
DRAFT

**REPORT TO THE ADVISORY BOARD
ON RADIATION AND WORKER HEALTH**

National Institute for Occupational Safety and Health

**COMPARISON OF SC&A'S BLIND DOSE RECONSTRUCTION
TO NIOSH'S DOSE RECONSTRUCTION OF CASE # [REDACT]
FROM THE NEVADA TEST SITE**

**Contract No. 211-2014-58081
SCA-TR-DRC2015-CN [Redact]**

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S. Cohen & Associates: <i>Technical Support for the Advisory Board on Radiation & Worker Health Review of NIOSH Dose Reconstruction Program</i>	Document No. SCA-TR-DRC2015-CN[Redact]
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ABBREVIATIONS AND ACRONYMS

Advisory Board	Advisory Board on Radiation and Worker Health
BCC	basil cell carcinoma
CADW	chronic annual dose workbook
CATI	Computer-Assisted Telephone Interview
DCF	dose conversion factors
DOE	(U.S.) Department of Energy
DOL	(U.S.) Department of Labor
DR	dose reconstruction
ENSD	entrance skin dose
EE	energy employee
GSD	geometric standard deviation
ICD	International Classification of Diseases
ICRP	International Commission on Radiological Protection
IREP	Interactive RadioEpidemiological Program
keV	kilo electron volt; 1,000 electron volts
LAT	lateral
LOD	limit of detection
NIOSH	National Institute for Occupational Safety and Health
NTS	Nevada Test Site
PA	posterior-anterior
POC	probability of causation
RBM	red bone marrow
rem	Roentgen equivalent man
SC&A	S. Cohen and Associates (SC&A, Inc.)
SCC	squamous cell carcinoma
SEC	Special Exposure Cohort
TBD	technical basis document

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1.0 RELEVANT BACKGROUND INFORMATION

Under Contract No. 211-2014-58081, SC&A was tasked by the Advisory Board on Radiation and Worker Health (Advisory Board) to perform six blind dose reconstructions (DRs) at the July 2014, DR Subcommittee meeting. SC&A was provided all of the Department of Energy (DOE) dosimetry records; the Department of Labor (DOL) correspondence, forms, and medical records; and the Computer-Assisted Telephone Interview (CATI) Reports that were made available to the National Institute for Occupational Safety and Health (NIOSH) for constructing doses in behalf of these cases. SC&A used an independent approach to reconstruct occupational external and internal doses for the cases using the available dosimetry records and current guidance from NIOSH; including the spreadsheets and other tools developed by NIOSH to calculate the doses.

On February 12, 2015, SC&A submitted to the Advisory Board and NIOSH, a memorandum containing the summary results of our blind DR in behalf of Case # [Redact]. After reviewing our draft DR blind report, it was determined that there was a slight error in calculating external doses for two of the eight cancers. Therefore, SC&A resubmitted the corrected total doses and resultant Probability of Causation (POC) for this case in a memo dated March 16, 2015. The complete DR report titled *SC&A's Dose Reconstruction of Case # [Redact] from the Nevada Test Site* (SCA-TR-BDR2015-CN[Redact]), which provides the assumptions and methodologies used to derive occupational radiation doses and resultant POC, is included herein as Addendum A.

In this report, SC&A presents a comparison between NIOSH's and SC&A's DR methodologies, doses, and resultant POC values for Case # [Redact]. Table 1-1 summarizes the external and internal occupational doses calculated by SC&A and the NIOSH-assigned doses for the eight cancers diagnosed in behalf of Case # [Redact]. A detailed comparison of the two methodologies used to calculate doses in behalf of this case is presented in Section 2. Section 3 of this report provides Summary Conclusions.

It should be noted that, where appropriate, an explanation is provided regarding the differences in doses and why they occurred; however, SC&A does not make any value judgments regarding which among them may be the more preferred approach. It is our position that further discussions are best addressed by the DR Subcommittee.

Table 1-1. Comparison of SC&A’s Blind Dose Reconstruction to NIOSH’s Dose Reconstruction for Case # [Redact]

	SC&A #1 [redact] Dose (rem)	NIOSH #1 [redact] Dose (rem)	SC&A #2 Scalp [redact] Dose (rem)	NIOSH #2 Scalp [redact] Dose (rem)	SC&A #3 Prostate [redact] Dose (rem)	NIOSH #3 Prostate [redact] Dose (rem)	SC&A #4 Neck [redact] Dose (rem)	NIOSH #4 Neck [redact] Dose (rem)	SC&A #5 Neck [redact] Dose (rem)	NIOSH #5 Neck [redact] Dose (rem)	SC&A #6 [redact] Dose (rem)	NIOSH #6 [redact] Dose (rem)	SC&A #7 Thromb. [redact] Dose (rem)	NIOSH #7 Thromb. [redact] Dose (rem)	SC&A #8 [redact] Dose (rem)	NIOSH #8 [redact] Dose (rem)
External Dose																
▪ Recorded Dose:																
30–250 keV Photons	-	-	0.011	0.011	0.014	0.018	0.011	0.011	0.011	0.011	0.011	0.011	0.007	.014	0.011	0.011
>250 keV Photons	-	-	0.039	0.039	0.034	0.051	0.039	0.039	0.039	0.039	0.039	0.039	0.028	0.051	0.039	0.039
▪ Missed Dose:																
>15 keV Electrons	-	-	0.015	0.015	-	-	0.015	0.015	0.015	0.015	0.015	0.015	-	-	0.015	0.015
30–250 keV Photons	2.140	2.280	3.550	3.600	0.972	0.969	3.550	3.600	3.550	3.600	3.550	3.600	0.489	0.779	3.550	3.600
>250 keV Photons	-	-	-	-	2.445	2.761	-	-	-	-	-	-	1.994	2.761	-	-
▪ Occup. Medical Dose:																
30–250 keV Photons	0.113	0.113	0.042	0.042	0.003	0.003	0.069	0.069	0.069	0.069	0.031	0.032	0.021	0.021	0.032	0.032
Internal Dose, environ.:																
Alpha	0.001	0.001	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.208	0.208	0.007	0.007
>250 keV Photons	0.001	0.001	0.001	0.001	0.004	0.004	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.003	0.001	0.001
>15 keV Electrons	0.001	0.001	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.023	0.023	0.002	0.002
Cancer total dose:	2.256	2.396	3.666	3.716	3.480	3.814	3.694	3.744	3.694	3.744	3.656	3.708	2.773	3.859	3.658	3.708
Cancer POC:	4.31%	4.31%	12.66%	10.88%	3.45%	3.83%	10.52%	11.24%	10.67%	11.16%	2.29%	2.32%	3.55%	4.74%	2.27%	2.23%
Combined POC:	SC&A	40.59%	NIOSH		41.17%											

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2.0 COMPARISON OF METHODOLOGY/DOSES USED BY SC&A AND NIOSH FOR CASE # [Redact]

Case # [Redact] represents an energy employee (EE) who worked as a [Redact] at the Nevada Test Site (NTS) during the following periods:

- [Redact]–[Redact]
- [Redact]–[Redact]
- [Redact]–[Redact]
- [Redact]–[Redact]

The EE was diagnosed with eight cancers during the period [Redact]–[Redact], as summarized in Table 2-1:

Table 2-1. Summary of Cancers

Cancer	Cancer Site	ICD-9 Code	Year
#1	Malignant melanoma [Redact]	172.5	[Redact]
#2	BCC [Redact] scalp	173.41	[Redact]
#3	Prostate	185	[Redact]
#4	BCC [Redact] neck	173.41	[Redact]
#5	Melanoma [Redact] neck	172.4	[Redact]
#6	SCC in-situ [Redact]	232.32	[Redact]
#7	Essential thrombocytosis	238.71	[Redact]
#8	SCC in-situ [Redact]	232.3	[Redact]

BCC = Basal cell carcinoma, SCC = Squamous cell carcinoma

This was a partial DR, because not all internal doses could be assigned prior to 1993, as per the NTS Special Exposure Cohort (SEC), which is discussed in ORAUT-TKBS-0008-5, page 12:

NIOSH has determined, and the Secretary of Health and Human Services has concurred, that in the absence of bioassay results for the worker, internal doses cannot be reconstructed between 1951 and 1962 inclusive for an Energy Employee (EE). Based on the SEC petition evaluation, internal dose is not to be reconstructed for work before 1963 unless a worker has specific bioassay results that can be directly related to an event or incident.

NIOSH has determined, and the Secretary of Health and Human Services has concurred that NIOSH lacks sufficient information that would allow it to adequately estimate internal exposures during the period 1963 through 1992.

The EE was employed at NTS during the SEC period; however, since at least one of the cancers was a non-presumptive cancer, a DR was required.

For calculating radiation dose from employment at NTS, both DR methods primarily relied on guidance in the NTS Technical Basis Document (TBD) (issued as six separate documents numbered ORAUT-TKBS-0008-1 through ORAUT-TKBS-0008-6). Using the guidance

provided in these documents, along with the employee’s dosimetry records, SC&A employed a best-estimate approach for calculating annual external and internal doses. NIOSH employed a combination of best-estimate and over-estimate approaches for calculating annual external doses and a best-estimate approach for internal doses. Both SC&A and NIOSH derived a probability of causation (POC) of <50%.

