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ADVISORY BOARD ON RADIATION AND WORKER HEALTH

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

A REVIEW OF NIOSH'S PROGRAM EVALUATION REPORT DCAS-PER-055, "TBD-6000 REVISION, 9/12/2014"

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Disclaimer

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Record of Revisions

Revision Number	Effective Date	Description of Revision
0 (Draft)	07/24/2015	Initial issue

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ABBREVIATIONS AND ACRONYMS

Advisory Board or ABRWH	Advisory Board on Radiation and Worker Health
AWE	Atomic Weapons Employer
DCAS	Division of Compensation Analysis and Support
DR	Dose Reconstruction
m^2	square meter
m/s	meters per second
NIOSH	National Institute for Occupational Safety and Health
NOCTS	NIOSH/OCAS Claims Tracking System
OCAS	Office of Compensation Analysis and Support
ORAUT	Oak Ridge Associated Universities Team
PEP	Program Evaluation Plan
PER	Program Evaluation Report
POC	Probability of Causation
RF	resuspension factor
RU	recycled uranium
SC&A	S. Cohen and Associates (SC&A, Inc.)
SEC	Special Exposure Cohort
TBD	Technical Basis Document
TIB	Technical Information Bulletin

1.0 STATEMENT OF PURPOSE

To support dose reconstruction (DR), the National Institute for Occupational Safety and Health (NIOSH) and the Oak Ridge Associated Universities Team (ORAUT) have assembled a large body of guidance documents, workbooks, computer codes, and tools. In recognition of the fact that all of these supporting elements in DR may be subject to revisions, provisions exist for evaluating the effect of such programmatic revisions on the outcome of previously completed DRs. Such revisions may be prompted by document revisions due to new information, misinterpretation of guidance, changes in policy, and/or programmatic improvements.

The process for evaluating potential impacts of programmatic changes on previously completed DRs has been proceduralized in OCAS-PR-008, *Preparation of Program Evaluation Reports and Program Evaluation Plans* (OCAS 2006), Revision 2. This procedure describes the format and methodology to be employed in preparing a Program Evaluation Report (PER) and a Program Evaluation Plan (PEP).

A PER provides a critical evaluation of the effect(s) that a given issue/programmatic change may have on previously completed DRs. This includes a qualitative and quantitative assessment of potential impacts. Most important in this assessment is the potential impact on the Probability of Causation (POC) of previously completed DRs with POCs of <50%.

As needed, a PEP may be issued that serves as a formal notification of an impending PER. The PEP provides a preliminary description of the issue(s) that will be addressed in the PER, and summarizes the likely scope of the effort required to complete the PER.

During a meeting of the Procedures Review Subcommittee held on April 28, 2015, SC&A was authorized to review DCAS-PER-055, *TBD-6000 Revision* (DCAS 2014). In conducting a PER review, SC&A is committed to perform the following five subtasks, each of which is discussed in this report:

Subtask 1: Assess NIOSH's evaluation/characterization of the "issue" and its potential impacts on DR. Our assessment intends to ensure that the "issue" was fully understood and characterized in the PER.

Subtask 2: Assess NIOSH's specific methods for corrective action. In instances where the PER involves a technical issue that is supported by document(s) (e.g., white papers, technical information bulletins, procedures) that have not yet been subjected to a formal SC&A review, Subtask 2 will include a review of the scientific basis and/or sources of information to ensure the credibility of the corrective action and its consistency with current/consensus science. Conversely, if such technical documentation has been formalized and previously subjected to a review by SC&A, Subtask 2 will simply provide a brief summary/conclusion of this review process.

Subtask 3: Evaluate the PER's stated **approach** for identifying the universe of potentially affected DRs, and assess the **criteria** by which a subset of potentially affected DRs was

selected for re-evaluation. The second step may have important implications in instances where the universe of previously denied DRs is very large and, for reasons of practicality, NIOSH's re-evaluation is confined to a subset of DRs that, based on their scientific judgment, have the potential to be significantly affected by the PER. In behalf of Subtask 3, SC&A will also evaluate the timeliness for the completion of the PER.

