Update: Oak Ridge National Laboratory (X-10) Work Group

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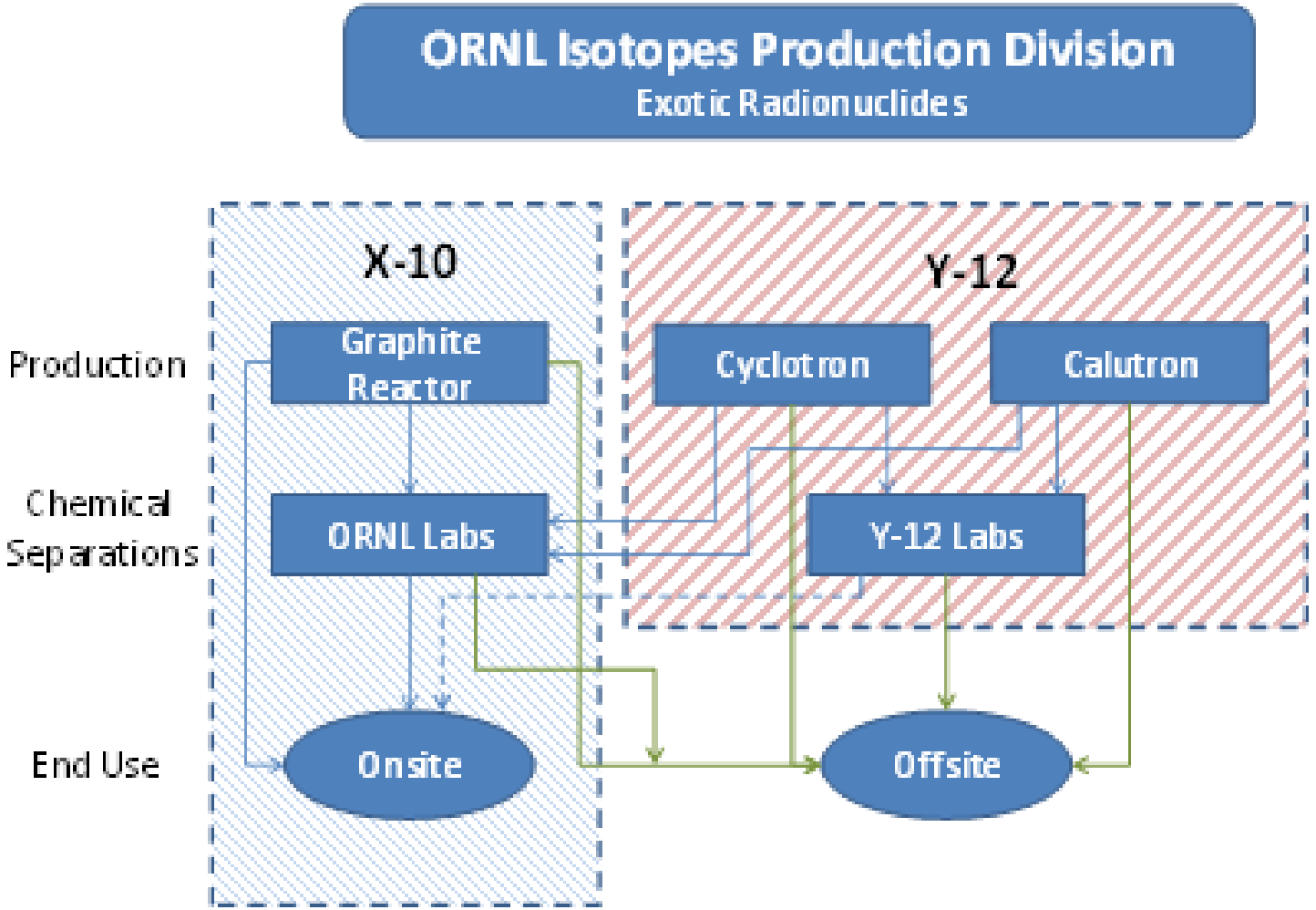
Background


ORNL Isotopes Production Division
Exotic Radionuclides
X-10
Y-12
Production
Chemical Separations
End Use
Graphite Reactor
Cyclotron
Calutron
ORNL Labs
Y-12 Labs
Onsite
Offsite

Exotic Radionuclides

- **Due to resource overlap, NIOSH decided to *Reserve* the exotic radionuclide evaluation at ORNL and combine with the Y-12 83.14 effort once SEC-00189 was completed and presented.**

- **On August 30, 2012 NIOSH/ORAUT had a kick-off meeting for this combined effort**

- **NIOSH will update the ABRWH as we progress in our evaluation**

Overview

- ORNL WG meeting June 30, 2021
- Relevant documents under discussion:
  - **ORAUT-RPRT-0090,** 3/28/2018, Assessing doses from isotope production at ORNL from 1955-1988
  - **SC&A Review of ORAUT-RPRT-0090,** 10/9/2018
  - **NIOSH Response to SC&A Review of ORAUT-RPRT-0090,** 6/3/2020
  - **SC&A Review of NIOSH Response to SC&A Review of ORAUT-RPRT-0090,** 1/8/2021
    - **7 Findings – 3 open pending NIOSH action, 4 closed**
    - **6 Observations – 2 open pending NIOSH action, 4 closed**