A summary of the documents, assumptions, and dose parameters used by each DR method is provided in Tables 2-2 and 2-3 below:

Table 2-2. Comparison of External Dose Data and Assumptions Used by SC&A and NIOSH

Parameters	SC&A	NIOSH
<i>External Recorded Dose:</i>		
Records/Guidance Documents	DOE records, NTS TBD-6, OCAS-IG-001, OTIB-0005, & OTIB-0017.	DOE records, NTS TBD-6, OCAS-IG-001, OTIB-0005, OTIB-0017, & the NTS Dose Calculation Workbook 1.04.
Dose Determination Approach	Best-estimate methodology.	Best-estimate and some over-estimate methodology.
Work Locations	[Redact] & [redact].	[Redact] & [redact].
Energy Range	22% 30–250 keV 78% >250 keV	22% 30–250 keV 78% >250 keV
Exposure Organ DCFs	<u>Prostate:</u> 30–250 keV DCF = 1.244 >250 keV DCF = 0.883 <u>RBM:</u> 30–250 keV DCF = 0.626 >250 keV DCF = 0.720 <u>Skin:</u> 30–250 keV DCF = 1.00 >250 keV DCF = 1.00	<u>Prostate:</u> 30–250 keV DCF = 1.244 >250 keV DCF = 1.00 <u>RBM:</u> 30–250 keV DCF = 1.00 >250 keV DCF = 1.00 <u>Skin:</u> 30–250 keV DCF = 1.00 >250 keV DCF = 1.00
Photon Dosimetry Correction Factor	1.25 <1966	1.25 <1966
ICRP-60 Correction F.	NA	NA
Neutron Fading F.	NA	NA
Dose Distribution	<u>Prostate:</u> Normal; 30% uncertainty. <u>RBM:</u> Normal; 30% uncertainty. <u>Skin:</u> Normal; 30% uncertainty.	<u>Prostate:</u> Constant, no uncertainty. <u>RBM:</u> Constant, no uncertainty. <u>Skin:</u> Constant, no uncertainty.
<i>External Missed Dose:</i>		
Records/Guidance Documents	DOE records, NTS TBD-6, OCAS-IG-001, OTIB-0005, OTIB-0017, & PROC-0006.	DOE records, NTS TBD-6, OCAS-IG-001, OTIB-0005, OTIB-0017, PROC-0006, & the NTS Dose Calculation Workbook 1.04.
Dose Determination Approach	Best-estimate methodology.	Best-estimate and some over-estimate methodology.

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Table 2-2. Comparison of External Dose Data and Assumptions Used by SC&A and NIOSH

Parameters	SC&A	NIOSH
No. of zeros	<u>Prostate:</u> 207 photons <u>RBM:</u> 207 photons <u>Skin:</u> 119 or 207 photons, 1 shallow.	<u>Prostate:</u> 207 photons <u>RBM:</u> 207 photons <u>Skin:</u> 119 or 207 photons, 1 shallow.
LOD Value	Skin, prostate, & RBM: 1962–Feb 1971: 0.040 rem Mar 1971–1982: 0.030 rem	Skin: 1962–1971; 0.040 rem Skin: 1972–1982; 0.030 rem Prostate & RBM: 1962–1970; 0.040 rem Prostate & RBM: 1971–1982; 0.030 rem
Energy Range	<u>Prostate:</u> 22% 30–250 keV 78% >250 keV <u>RBM:</u> 22% 30–250 keV 78% >250 keV <u>Skin:</u> 100% 30–250 keV	<u>Prostate:</u> 22% 30–250 keV 78% >250 keV <u>RBM:</u> 22% 30–250 keV 78% >250 keV <u>Skin:</u> 100% 30–250 keV
Exposure Organ DCFs	<u>Prostate:</u> 30–250 keV DCF = 1.244 >250 keV DCF = 0.883 <u>RBM:</u> 30–250 keV DCF = 0.626 >250 keV DCF = 0.720 <u>Skin:</u> 30–250 keV DCF = 1.00	<u>Prostate:</u> 30–250 keV DCF = 1.244 >250 keV DCF = 1.00 <u>RBM:</u> 30–250 keV DCF = 1.00 >250 keV DCF = 1.00 <u>Skin:</u> 30–250 keV DCF = 1.00
Photon Dosimetry Correction Factor	1.25 <1966	1.25 <1966
ICRP-60 Correction F.	NA	NA
Neutron Fading F.	NA	NA
Dose Distribution	Lognormal with GSD = 1.52	Lognormal with GSD = 1.52
Coworker Dose:		
	NA	NA
Shallow Dose:		
Records/Guidance Documents	DOE records, NTS TBD-6, OCAS-IG-001, OTIB-0005, & OTIB-0017.	DOE records, NTS TBD-6, OCAS-IG-001, OTIB-0005, OTIB-0017, & the NTS Dose Calculation Workbook 1.04.
Energy Range	>15 keV electrons	>15 keV electrons
Exposure Organ DCFs	1.00	1.00
Dose Distribution	Lognormal with 1.520 uncertainty.	Lognormal with 1.520 uncertainty.
Onsite External Dose:		
	NA	NA
Occupational Medical Dose:		
Guidance Documents	NTS TBD-3, ORAUT-OTIB-0006.	NTS TBD-3, ORAUT-OTIB-0006.
Frequency	3 documented x-ray exams.	3 documented x-ray exams
Dose Distribution	Normal; GSD = 30%.	Normal; GSD = 30%.

NA = not applicable or not analyzed.

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Table 2-3. Comparison of Internal Dose Data and Assumptions Used by SC&A and NIOSH

Parameters	SC&A	NIOSH
<i>Bioassay Internal:</i>		
Records/Guidance Documents	Bioassay records not available.	Bioassay records not available.
<i>Environmental Internal:</i>		
Records/Guidance Documents	NTS TBD-4, TBD-5, OTIB-0005, & CADW.	NTS TBD-4, TBD-5, OTIB-0005, & CADW.
Dose Determination Approach	Best-estimate methodology.	Best-estimate methodology.
Solubility Type	Site default.	Site default.
Dose Distribution	Constant, with zero uncertainty.	Constant, with zero uncertainty.

2.1 OCCUPATIONAL EXTERNAL DOSE CALCULATIONS

2.1.1 Recorded Photon and Electron Doses

The DOE files contained monthly badge readings. Most of the recorded readings were zero with the only positive reading recorded in [redact]. All recorded shallow doses were zero or <LOD/2.

Comparison of SC&A's and NIOSH's Methods and Doses for Recorded Photons

Both DR methods assumed the EE worked primarily in the NTS [redact]. Therefore, the photon energy fraction of 22% 30–250 keV and 78% >250 keV was assumed, as specified in ORAUT-TKBS-0008-6, Table 6-13, page 50, for areas associated with routine [redact] operations. Both SC&A and NIOSH selected DCFs that reflected Exposure (R) to Organ Dose (H_T) values from OCAS-IG-001. The urinary bladder was used as the surrogate organ for the prostate (ORAUT-OTIB-0005, page 20), and the red bone marrow (RBM) was used as the surrogate organ for the thrombocytosis (ORAUT-OTIB-0005, page 38). SC&A and NIOSH used the mode DCF values listed in OCAS-IG-001; it did not appear that NIOSH used Monte Carlo-generated DCFs in this case.

Using the EE's dosimetry records and above-cited parameters, SC&A and NIOSH assigned photon and electron recorded doses, as shown in Table 2-4. The slightly larger photon doses assigned to the prostate and RBM by NIOSH reflects NIOSH's use of a conservative DCF of 1.00 when OCAS-IG-001 recommended a DCF of <1.00. In addition, NIOSH used a constant distribution for the prostate and RBM doses; therefore, the derived dose was multiplied by an uncertainty factor of 1.3 before it was entered into the IREP Input tables. SC&A used the DCFs as recommended in OCAS-IG-001, and a normal distribution, with the 30% uncertainty entered into Parameter 2 of the IREP Input tables.

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Table 2-4. Comparison of Recorded Photon Doses

	SC&A (rem)	NIOSH (rem)
Prostate total recorded photon dose	0.048	0.069
RBM total recorded photon dose	0.035	0.065
Skin total recorded photon dose – 1979*	0.050	0.050

*There was only recorded dose during 1979.

2.1.2 Missed Photon and Electron Doses

Missed photon and electron doses were assigned by both SC&A and NIOSH.

Comparison of SC&A’s and NIOSH’s Methods Used to Assign Missed Dose

SC&A analyzed the number of actual zeros and potential zeros based on a monthly badge exchange cycle using the guidance in OCAS-IG-001, page 16, to arrive at a total of **207 zeros** (or <LOD/2 values) for photons, and **1 zero** (or <LOD/2 value) for electrons; this matched the number of zeros used by NIOSH in this case. SC&A and NIOSH used the annual number of zeros, the LOD/2 value, the DR parameters as listed above, and the applicable DCFs to determine the annual missed photon and electron doses.

SC&A’s Missed Photon Dose

SC&A used the following methods to derive missed photon dose:

- DCFs as recommended in OCAS-IG-001 and ORAUT-OTIB-0017.
- For the skin cancer diagnosed in [[redact]], SC&A used 6 zeros to derive the missed photon dose because the cancer was diagnosed on [[redact]].
- For [[redact]], SC&A applied the dosimetry limit of detection (LOD) value of 0.040 rem for the months of January and February [[redact]], and the value of 0.030 rem for the months of March through December [[redact]].

NIOSH’s Missed Photon Dose

NIOSH used the following methods to derive missed photon dose:

- DCFs as recommended in OCAS-IG-001, or a value of 1.00, whichever was greater.
- For the skin cancer diagnosed in [[redact]], NIOSH used the entire year of 12 zeros to derive the missed photon dose for the cancer that was diagnosed on [[redact]].
- For [[redact]], NIOSH applied the dosimetry LOD value of 0.040 rem for 12 months to some organs, and the value of 0.030 rem for 12 months to other organs.

Comparison of SC&A’s and NIOSH’s Missed Photon Doses

SC&A and NIOSH assigned missed photon and electron doses as shown in Table 2-5. The larger missed photon doses assigned by NIOSH were due to the fact that:

- NIOSH always applied DCF ≥ 1.00 for all organs for all photon energies, whereas SC&A used the DCFs recommended in OCAS-IG-001.