Subtask 4: Conduct audits of DRs affected by the PER under review. Based on information contained in Table 1 (and discussed in Section 3.1 below), the number of DRs selected for audit for a given PER will vary. (It is assumed that the selection of the DRs and the total number of DR audits per PER will be made by the Advisory Board.)

Subtask 5: Prepare a comprehensive written report that contains the results of the above-stated subtasks, along with our review conclusions.

2.0 SUBTASK 1: IDENTIFY THE CIRCUMSTANCES THAT NECESSITATED THE NEED FOR DCAS-PER-055

DCAS-PER-055 was issued on September 12, 2014, in response to the issuance of Revision 1 of Battelle-TBD-6000, *Site Profiles for Atomic Weapons Employers that Worked Uranium Metals* (Battelle 2011) (referred to here as Rev. 1 to TBD-6000). Prior to the issuance of Rev. 1 to TBD-6000, many DRs were performed based on Rev. 0 of TBD-6000 (Battelle 2006); hence, the need for this PER.

As explained in PER-055, there are many appendices to TBD-6000, which provide DR guidance for specific Atomic Weapons Employer (AWE) facilities that handled and machined uranium metal. These appendices are not addressed as part of PER-055, even though they could be affected by changes to TBD-6000. If the appendices to TBD-6000, such as Appendix BB dealing with General Steel Industries, require revision, they will be treated under separate PERs. As such, only DRs that are based entirely on TBD-6000 and not based on one of the appendices to TBD-6000 were revisited under this PER.

While some changes incorporated into Rev. 1 to TBD-6000 increased the assigned doses, others resulted in a decrease. All changes introduced in Rev. 1 reflect formal internal reviews by ORAUT, NIOSH, and the TBD-6000 Work Group.

However, subsequent to the issuance of Rev. 1 to TBD-6000, new TBD-6000 issues emerged due to ongoing reviews of a number of site profiles. These new issues were brought to the attention of the TBD-6000 Work Group and resolved. These matters are discussed in greater detail later in this review.

3.0 SUBTASK 2: ASSESS NIOSH'S SPECIFIC METHODS FOR CORRECTIVE ACTION

3.1 CHANGES INCORPORATED IN REVISION 01 OF TBD-6000

On June 17, 2011, **Rev. 1** of TBD-6000 was issued, which contained the following changes that are briefly summarized in the section of TBD-6000 titled, "Records of Review/Revisions." However, this section is quite brief, stating the following:

> *Revision initiated to incorporate review comments. Added external beta dose from surface contamination. Expanded discussion in Section 3.3.1. Additional editorial changes and typographical errors.*

A more complete description of the changes is provided in the TBD-6000 issues resolution matrix dated October 28, 2009 (SC&A 2009), which reflects the discussions held during the TBD-6000 Work Group meeting held on October 14, 2009. The following summarizes the issues and the degree to which they have been resolved in Rev. 1 of TBD-6000:

1. Resolution of issues pertaining to the Putzier (1982) effect. NIOSH explained that the Putzier effect only occurs during re-casting of uranium, and SC&A agrees. Also, during the Work Group meeting, NIOSH agreed to look into this matter further. Section 3.3.1 of Rev. 1 of TBD-6000 on Electron Dosimetry, does explore this issue with the following discussion:

   > *The derby resulting from the reduction step contained impurities that made it unsuitable for reactor fuel. The metal was both purified and altered in shape in the remelt process. In this process, the derbies are melted in a vacuum furnace and molten uranium metal poured into a graphite mold (Chrisofano and Harris 1960). The vacuum casting removes volatile contaminants and allows other impurities to float to the surface concentrating impurities near the top. Impurities can also be concentrated where the molten uranium metal cools rapidly preventing (or minimizing) the time necessary for the impurities to separate. This can cause impurities to also concentrate near other surfaces of the casting. The separation can be improved by controlling the cooling of the cast uranium. If the mold is insulated near the top, a steep temperature gradient is formed causing the ingot to solidify from the bottom to the top. This allows impurities to separate and migrate to the top of the ingot without being trapped in solidifying metal. The "hot-top" that is formed is then cut off (cropped) to eliminate the impurities (Fleishman-Hillard 1967).*

