NIOSH RESPONSE: KANSAS CITY PLANT SITE PROFILE ISSUES MATRIX

Item No.	Issue	Post-data capture	NIOSH response
SEC2	**Worker Location, Job Category, and Coworker Model –** Because of the varied historic operations at the KCP, coupled with the lack of specific worker locations and job categories, the application of coworker or generalized technical basis document derived doses could result in incorrect dose assignments. This could involve a relatively large number of workers because in many cases there is a lack of (or illegible) bioassay and/or external dose records. Therefore, the adequacy and completeness of the available data used for the coworker model need to be addressed, along with their applicability to different categories of workers.	Based on 5/5-8/14 KCP interviews, there were conflicting accounts of how freely workers "on the plant floor" were able to move from one department to another. One interviewee recollected moving from job to job, while another disagreed, noting that the union restricted such movement. Based on past interviews, the organizational codes did not necessarily match the assigned jobs, which could change over time; however, the distinction between operators, supervisors, and administrative staff was seen as clear. There appears to be a clear delineation and access restriction afforded the operating area containing the natural and depleted uranium work (Depts. 20 and 26). While some scanned records on the SRDB are not legible, the original records are readable. Further review warranted to ascertain whether worker location and job category are sufficiently distinguishable for coworker modelling.	This is primarily a site profile issue and NIOSH is planning a revision to the site profile. The adequacy and completeness of the available data are being addressed in the Kansas City Plant Special Exposure Cohort (SEC 210) Issues Matrix, item 1. Interviewees during the May 2014 visit indicated that historic radiological operations were not that varied (e.g., five separate operations), and that personnel movement throughout the radiological facility was limited. A better understanding of these classified operations is desirable; however, NIOSH has not received any new information that thus far appears to conflict with the bounding assumptions documented in the SEC00210 Evaluation Report (ER).
	June 10, 2014 WG: Remaining issue revolves around application of coworker model to KCP worker categories. Additional bioassay records have been requested by NIOSH (as part of medical records) and a future site visit will be scheduled to obtain additional information regarding the adequacy and completeness of available data used for the coworker model, along with applicability to various job categories.		

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	NIOSH status for January 20, 2015 WG: After writing the ER, NIOSH became aware of additional bioassay monitoring that was performed by Los Alamos for KCP (128346). NIOSH worked with the KCP HP to locate any records of this previously unknown monitoring, and on May 15, 2014, the KCP HP uncovered one such record. Learning from this approach, NIOSH compiled a list of employee names from access lists for the Model Shop and Project Royal. That list of 550 names was submitted to KCP as part of the data request prior to the October 2014 site visit. As a result, additional bioassay records that were filed with medical records were retrieved by NIOSH, and 164 new medical examination and hospital card entries were made to the SRDB. These documents, along with additional information regarding the adequacy and completeness of data used for a coworker model and its applicability to various job categories, was also retrieved and will be incorporated in the next site profile revision.		
	Site Profile Issue: The WG has combined SEC Issues Matrix items 2 and 3, and agrees that they can be considered site profile issues and moved to the site profile matrix for later review.		
	May 28, 2015 Status: As stated above, NIOSH will incorporate the information obtained from the SEC Issues Matrix Item 1 efforts. This information will be used to improve the internal dose coworker study and develop a method to apply the coworker doses to workers based on job categories as appropriate. NIOSH does not intend to expand the coworker study to cover the Project Royal work scope. NIOSH believes the bioassay data collected in the medical files from workers involved in Project Royal can be used to perform individual dose reconstructions for those workers. Site Profile sections affected: Sections 5.1.3 and 5.1.4.		
	January 26, 2016 Status: The V&V effort was confirmed to be accurate such that the existing coworker studies are valid for dose reconstruction. The revision of the site profile document will define the implementation of coworker doses to various workgroups and time periods. Information regarding the adequacy and completeness of data use for the coworker models will be incorporated into the next site profile revision.		

