Simonds Saw and Steel Site Profile Review Issues Matrix

SC&A Finding # (reference pages in TBD review)	**Summary of SC&A Finding (6/13/2012)**	**Draft NIOSH Response (2/1/2013)**	**Actions to be Taken**
Finding 1 (pp. 24–26)	The TBD would benefit from a more substantive discussion and justification of its proposed external dose model in light of the limited film badge data available. If the film badge data are extrapolated to a full year of uranium rolling, then the proposed external model would underestimate doses for 6 of the 20 badged workers. The current external dose model utilizes a combination of MCNP modeling, surrogate data from Aliquipa Forge, and a single general area measurement taken by the AEC.	SC&A compared total dose—beta plus gamma—of extrapolated film badge results with the total dose recommended in the TBD, which would be applicable for dose to the skin. NIOSH has done additional evaluation according to radiation type. With the exception of a beta dose outlier, the extrapolated film badge data is in general agreement with the TBD, given the applied uncertainties. NIOSH believes the values in the TBD are the preferred method over the limited film badges that are available. **SC&A Preliminary Response (2/13/13): It is SC&A's position that consideration should be given towards increasing the assigned external doses to assure the bounding nature of the model unless there is evidence to suggest the limited film badge data available are not representative of the exposure potential to workers at Simonds.**	

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Finding 2 (pp. 27–37)	Simonds Saw and Steel had well documented changes in industrial hygiene controls during its operational controls. Various dust control measures were steadily implemented during the early years of operation which markedly reduced worker exposures as evidenced by the changing Daily Weighted Exposure studies. These industrial controls were later removed or rendered ineffective in the later years of operation. The TBD would benefit from a more substantive and analytical discussion to demonstrate that the proposed intakes accurately reflect and bound the varying exposure potential at Simonds.	The TBD has summary discussions on operations and practices, and an extensive evaluation of daily weighted exposure studies for[m] air sampling. More has been provided in the SEC Evaluation Report and in the SC&A review. For the next TBD revision, NIOSH will consider an additional paragraph(s) to better explain the significance of the air sampling results and why urine data was used to assess intakes. However, additional evaluation of the air sampling data is not necessary for the TBD, given the urine measurements are the preferred data source for assessing intakes. **SC&A Preliminary Response (2/13/13): SC&A agrees that urinalysis measurements are the preferred method for evaluating internal exposures. However, SC&A feels that the application of urinalysis data in a "one size fits all" model should be analytically discussed in the context of the significantly different exposure potential among different job types (as evidenced by the DWE data) to assure that assigned intakes are bounding to ALL worker types at Simonds.**	

SC&A Finding # (reference pages in TBD review)	Summary of SC&A Finding (6/13/2012)	Draft NIOSH Response (2/1/2013)	Actions to be Taken
Finding 3 (pp. 37–39)	Urinalysis sampling at Simonds was generally conducted just before and right after a rolling operation (usually two weeks in duration). It is not clear how these different types of samples were interpreted when developing the proposed intakes. It may be beneficial to analyze these samples to individual workers and compare the proposed intakes to actual changes in urine concentrations before and after a rolling period. Furthermore, it was mentioned in the TBD and site documentation that the second shift may have had higher exposure potential due to less supervision during this shift. This issue should be more explicitly discussed and analyzed to assure that the proposed intakes are bounding to all workers at Simonds Saw and Steel.	To determine intakes, the daily geometric mean bioassay sample results from Table 5 of the TBD were weighted equally in IMBA and fit to a continuous curve over the specified periods of time that included both uranium rolling days and non-rolling days. It is believed that this method provides the most accurate means to assess intake. The AEC reports on the pre- and post-bioassay data indicate the overall post-roll bioassay results were higher than the pre-roll results (as would be expected); however, that is not the case in all instances, nor for all workers. Urinalysis data indicate[s] there were exposures from work in contaminated areas between uranium rollings that would impact "pre-roll" sample results. It is likely that significant loose uranium contamination remained and was disturbed during non-uranium rollings and maintenance activities. Housekeeping practices were not consistently applied and it is apparent there were some internal exposures between rollings. These factors support the inclusion of all sample results in the analysis. The reference to the 2nd shift is from Ref ID 4609, pg. 224. The 2nd shift statement was included in a speculative list by HASL of possible explanations for pre-roll samples being higher than the post-roll samples in August 1950. It was not a conclusion by HASL. NIOSH is continuing to evaluate records of workers on day and night shift to determine if there is a statistical difference between bioassay data for first and second shift workers. **SC&A Preliminary Response (2/13/13): SC&A agrees with NIOSH's plan to further evaluate the bioassay data used to develop intakes to assure that all assigned internal exposures are bounding for all workers at Simonds (see NIOSH Response to this Finding and Finding 4, as well as SC&A's Preliminary Response in Finding 2).**	