   The implications are that TBD-6000 alerts the dose reconstructor to this potential issue, but provides little guidance regarding how to address this issue. SC&A therefore remains concerned that TBD-6000 does not adequately address this issue with respect to providing adequate guidance to the dose reconstructor.

2. Resolution of issues related to external beta exposures associated with contaminated surfaces. Rev. 1 to TBD-6000 adequately addresses this issue.
3. Issues related to the inclusion of Th-232 as one of the radionuclides present in recycled uranium (RU). This issue was resolved by NIOSH explaining the origin of Th-232 in RU, and there was no need to address this issue in Rev. 1 to TBD-6000; the issue was closed.
4. Issues related to investigating data characterizing sources of airborne uranium in addition to those cited by Harris and Kingsley (1959), such as Adley et al. (1952) and those reported for Simonds Saw and Steel (ORAUT 2005[1]). Rev. 1 to TBD-6000 addresses this issue and SC&A recommends that this issue be closed.
5. Issues related to the methods used by NIOSH to derive the accumulation of uranium dust on surfaces. NIOSH addressed this issue by drawing from data in Adley et al. 1952 and SC&A recommends that this issue be closed.
6. Issues related to the resuspension factor (RF): The issue related to NIOSH's use of an RF of 1E-6/m. This issue was resolved by OTIB-0070 (ORAUT 2012), which deals with derivation of exposures during the residual period. This TIB itself went through a complex review process, where all issues were resolved. One of the issues dealt with the need to adjust the RF for different sets of conditions. Rev. 1 to TBD-6000 does not adopt the approved OTIB-0070 protocols. In response to an inquiry regarding this matter made by SC&A, SC&A received a response to our inquiry from NIOSH (Jim Neton) on June 1, 2015 (see Attachment A), which explains that NIOSH concurs that Rev. 1 to TBD-6000 should have made reference to OTIB-0070 (ORAUT 2012). Hence, this issue should remain in abeyance.
7. Issues related to inadvertent ingestion of uranium. This issue was resolved by the Procedures Review Subcommittee and was appropriately incorporated into Rev. 1 of TBD-6000.

All these issues were resolved in principle during the TBD-6000 Work Group meetings and were either closed or placed in abeyance until Rev. 1 to TBD-6000 was issued, and it can be confirmed that all issues were, in fact, appropriately addressed. A review of Rev. 1 reveals that, except for the Putzier effect issue (Issue 1) and the RF issue (Issue 6), all issues have been appropriately addressed in Rev. 1. The e-mail SC&A received on June 1, 2015, confirms that Issue 6 was, in fact, resolved with the finalization of OTIB-0070 (ORAUT 2012), and Rev. 1 to TBD-6000 should have made appropriate reference to OTIB-0070. We still have concerns regarding Issue 1.

On June 17, 2011, Rev. 1 of TBD-6000 was issued, which contained the following changes salient to DR:

- Section 3.3.1 (page 22) discusses issues related to the enhancement of Th-234 at the surface of re-cast uranium (and associated elevated beta exposures). Hence, this issue is

[1] This TIB was cancelled in April 2011 and the sites that were previously appendices to TBD-6001 are now stand-alone documents (see the NIOSH web site at http://www.cdc.gov/niosh/ocas/awedocs.html.

addressed in Rev. 1 and alerts dose reconstructors to the possibility of encountering this phenomenon at some metal-handling facilities. However, additional guidance is needed regarding how to address this issue.

