



MEMO

TO: BNL Work Group
FROM: Ron Buchanan, SC&A
DATE: January 10, 2013
SUBJECT: SC&A's Evaluation of the NIOSH White Paper, *Response to SC&A's Evaluation of Brookhaven National Laboratory SEC End Date*, by Grady Calhoun dated January 4, 2013

INTRODUCTION

The following is a summary of the exchange of papers addressing the issue of the 1993 end date for the Brookhaven National Laboratory (BNL) Special Exposure Cohort (SEC).

SC&A's Evaluation of SEC-00196 End Date of 1993

SC&A evaluated the technical soundness of using December 31, 1993, as the end date for the BNL SEC-00196 recommended in NIOSH's Evaluation Report (ER) (NIOSH 2012). The SEC was based on the results of the lack of bioassay data records available for dose reconstruction (DR) purposes. SC&A provided a summary of this evaluation to the BNL Work Group, NIOSH, and other appropriate personnel on May 22, 2012 (SC&A 2012).

NIOSH's Response to SC&A's Evaluation of SEC-00196 End Date of 1993

NIOSH provided a response to SC&A's evaluation in a White Paper titled, *Response to SC&A Evaluation of Brookhaven National Laboratory SEC End Date*, by Grady Calhoun dated January 4, 2013 (NIOSH 2013).

SC&A's Evaluation of NIOSH's Paper of 1/04/2013

SC&A reviewed NIOSH's current response to the issue of the SEC end date of 1993. The following is a summary of SC&A's current evaluation.

SC&A'S CURRENT EVALUATION OF BNL SEC END DATE OF 1993

NIOSH stated in their recent paper (NIOSH 2013) that BNL has instituted a new data recovery system and can now provide for more accurate exposure records in a more reasonable turn-around time. This was incorporated into SC&A's re-evaluation of the following items.

Item #1 – SC&A's Original Concern: *Lack of two 1994 records in BNL files*

NIOSH had indicated in Attachment 6, page 116, of the SEC-00113 ER (NIOSH 2009) that there were two whole-body count (WBC) records in NIOSH's document capture that were not in the BNL **Index**, **Medical**, or **PM** (Personnel Medical) files (which would contain the data used to

respond to NIOSH's request to BNL for data for DR). This is an indication that not all the bioassay data were complete for 1994 in the BNL files, as of 2009.

Item #1 – NIOSH's Response

The 2009 evaluation report identified 2 individuals for which whole body counting was requested but for which records could not be identified for 1994. One of these individuals is currently a claimant and one is not. Although not specifically identified in the January 5, 2012 revision of the evaluation report, the report does state that gaps in whole body count data exist for 1963, 1965–69, 1971, and 1991. Since the time of initial evaluation report and the revision, the 1994 whole body count data has been found. The Brookhaven National Lab provided the data for the current claimant in a revised response on 2/16/10. NIOSH located the 1994 data for the individual who was not a claimant in the records that had been captured during the numerous visits to the site. Additionally BNL provided a response for the non-claimant on 12/10/12 which included the 1994 whole body count along with many others.

Therefore 100% of the WBC data for the study performed for the period after the SEC end date of 1993 as listed in attachment 6 of the 2009 evaluation report has been located.

Item #1 – SC&A's Current Evaluation

The location of these two data points negates SC&A's concern of this item.

Item #2 – SC&A's Original Concern: *Lack of completeness of bioassay data in [less than 9] case studies*

BNL is a difficult site to assess the completeness of bioassay records because of its diverse facilities, and changes over time. One possible method to assess if 1993 is a reasonable date for the SEC to terminate (on the basis of the lack of bioassay records) is to analyze the bioassay records for workers at a given facility that had a fairly stable staff and function in the 1990s, and had the potential for internal exposures. SC&A found that the High Flux Beam Reactor (HFBR), which operated between 1965–1999, was one of the few candidates available.

SC&A found [less than 9] workers who met the criteria of having filed a claim, worked at the HFBR during 1994–1999, and had job titles that could indicate a possible need for routine bioassay monitoring. Of these [less than 9] cases, there were [less than 9] cases identified that were on the 1996 HFBR bioassay and WBC lists, and [less than 9] additional cases that indicated a potential need for monitoring at the HFBR, because of the work description and location in the Computer-Assisted Telephone Interview (CATI)/DR reports. SC&A analyzed the DOE files, CATI reports, and DR reports for these [less than 9] cases to obtain an indication of the percent of time the bioassay records (tritium and WBCs) were available. These [less than 9] cases were randomly designated as Case [redact], [redact], [redact], [redact], and [redact]; a brief summary of these cases follows:

Case [redact]: The energy employee (EE) worked at the HFBR from 1971 through September 1995 as a technician at the [redact] Facility ([redact]), but was not listed on the *1996 Tritium Dose Annual Summary* HFBR list of bioassays.