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- NIOSH applied 12 zeros to the [Redact] skin cancer that was diagnosed on [Redact], which was greater than the dose derived by SC&A using 6 zeros.
- NIOSH applied the larger dosimeter LOD value of 0.040 rem for the entire year of [Redact] to missed skin doses, whereas SC&A applied the larger dosimeter LOD value for only the months of January and February of [Redact], and the lower value thereafter, as recommended in ORAUT-TKBS-0008-6, Table 6-1, page 19.
- NIOSH applied the smaller dosimeter LOD value of 0.030 rem for the entire year of [Redact] to prostate and RBM missed doses, whereas SC&A applied the larger dosimeter LOD value for the months of January and February of [Redact], and the lower value thereafter, as recommended in ORAUT-TKBS-0008-6, Table 6-1, page 17.

Table 2-5. Comparison of Missed Photon and Electron Doses

	SC&A (rem)	NIOSH (rem)
Prostate total missed photon dose	3.417	3.730
RBM total missed photon dose	2.483	3.540
Skin ([Redact]) total missed photon dose	2.140	2.280
Skin ([Redact]-[Redact]) total missed photon dose	3.550	3.600
Skin total missed electron dose ([Redact]-[Redact])	0.015	0.015

Both DR methods entered missed photon and electron doses into the Interactive Radio-Epidemiological Program (IREP) as a lognormal distribution with an uncertainty of 1.520.

2.1.3 Onsite Ambient Doses

As per ORAUT-PROC-0060, page 14, external ambient dose should not be applied when the EE is assigned recorded and missed doses. Therefore, neither SC&A nor NIOSH assigned external ambient dose in this case, since the EE was assigned recorded and missed doses for all years of employment.

2.1.4 Occupational Medical Doses

Both DR methods:

- Calculated an occupational medical dose from diagnostic x-ray procedures required as a condition of employment.
- Used the number and type of x-ray exams as provided in the EE's DOE files.
- Assigned doses for 3 posterior-anterior (PA) view and 2 lateral (LAT) view x-ray exams.
- Used doses recommended in Tables 3-3 and 3-5 of ORAUT-TKBS-0008-3 for PA and LAT views.
- Assigned LAT view doses for x-ray exams performed after 1972, as per Table 3-5 of ORAUT-TKBS-0008-3.

Comparison of SC&A's and NIOSH's Medical X-ray Assigned Doses

SC&A and NIOSH assigned identical x-ray doses. Both DR methods used the pre-calculated skin dose table (Table 3-5 in ORAUT-TKBS-0008-3) for determining the various skin doses. Using data from this table provides for greater consistency in DR results as compared to manually calculating skin doses using the entrance skin dose (ENSD) and applying various modification factors for a particular skin location outside the primary beam, as is required if using values listed in the tables in Attachment C of ORAUT-PROC-0061. There is, however, still some subjectivity in the location selected for a given cancer site when using Table 3-5 of ORAUT-TKBS-0008-3. For example, the [redact] or scalp is not listed in Table 3-5; therefore, either the left side of the face or the eye/brain could be used as a possible surrogate organ for the [redact], and the right/left temple or the back of the neck are possible surrogate organs for the scalp. This can lead to some differences in the assigned dose for various locations. However, the x-ray doses to locations outside the primary beam are relatively small and the selection of surrogate organs generally does not impact the assigned dose significantly.

Table 2-6 shows a comparison of the occupational medical doses calculated by the two DR methods.

Table 2-6. Comparison of Occupational Medical Doses

	SC&A (rem)	NIOSH (rem)
Skin-[redact] [redact]	0.133	0.133
Skin-scalp [redact]	0.042	0.042
Prostate [redact]	0.003	0.003
Skin-neck (2) [redact]	0.069	0.069
Skin-[redact] [redact]	0.031	0.032
RBM [redact]	0.021	0.021
Skin-[redact] [redact]	0.032	0.032

Both methods entered annual doses into IREP as a normal distribution with an uncertainty of 30%.

2.2 OCCUPATIONAL INTERNAL DOSES

There were no recorded bioassay results for this EE in the DOE records. According to the information provided in the Site Profile for the NTS SEC (ORAUT-TKBS-0008-5, page 12), internal radiation doses at NTS cannot be reconstructed prior to 1993. Therefore, because no bioassay data are available for the EE, no techniques can be employed to derive an estimate of internal dose, except for internal dose from the intake of ambient air activity.

2.2.1 Internal Environmental Dose

Both SC&A and NIOSH used the NTS site default radionuclides and associated intakes by inhalation as a function of year (ORAUT-TKBS-0008-4, Table A-7, page 67) and the maximum intake values for ingestion (ORAUT-TKBS-0008-4, Table A-12, page 77) for the years of employment in the chronic annual dose workbook (CADW) to derive a best estimate of the annual doses to the eight cancers. As per ORAUT-OTIB-0005 guidelines, SC&A used *all male*

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genitalia as the surrogate organ for the prostate (page 20); the *bone* and also *lymphoma & multiple myeloma* for the thrombocytosis (page 38); and the corresponding type of skin cancer (i.e., malignant melanoma, BCC, or SCC) for each skin cancer site in the CADW. This evaluation included chronic inhalation and ingestion of NTS environmental Am-241, Co-60, Cs-137, Eu-152, Eu-154, Eu-155, Pu-238, Pu-239, Pu-240, and Sr-90 for full years from 1963 to 1982 (1963 was the first year that environmental data were available).

Essential thrombocytosis (ICD-9 Code 238.71)

According to ORAUT-OTIB-0005, page 38, for the essential thrombocytosis cancer (ICD-9 Code 238.71), both the bone and the lymphoma & multiple myeloma IREP models should be run, and the one that produces the greater dose used in the DR. Both SC&A and NIOSH found that the bone IREP model provided for the greater dose and used its associated annual doses in the IREP Input table.

Type SS Plutonium

The EE's cancer sites involved systemic organs. ORAUT-OTIB-0049, Table 4-8, page 17, recommends when assigning plutonium doses using measured air concentrations to systemic organs that no Type SS adjustment be made, because more soluble Types M or S plutonium provide for greater doses to these organs.

Table 2-7 shows a comparison of the internal doses calculated by the two DR methods.

Table 2-7. Comparison of Internal Environmental Doses

	SC&A (rem)	NIOSH (rem)
Skin-[redact] [redact]	0.003	0.003
Skin-scalp [redact]	0.009	0.009
Prostate [redact]	0.013	0.013
Skin-neck (2) [redact]	0.009	0.009
Skin-[redact] [redact]	0.010	0.010
RBM [redact]	0.234	0.234
Skin-[redact] [redact]	0.011	0.011

Both methods entered annual doses into IREP as a constant with zero uncertainty.

3.0 SUMMARY CONCLUSIONS

Total external and internal doses and resultant POCs calculated by NIOSH and SC&A in behalf of Case # [Redact] are presented in Table 3-1 for comparison.

Table 3-1. Comparison of SC&A’s and NIOSH’s Total External and Internal Dose Estimates for the 8 Cancers

	SC&A (rem)	POC	NIOSH (rem)	POC
Skin-[redact] [redact]	2.256	4.31%	2.396	4.31%
Skin-scalp [redact]	3.666	12.66%	3.716	10.88%
Prostate [redact]	3.480	3.45%	3.814	3.83%
Skin-neck [redact] (1.73.41)	3.694	10.52%	3.744	11.24%
Skin-neck [redact] (1.73.4)	3.694	10.67%	3.744	11.16%
Skin-[redact] [redact]	3.656	2.29%	3.708	2.32%
RBM [redact]	2.773	3.55%	3.859	4.74%
Skin-[redact] [redact]	3.658	2.27%	3.708	2.23%
Combined POC		40.59%		41.17%

As shown in Table 3-1, SC&A’s and NIOSH’s dose estimates and resulting POCs are in close agreement. The main difference was in external doses and resulted due to NIOSH applying values all ≥ 1.00 for DCFs, whereas SC&A used the mode values as listed in OCAS-IG-001.

A more detailed discussion of variables that contributed to key differences in dose assignments is presented below.

- Dose Reconstruction Methodology
 - SC&A employed a best-estimate approach to dose reconstruction throughout.
 - NIOSH employed best-estimate and some over-estimate approaches to external doses, and a best-estimate approach to internal dose reconstruction.
- Dose Conversion Factors
 - SC&A applied DCFs as recommended in ORAUT-OTIB-0017 and OCAS-IG-001.
 - NIOSH applied DCFs using ORAUT-OTIB-0017 and OCAS-IG-001 data; however, when any of the DCFs were < 1.0 , NIOSH used a DCF of 1.00 as an over-estimating methodology.
 - This difference in methodology resulted in NIOSH assigning larger recorded and missed external doses in some instances.
- Dose Distribution
 - SC&A used the following dose distributions:
 - Recorded photon dose; normal distribution with 30% uncertainty
 - Missed photon dose; lognormal distribution with 1.50 GSD
 - Medical x-ray dose; normal distribution with 30% uncertainty
 - Internal environmental dose; constant with no uncertainty.