- Tables 3.4 and 3.10 explicitly address beta exposures at contact with uranium slabs and also at 1 meter above surfaces contaminated with uranium dust and flakes.
- Section 3.4.2 (page 25) discusses data provided in Adley et al. (1952) and Simonds Saw and Steel (AEC 1949), and factors those data into the exposure matrices employed in Rev. 1 to TBD-6000.
- Section 7.1.5 (page 49) discusses resuspension during periods with no uranium operations. The discussion adopts an RF of 1E-6/m, with no mention of updated information regarding RFs provided in OTIB-0070 (ORAUT 2012). However, as discussed above, NIOSH acknowledges this oversight. As part of Subtask 4 of this PER review, it would be appropriate to review cases where OTIB-0070 might apply to some cases in order to determine if appropriate RFs were, in fact, used; e.g., situations where an RF of 1E-5/m should be used.
- Section 7.1.6 (page 50) describes the procedures to be used to reconstruct ingestion doses. Reference is made to OCAS-TIB-009 (OCAS 2004), which describes the methods approved for use in reconstructing ingestion intakes due to inadvertent ingestion.

3.2 ISSUES RAISED SUBSEQUENT TO THE PUBLICATION OF REVISION 1 TO TBD-6000

Subsequent to the issuance of Rev. 1 to TBD-6000, SC&A reviewed a number of DRs, site profiles, and a petition evaluation report that relied on Rev. 1 of Battelle-TBD-6000 to provide the bases for completed DRs or possible future DRs (e.g., Joslyn). During those reviews, SC&A had an opportunity to look closely at Rev. 1 of TBD-6000 as it was applied to these specific cases and site profiles. As a result of these reviews (SC&A 2013), SC&A identified the following supplementary issues associated with Rev. 1 to TBD-6000:

- The suitability of using a terminal settling velocity of 0.00075 m/s and the time required to reach an equilibrium surface concentration
- The attenuation rate for surface contamination
- A comparison of site-specific air concentrations with generic data used in TBD-6000
- Operations not explicitly covered in TBD-6000

SC&A advised the Designated Federal Official, NIOSH, and the TBD-6000 Work Group of these additional concerns, and SC&A was directed to perform a focused review of these concerns. On May 13, 2013, SC&A issued *Supplementary Comments on Revision 1 of Battelle-TBD-6000* (SC&A 2013) in response to this directive.

Our review confirmed the adequacy of the dust deposition velocity of 0.00075/m^2. However, we found that there was considerable uncertainty associated with the deposition duration of 30 days

before an effective equilibrium was achieved (i.e., the time period when the deposition rate of dust on surfaces was in quasi-equilibrium with the rate at which dust was removed from surfaces due to air turbulence and perhaps some anthropomorphic activities). After discussion of this issue with the Work Group, an assumed default dust deposition duration of 30 days was found to be reasonable. We also compared the generic airborne uranium dust concentrations in TBD-6000 (Battelle 2011) to the site-specific time-weighted air exposure values for the Hanford Melt Plant Building (Adley et al. 1952), Simonds Saw and Steel (ORAUT 2011), Joslyn (NIOSH 2012), and Bethlehem Steel (NIOSH 2010). These comparisons demonstrated that the default assumptions employed in Rev. 1 to TBD-6000 were largely claimant favorable for a very broad range of job descriptions at numerous uranium handling and machining facilities.

We also questioned whether the geometric mean airborne concentrations should be employed as the basis for estimating internal doses, as opposed to either the arithmetic mean or upper 95th percentile. NIOSH demonstrated that, by using the full distribution of airborne dust loadings, which assumed a lognormal distribution with a geometric standard deviation of 5, the outcome of the calculation of the POC was similar to the POC one would derive if a fixed airborne dust loading at the 95th percentile was employed. On this basis, this issue was resolved.

Our final supplementary issue was a concern that the default airborne dust loading used in TBD-6000 did not take into consideration transient conditions, such as aggressive sweeping and uranium fires. However, after careful review of the underlying research used to derive the default dust loading used in TBD-6000, we realized that there was sufficient conservatism inherent in these default values to accommodate such transients in a claimant-favorable manner. Therefore, the outcome of our supplemental investigations found Rev. 1 to TBD-6000 to be quite claimant favorable with respect to this matter.