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SC&A Finding # (reference pages in TBD review)	**Summary of SC&A Finding (6/13/2012)**	**Draft NIOSH Response (2/1/2013)**	**Actions to be Taken**
Finding 4 (pp. 39–41)	Daily weighted exposure studies conducted at Simonds Saw and Steel show a large variation in exposure potential based on the individual job types and in some cases the position of the worker (e.g., east side roller versus west side roller). Given these large changes in exposure potential, NIOSH should demonstrate that the proposed intakes are bounding for all types of workers and associated exposure potential.	Workers who were routinely exposed to the highest levels of airborne uranium should have at least some bioassay results that can be used to provide worker-specific evaluations for claims. It is presumed that the distribution of worker intakes provides a claimant-favorable means to assess intakes for those with insufficient or no bioassay results. NIOSH is continuing to review bioassay and exposure records to assess the coworker data in the TBD (see response to Finding #3). **SC&A Preliminary Response (2/13/13): SC&A agrees with NIOSH's plan to further evaluate the bioassay data used to develop intakes to assure that all assigned internal exposures are bounding for all workers at Simonds. This may include analysis of job titles with regard to bioassay records and/or the evaluation of the availability of specific worker bioassay records for the highest exposed job titles that would preclude them from being assigned the proposed TBD intakes.**	

SC&A Finding # (reference pages in TBD review)	Summary of SC&A Finding (6/13/2012)	Draft NIOSH Response (2/1/2013)	Actions to be Taken
Finding 5 (pp. 41–43)	The TBD describes two methods for deriving intakes for Simonds which utilize the urinalysis samples and daily weighted exposures. Ultimately the TBD uses the urinalysis derived intakes which are often preferable from a data hierarchy standpoint. However, intakes derived using DWE data are higher than urinalysis intakes for certain time periods when soluble forms (Type M) of uranium are considered. The TBD would benefit from a more substantive justification for selecting the proposed intake values over the DWE derived values to assure that assigned doses are bounding to all workers.	The intakes provided in the TBD for Type S are somewhat higher than the intakes indicated by the DWE data (the TBD intakes based on bioassay data were multiplied by 2 to allow for bias). Type M intakes based on bioassay data are lower than the DWE intake data. The oxidized uranium metal at Simonds would be expected to resemble Type S more than Type M, although Type M intakes are provided in case they provide a more favorable dose. A check of doses indicates that in nearly all situations the Type S intakes in the TBD result in higher doses than the Type M intakes (for certain periods and short exposures and latencies, the Type M intakes may provide a marginally higher dose). As SC&A acknowledges, the use of bioassay data to estimate intakes is considered more accurate than the use of air sample data. It would be inconsistent to "cherry pick" one method over the other just because it could result in higher doses for some limited exposure scenarios. Regarding more TBD discussion of DWE data, see response to Finding #2. **SC&A Preliminary Response (2/13/13): SC&A acknowledges that the material at Simonds was most likely Type S and that this solubility type will be applied in most applications. SC&A also agrees that "cherry picking" a method of intake such as DWE versus bioassay on a case-by-case basis would be inconsistent and inappropriate. SC&A believes that further discussion on the appropriateness and bounding nature of the bioassay versus DWE would help buttress the claimant favorability of the proposed approach.** **SC&A further agrees and acknowledges that additional numerical analysis of the DWE data may not be warranted (as noted in NIOSH Response to Finding #2) so long as the bounding and claimant favorability of the bioassay-based intakes have been established.**	