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- NIOSH used the following dose distributions:
 - Recorded photon skin dose; constant with no uncertainty
 - Recorded prostate and RBM photon doses; constant (with dose multiplied by a 1.3 uncertainty factor) with no uncertainty in the distribution
 - Missed photon dose; lognormal distribution with a 1.50 GSD
 - Medical x-ray dose; normal distribution with a 30% uncertainty
 - Internal environmental dose; constant with no uncertainty.
- The difference in distributions for recorded doses resulted in NIOSH deriving greater recorded doses than SC&A in some instances.
- Assignment of Missed External Dose
 - Both SC&A and NIOSH derived the same number of missed photon and electron doses.
 - SC&A applied the dosimeter LOD value of 0.040 rem for the months of January and February of [Redact], and the lower value of 0.030 rem thereafter; as recommended in ORAUT-TKBS-0008-6, Table 6-1, page 19.
 - NIOSH applied the larger dosimeter LOD value of 0.040 rem for the entire year of [Redact] to missed skin dose, but the lower LOD value of 0.030 rem to the prostate and RBM for the entire year of [Redact].
 - This created some differences in the derived missed photon doses for the year [Redact], and the resulting total doses; this varied depending on the organ.
- Assignment of [Redact] Skin Cancer Missed Photon Dose
 - SC&A used 6 zeros for missed photon dose for the [Redact], skin cancer.
 - NIOSH used 12 zeros for missed photon dose for the [Redact], skin cancer.
 - This difference in methodology resulted in NIOSH assigning a greater missed photon dose for the [Redact] skin cancer, as compared to SC&A's dose value.
- Assignment of Onsite Ambient Dose
 - Neither SC&A nor NIOSH assigned onsite external ambient dose because the EE was assigned recorded or missed doses for the entire employment period at NTS.
- Assignment of Occupational Medical X-ray Dose
 - Both SC&A and NIOSH used the number and view of recorded exams in the DOE files for this EE to assign medical x-ray doses.
 - Both SC&A and NIOSH used the dose tables in NTS ORAUT-TKBS-0008-3 to assign doses.
 - Medical dose assigned by SC&A and NIOSH for the various cancers closely matched.

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- Assignment of Internal Dose

- Both SC&A and NIOSH used the best-estimate approach to assign environmental intakes/doses.
- Both SC&A and NIOSH used the NTS environmental default intakes to assign environmental intakes/doses.
- Internal doses assigned by SC&A and NIOSH for the various cancers were identical.

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ADDENDUM A: SC&A'S BLIND DR REPORT FOR CASE # [REDACT]

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DRAFT

**REPORT TO THE ADVISORY BOARD
ON RADIATION AND WORKER HEALTH**

National Institute of Occupational Safety and Health

**BLIND DOSE RECONSTRUCTION OF CASE # [REDACT]
FROM THE NEVADA TEST SITE**

**Contract No. 211-2014-58081
SCA-TR-BDR2015-CN [Redact]**

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February 2015

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S. Cohen & Associates: <i>Technical Support for the Advisory Board on Radiation & Worker Health Review of NIOSH Dose Reconstruction Program</i>	Document No. SCA-TR-BDR2015-CN[Redact]
	Effective Date: Draft – February 12, 2015
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Task Manager: _____ Date: _____ Douglas Farver, MS	Supersedes: N/A
Project Manager: _____ Date: _____ John Stiver, MS, CHP	Reviewer: Rose Gogliotti Kathleen Behling Douglas Farver John Stiver

Record of Revisions

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ABBREVIATIONS AND ACRONYMS

AP	anterior-posterior
BCC	basil cell carcinoma
CADW	chronic annual dose workbook
CATI	Computer-Assisted Telephone Interview
D.D.	deep dose
DCF	dose conversion factors
DOE	(U.S.) Department of Energy
DOL	(U.S.) Department of Labor
DR	dose reconstruction
EE	energy employee
ICD	International Classification of Diseases
IREP	Interactive RadioEpidemiological Program
keV	kilo electron volt; 1,000 electron volts
LAT	lateral
LOD	limit of detection
NIOSH	National Institute for Occupational Safety and Health
NTS	Nevada Test Site
PA	posterior-anterior
POC	probability of causation
RBM	red bone marrow
rem	Roentgen equivalent man
SC&A	S. Cohen and Associates (SC&A, Inc.)
SCC	squamous cell carcinoma
SEC	Special Exposure Cohort
TBD	technical basis document

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1.0 SUMMARY BACKGROUND INFORMATION

This report presents the results of an independent blind dose reconstruction (DR) performed by SC&A for an energy employee (EE) who worked as a [redact] at the Nevada Test Site (NTS) during the following periods:

- [redact]–[redact]
- [redact]–[redact]
- [redact]–[redact]
- [redact]–[redact]

The EE was diagnosed with eight cancers during the period [redact]–[redact], summarized in Table 1:

Table 1. Summary of Cancers

Cancer	Cancer Site	ICD-9 Code	Year
#1	Malignant melanoma [redact]	172.5	[redact]
#2	BCC [redact] scalp	173.41	[redact]
#3	Prostate	185	[redact]
#4	BCC [redact] neck	173.41	[redact]
#5	Melanoma [redact] neck	172.4	[redact]
#6	SCC in-situ [redact]	232.32	[redact]
#7	Essential thrombocytosis	238.71	[redact]
#8	SCC in-situ [redact]	232.3	[redact]

BCC = Basal cell carcinoma, SCC = Squamous cell carcinoma

This was a partial DR, because not all internal doses could be assigned prior to 1993, as per the NTS Special Exposure Cohort (SEC), which is discussed in ORAUT-TKBS-0008-5, page 13. The EE was employed at NTS during the SEC period; however, since at least one of the cancers was a non-presumptive cancer, a DR was required.

According to Department of Labor (DOL) files and the Computer-Assisted Telephone Interview (CATI) report, the EE was a [redact] at NTS. The EE worked in the [redact] as needed. The EE was monitored for external photon exposure during most of the employment periods at NTS, but was not bioassayed.

1.1 SC&A'S BLIND DR APPROACH

SC&A reviewed all of the DOE records provided on behalf of this employee and the NIOSH procedures relevant to this case, which included the Technical Basis Document (TBD) for the NTS (issued as six separate documents numbered ORAUT-TKBS-0008-1 through ORAUT-TKBS-0008-6), ORAUT-OTIB-0005 for surrogate organs, OCAS-IG-001 for dose conversion factors (DCFs), and ORAUT-OTIB-0017 for skin doses. Using the guidance provided in these documents, along with the EE's dosimetry records, SC&A calculated reasonable, claimant-favorable annual organ doses for each of the eight cancer sites. Table 2 provides a summary of the total doses assigned to each cancer site. Appendices A-1 through A-8 provide a list of SC&A's assigned annual organ dose, and also includes the Interactive RadioEpidemiological

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Program (IREP) input parameters, such as energy range, distribution type, and uncertainty for each year.

Table 2. Summary of SC&A-Derived External/Internal Dose Estimates

	#1 - [redact] IREP entry	Dose (rem)	#2 - Scalp [redact] IREP entry	Dose (rem)	#3 - Prostate [redact] IREP entry	Dose (rem)	#4 & #5 - Neck (2) [redact] IREP entry	Dose (rem)
External Dose (Occupational)								
▪ Recorded Dose:								
30–250 keV Photons	NA	–	1	0.011	1	0.014	1	0.011
>250 keV Photons	NA	–	2	0.039	2	0.034	2	0.039
▪ Missed Dose:								
>15 keV Electrons	NA	–	3	0.015	NA	–	3	0.015
30–250 keV Photons	1–12	2.140	4–23	3.550	3–22	0.972	4–23	3.550
>250 keV Photons	NA	–	NA	–	23–42	2.445	NA	–
▪ Occupational Medical Dose:								
30–250 keV Photons	13–15	0.113	24–28	0.042	43–47	0.003	24–28	0.069
Internal Dose, Environmental:								
Alpha	16–27	0.001	29–68	0.006	48–89	0.006	29–71	0.006
>250 keV Photons	28–39	0.001	69–110	0.001	90–131	0.004	72–114	0.001
>15 keV Electrons	40–51	0.001	111–151	0.002	132–173	0.003	115–157	0.002
Total		2.256		3.666		3.480		3.694
Cancer POC		4.31%		12.66%		3.45%		10.52%

	#6 - [redact] IREP entry	Dose (rem)	#7 - Thrombocytosis [redact] IREP entry	Dose (rem)	#8 - [redact] IREP entry	Dose (rem)
External Dose (Occupational)						
▪ Recorded Dose:						
30–250 keV Photons	1	0.011	1	0.007	1	0.011
>250 keV Photons	2	0.039	2	0.028	2	0.039
▪ Missed Dose:						
>15 keV Electrons	3	0.015	NA	–	3	0.015
30–250 keV Photons	4–23	3.550	3–22	0.489	4–23	3.550
>250 keV Photons	NA	–	23–42	1.994	NA	–
▪ Occupational Medical Dose:						
30–250 keV Photons	24–28	0.031	43–47	0.021	24–28	0.032
Internal Dose, Environmental:						
Alpha	29–71	0.007	48–96	0.208	29–71	0.007
>250 keV Photons	72–114	0.001	97–145	0.003	72–114	0.001
>15 keV Electrons	115–157	0.002	146–194	0.023	115–157	0.002
Total		3.656		2.773		3.658
Cancer POC		2.29%		3.55%		2.27%

SC&A determined the probability of causation (POC) for this case using the annual doses as input into the NIOSH POC program. The doses shown in Table 2 produced a total POC of **40.59%**.

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2.0 EXTERNAL DOSES

To perform this DR, SC&A analyzed the Department of Energy DOE files containing the monthly badge readings. Most of the recorded readings were zero, with only one positive reading recorded in [redact].

SC&A used the DR parameters as recommended in ORAUT-TKBS-0008-6, which consisted of an energy range of 22% 30–250 keV photons, 78% >250 keV photons (Table 6-13, page 50) associated with routine [redact] operations, and a limit of detection (LOD) value of 0.040 rem for [redact] through [redact] and 0.030 rem for [redact] through [redact] (Table 6-1, page 17). Exposure (as opposed to deep) DCFs were used, as per ORAUT-TKBS-0008-6, pages 19–20. The urinary bladder was used as the surrogate organ for the prostate (ORAUT-OTIB-0005, page 20), and the red bone marrow (RBM) was used as the surrogate organ for the thrombocytosis (ORAUT-OTIB-0005, page 38). SC&A used DCFs as recommended in OCAS-IG-001 [for anterior-posterior (AP) geometry], which consisted of a prostate 30–250 keV photon DCF of 1.244, a >250 keV photon DCF of 0.883 (page 46), an RBM 30–250 keV photon DCF of 0.626, and a >250 keV photon DCF of 0.720 (page 47). A skin DCF of 1.00 was used, as per ORAUT-OTIB-0017, page 6.

