WELDON SPRING PLANT SITE PROFILE OBSERVATIONS MATRIX

Obs. No. (Doc. Obs. No.)	Observation	Resolution	Status
1 (Gen. No. 1)	**Lack of Coverage of Offsite Activities** Apparently, some work was performed by offsite contractors for the WS site, which consisted of inspection of uranium metal samples by cutting of the material and then irradiation using high-energy betatrons. This procedure could induce fission in uranium and create fission products that could emit radiation not normally encountered in a uranium facility, and expose nearby WS workers and transporters who may not have normally been badged; and it could have created inhalable radioactive material for which bioassays were not performed. This subject should be investigated and addressed in the appropriate TBDs.	Exposures occurring off site are not covered; therefore, this observation has been resolved.	*Considered resolved by WS WG 2/1/2018.*
2 (TBD-3 No. 1)	**Equation 3-1** The equation *Dom = SnDi*, is provided on page 6 of TBD-3 (ORAUT 2005c), and the individual terms in the equation are defined, except for the term "S." This may have been meant to be the Greek symbol sigma "Σ" for summing, instead of an "S."	NIOSH removed Equation 3-1 from Rev. 01, 1/30/2013.	*Considered resolved by WS WG 2/1/2018.*
3 (TBD-4 No. 1)	**Application of Environmental Doses** Section 4.1.2 of TBD-4 (ORAUT 2005d, page 6) states the following: *The term occupational environmental dose refers to the radiation dose received in the course of work duties outside plant buildings, but on the WSCP site. This TBD considers internal and external exposures to radionuclides in the outdoor environment separately in calculating this dose. Dose reconstructors can use estimated occupational environmental dose to develop a reliable individual dose when a worker was not monitored adequately.* However, this statement should be qualified to apply only to workers that were **not** routinely exposed and would not be considered a radiation worker by today's standards. If the worker would be considered a radiation worker by today's standard, then the dose reconstruction should be based on coworker dose data, not environmental dose data.	TBD-4, Rev. 01 of 5/17/2013, Section 4.1.1, page 8, provides correct wording.	*Considered resolved by WS WG 2/1/2018.*

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4 (TBD-4 No. 2)	**Special Uranium Curie** The equation for the special uranium curie is correct on page 31 of TBD-5 (ORAUT 2005e), and on page 14 of TBD-4 (ORAUT 2005d), where it is stated that "The original data are reported in dps from units of special uranium microcuries, defined as the sum of 3.7×10^4 dps from ^{238}U, 3.7×10^4 dps from ^{234}U, and 9×10^2 dps from ^{235}U." However, it goes on to state, "Converting to units of Bq, the special uranium µCi is multiplied by 3.7×10^4 Bq/µCi **and by a factor of 2.024** to report total uranium activity" (emphasis added). The factor of **3.7×10^4 Bq/µCi** is correct, but the factor of 2.024 should be omitted, because the special uranium **µCi** already includes the 2.024 factor [which consists of the sum of (3.7×10^4 dps from ^{238}U, 3.7×10^4 dps from ^{234}U, and 9×10^2 ^{235}U)/(3.7×10^4 dps from ^{238}U) = 2.024].	SC&A has analyzed this issue, and the associated wording, and agrees with NIOSH and finds the observation resolved.	*Considered resolved by WS WG 2/1/2018.*
5 (TBD-4 No. 3)	**Corrections to Text of TBD-4** • The equation on page 5 should read, "WL Working Level = 1.3 × 105 MeV of alpha energy in 1 liter of air;" not "105 MeV." • The equation on page 5 should read, "WLM Working Level Month = Exposure from 1 WL of radon daughters for 170 working hours;" not "…or radon…"	TBD-4, Rev. 01 of 5/17/2013, corrected this wording.	*Considered resolved by WS WG 2/1/2018.*
6 (TBD-5 No. 1)	**Years of Thorium Use** Table 5-2 (ORAUT 2005e, page 10) lists the starting date for potential Th-232 exposure as 1963, 1965, and 1966 depending on the building. This should be verified, as it would seem that WS would have processed thorium fairly uniformly throughout the different buildings, at least on a yearly basis.	Thorium exposures have been addressed in the site profile findings.	*Considered resolved by WS WG 2/1/2018*

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7 (TBD-5 No. 2)	**Changes in Text of TBD-5** a) The second paragraph on page 12 appears to be out of place in this location; it may be more applicable to the contents of page 9. b) The last paragraph on page 12 contains an incorrect table and document reference; it should read, "Table **2-7** in ORAU (**2005b**) gives the annual (fiscal year) mass receipts of each of these feed materials;" not "Table **2-4** in ORAU (**2005a**)…" c) The second paragraph on page 36 states that "Under these assumptions, the claimant-favorable assumption results in an annual exposure of **735 MAC-hr** (in comparison to 1,050 MAC-hr for Fernald)…" when actually it is **1,050 MAC-hr** for the WS site, based on the definition of the MAC for the WS facility. Considering that the MAC for the WS facility was set at 70 dpm/m3 compared to 100 dpm/m3 for the Fernald facility, it would be **equivalent** to 735 MAC-hr as defined for the Fernald facility.	a) Does not affect dose reconstruction. b) Correct text on page 13 of Rev. 02, 5/21/2013, of TBD-5. c) TBD-5, Rev. 02 of 5/21/2013, Section 5.6.1.2, page 40, uses a different methodology. This observation is no longer applicable.	*a), b), and c) considered resolved by WS WG 2/1/2018.*
8 TBD-6 (No. 1)	**Changes in Text of TBD-6** a) Table 6-6, page 15, contains "?" where the gamma symbol should be, which causes some confusion while reading the contents of the table. b) In Table 6-6, page 15, under the **Report** column, the text in the first and second row both refer to "Figures A-1 – A-6;" however, they describe different contents. Apparently, each one of them should refer to only a few of the Figures, not all six of them.	a) TBD-6, Rev. 01 of 2/6/2013, Table 6-5, page 16, provides correct wording. b) Issue does not affect dose reconstruction.	*a) and b) considered resolved by WS WG 2/1/2018.*

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9 (TBD-6 No. 2)	**Missing Data in TBD-6** a) Table 6-2 (*Summary of historical recorded dose practices*) on page 12 is not complete, in that it does not contain any information (has blank spaces) for the time periods other than 1958–1966. No *Dosimeter measured quantities* or *Compliance dose quantities* are provided for 1957, or the periods when EU and RU (*Plant operations period Special case for enriched uranium*) were processed, or 1967–1984 (*Maintenance period*), or for Landauer. This information is important during dose reconstruction to correctly interpret the recorded data and to determine if adequate data exist to assign accurate doses, especially for beta doses, which were prevalent at the WS site. b) For the period 1957–1969, Table 6-14 (page 25) provides data for potentially missed gamma dose during 1957–1958 and 1959–1969; however, Table 6-16 only provides beta missed dose data for 1957–1966 (does not include 1967, 1968, and 1969).	a) Issue does not affect dose reconstruction. b) The missed dose for a given year can be determined by using the LOD of 50 mR gamma and 80 mrep beta as provided on page 24 and the appropriate exchange frequency. The tables are for convenience and do not affect dose reconstruction	*a) and b) considered resolved by WS WG 2/1/2018.*

EU = enriched uranium; LOD = limit of detection; MAC = maximum allowable concentration; RU = recycled uranium; TBD = technical basis document; WG = Work Group; WS = Weldon Spring