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Finding 6 (pp. 44–45)	The TBD would benefit from a more substantive discussion of its selected external dose assignments during the residual period. This should include a more detailed description of available survey data during the 1970s and 1980s to assure claimant favorability. Also, justification should be provided as to why the work day was decreased from 10 hours (assumed during the operational period) to 8 hours (assumed during the residual period). Additionally, NIOSH should consider the methods outlined in Strom 2007 which recommend the use of a GSD of 5 when sufficient information characterizing the distribution is not available.	The GSD for residual external doses used in the TBD is based on two measured dose rates, one assumed to be the median dose rate and a bounding rate assumed for the 95th percentile rate. Although the median dose rate based on a 2,000 hour [sic] does not directly allow for overtime work, the favorable method used to determine the GSD effectively allows for higher exposures. It is believed that 2,000 hours of exposure at the median dose rate likely bounds external exposures; dose from time spent in other, lower dose rate areas are insignificant in comparison; the GSD allows for the uncertainty. However, the residual period dose rates used in the TBD are currently being reviewed by NIOSH to better address SC&A's comments concerning a more thorough discussion and to determine if any changes are needed. **SC&A Preliminary Response (2/13/13): SC&A agrees with NIOSH's plan to further research/analyze/discuss the available external dose measurements in the residual period to assure that assigned external doses are bounding to all workers at Simonds.**	

SC&A Finding # (reference pages in TBD review)	Summary of SC&A Finding (6/13/2012)	Draft NIOSH Response (2/1/2013)	Actions to be Taken
Finding 7 (pp. 45–49)	The proposed internal coworker model for the residual period appears to differ from the methodology described in ORAUT-OTIB-0070. Intake rates at the beginning of the residual period are based on the average of general air samples taken from 1948–1953 (general air samples taken in 1954 were not included). The majority of these samples were collected while the major dust control measures were in place and functioning; this would not be reflective of conditions at the end of the operational period when many of these measures had been removed or were not functioning properly. Additionally, a 2007 survey was used to develop intakes at the end of the period; however, the conditions observed in 2007 were assumed to be identical to those experienced 24 years earlier. NIOSH should consider a correction factor to account for source term degradation between 1983 and 2007.	The method used in the TBD for deriving intakes during the residual period follow[s] the method prescribed in ORAUT-TKBS-0070 Section 4.1.4, which specifies that the air concentration during the operational period and the air concentration during the residual period can be used to determine an exponential depletion rate, with the two measurements and the elapsed time between those measurements used to determine the rate. ORAUT-TKBS-0070 does not specify the method to estimate the air concentration during the operational period, and the method can vary depending on the type of data that is available. The TBD used results from 1949–1953. Air concentrations in 1948 were noticeably higher (prior to controls) and not representative of air in any of the later years. Although 1954 data was not used in the estimate, the 1954 average result is in the range of values for 1949–1953, although there are only limited 1954 data available, presumably because of infrequent uranium rolling in the later years. NIOSH believes the values in the TBD bound the air concentrations at the end of the operational period. NIOSH continues to evaluate the following issues identified by SC&A: It is not clear why the average air concentration values in the TBD differ from those estimated by SC&A. SC&A's suggestion that an additional factor be applied for depletion 1983–2007. **SC&A Preliminary Response (2/13/13): While TKBS-0070 is not specifically prescriptive on how to derive the starting and ending values used to define the residual period, the values selected for the beginning of the residual period should be representative of the conditions at the end of operations.**	