2.1 RECORDED PHOTON DOSES

SC&A used the [redact] recorded photon dose value of 0.050 rem to assign measured photon doses using the parameters previously described. There were no electron doses recorded \geq LOD/2.

Example of [redact] recorded photon dose calculations – SC&A calculated the [redact] photon dose to the prostate as follows:

Records show that for the month of [redact], the EE received a deep dose of 0.050 rem. The photon dose was assumed to be 22% 30–250 keV and 78% >250 keV. Prostate DCFs of 1.244 for 30–250 keV photons and 0.883 for >250 keV photons were applied.

$$\begin{aligned}
 \text{30–250 keV photon dose} &= \text{D.D.} \times \text{DCF} \times \text{Energy f.} \\
 &= 0.050 \times 1.244 \times 0.22 \\
 &= 0.014 \text{ rem}
 \end{aligned}$$

$$\begin{aligned}
 \text{>250 keV photon dose} &= \text{D.D.} \times \text{DCF} \times \text{Energy f.} \\
 &= 0.050 \times 0.883 \times 0.78 \\
 &= 0.034 \text{ rem}
 \end{aligned}$$

SC&A's calculated [redact] 30–250 keV and >250 keV doses are shown in entries #1 and #2, respectively, of Appendix A-3 for the prostate.

The recorded photon doses were entered into the IREP as a normal distribution with a 30% uncertainty (ORAUT-TKBS-0008-6, page 91, was the best guidance available). SC&A assigned

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recorded doses to the eight cancer sites in entries #1–#2 of the IREP Input tables; as summarized in Table 2 above, and detailed in Appendices A-2 through A-8.

2.2 MISSED PHOTON/ELECTRON DOSES

SC&A analyzed the number of physical zeros based on a monthly badge exchange cycle and arrived at a total of 207 zeros, or <LOD/2 values, for photons. SC&A used the annual number of zeros, the LOD/2 value, the DR parameters as listed above, and the applicable DCFs to determine the annual missed photon and electron doses. SC&A noted that during the year [Redact], the LOD value changed from 0.040 rem during January and February to 0.030 rem for March through December. SC&A used the appropriate LOD values for each time period in assigning dose in the IREP tables.

Example of [Redact] missed photon dose calculations – SC&A calculated the missed [Redact] photon dose to the prostate as follows:

Records show that for the 12 months of [Redact], the EE had received a deep dose of 0.050 rem; plus, 11 zeros were recorded. The photon dose was assumed to be 22% 30–250 keV and 78% >250 keV. Prostate DCFs of 1.244 for 30–250 keV photons and 0.883 for >250 keV photons were applied. The LOD for [Redact] was 0.030 rem.

$$\begin{aligned} \text{Missed Photon Dose (30–250 keV)} &= (\# \text{ zeros} \times \text{LOD}/2) \times \text{DCF} \times \text{Energy f.} \\ &= (11 \times 0.015 \text{ rem}) \times 1.244 \times 0.22 \\ &= 0.045 \text{ rem} \end{aligned}$$

$$\begin{aligned} \text{Missed Photon Dose (>250 keV)} &= (\# \text{ zeros} \times \text{LOD}/2) \times \text{DCF} \times \text{Energy f.} \\ &= (11 \times 0.015 \text{ rem}) \times 0.883 \times 0.78 \\ &= 0.114 \text{ rem} \end{aligned}$$

The photon missed doses were entered into IREP as a lognormal distribution with an uncertainty of 1.520. The missed photon doses were assigned in the IREP Input tables, as summarized in Table 2 above, and detailed in Appendices A-1 through A-8. Missed photon dose to the skin cancer sites were assigned as 100% 30–250 keV photons, as recommended in ORAUT-OTIB-0017, page 18.

2.3 NEUTRON DOSE

SC&A found that, as a [Redact], the EE most likely would not have been exposed to significant neutron doses; therefore, as per ORAUT-TKBS-0008-6, page 43, no neutron dose was assigned in this case.

2.4 OCCUPATIONAL MEDICAL DOSE

Records

The DOE records show that the EE received a routine x-ray exam in [Redact], [Redact], and [Redact] (a [Redact] exam was performed in [Redact], but was labeled as non-occupational, and

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not included as per recommendations in ORAUT-TKBS-0008-3, page 10). Posterior-anterior (PA) views were assumed for all exams, plus lateral (LAT) views for those taken after [Redact], as per ORAUT-TKBS-0008-3, Table 3-1, page 7.

SC&A used the appropriate prostate and RBM dose values recommended in Table 3-3, page 11, of ORAUT-TKBS-0008-3 as a function of the year the exam was performed, and the appropriate skin doses from Table 3-5, page 13, for five of the six skin cancer sites. The eye/brain dose was used as a surrogate for the skin of the forehead, because of its physical location, to assign occupational medical x-ray doses in the IREP Input tables. A summary of the locations used for the cancer sites is listed below:

- #1 [Redact] – [Redact]
- #2 scalp – Right side of head
- #3 prostate – Urinary bladder/prostate
- #4 [Redact] neck – Back of neck
- #5 [Redact] neck – Back of neck
- #6 [Redact] – Eye/brain
- #7 thrombocytosis – Bone marrow (male)
- #8 [Redact] – Left side of face

The doses assigned are summarized in Table 2 above, and detailed in Appendices A-1 through A-8. The annual occupational medical dose values were entered into the IREP as a normal distribution with 30% uncertainty and a photon energy range of 30–250 keV.

2.5 ONSITE AMBIENT DOSE

As per ORAUT-PROC-0060, Attachment A, page 14, external ambient dose should not be applied when the EE is assigned recorded (and/or missed) dose. Therefore, no external ambient dose was assigned in this case since the EE was assigned recorded and/or missed doses for all years of employment.

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3.0 INTERNAL DOSES

There were no bioassay records in the EE's DOE files. Therefore, according to the NTS SEC, internal dose could not be reconstructed, except for environmental.

3.1 INTERNAL ENVIRONMENTAL INTAKES/DOSES

Intake and Doses

SC&A used the NTS default environmental intakes in the chronic annual dose workbook (CADW), located in the DR Tools folder, to derive the intakes and corresponding annual doses for each of the eight cancers. As per ORAUT-OTIB-0005 guidelines, SC&A used *all male genitalia* as the surrogate organ for the prostate (page 20); the *bone* and also *lymphoma & multiple myeloma* for the thrombocytosis (page 38); and the corresponding type of skin cancer (i.e., malignant melanoma, BCC, or SCC) for each skin cancer site in the CADW. The doses consisted of contributions from alphas, >250 keV photons, and >15 keV electron emitters.

IREP Tables

The annual doses from the CADWs were entered into the IREP Input tables (one IREP table for each cancer, for a total of eight IREP tables) up through the date of diagnosis for each of the cancer sites. The annual dose values were entered into the IREP tables with a constant distribution and an uncertainty value of 0.000.

For the thrombocytosis cancer, two IREP input tables were created, one using the *bone* and the other using *lymphoma & multiple myeloma* as the IREP model, as recommended in ORAUT-OTIB-0005, page 38. Both of these IREP tables were analyzed using the POC program and found to produce the same POC in this case.

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4.0 CATI REPORT AND RADIOLOGICAL INCIDENTS

SC&A reviewed the DOE records in behalf of Case # [Redact] and the CATI report (which was provided by the EE) to determine if the EE was involved in any radiological incidents. The CATI did not indicate any known radiological accidents or incidents. The EE did have concerns that the drinking water in Area 3 may have been contaminated; however, as outlined in the NTS SEC, no further internal dose assignments can be made. Additionally, the EE indicated that in the late [Redact]s or early [Redact]s, the EE was involved in work that required that the workers spend only a short time in an area because of heavily-radiated material. It is not known if this was because of internal or external radiation exposure potential; however, further internal doses cannot be reconstructed, and the EE was monitored for external exposures during this time and those data were used in the external dose section of this DR.

SC&A did not find any further documentation of radiological incidents that would impact the radiation doses assigned in this case.

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5.0 SUMMARY CONCLUSIONS

This partial DR used best-estimate methods to obtain reasonable external and internal dose assignments.

The total POC for the eight cancers was calculated using the NIOSH-Interactive Radio-Epidemiological Program (v.5.7.1) and was determined to be 40.59%.

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REFERENCES

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APPENDIX A-1: IREP INPUT – [REDACT] [REDACT] #1

CLAIMANT CANCER DIAGNOSES						
	Primary Cancer #1	Primary Cancer #2	Primary Cancer #3	Secondary Cancer #1	Secondary Cancer #2	Secondary Cancer #3
Cancer Type	Malignant Melanoma – [REDACT]	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
51							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[REDACT]	acute	photons E=30-250keV	Lognormal	0.325	1.520	0.000
2	[REDACT]	acute	photons E=30-250keV	Lognormal	0.050	1.520	0.000
3	[REDACT]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
4	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
5	[REDACT]	acute	photons E=30-250keV	Lognormal	0.220	1.520	0.000
6	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
7	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
8	[REDACT]	acute	photons E=30-250keV	Lognormal	0.160	1.520	0.000
9	[REDACT]	acute	photons E=30-250keV	Lognormal	0.190	1.520	0.000
10	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
11	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
12	[REDACT]	acute	photons E=30-250keV	Lognormal	0.090	1.520	0.000
13	[REDACT]	acute	photons E=30-250keV	Normal	3.01E-02	0.009	0.000
14	[REDACT]	acute	photons E=30-250keV	Normal	5.60E-02	0.017	0.000
15	[REDACT]	acute	photons E=30-250keV	Normal	2.67E-02	0.008	0.000
16	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
17	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
18	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
19	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
20	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
21	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
22	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
23	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
24	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
25	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
26	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
27	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
28	[REDACT]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
29	[REDACT]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
30	[REDACT]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
31	[REDACT]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

NOTICE: This report has been reviewed for Privacy Act information and has been cleared for distribution. However, this report is pre-decisional and has not been reviewed by the Advisory Board on Radiation and Worker Health for factual accuracy or applicability within the requirements of 42 CFR 82.