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Item No.	Issue	Post-data capture	NIOSH response
SEC3	**Chronic vs. Acute –** Default chronic pattern of intake used in the uranium coworker model, apparently being applied to most KCP workers may not be applicable to a large number of them. SC&A's review of actual claims reveals that workers that have legible bioassay records show patterns of excretion rates that indicate that the coworker model may not be necessarily claimant favorable for all workers.	The operational information obtained during the KCP visit indicates that there was the potential for acute intakes, i.e., not all operations were continuous steady-state production processes. Therefore, this issue remains open as an internal dose reconstruction issue that NIOSH should address. Additionally, the cause of the generally higher bioassay reading for 1960–1961 warrants further investigation.	This is primarily a site profile issue and NIOSH is planning a revision to the site profile. The TBD 6000 Working Group has also generically addressed these chronic vs. acute coworker model issues.
	June 10, 2014 WG: Work group agreed that question regarding chronic versus acute intake patterns does not represent an SEC issue and can be accommodated by the TBD 6000 model. The issue of unexplained higher bioassay readings in 1960–1961 will be addressed under SEC Issues Matrix item 18, as part of review of KCP incidents. The work group decided to hold SEC Issues Matrix item 3 in abeyance pending further discussion of an internal coworker model for KCP and whether scope of worker category coverage is adequate.		
	Site Profile Issue: The WG has combined SEC Issues Matrix items 2 and 3, and agrees that they can be considered site profile issues and moved to the site profile matrix for later review.		
	May 28, 2015 Status: This issue will be considered when the internal dose coworker study is updated, as noted in item SEC2 above. Site profile sections affected: Sections 5.1.3 and 5.1.4.		
	January 26, 2016 Status: The implementation of chronic versus acute intakes will be incorporated into the revision of the site profile document.		

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Item No.	Issue	Post-data capture	NIOSH response
SEC10	**Non-penetrating Dose –** It appears that there are periods (especially 1950–1963) where the details of non-penetrating exposure, dose, and records are lacking, making it difficult to evaluate non-penetrating doses to workers and for developing a coworker model.	SC&A's research of KCP claims files indicates that before 1964, there was a column labeled "RADS" that may have been used for recording of the beta dose. However, this has not been addressed in the ER or site profile documents. The relationship between recorded RADS, ROENTGENS, REM, and BETA RAD, as recorded at the KCP, needs to be defined, and how these quantities will be applied during DR (i.e., how will the non-penetrating dose be calculated from the recorded data) to determine if appropriate data were recorded for DR purposes.	The ER provides a method to place an upper bound on non-penetrating doses with sufficient accuracy. NIOSH is aware of the dosimetry used from 1950 to 1963, and that KCP records show 5,000 entries for non-penetrating doses during this time. NIOSH is satisfied that the maximally exposed work group and work scenario are represented with the available data, and can bound doses to others in the evaluated class with their data.
	June 10, 2014 WG: NIOSH to arrange technical call between Matt Smith, ORAUT, and Ron Buchanan, SC&A, regarding the following specific, outstanding questions, prior to 1964: [Notes from call and subsequent written statement of issue disposition from NIOSH will be needed for work group review]. *Is the "Shallow" dose (such as listed in Column F of the SRDB Ref ID#14707) being derived from the values in the "RADS" column of the original data cards?* *Which column in the original data cards is the 'Deep" dose (such as listed in Column D of the SRDB Ref ID#14707) being derived from; the "ROENTGENS" or from the "REM" column of the original data cards?* *For DR purposes, is the non-penetrating dose being determined by NP = (RAD-Deep) dose?* This clarification is needed because the details of non-penetrating dose assignments are not covered in the Site Profile or ER.		

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Item No.	Issue	Post-data capture	NIOSH response
	NIOSH status for January 20, 2015 WG: The technical call between Matt Smith, ORAUT, and Ron Buchanan, SC&A, was conducted on 7/22/14. The notes from that call were sent to the Work Group by Pete Darnell on 7/31/14. The following Action Item was created during the technical call on 7/22/14: NIOSH will provide a summary of their analysis of external dose record terms and what data values are used for DR purposes. The hand-entered film-badge dosimetry data (typically seen prior to 1965) had several columns labeled "RADS," "ROENT." and "REM." After reviewing the derivation of these values and information provided by site personnel, it is determined that the columns can be defined and are used by the Dose Reconstructors as follows: RADS = Open Window (gamma/x-ray + beta). ROENT. = Shielded (gamma/x-ray). REM = RADS + ROENT. NOTE: The REM value is a total of the RADS and ROENT. values and is not used by the dose reconstructor. Historically, dose reconstructors have been assigning the RAD value for non-penetrating dose. This is a claimant-favorable approach. NIOSH will also add this analysis of the pre-1965 data to the next revision of the site profile.		
	Site Profile Issue: The WG agreed that the external dose record terms in question can be clarified and included in an update of the site profile. Accordingly, this SEC issue is moved to the site profile issues matrix.		
	May 28, 2015 Status: This item has been fully developed, and the definitions and dose reconstruction instructions above will be incorporated in the next revision to the site profile. Site profile sections affected: Section 6.4.		