Finding 1: Scope of ORAUT-RPRT-0090 needs to be clearly defined

- NIOSH clarified that only activities of ORNL Isotope Division were the scope of the report
  - Question involved other activities such as waste management, construction, and maintenance
- SC&A accepts this clarification
- WG accepts SC&A's recommendation to close the finding.
- **Finding 1 closed**

Finding 2: Incomplete radionuclide and radioisotope facility inventory

- SC&A found several radionuclides missing from Table 7-2 (a listing of radionuclides considered in the report)
- NIOSH response: Discrepancy is due to focus of document on being on radioisotope production only. NIOSH will explain in next revision of RPRT-0090
- SC&A accepts this clarification
- WG accepts SC&A's recommendation to close the finding
- **Finding 2 closed**

Finding 3: In vitro bioassay methods lack information about actual implementation

- Bioassay methods in ORAUT-RPRT-0090 do not discuss actual implementation of methods as required by DCAS-IG-006
- DCAS IG-006 was issued after ORAUT-RPRT-0090
- WG agrees that finding should remain open pending NIOSH action
- **<u>NIOSH action item:</u> develop co-exposure model for exotic radionuclides and update language in ORAUT-RPRT-0090 related to "feasibility"**
- **Finding 3 open**

Finding 4: Feasibility of monitoring 28 radionuclides not adequately addressed

- The approach presented in ORAUT-RPRT-0090 for the 28 radionuclides in Table 7-6 is not sufficiently detailed
- NIOSH responded that the approach used is the source term approach -- an accepted procedure for bounding dose
- WG agrees that ORAUT-RPRT-0090 needs to be updated with more suitable wording (remove language regarding “insignificant intakes”)
- **<u>NIOSH action item:</u> update ORAUT-RPRT-0090 with more detail on DR approach for the 28 listed radionuclides**
- **Finding 4 open**

Finding 5: Iodine – 1955/1956 intakes may not be bound by earlier co-exposure data

- Related to Observation 6
- Radiodine production and RaLa iodine by-product release are different processes
- SC&A finds many issues with the NIOSH iodine exposure approach for unmonitored workers
- WG agrees with SC&A that the Finding remains open pending NIOSH action
- **NIOSH action item: revise the iodine approach based on standards of IG-006 after SC&A concerns have been evaluated in detail**
- **Finding 5 open**

Finding 6: Adequacy and implementation of in vivo bioassay program not addressed

- The discussion of the implementation of the in vivo program is not sufficient in ORAUT-RPRT-0090
- SC&A agreed that this issue would be addressed under Finding 3 and could be closed here
- WG accepts SC&A's recommendation to close the finding
- **Finding 6 closed**

Finding 7: Unclear treatment of post-1988 monitoring capability during abandonment, deactivation and D&D phases

- NIOSH clarified the scope of ORAUT-RPRT-0090 to only include the production operations of the radioisotope division
- WG accepts SC&A's recommendation to close the finding
- **Finding 7 closed**

Observation 1: Inventory discrepancy between Table 7-2 and X-10 inventory spreadsheet

- NIOSH clarified discrepancy due to:
  - Additional data found in logbooks
  - Scope of document (see Finding 2)
- WG accepts SC&A's recommendation to close the observation
- **Observation 1 closed**

Observation 2: Specific alpha emitting radionuclides need to be identified for dose reconstruction

- X-10 data base does not always list the specific radionuclide needed for DR
- NIOSH clarified that the actual bioassay cards are used for DR and contain this information
- WG accepts SC&A's recommendation to close the observation
- **Observation 2 closed**

Observation 3: Trans-Plutonium radionuclides may need further analysis

- Assigning Am-241 as a default is a reasonable default assumption
- Bioassay cards with actual radionuclide are used if possible
- WG accepts SC&A's recommendation to close the observation
- **Observation 3 is closed**

Observation 4: Use of gross beta or gamma count data could result in underestimate of dose

- Use of gross count data without knowledge of the counting system (e.g., calibration and counting efficiencies, correction factors, etc.) could lead to an underestimate of dose

- Specifics of the DR approach are outside the scope of ORAUT-RPRT-0090, but will be added to revised report

- **<u>NIOSH action item:</u> Revise ORAUT-RPRT-0090 to include more DR detail**

- **Observation 4 remains open**

Observation 5: The results in Table 7-6 depend on the inventory used

- Spreadsheet used for X-10 data is incomplete (same as Observation 1)
- NIOSH will address in revision of ORAUT-RPRT-0090 and next revision of TKBS-0012-5
- WG agrees with SC&A to close this observation
- **Observation 5 closed**

Observation 6: Additional RaLa information should be provided

- Subsection of Finding 5 (iodine)
- NIOSH should analyze different exposure potentials between commercial iodine production and RaLa process
- WG agrees to discuss this at the same time as Finding 5
- **<u>NIOSH action item:</u> address issues of the iodine model as outlined in Finding 5**
- **Observation 6 is open**

Questions/Discussion