Appendix A-1: IREP Input – [Redact] [Redact] #1 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
32	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
33	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
34	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
35	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
36	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
37	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
38	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
39	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
40	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
41	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
42	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
43	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
44	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
45	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
46	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
47	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
48	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
49	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
50	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
51	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

Note: The following information applies to all 8 IREP Input tables.

OTHER ADVANCED FEATURES			
<u>Sample Size</u>	<u>Random Seed</u>		
2000	99		
<u>User Defined Uncertainty Distribution</u>			
<u>Dose Distribution Type</u>	<u>Parameter 1</u>	<u>Parameter 2</u>	<u>Parameter 3</u>
Lognormal	1.000	1.000	0.000

SKIN CANCER INPUTS	
<u>Ethnic Origin</u>	[redact]

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APPENDIX A-2: IREP INPUT – [REDACT] SCALP #2

CLAIMANT CANCER DIAGNOSES						
	<u>Primary Cancer #1</u>	<u>Primary Cancer #2</u>	<u>Primary Cancer #3</u>	<u>Secondary Cancer #1</u>	<u>Secondary Cancer #2</u>	<u>Secondary Cancer #3</u>
Cancer Type	BCC scalp	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
151							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[redact]	acute	photons E=30-250keV	Normal	0.011	0.003	0.000
2	[redact]	acute	photons E>250keV	Normal	0.039	0.012	0.000
3	[redact]	acute	electrons E>15keV	Lognormal	0.015	1.520	0.000
4	[redact]	acute	photons E=30-250keV	Lognormal	0.325	1.520	0.000
5	[redact]	acute	photons E=30-250keV	Lognormal	0.050	1.520	0.000
6	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
7	[redact]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
8	[redact]	acute	photons E=30-250keV	Lognormal	0.220	1.520	0.000
9	[redact]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
10	[redact]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
11	[redact]	acute	photons E=30-250keV	Lognormal	0.160	1.520	0.000
12	[redact]	acute	photons E=30-250keV	Lognormal	0.190	1.520	0.000
13	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
14	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
15	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
16	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
17	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
18	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
19	[redact]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
20	[redact]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
21	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
22	[redact]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
23	[redact]	acute	photons E=30-250keV	Lognormal	0.105	1.520	0.000
24	[redact]	acute	photons E=30-250keV	Normal	3.00E-03	0.001	0.000
25	[redact]	acute	photons E=30-250keV	Normal	5.60E-03	0.002	0.000
26	[redact]	acute	photons E=30-250keV	Normal	5.60E-03	0.002	0.000
27	[redact]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
28	[redact]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
29	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
30	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
31	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
32	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
33	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
34	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
35	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
36	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
37	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
38	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
39	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
40	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
41	[redact]	chronic	alpha	Constant	0.000	0.000	0.000

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Appendix A-2: IREP Input – [Redact] Scalp #2 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
42	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
43	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
44	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
45	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
46	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
47	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
48	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
49	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
50	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
51	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
52	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
53	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
54	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
55	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
56	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
57	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
58	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
59	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
60	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
61	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
62	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
63	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
64	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
65	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
66	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
67	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
68	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
69	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
70	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
71	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
72	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
73	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
74	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
75	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
76	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
77	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
78	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
79	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
80	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
81	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
82	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
83	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
84	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
85	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
86	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
87	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
88	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
89	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
90	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
91	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
92	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
93	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-2: IREP Input – [Redact] Scalp #2 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
94	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
95	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
96	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
97	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
112	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
113	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
114	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
115	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
116	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
117	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
118	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
119	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
120	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
121	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
122	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
123	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
124	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
125	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
126	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
127	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
128	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
129	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
130	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
131	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
132	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
133	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
134	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
135	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
136	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
137	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
138	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
139	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
140	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
141	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
142	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
143	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
144	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

NOTICE: This report has been reviewed for Privacy Act information and has been cleared for distribution. However, this report is pre-decisional and has not been reviewed by the Advisory Board on Radiation and Worker Health for factual accuracy or applicability within the requirements of 42 CFR 82.

Appendix A-2: IREP Input – [Redact] Scalp #2 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
145	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
146	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
147	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
149	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
150	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
151	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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APPENDIX A-3: IREP INPUT – [REDACT] PROSTATE #3

CLAIMANT CANCER DIAGNOSES						
	<u>Primary Cancer #1</u>	<u>Primary Cancer #2</u>	<u>Primary Cancer #3</u>	<u>Secondary Cancer #1</u>	<u>Secondary Cancer #2</u>	<u>Secondary Cancer #3</u>
Cancer Type	Prostate	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
173							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[redact]	acute	photons E=30-250keV	Normal	0.014	0.004	0.000
2	[redact]	acute	photons E>250keV	Normal	0.034	0.010	0.000
3	[redact]	acute	photons E=30-250keV	Lognormal	0.089	1.520	0.000
4	[redact]	acute	photons E=30-250keV	Lognormal	0.014	1.520	0.000
5	[redact]	acute	photons E=30-250keV	Lognormal	0.007	1.520	0.000
6	[redact]	acute	photons E=30-250keV	Lognormal	0.066	1.520	0.000
7	[redact]	acute	photons E=30-250keV	Lognormal	0.060	1.520	0.000
8	[redact]	acute	photons E=30-250keV	Lognormal	0.066	1.520	0.000
9	[redact]	acute	photons E=30-250keV	Lognormal	0.066	1.520	0.000
10	[redact]	acute	photons E=30-250keV	Lognormal	0.044	1.520	0.000
11	[redact]	acute	photons E=30-250keV	Lognormal	0.052	1.520	0.000
12	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
13	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
14	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
15	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
16	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
17	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
18	[redact]	acute	photons E=30-250keV	Lognormal	0.045	1.520	0.000
19	[redact]	acute	photons E=30-250keV	Lognormal	0.045	1.520	0.000
20	[redact]	acute	photons E=30-250keV	Lognormal	0.049	1.520	0.000
21	[redact]	acute	photons E=30-250keV	Lognormal	0.045	1.520	0.000
22	[redact]	acute	photons E=30-250keV	Lognormal	0.029	1.520	0.000
23	[redact]	acute	photons E>250keV	Lognormal	0.224	1.520	0.000
24	[redact]	acute	photons E>250keV	Lognormal	0.034	1.520	0.000
25	[redact]	acute	photons E>250keV	Lognormal	0.017	1.520	0.000
26	[redact]	acute	photons E>250keV	Lognormal	0.165	1.520	0.000
27	[redact]	acute	photons E>250keV	Lognormal	0.152	1.520	0.000
28	[redact]	acute	photons E>250keV	Lognormal	0.165	1.520	0.000
29	[redact]	acute	photons E>250keV	Lognormal	0.165	1.520	0.000
30	[redact]	acute	photons E>250keV	Lognormal	0.110	1.520	0.000
31	[redact]	acute	photons E>250keV	Lognormal	0.131	1.520	0.000
32	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
33	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
34	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
35	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
36	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
37	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
38	[redact]	acute	photons E>250keV	Lognormal	0.114	1.520	0.000
39	[redact]	acute	photons E>250keV	Lognormal	0.114	1.520	0.000
40	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
41	[redact]	acute	photons E>250keV	Lognormal	0.114	1.520	0.000
42	[redact]	acute	photons E>250keV	Lognormal	0.072	1.520	0.000

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Appendix A-3: IREP Input – [Redact] Prostate #3 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
43	[redact]	acute	photons E=30-250keV	Normal	2.62E-03	0.009	0.000
44	[redact]	acute	photons E=30-250keV	Normal	7.20E-05	0.000	0.000
45	[redact]	acute	photons E=30-250keV	Normal	7.20E-05	0.000	0.000
46	[redact]	acute	photons E=30-250keV	Normal	9.00E-05	0.000	0.000
47	[redact]	acute	photons E=30-250keV	Normal	9.00E-05	0.000	0.000
48	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
49	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
50	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
51	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
52	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
53	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
54	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
55	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
56	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
57	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
58	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
59	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
60	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
61	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
62	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
63	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
64	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
65	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
66	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
67	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
68	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
69	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
70	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
71	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
72	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
73	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
74	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
75	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
76	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
77	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
78	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
79	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
80	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
81	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
82	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
83	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
84	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
85	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
86	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
87	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
88	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
89	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
90	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
91	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
92	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
93	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
94	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-3: IREP Input – [[Redact]] Prostate #3 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
95	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
96	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
97	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
112	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
113	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
114	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
115	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
116	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
117	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
118	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
119	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
120	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
121	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
122	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
123	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
124	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
125	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
126	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
127	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
128	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
129	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
130	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
131	[[redact]]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
132	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
133	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
134	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
135	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
136	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
137	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
138	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
139	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
140	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
141	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
142	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
143	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
144	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
145	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
146	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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Appendix A-3: IREP Input – [[Redact]] Prostate #3 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
147	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
149	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
150	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
151	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
152	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
153	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
154	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
155	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
156	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
157	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
158	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
159	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
160	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
161	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
162	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
163	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
164	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
165	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
166	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
167	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
168	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
169	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
170	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
171	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
172	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
173	[[redact]]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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APPENDIX A-4: IREP INPUT – [REDACT] [REDACT] NECK #4

