

# **Pinellas Site Profile Review**

## **Final Status Report**

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**Contractor to:**

**Advisory Board on Radiation and Worker Health  
Centers for Disease Control and Prevention**

**August 9, 2016**

# Background

- Original Pinellas technical basis documents (TBDs) prepared in the 2005–2006 timeframe.
- SC&A Site Profile review completed September 2006 – 11 primary issues and 8 secondary issues were identified.
- Subsequently, 6 Work Group (WG) meetings and 1 set of worker interviews:
  - June 11, 2008, WG meeting
  - June 11, 2009, WG meeting
  - October 13, 2011, WG meeting
  - January 24–25, 2012, Classified worker interviews – FBI building, Tampa Florida
  - November 19, 2012, WG teleconference meeting
  - February 11, 2016, WG teleconference meeting (stable metal tritide [SMT] model reviewed)
  - March 1, 2016, WG teleconference meeting (remaining issues closed out)
- 2011–2012, NIOSH made extensive revisions to their TBDs – most complete rewrites.

# Status as of March 2016 Board Meeting

- SC&A and the Pinellas Work Group agree that all of the primary and secondary issues raised in SC&A's site profile review have been adequately addressed and resolved.
- Primary Issue 2 in abeyance until NIOSH delivers a revision of the internal dose TBD.
- The Work Group recommends closure on remaining issues.

## Primary Issue 2

### Issue Description: Potential doses from insoluble metal tritides (stable metal tritides [SMTs]) not sufficiently addressed

- December 2015: Updated SMT model delivered by NIOSH (see file “dc-pinellastrit-r0.pdf” on the DCAS website).
- There were 5 key aspects of the SMT model.
- **SC&A White Paper Response (February 2016)**
  - Review contained 7 observations and 1 finding.

*(Note: Sole finding was withdrawn after NIOSH clarified that worker exposures are assigned for 2,600 hours/year.)*

# Primary Issue 2, continued

## Five Key Aspects of December 2015 SMT model:

1. **Resuspension factor:** Increased from 1E-6 to 5E-5 per meter (same as Mound).
2. **The use of the highest tritium contamination measurement (1957–1973):** Airborne contamination estimated based on highest observed value in monthly health physics reports from 1957 to 1973. *(Note: Assumed level of SMT contamination level is 1 to 2 orders of magnitude higher than the assumed values at the Mound Site.)*
3. **Technical adequacy of the method to detect tritium that is bound to particulate metal:** Contamination swipes utilize a cotton ball that was rinsed with DI water (counting liquid) and then filtered prior to measurement by liquid scintillation counting. Particulate tritium could potentially be trapped in the cotton ball and not transfer to the counting liquid.
4. **The magnitude and the extent of potential for tritide contamination at Pinellas:** SMTs only handled in areas where tritium was handled, and all tritium workers were monitored via urinalysis. Model only applied to those with tritium bioassay (i.e., coworker intakes not applied to unmonitored workers).
5. **Choice of solubility type for the metal tritides present:** Assumes all SMT intakes are Type M or Type S depending on which is favorable to the individual claimant.

## Primary Issue 2, continued

- February 2016 WG Meeting
  - Discussions focused mainly on the applicability of the sample method (NIOSH Item 3), and the documentation supporting prompt cleanup of spills and contamination that evidenced a strong health physics program (SC&A Observations 4–6).
  - SC&A and the WG concurred that the NIOSH model is sufficiently accurate and claimant favorable. **The WG accepted the SMT model and motioned to put Issue 2 into abeyance until the TBD was revised.**
  - A remaining SC&A concern pertained to the treatment of organically bound tritium (OBT). NIOSH responded that OBT behaves more like an insoluble particulate than tritiated water (HTO) and is subsumed in the SMT dose. The next TBD revision will include a discussion of how intakes of tritides, OBT, and HTO are addressed individually.

# NIOSH Occupational Internal Dose TBD Revision 3, 7/18/2016

- Sections 5.7.1.1 and 5.7.1.2 were modified to incorporate changes agreed upon by the Pinellas Plant Working Group.
- Section 5.3.1 was modified to provide more details about the tritium contamination smear collection and analysis procedures.
- Sections 5.2.1 and 5.3.1 were modified to provide additional details, which included changes to the References section.
- Section 5.2.1 was modified to provide additional details regarding organically bound tritium.
- Section 5.4.2 was modified to provide additional details regarding the analysis of the tritium bioassay samples. Incorporates formal internal and NIOSH review comments.

# SC&A Position on TBD-5 Rev. 3

- Exposures to tritium gas (HT), HTO, and OBT
  - Exposures to HT, HTO, and OBT should be assessed using the worker's urine sample data.
  - Both 100% HT and HTO doses and 100% OBT doses are assessed, and the most favorable to the claimant is assigned.
  - Potential exposures to HT and HTO should be assessed assuming that 100% of the tritium intake was attributable to HTO because HTO is the most dosimetrically significant form of tritium
  - **SC&A agrees that this is a claimant-favorable approach.**



# SC&A Position on TBD-5 Rev. 3, continued

- Exposures to HT and HTO
  - Calculations of HTO doses use worker's urine bioassay data according to ORAUT-OTIB-011.
  - SC&A initially concerned about potential for using this methodology for composite samples.
  - TBD 5 Rev. 3 explains that records of bioassay results from workers do not indicate the use of composite samples.
  - SC&A has reviewed the bioassay records indicated by NIOSH and confirmed that only individual samples from individual workers were analyzed.
  - **SC&A has no objections to the use of OTIB-011 to calculate tritium doses.**

# SC&A Position on TBD-5 Rev. 3, continued

- Exposures to OBT
  - Potential exposures to OBT assessed using IMBA assuming 100% of the tritium intake is attributable to OBT; calculated in accordance with ORAUT-OTIB-0060, Internal Dose Reconstruction.
  - Detailed guidance provided for OBT intakes and doses using IMBA to ensure claimant favorability.
  - **SC&A agrees with the method proposed by NIOSH.**

# SC&A Position on TBD-5 Rev. 3, continued

- Exposures to SMT
  - All 5 key aspects of the SMT model have been incorporated into TBD-5 Rev. 3.
  - **SC&A agrees with the method proposed by NIOSH and believes that TBD-5 Rev. 3 has faithfully incorporated the needed changes.**

# Board Member Concern Regarding Urine Bioassay Sampling Frequency

- At the March 2016 Board meeting in Tampa, Florida, a Board member questioned whether a monthly sampling frequency was adequate to detect tritium in urine, given its rapid biological clearance.
  - For acute exposures, ICRP Publication 78 (1997) provides a simple rule that limits the possible error in the estimate of intake arising from the unknown time of exposure. ICRP 130 (2015) maintains this rule.
    - For each radionuclide, the monitoring periods are selected so that any underestimation introduced by an unknown time of intake is no more than a factor of 3 when an acute intake in the middle of the monitoring interval is assumed.
    - For tritium, the ICRP recommends monitoring intervals up to 30 days.

**Questions?**