4.0 SUBTASK 3: EVALUATE THE PER'S STATED APPROACH FOR IDENTIFYING THE NUMBER OF DRS REQUIRING RE-EVALUATION

NIOSH used the following set of criteria to determine the universe of claims that could have potentially been impacted by the revisions to TBD-6000:

1. A text search of all DR reports for previously completed claims for the phrase "6000"
2. Claims that resulted in a POC of less than 50%

Using these criteria, NIOSH identified a total of 809 cases that were potentially affected by the revisions to TBD-6000. In DCAS-PER-055 (DCAS 2014), NIOSH lists the following reasons for which cases would be removed from the universe of 809 for re-evaluation:

1. Cases that were associated with a site for which a site-specific PER was already conducted. The PERs included the revision to TBD-6000.

2. Cases that were associated with a site for which an appendix to TBD-6000 exists and/or were already scheduled for a site-specific PER that would include the revision to TBD-6000.
3. Cases whose text search result was not associated with TBD-6000 or cases in which TBD-6000 was referenced but not used in the DR.
4. Cases whose DR reports already referenced Rev. 1 of TBD-6000.
5. Cases whose original DR indicated that using Rev. 1 of TBD-6000 would result in the same or lower POC values.

SC&A believes that this basic strategy for identifying the potentially impacted cases, and the screening criteria used to determine which cases need to be re-evaluated, are appropriate. In the subsections that follow, we describe our approach, and results of our approach, for (1) confirming that NIOSH did not miss any potentially impacted cases, and (2) that NIOSH did not screen out any cases that require re-evaluation. In order to accomplish this, we requested that NIOSH provide us with the database identifying the 809 cases that represent the universe of potentially impacted cases and screening information used to identify the 30 cases that were determined to require a formal re-evaluation. Appendix B presents the correspondence between SC&A and NIOSH where NIOSH provided the requested information.

4.1 SC&A'S REVIEW OF THE PROCESS USED BY NIOSH TO IDENTIFY THE UNIVERSE OF POTENTIALLY IMPACTED CLAIMS

The information provided by NIOSH in response to our request is in the form of a large spreadsheet with three columns. Because of its size, this spreadsheet is not provided here. The first column in the spreadsheet is the case number, the second column is the site at which that claimant worked, and the third column is NIOSH's screening designation for that case. The first column of NIOSH's spreadsheet is the list of the 809 cases captured by NIOSH's search.

The first step in our review was to confirm that the 809 cases identified by NIOSH do, in fact, represent the list of cases that, in theory, might be impacted by the revisions to TBD-6000; i.e., did NIOSH miss any potentially impacted cases?

The approach we used to try to answer this question was to first identify all of the sites represented by the 809 cases. We found that a total of 61 sites are represented by these cases. If NIOSH missed any cases, they would likely be among the sites captured by NIOSH's search. We then went through a site elimination process to determine if we could find any cases that might have been missed by NIOSH and would have a greater potential for the need to be re-evaluated under Rev. 1.

The site elimination process began with the elimination of sites from further consideration for any of the following reasons:

1. The site has an appendix to TBD-6000
2. The site has a pre-existing PER

3. The site has cases where TBD-6000 is referenced but not used
4. The site has cases where the number '6000' is within the text, but has nothing to do with TBD-6000

After this screening process, we were left with the facilities listed in Table 4-1, which, in theory, could include claimants that require reconsideration. The first step was to conduct a NIOSH/ OCAS Claims Tracking System (NOCTS) search for all cases associated with these sites whose POC was less than 50%. Then, we eliminated all cases from those facilities that were among NIOSH's 809 cases. At this point, we identified 472 cases, and we checked if any of the cases refer to TBD-6000. We found 294 cases that did use TBD-6000, but are not on NIOSH's list of 809 cases. However, of these, 287 used Rev. 1 of TBD-6000 (Battelle 2011). The remaining seven cases referenced Appendix C of TBD-6000 for Dow Chemical Company (Madison Site). It is likely that the cases found during this search were not included in NIOSH's list of 809 cases, because the DR reports may not have been completed until after NIOSH conducted their search. Based on this review, we believe that the 809 cases identified by NIOSH do, in fact, represent the universe of cases that might require reconsideration.