CLAIMANT CANCER DIAGNOSES						
	Primary Cancer #1	Primary Cancer #2	Primary Cancer #3	Secondary Cancer #1	Secondary Cancer #2	Secondary Cancer #3
Cancer Type	BCC [REDACT] neck	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
157							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[REDACT]	acute	photons E=30-250keV	Normal	0.011	0.003	0.000
2	[REDACT]	acute	photons E>250keV	Normal	0.039	0.012	0.000
3	[REDACT]	acute	electrons E>15keV	Lognormal	0.015	1.520	0.000
4	[REDACT]	acute	photons E=30-250keV	Lognormal	0.325	1.520	0.000
5	[REDACT]	acute	photons E=30-250keV	Lognormal	0.050	1.520	0.000
6	[REDACT]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
7	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
8	[REDACT]	acute	photons E=30-250keV	Lognormal	0.220	1.520	0.000
9	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
10	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
11	[REDACT]	acute	photons E=30-250keV	Lognormal	0.160	1.520	0.000
12	[REDACT]	acute	photons E=30-250keV	Lognormal	0.190	1.520	0.000
13	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
14	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
15	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
16	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
17	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
18	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
19	[REDACT]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
20	[REDACT]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
21	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
22	[REDACT]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
23	[REDACT]	acute	photons E=30-250keV	Lognormal	0.105	1.520	0.000
24	[REDACT]	acute	photons E=30-250keV	Normal	3.01E-02	0.009	0.000
25	[REDACT]	acute	photons E=30-250keV	Normal	5.60E-03	0.002	0.000
26	[REDACT]	acute	photons E=30-250keV	Normal	5.60E-03	0.002	0.000
27	[REDACT]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
28	[REDACT]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
29	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
30	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
31	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
32	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
33	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
34	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
35	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
36	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
37	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
38	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
39	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
40	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
41	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000

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Appendix A-4: IREP Input – [Redact] [Redact] Neck #4 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
42	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
43	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
44	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
45	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
46	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
47	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
48	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
49	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
50	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
51	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
52	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
53	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
54	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
55	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
56	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
57	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
58	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
59	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
60	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
61	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
62	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
63	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
64	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
65	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
66	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
67	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
68	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
69	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
70	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
71	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
72	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
73	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
74	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
75	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
76	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
77	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
78	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
79	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
80	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
81	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
82	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
83	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
84	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
85	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
86	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
87	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
88	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
89	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
90	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
91	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
92	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
93	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-4: IREP Input – [Redact] [Redact] Neck #4 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
94	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
95	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
96	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
97	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
112	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
113	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
114	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
115	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
116	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
117	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
118	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
119	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
120	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
121	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
122	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
123	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
124	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
125	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
126	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
127	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
128	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
129	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
130	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
131	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
132	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
133	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
134	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
135	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
136	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
137	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
138	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
139	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
140	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
141	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
142	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
143	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
144	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
145	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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Appendix A-4: IREP Input – [Redact] [Redact] Neck #4 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
146	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
147	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
149	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
150	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
151	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
152	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
153	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
154	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
155	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
156	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
157	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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APPENDIX A-5: IREP INPUT – [REDACT] [REDACT] NECK #5

CLAIMANT CANCER DIAGNOSES						
	Primary Cancer #1	Primary Cancer #2	Primary Cancer #3	Secondary Cancer #1	Secondary Cancer #2	Secondary Cancer #3
Cancer Type	Melanoma [REDACT] neck	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
157							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[REDACT]	acute	photons E=30-250keV	Normal	0.011	0.003	0.000
2	[REDACT]	acute	photons E>250keV	Normal	0.039	0.012	0.000
3	[REDACT]	acute	electrons E>15keV	Lognormal	0.015	1.520	0.000
4	[REDACT]	acute	photons E=30-250keV	Lognormal	0.325	1.520	0.000
5	[REDACT]	acute	photons E=30-250keV	Lognormal	0.050	1.520	0.000
6	[REDACT]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
7	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
8	[REDACT]	acute	photons E=30-250keV	Lognormal	0.220	1.520	0.000
9	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
10	[REDACT]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
11	[REDACT]	acute	photons E=30-250keV	Lognormal	0.160	1.520	0.000
12	[REDACT]	acute	photons E=30-250keV	Lognormal	0.190	1.520	0.000
13	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
14	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
15	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
16	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
17	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
18	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
19	[REDACT]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
20	[REDACT]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
21	[REDACT]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
22	[REDACT]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
23	[REDACT]	acute	photons E=30-250keV	Lognormal	0.105	1.520	0.000
24	[REDACT]	acute	photons E=30-250keV	Normal	3.01E-02	0.009	0.000
25	[REDACT]	acute	photons E=30-250keV	Normal	5.60E-03	0.002	0.000
26	[REDACT]	acute	photons E=30-250keV	Normal	5.60E-03	0.002	0.000
27	[REDACT]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
28	[REDACT]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
29	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
30	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
31	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000
32	[REDACT]	chronic	alpha	Constant	0.000	0.000	0.000

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Appendix A-5: IREP Input – [Redact] [Redact] Neck #5 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
33	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
34	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
35	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
36	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
37	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
38	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
39	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
40	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
41	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
42	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
43	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
44	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
45	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
46	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
47	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
48	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
49	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
50	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
51	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
52	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
53	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
54	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
55	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
56	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
57	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
58	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
59	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
60	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
61	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
62	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
63	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
64	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
65	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
66	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
67	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
68	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
69	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
70	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
71	[Redact]	chronic	alpha	Constant	0.000	0.000	0.000
72	[Redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
73	[Redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
74	[Redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-5: IREP Input – [Redact] [Redact] Neck #5 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
75	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
76	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
77	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
78	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
79	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
80	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
81	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
82	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
83	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
84	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
85	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
86	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
87	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
88	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
89	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
90	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
91	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
92	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
93	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
94	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
95	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
96	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
97	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
112	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
113	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
114	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
115	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
116	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

NOTICE: This report has been reviewed for Privacy Act information and has been cleared for distribution. However, this report is pre-decisional and has not been reviewed by the Advisory Board on Radiation and Worker Health for factual accuracy or applicability within the requirements of 42 CFR 82.

Appendix A-5: IREP Input – [Redact] [Redact] Neck #5 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
117	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
118	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
119	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
120	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
121	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
122	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
123	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
124	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
125	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
126	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
127	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
128	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
129	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
130	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
131	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
132	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
133	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
134	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
135	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
136	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
137	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
138	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
139	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
140	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
141	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
142	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
143	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
144	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
145	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
146	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
147	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
149	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
150	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
151	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
152	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
153	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
154	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
155	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
156	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
157	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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APPENDIX A-6: IREP INPUT – [[REDACT]] [[REDACT]] #6

CLAIMANT CANCER DIAGNOSES						
	Primary Cancer #1	Primary Cancer #2	Primary Cancer #3	Secondary Cancer #1	Secondary Cancer #2	Secondary Cancer #3
Cancer Type	SCC in [[redact]]	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
175							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[[redact]]	acute	photons E=30-250keV	Normal	0.011	0.003	0.000
2	[[redact]]	acute	photons E>250keV	Normal	0.039	0.012	0.000
3	[[redact]]	acute	electrons E>15keV	Lognormal	0.015	1.520	0.000
4	[[redact]]	acute	photons E=30-250keV	Lognormal	0.325	1.520	0.000
5	[[redact]]	acute	photons E=30-250keV	Lognormal	0.050	1.520	0.000
6	[[redact]]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
7	[[redact]]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
8	[[redact]]	acute	photons E=30-250keV	Lognormal	0.220	1.520	0.000
9	[[redact]]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
10	[[redact]]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
11	[[redact]]	acute	photons E=30-250keV	Lognormal	0.160	1.520	0.000
12	[[redact]]	acute	photons E=30-250keV	Lognormal	0.190	1.520	0.000
13	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
14	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
15	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
16	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
17	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
18	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
19	[[redact]]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
20	[[redact]]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
21	[[redact]]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
22	[[redact]]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
23	[[redact]]	acute	photons E=30-250keV	Lognormal	0.105	1.520	0.000
24	[[redact]]	acute	photons E=30-250keV	Normal	4.79E-04	0.000	0.000
25	[[redact]]	acute	photons E=30-250keV	Normal	1.84E-03	0.001	0.000
26	[[redact]]	acute	photons E=30-250keV	Normal	1.84E-03	0.001	0.000
27	[[redact]]	acute	photons E=30-250keV	Normal	1.33E-02	0.004	0.000
28	[[redact]]	acute	photons E=30-250keV	Normal	1.33E-02	0.004	0.000
29	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
30	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
31	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
32	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
33	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
34	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
35	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
36	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
37	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
38	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
39	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
40	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000
41	[[redact]]	chronic	alpha	Constant	0.000	0.000	0.000

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Appendix A-6: IREP Input – [Redact] [Redact] #6 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
42	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
43	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
44	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
45	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
46	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
47	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
48	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
49	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
50	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
51	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
52	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
53	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
54	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
55	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
56	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
57	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
58	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
59	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
60	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
61	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
62	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
63	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
64	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
65	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
66	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
67	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
68	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
69	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
70	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
71	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
72	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
73	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
74	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
75	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
76	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
77	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
78	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
79	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
80	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
81	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
82	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
83	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
84	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
85	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
86	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
87	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
88	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
89	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
90	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
91	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
92	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
93	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-6: IREP Input – [Redact] [Redact] #6 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
94	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
95	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
96	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
97	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
112	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
113	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
114	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
115	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
116	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
117	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
118	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
119	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
120	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
121	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
122	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
123	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
124	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
125	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
126	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
127	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
128	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
129	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
130	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
131	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
132	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
133	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
134	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
135	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
136	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
137	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
138	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
139	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
140	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
141	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
142	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
143	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
144	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
145	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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Appendix A-6: IREP Input – [Redact] [Redact] #6 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
146	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
147	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
149	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
150	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
151	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
152	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
153	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
154	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
155	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
156	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
157	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
158	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
159	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
160	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
161	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
162	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
163	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
164	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
165	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
166	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
167	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
168	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
169	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
170	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
171	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
172	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
173	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
174	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
175	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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APPENDIX A-7: IREP INPUT – [REDACT] THROMBOCYTOSIS #7

