level for a given year and external dosimetry records do not include the H-3 dose for that year, then the tritium dose needs to be evaluated and assigned by the Internal Dosimetry Group. If there are results greater than the reporting level for a given year and a tritium dose is recorded in external dosimetry records, then the greater of the recorded dose or the missed dose is assigned for the dose reconstruction.

If it is not clear what tritium dose was assigned in the radiological record, it is assumed that any results greater than the reporting level were included in the tritium dose assessment. A missed dose is assigned based on the remaining results. If all tritium results are less than the reporting level for a given year, then a missed dose of 0.071 rem is assigned for the period 1984 to 1991, and 0.007 rem is assigned for the period 1992 to the present.

4.3

REFERENCES

ORAUT 2003. Technical Basis Document for the Savannah River Site to be used for EEOICPA Dose Reconstructions, ORAUT-TKBS-0003 Rev. 01. August, 21, 2003. Oak Ridge Associated Universities Team, Oak Ridge, Tennessee.

NIOSH 2002. Internal Dose Reconstruction Implementation Guideline, OCAS-IG-002, Rev 0. National Institute for Occupational Safety and Health, Cincinnati, Ohio