SC&A found that the selection criteria used to identify the universe of 809 cases that might require a reassessment to be appropriate and comprehensive.

Table 4-1. Sites Included in the NOCTS Search for Potentially Missed Cases

Work Site Name
AC Spark Plug
Alba Craft
Allied Chemical and Dye Corp.
Allis-Chalmers Co.
B&T Metals
Baker Brothers
Bendix Aviation (Pioneer Division)
Beryllium Production Plant (Brush Luckey Plant)
Brush Beryllium Co. (Cleveland)
C.H. Schnoor & Company
Cincinnati Milling Machine Co.
Colonie Interim Storage Site (National Lead Co.)
Crucible Steel Co.
Heppenstall Co.
Herring-Hall Marvin Safe Co.
Hunter Douglas Aluminum Corp.
Ithaca Gun Co.
Koppers Co. Inc.
Medart Co.
Metallurgical Laboratory
Metals and Controls Corp.
Norton Co.
Nuclear Metals Inc.
Reed Rolled Thread Co.
Revere Copper and Brass
Southern Research Institute
Spencer Chemical Co. Jawhawks Works
Superior Steel Co.
Sylvania and Corning Nuclear Corp. - Bayside Laboratories
Sylvania and Corning Nuclear Corp. - Hicksville Plant
Torrington Co.
Ventron Corporation
Vulcan Tool Co.
W.E. Pratt Manufacturing Co.

4.2 SC&A'S COMMENTS ON EXECUTION OF SELECTION CRITERIA

Table 4-2 summarizes NIOSH's screening criteria used to identify the 30 cases out of the 809 that were selected for re-evaluation.

Table 4-2. Summary of Potentially Affected Cases as Reported by NIOSH

Number of Claims	NIOSH's Evaluation
166	Eliminated due to existence of site-specific PER
356	Eliminated because site has an appendix to TBD-6000
50	Eliminated because TBD-6000 referenced and not used, or listed in error
56	Eliminated because Rev. 1 used in DR
151	Eliminated because using Rev. 1 would result in the same or lower values
30	Re-worked under Rev. 1 of TBD-6000

4.2.1 SC&A's Comments on NIOSH's Exclusion Criteria

SC&A agrees with NIOSH's evaluation and exclusion of cases associated with sites that have another PER. All of the PERs mentioned in these cases were issued after the Rev. 1 of TBD-6000 went into effect, as shown in Table 4-3. It is therefore assumed that the cases pulled by the other PERs would address all open concerns, including the revision of TBD-6000.

Table 4-3. PERs Referenced by NIOSH in the Exclusion of Cases for Re-Evaluation

PER Mentioned	Date PER Issued
PER-039 Baker Perkins	1/7/2013
PER-047 Grand Junction	3/26/2014
PER-048 Wah Chang	9/27/2013
PER-050 Bliss and Laughlin	3/14/2014
PER-052 Westinghouse Nuclear Fuels Division	3/24/2014
PER-054 Carborundum	7/25/2014
PER-056 BWXT Technologies Inc. (Virginia)	9/12/2014

SC&A agrees with NIOSH's evaluation and exclusion of cases associated with sites that have an appendix to TBD-6000. If NIOSH finds that any of the appendices to TBD-6000 require revision, a PER will be issued for those appendices. This is, in fact, what was done with Appendix BB to TBD-6000, which deals with General Steel industries.

SC&A agrees that the cases in which TBD-6000 is referenced but not actually used in the DR should be eliminated from consideration for re-evaluation. The cases which were captured in the text search for the phrase "6000," but do not deal with TBD-6000, were also correctly excluded from further consideration.