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		SC&A agrees that air concentrations in 1948 were higher than in the 1949–1953 period; however, it should be noted that in estimating internal exposures during the operational period, the TBD assumes that internal exposure potential was the same in 1948 as it was in 1953–1957, due to the absence of engineering controls (TBD Table 17). However, the TBD indicates that 1948 data were in fact used, as it cites AEC 1948c,d (visits to Simonds in October and December of 1948, respectively) in association with the residual contamination estimate. Note: General and Editorial Issue #11 below. **SC&A also disagrees that the 1954 air sample data, which would more closely resemble conditions at the end of the operational period, are sufficiently in the range of the 1949–1953 general air sample data. SC&A's compilation shows that the average for 1949–1953 is a factor of 1.6 lower than the average value for 1954. Additionally, the geometric mean value from 1949–1953 is a factor of 2.5 lower than the geometric mean value from 1954.** **SC&A agrees with NIOSH's plan to look into an additional depletion factor for the 1983–2007 timeframe and investigate potential discrepancies between the two separate general air data compilations.**	

Other General Issues and Editorial Comments

1.) Pg. 10: SC&A could not verify the start date based on the reference provided (AEC 1948a).

2.) Pg. 11: *"The process generated a considerable amount of waste, as evidenced from a 1952 Tonawanda Progress Report (AEC 1952): 'Approximately fifty drums of [uranium contaminated] scrap and oxide were received from Simonds at the completion of the January rolling.'"* SC&A could not find the provided reference based on the SRDB REF ID. SC&A found an equivalent document as REF ID 75071, but could not find mention of the 'fifty drums' therein.

3.) Pg. 11: *"Information on material processing was compiled from all available Simonds-related documents and places the total quantities of uranium and thorium processed at 11,500 tons and 114,000 pounds respectively (NIOSH 2010b). These values exceed the amounts stated in various documented historical narratives by about a factor of three."* It appears the factor of 3 only applies to the amount of thorium processed.

4.) Pg. 17: Paragraphs one and three are essentially identical.

5.) Pg. 20: *"It was assumed that operations in 1953 continued at the same level as those in 1952, although the available records indicate significant curtailment at the end of 1953."* Table 3 shows the number of rolling days in 1953 as 20% of the load in 1952—this assumption (per the text) should not be applied until January 1, 1954. The title for Table 3 should be clarified to number of uranium rolling days per year.

6.) Pg. 20: Table 4 only extends to January 1, 1957, and should be December 31, 1957.

7.) Pg. 22: *"In addition, some postrolling samples might have been collected at the rolling day's end (i.e., at the very end of rolling, not after rolling."* It is unclear what this sentence is meant to convey and should be clarified.

8.) Pg. 27: *"Several assumptions included in the dose reconstruction are likely to be overestimating assumptions, which increase the estimate of the median intakes from air concentrations."* These assumptions should be described and some idea of the quantitative effect on the dose reconstruction discussed.

9.) Pg. 32: Table 16 displays assumed contaminant ratios for Np, Pu, and Tc; however, the intakes displayed in Table 17 only show intake rates for Np and Pu.

10.) Pg. 33: Row for Np-237 instructs to use absorption Type M "if U is S." This is likely a typo and should be Type S "if U is S."

11.) Pg. 39: *"The average of general area air sample results reported during air monitoring studies conducted between 1949 and 1953 was used as an estimate of the air concentration at the start of the residual period (AEC 1948 c,d, 1949d,e,h, 1950;*

Heatherton 1950 a,b, 1951b, 1953b; Klevin 1951; Klevin and Weinstein 1953 a,b)." Sentence should likely say it used the average of general area air samples reported form **1948**–1953.

12.) Pg. 39: The text shows the intake rate starting in 1982 as 5.5 pCi/d; however, Table 23 on the following page lists it as 5.4 pCi/d. It is not clear whether the 5.5 pCi/d is meant to include both the inhalation and ingestion rates or is a typo.

13.) Pg. 41: Column 3 of Table 24 appears to have the wrong footnote.