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Item No.	Issue	Post-data capture	NIOSH response
SP1	**AMAD –** The TBD (p. 18) recommends using a default AMAD of 5 µm. However, SC&A evaluated internal doses associated with inhaling uranium and determined that, since the Atomic Weapons Employer (AWE) activities at KCP involved handling substantial quantities of UO2 powder, it does not appear to be appropriate to use the default option of 5-µm AMAD. Without specific information regarding the chemical form and particle size distribution experienced by a worker, dose reconstructors should use combinations of 1- and 5-µm AMAD and Types M and S uranium, and use those assumptions that result in the highest dose to the organ of concern.		**May 28, 2015 Status:** In ICRP modeling, with no site-specific data on particle size distribution, the default value for AMAD is 5 um. The site profile currently has a detailed specification for the uranium oxide used in the 1959 - 1971 DU campaign (Specification Control No. 4542260-00 SRDB 14693). The specifications from this document will be used (AMAD, density, solubility type, etc.) for this period for uranium work. All bioassay is affected, so dose reconstruction methodology and the coworker study will be reassessed. For other time periods and radionuclides, the default AMAD of 5um will be used. Site profile sections affected: Sections 5.1.3 and 5.1.4.

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Item No.	Issue	Post-data capture	NIOSH response
SP3	**Bioassay Data –** The bioassay data summarized in Table 12 of the site profile appear to be incomplete, which raises concerns regarding their use in developing a coworker model.	This should be addressed by item SEC2.	**May 28, 2015 Status:** This item will be corrected with the revised internal dose coworker study mentioned in several items above. SEC Issues Matrix Item 1 will verify the completeness of the available bioassay data, and the new coworker study will include all available information. Site Profile sections affected: Sections 5.1.3 and 5.1.4.
SP5	**Admin Codes –** The system used to categorize workers by administrative code for the purpose of implementing the coworker model might result in misassignments that result in underestimates of reconstructed doses.	This should be addressed by item SEC2.	**May 28, 2015 Status:** The revision to the site profile will include instructions for dose reconstructors to assign intakes from the revised internal dose coworker study. The intakes will be assigned based on potential for exposure. The potential for exposure is dependent on job title, work location, duties, etc, not the administrative codes for workers. Site profile sections affected: Sections 5.1.3 and 5.1.4.

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Item No.	Issue	Post-data capture	NIOSH response
SP20	**Photon Calib. –** A correction factor for exposures to photon radiation might be needed, due to the differences between the actual photon energy distributions created largely by x-ray machines, and the relatively high-energy photons associated with Co-60, which were used for calibration of dosimeters. This issue is especially of concern regarding exposures to skin and shallow organs.		**May 28, 2015 Status:** The method for calibration of film badges may result in an under-response to low energy photons created by the radiation generating devices in use at KCP. To account for under response of film dosimetry to low energy photons, the result in the open window will be assigned as <30 keV photons in addition to the assigned deep dose. For shallow organs, the shallow dose will be assigned in this method, in lieu of electrons. While there is available information on the departments of monitored workers, there is no assurance that a monitored individual worker was exclusively exposed to sources of radiation from RGDs or the uranium work. Therefore, this method will apply to all monitored workers in the film badge era (through 1972). The external coworker study will be revised to incorporate this methodology (shallow dose is currently not included at all in the coworker study). Site profile sections affected: Sections 6.2, 6.3, and 6.4.

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Item No.	Issue	Post-data capture	NIOSH response
SEC13	**Mg-Th Alloy operations –** In the ER NIOSH identified the Mg-Th operations period as May 1, 1957 through April 30, 1979, as well as a residual period after operations ceased and before D&D. For the operational period, NIOSH proposes to use engineered air concentration limits coupled with ORAUT-OTIB-0070 to bound internal doses. The operations, timeframe, data adequacy/completeness, dose estimation approach, as well as the representativeness of 1970 BZ sampling for null exposure, need to be validated. For the residual period, NIOSH proposes to assume 3E-11 uCi/ml lower air limit and deposition, re-suspension, and depletion models to assign intakes. Thoron dose assumed to be 5.1 WLM/yr coupled with TBD-6000 modeled air concentrations. These assumptions and models need to be evaluated.		**January 26, 2016 Status:** A methodology for assigning doses has been developed for Mg-Th work. The operations periods for Mg-Th work are still being defined. The site profile will provide the development of the methodology and will define the intakes/doses to apply in the next revision.