SC&A agrees that the cases within the universe of 809 that already used Rev. 1 of TBD-6000 should be removed from further consideration.

The following presents a series of observations that have no effect on the outcome of the PER case selection process, but identify places where cases should have been eliminated for reasons other than the reasons cited by NIOSH. This material is provided solely for the purpose of

having a complete record describing the basis for eliminating certain cases from further consideration.

During SC&A's review of the cases that NIOSH excluded from consideration because use of Rev. 1 would result in "the same or lower values," it was found that several cases included in this category should have been excluded by other criteria used by NIOSH, as summarized below.

Table 4-4. Cases Listed by NIOSH as Having "Lower or the Same Values" under Revision 1 that Should Have Been Excluded for Other Reasons

Number of cases	Reason Case Should Have Been Excluded Earlier in the Process
14	Work site has an appendix to TBD-6000
5	Listed in error; does not reference TBD-6000
1	Referenced TBD-6000, but was not used in DR
42	DR report used Rev. 1

SC&A found six cases from US Steel Co., National Tube Division, and eight cases from Heald Machine Company listed by NIOSH in this category. However, appendices to TBD-6000 exist for these sites (Appendix CO and Appendix BD, respectively) and should have been eliminated for this reason. Four of the cases for Heald Machine Company even referenced Appendix BD in their DR report.

SC&A found five cases in which TBD-6000 was not referenced, but the phrase "6000" happened to appear elsewhere in an unrelated manner. SC&A also found one case where TBD-6000 was referenced but not used in the DR.

It is interesting that 42 cases NIOSH excluded by claiming that the use of Rev. 1 would result in "the same or lower values" were, in fact, already evaluated by NIOSH using Rev. 1 to TBD-6000.

The remaining 89 cases were eliminated for re-evaluation because use of Rev. 1 would result in "the same or lower values." Specifically, NIOSH indicated that several cases used TBD-6000 in such a way that Rev. 1 would likely result in such a small increase in dose that it would not affect the compensation decision if the POC was below 49.6%. Our review revealed that no cases were actually eliminated based on their POC. We believe that NIOSH simply is informing the reader that the POC based on doses derived using Rev. 0 would have to be 49.6% before a reversal of the compensation decision would occur if the doses were reconstructed using Rev. 1. SC&A did not check whether 49.6% is, in fact, the decision threshold, since the case elimination process never had to use this elimination criterion. SC&A agrees with NIOSH's elimination of cases whose POC will likely change very slightly under Rev. 1.

4.2.2 SC&A's Comments on Cases Re-evaluated by NIOSH

NIOSH listed 30 cases that were not excluded from consideration and were re-evaluated under Rev. 1 of TBD-6000. SC&A examined these 30 cases to check if they were appropriately considered.

SC&A found one case that should not have been included in the universe of potentially affected cases from the start. A document from 2011 associated with this particular case says that the claim was compensated as part of a Special Exposure Cohort (SEC); therefore, re-evaluation of the case was not necessary.

Eight of the remaining cases that were re-evaluated involved skin cancers and the use of TBD-6000 for external beta dose. Therefore, re-working of these cases under Rev. 1 was likely necessary. However, the remaining 21 cases do not exhibit characteristics that make them stand out as good candidates for re-evaluation. Many of these cases deal with non-skin cancers, and their DRs appear to have been done in a similar manner as cases previously excluded from consideration because Rev. 1 would result in "the same or lower values." Additionally, the cases eliminated for this reason all had POCs below 45%. However, NIOSH also states that 29 of the re-evaluated cases resulted in POCs that were also below 45%. It is unclear why these non-skin cancer cases were re-evaluated by NIOSH under Rev. 1, since the cases were not concerned with external beta dose and would likely receive only a slight increase in assigned dose from photons. To reiterate, all of these observations have no effect on NIOSH's decision-making process or its conclusions, but are provided to help clarify the record.