Case [redact]: The EE worked at the HFBR and the Brookhaven Medical Research Reactor (BMRR) from 1986 through 1999 as an [redact] technician. The EE was listed on the *1996 Tritium Dose Annual Summary* HFBR list of bioassays. SC&A searched the Department of Energy (DOE) files (last posted September 27, 2011) and found records of the EE's tritium bioassay every year from 1990–1999, and WBCs each year from 1990–1999.

Case [redact]: The EE worked at the HFBR, the BMRR, and then at other facilities from 1990 through the present as a [redact] and [redact] engineer. The EE was listed on the *1996 Tritium Dose Annual Summary* HFBR list of bioassays.

Case [redact]: The EE worked in the target processing areas of the accelerators and the HFBR from 1989 through 2004 as a [redact]. The EE was not listed on the *1996 Tritium Dose Annual Summary* HFBR list of bioassays.

Case [redact]: The EE worked at the HFBR from 1994 to March 1999 as a technician. The EE was listed on the *1996 Tritium Dose Annual Summary* HFBR list of bioassays.

SC&A's analysis of the bioassay records for these [less than 9] workers indicated that the completeness of the tritium and WBC records may be questionable for some years during the period 1994–1996.

Item #2 – NIOSH's Response

NIOSH referred in their recent paper (NIOSH 2013) to the bioassay data recently available for each of the [less than 9] cases analyzed by SC&A. A summary of their response is as follows:

It must be noted that the records management program at BNL has improved greatly since the time of the latest evaluation report and since the subject SC&A report was written. Prior to 2011, all internal dosimetry records, many in hard copy format, were manually searched to respond to EEOICPA requests. In early 2011 BNL electronically captured all of the internal dosimetry records on-hand. BNL now performs both electronic and manual searches for an individual. The electronic capture of the records has helped improve the quality of the reported data. This has resulted in significantly more comprehensive records being provided in response to our requests. Data was re-requested for all [less than 9] of the cases listed below. In every case, BNL provided more dosimetry data than they had in previous responses. [Emphasis added.]

Item #2 – SC&A Current Evaluation

SC&A re-evaluated the [less than 9] cases using the updated DOE bioassay data in the NIOSH OCAS Claims Tracking System (NOCTS) to compare the earlier data to the revised data. The

results of the comparison are presented below. The percentages for 1999 went down slightly in some instances because of revised work fraction and bioassay data. SC&A noted that the DOE files for Case B had not been revised since September 27, 2011; therefore, not all the [less than 9] cases had additional data, as stated in NIOSH's response (NIOSH 2013). However, Case [redact] originally had 100% of the required bioassays, so this did not impact the analysis.

Records of Tritium Bioassays

A plot of the number of monthly tritium bioassay records located in the DOE files for the [less than 9] workers that may have required bioassays is shown in Figures 1a and 1b.

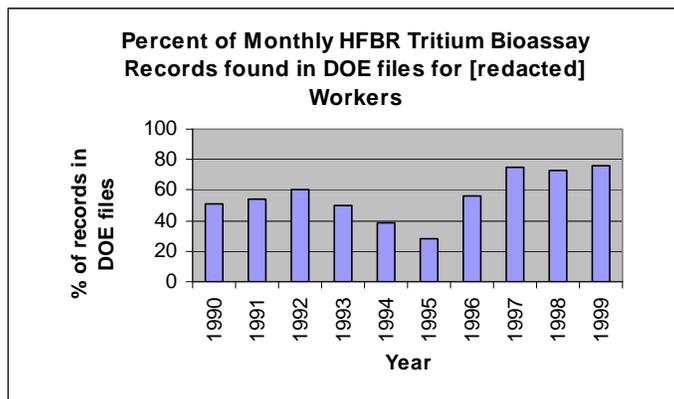


Figure 1a. Percent of Recorded Monthly Tritium Bioassay for [less than 9] Workers (2012)