5.0 SUBTASK 4: REVIEW OF CASES

SC&A would like to request the opportunity to audit a sample set of the re-evaluated cases to assess whether Rev. 1 of TBD-6000 was implemented correctly. SC&A recommends selection of three claims affected by PER-055. We would like to review the case that had a reversal in the compensation decision. We would also like to review one case where the dose increased and one where the dose decreased, which should include a case were OTIB-0070 was employed.

6.0 REFERENCES

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ATTACHMENT A: CORRESPONDENCE PERTAINING TO ORAUT-OTIB-0070

From: Neton, Jim (CDC/NIOSH/DCAS)
Sent: Monday, June 01, 2015 9:22 AM
To: John Mauro
Subject: RE: PER-055

John,

You raise a good point. I think that TBD-6000 should refer to the guidance in TIB-0070, which says that the 1E-06 value needs to be reviewed for facilities that have active operations.

Jim

From: John Mauro
Sent: Friday, May 29, 2015 3:39 PM
To: Neton, Jim (CDC/NIOSH/DCAS)
Subject: PER-055

Jim,

I'm reviewing PER-055 dealing with Revision 1 to TBD-6000. One of the sections of my report summarizes the changes made from going from Rev 0 to Rev 1. In preparing this section of my report, I am taking advantage of a very thorough issues resolution matrix issued on March 9, 2009, which shows all that all issues were resolved/placed in abeyance. In reading Rev 1, I noticed that section 7.1.5 uses a RF of 1E-6/m and no mention is made of OTIB-0070. However, in response to Issue 6 in the issues resolution matrix, reference is made to OTIB-0070, which resolved this issue. I am writing seeking clarification on how resuspension during the residual period will being handled under Rev 1 to TBD-6000. Will 1E-6/m always be used or will OTIB-0070 be used?

John

Can you help me out?

John

ATTACHMENT B: CORRESPONDENCE THAT PROVIDED SC&A WITH THE UNIVERSE OF POTENTIALLY IMPACTED CASES IDENTIFIED BY NIOSH

From: Allen, David (CDC/NIOSH/DCAS)
Sent: Tuesday, June 02, 2015 1:50 PM
To: John Mauro
Subject: RE: memo

Hi John,

Sorry I didn't get back to you sooner, I was on vacation last week. The text search is something I had to get our computer folks to do. It is not a standard NOCTS query. The results of the search are in a spreadsheet that that I put in a folder I think you can get to (let me know if you can't). I don't know what it looks like when you log in but here is the folder hierarchy I'm seeing "ABRWH\ABRWH_Board_Meetings\AB Document Review\Procedures Subcommittee\PER-055". I made the "PER-055" folder and put a spreadsheet in there.

On the "Cases" tab all 809 cases are listed. There are 831 lines but 22 cases are duplicated because they had employment at more than one of the sites.
Column A is the NIOSH ID
Column B is the site name
Column D is the disposition of the case for this PER

The "Tally" tab is where the numbers come from that appear in the PER (Column I rows 18 through 25). You can see I categorized the disposition of the claims and then grouped them somewhat. Some of the claims with employment at more than one site had different dispositions so I had to just make a call as to what category to put them in. It made no difference whether the claims was evaluation just how it was tallied in the PER document.

Let me know if you can't get this spreadsheet or if you have any questions.

Dave

From: John Mauro
Sent: Thursday, May 28, 2015 4:24 PM
To: Allen, David (CDC/NIOSH/DCAS)
Subject: FW: memo

Dave,

In reading DCAS-PER-055, it was stated that NIOSH identified the population of claims to consider based on "a text search of the dose reconstruction reports for all previously completed claims" for any mention of '6000.' However, within the custom query page of NOCTS, I am not able to search within the text of a specific type of document. It would be very beneficial if NIOSH would provide us with a list of the 809 cases they identified as the initial populations of claims to consider for PER-055. NIOSH has done this for SC&A in the past for PER-011 and PER-014. This would certainly help our review of PER-055.

Thank you,

John