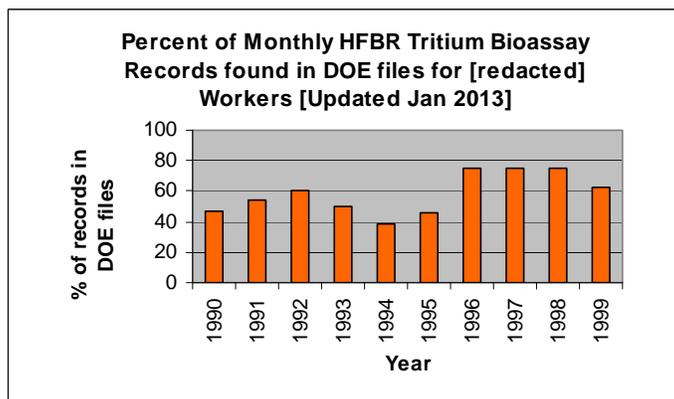


Figure 1b. Percent of Recorded Monthly Tritium Bioassay for [less than 9] Workers (2013)

A plot of the number of monthly tritium bioassay records located in the DOE files for the [less than 9] workers that were mostly like required to have bioassays, as per the 1993 *Internal Monitoring Procedure* document (Reciniello 1993) is shown in Figures 2a and 2b.

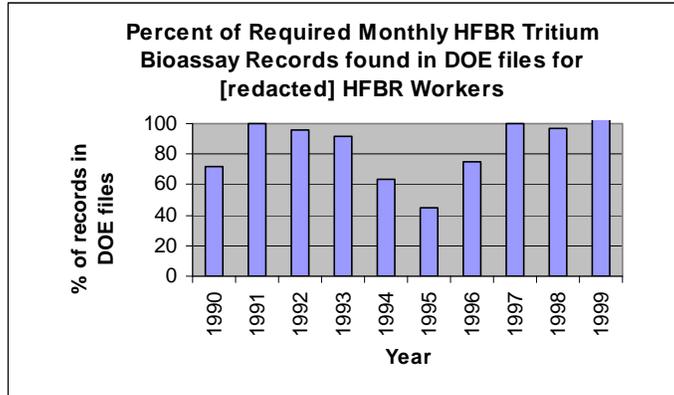


Figure 2a. Percent of Recorded Monthly Tritium Bioassay for [less than 9] Workers (2012)

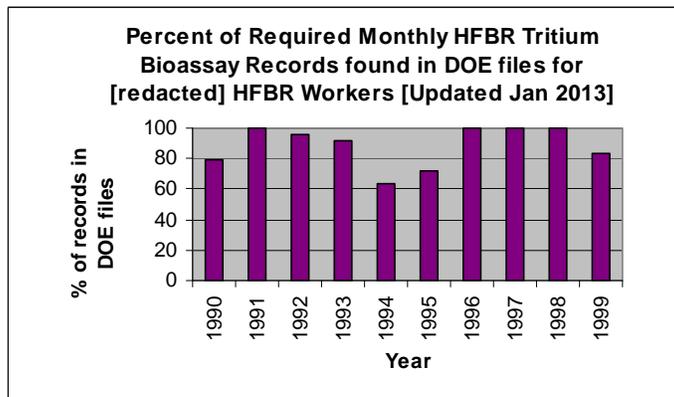


Figure 2b. Percent of Recorded Monthly Tritium Bioassay for [less than 9] Workers (2013)

Records of WBCs

A plot of the number of yearly WBC records located in the DOE files for the [less than 9] workers that **may** have required yearly WBCs is shown in Figures 3a and 3b.

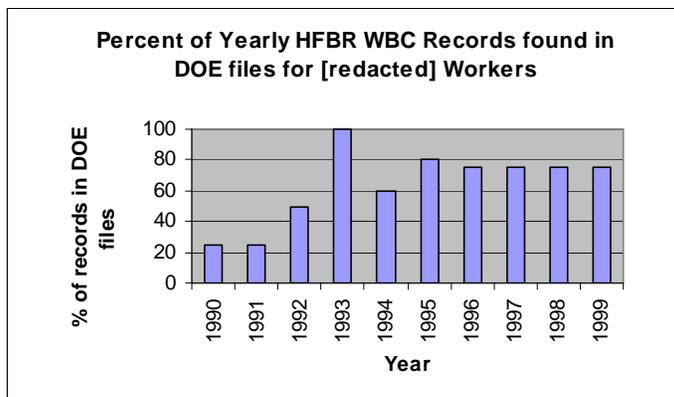


Figure 3a. Percent of Recorded WBC for [less than 9] Workers (2012)

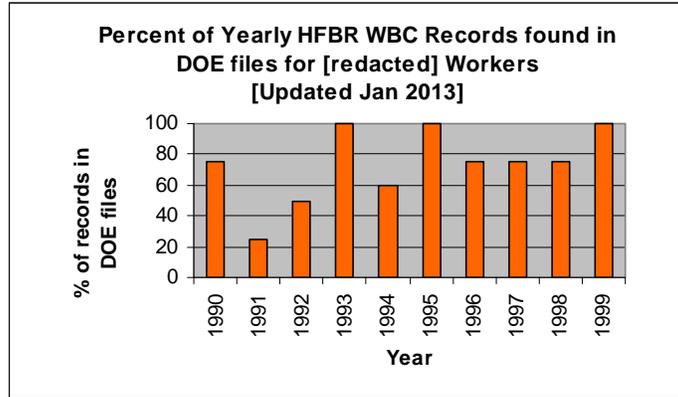


Figure 3b. Percent of Recorded WBC for [less than 9] Workers (2013)

A plot of the number of records of yearly WBCs located in the DOE files for the [less than 9] workers that were most likely required to have yearly WBCs, as per the 1993 *Internal Monitoring Procedure* document (Reciniello 1993) is shown in Figures 4a and 4b.

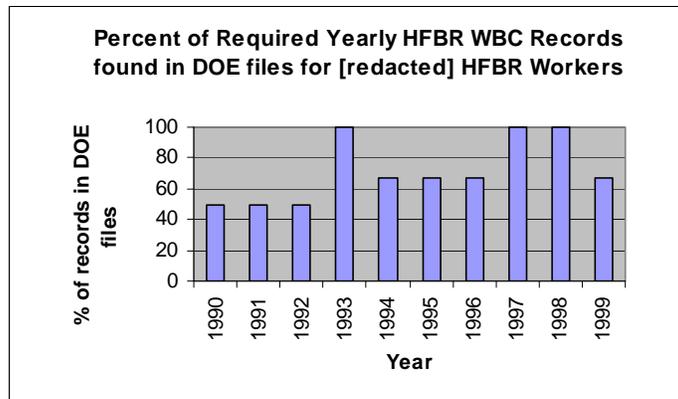


Figure 4a. Percent of Recorded WBCs for [less than 9] Workers (2012)

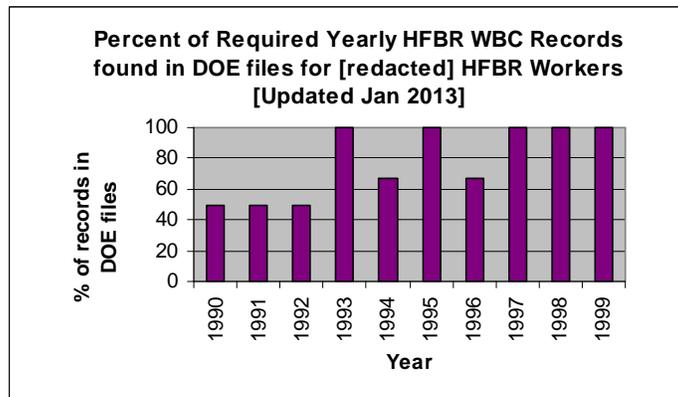


Figure 4b. Percent of Recorded WBCs for [less than 9] Workers (2013)

CONCLUSIONS

NIOSH recommended the BNL SEC end in 1993, based on the assumption that bioassay data became more complete after 1993. SC&A had found that the previously available data indicated a question of completeness, especially for the years 1994, 1995, and 1996. An analysis of the currently available data indicates that, while the recent BNL bioassay data fill in some of the holes after 1993, it still leaves an indication of lack of completeness for the years 1994, 1995, and 1996. As stated earlier, the many facets of the BNL site make it difficult to quantify the completeness of bioassay data, and further efforts would not likely provide a sharp cutoff date; therefore, SC&A recommends that in the interest of claimant favorability, the cutoff date should be 1996, rather than 1993.

REFERENCES

NIOSH 2009. *SEC Petition Evaluation Report, Petition SEC-00113*, Rev. 0. National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, Cincinnati, Ohio. September 29, 2009.

NIOSH 2012. *SEC Petition Evaluation Report, Petition SEC-00196*, Rev. 0. National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, Cincinnati, Ohio. January 5, 2012.

NIOSH 2013. *Response to SC&A's Evaluation of Brookhaven National Laboratory SEC End Date*, by Grady Calhoun. National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, Cincinnati, Ohio. January 4, 2013.

Reciniello, 1993, *Internal Monitoring*, Procedure RD APM 8.7; R. Reciniello; Brookhaven National Laboratory; August 13, 1993; SRDB Ref ID: 55393

SC&A 2012. *SC&A's Evaluation of SEC-00196 End Date of 1993*. SC&A, Inc., Vienna, Virginia, and Saliant, Inc., Jefferson, Maryland. May 22, 2012.