CLAIMANT CANCER DIAGNOSES						
	<u>Primary Cancer</u> #1	<u>Primary Cancer</u> #2	<u>Primary Cancer</u> #3	<u>Secondary Cancer #1</u>	<u>Secondary Cancer #2</u>	<u>Secondary Cancer #3</u>
Cancer Type	Thrombocytosis	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
194							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[redact]	acute	photons E=30-250keV	Normal	0.007	0.002	0.000
2	[redact]	acute	photons E>250keV	Normal	0.028	0.008	0.000
3	[redact]	acute	photons E=30-250keV	Lognormal	0.045	1.520	0.000
4	[redact]	acute	photons E=30-250keV	Lognormal	0.007	1.520	0.000
5	[redact]	acute	photons E=30-250keV	Lognormal	0.003	1.520	0.000
6	[redact]	acute	photons E=30-250keV	Lognormal	0.033	1.520	0.000
7	[redact]	acute	photons E=30-250keV	Lognormal	0.030	1.520	0.000
8	[redact]	acute	photons E=30-250keV	Lognormal	0.033	1.520	0.000
9	[redact]	acute	photons E=30-250keV	Lognormal	0.033	1.520	0.000
10	[redact]	acute	photons E=30-250keV	Lognormal	0.022	1.520	0.000
11	[redact]	acute	photons E=30-250keV	Lognormal	0.026	1.520	0.000
12	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
13	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
14	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
15	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
16	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
17	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
18	[redact]	acute	photons E=30-250keV	Lognormal	0.023	1.520	0.000
19	[redact]	acute	photons E=30-250keV	Lognormal	0.023	1.520	0.000
20	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
21	[redact]	acute	photons E=30-250keV	Lognormal	0.023	1.520	0.000
22	[redact]	acute	photons E=30-250keV	Lognormal	0.014	1.520	0.000
23	[redact]	acute	photons E>250keV	Lognormal	0.183	1.520	0.000
24	[redact]	acute	photons E>250keV	Lognormal	0.028	1.520	0.000
25	[redact]	acute	photons E>250keV	Lognormal	0.014	1.520	0.000
26	[redact]	acute	photons E>250keV	Lognormal	0.135	1.520	0.000
27	[redact]	acute	photons E>250keV	Lognormal	0.124	1.520	0.000
28	[redact]	acute	photons E>250keV	Lognormal	0.135	1.520	0.000
29	[redact]	acute	photons E>250keV	Lognormal	0.135	1.520	0.000
30	[redact]	acute	photons E>250keV	Lognormal	0.090	1.520	0.000
31	[redact]	acute	photons E>250keV	Lognormal	0.107	1.520	0.000
32	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
33	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
34	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
35	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
36	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
37	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
38	[redact]	acute	photons E>250keV	Lognormal	0.093	1.520	0.000
39	[redact]	acute	photons E>250keV	Lognormal	0.093	1.520	0.000
40	[redact]	acute	photons E>250keV	Lognormal	0.101	1.520	0.000
41	[redact]	acute	photons E>250keV	Lognormal	0.093	1.520	0.000

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Appendix A-7: IREP Input – [Redact] Thrombocytosis #7 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
42	[redact]	acute	photons E>250keV	Lognormal	0.059	1.520	0.000
43	[redact]	acute	photons E=30-250keV	Normal	0.002	0.007	0.000
44	[redact]	acute	photons E=30-250keV	Normal	0.005	0.001	0.000
45	[redact]	acute	photons E=30-250keV	Normal	0.005	0.001	0.000
46	[redact]	acute	photons E=30-250keV	Normal	0.005	0.004	0.000
47	[redact]	acute	photons E=30-250keV	Normal	0.005	0.004	0.000
48	[redact]	chronic	alpha	Constant	0.001	0.000	0.000
49	[redact]	chronic	alpha	Constant	0.002	0.000	0.000
50	[redact]	chronic	alpha	Constant	0.002	0.000	0.000
51	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
52	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
53	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
54	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
55	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
56	[redact]	chronic	alpha	Constant	0.005	0.000	0.000
57	[redact]	chronic	alpha	Constant	0.005	0.000	0.000
58	[redact]	chronic	alpha	Constant	0.005	0.000	0.000
59	[redact]	chronic	alpha	Constant	0.006	0.000	0.000
60	[redact]	chronic	alpha	Constant	0.006	0.000	0.000
61	[redact]	chronic	alpha	Constant	0.006	0.000	0.000
62	[redact]	chronic	alpha	Constant	0.006	0.000	0.000
63	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
64	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
65	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
66	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
67	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
68	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
69	[redact]	chronic	alpha	Constant	0.007	0.000	0.000
70	[redact]	chronic	alpha	Constant	0.006	0.000	0.000
71	[redact]	chronic	alpha	Constant	0.006	0.000	0.000
72	[redact]	chronic	alpha	Constant	0.005	0.000	0.000
73	[redact]	chronic	alpha	Constant	0.005	0.000	0.000
74	[redact]	chronic	alpha	Constant	0.005	0.000	0.000
75	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
76	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
77	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
78	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
79	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
80	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
81	[redact]	chronic	alpha	Constant	0.004	0.000	0.000
82	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
83	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
84	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
85	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
86	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
87	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
88	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
89	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
90	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
91	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
92	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
93	[redact]	chronic	alpha	Constant	0.003	0.000	0.000

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Appendix A-7: IREP Input – [Redact] Thrombocytosis #7 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
94	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
95	[redact]	chronic	alpha	Constant	0.003	0.000	0.000
96	[redact]	chronic	alpha	Constant	0.002	0.000	0.000
97	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
112	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
113	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
114	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
115	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
116	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
117	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
118	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
119	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
120	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
121	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
122	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
123	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
124	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
125	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
126	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
127	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
128	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
129	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
130	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
131	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
132	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
133	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
134	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
135	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
136	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
137	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
138	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
139	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
140	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
141	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
142	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
143	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
144	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
145	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-7: IREP Input – [Redact] Thrombocytosis #7 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
146	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
147	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
149	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
150	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
151	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
152	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
153	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
154	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
155	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
156	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
157	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
158	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
159	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
160	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
161	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
162	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
163	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
164	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
165	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
166	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
167	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
168	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
169	[redact]	chronic	electrons E>15keV	Constant	0.001	0.000	0.000
170	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
171	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
172	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
173	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
174	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
175	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
176	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
177	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
178	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
179	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
180	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
181	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
182	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
183	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
184	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
185	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
186	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
187	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
188	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
189	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
190	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
191	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
192	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
193	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
194	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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APPENDIX A-8: IREP INPUT – [REDACT] [REDACT] #8

CLAIMANT CANCER DIAGNOSES						
	Primary Cancer #1	Primary Cancer #2	Primary Cancer #3	Secondary Cancer #1	Secondary Cancer #2	Secondary Cancer #3
Cancer Type	SCC in situ [redact]	N/A	N/A	N/A	N/A	N/A
Date of Diagnosis	N/A	N/A	N/A	N/A	N/A	N/A

EXPOSURE INFORMATION							
Number of exposures							
178							
Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
1	[redact]	acute	photons E=30-250keV	Normal	0.011	0.003	0.000
2	[redact]	acute	photons E>250keV	Normal	0.039	0.012	0.000
3	[redact]	acute	electrons E>15keV	Lognormal	0.015	1.520	0.000
4	[redact]	acute	photons E=30-250keV	Lognormal	0.325	1.520	0.000
5	[redact]	acute	photons E=30-250keV	Lognormal	0.050	1.520	0.000
6	[redact]	acute	photons E=30-250keV	Lognormal	0.025	1.520	0.000
7	[redact]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
8	[redact]	acute	photons E=30-250keV	Lognormal	0.220	1.520	0.000
9	[redact]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
10	[redact]	acute	photons E=30-250keV	Lognormal	0.240	1.520	0.000
11	[redact]	acute	photons E=30-250keV	Lognormal	0.160	1.520	0.000
12	[redact]	acute	photons E=30-250keV	Lognormal	0.190	1.520	0.000
13	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
14	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
15	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
16	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
17	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
18	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
19	[redact]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
20	[redact]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
21	[redact]	acute	photons E=30-250keV	Lognormal	0.180	1.520	0.000
22	[redact]	acute	photons E=30-250keV	Lognormal	0.165	1.520	0.000
23	[redact]	acute	photons E=30-250keV	Lognormal	0.105	1.520	0.000
24	[redact]	acute	photons E=30-250keV	Normal	5.00E-04	0.000	0.000
25	[redact]	acute	photons E=30-250keV	Normal	1.80E-03	0.001	0.000
26	[redact]	acute	photons E=30-250keV	Normal	1.80E-03	0.001	0.000
27	[redact]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
28	[redact]	acute	photons E=30-250keV	Normal	1.40E-02	0.004	0.000
29	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
30	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
31	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
32	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
33	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
34	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
35	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
36	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
37	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
38	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
39	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
40	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
41	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
42	[redact]	chronic	alpha	Constant	0.000	0.000	0.000

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Appendix A-8: IREP Input – [Redact] [Redact] #8 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
43	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
44	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
45	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
46	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
47	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
48	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
49	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
50	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
51	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
52	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
53	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
54	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
55	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
56	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
57	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
58	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
59	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
60	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
61	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
62	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
63	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
64	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
65	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
66	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
67	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
68	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
69	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
70	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
71	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
72	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
73	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
74	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
75	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
76	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
77	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
78	[redact]	chronic	alpha	Constant	0.000	0.000	0.000
79	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
80	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
81	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
82	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
83	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
84	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
85	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
86	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
87	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
88	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
89	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
90	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
91	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
92	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
93	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
94	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000

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Appendix A-8: IREP Input – [Redact] [Redact] #8 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
95	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
96	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
97	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
98	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
99	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
100	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
101	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
102	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
103	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
104	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
105	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
106	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
107	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
108	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
109	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
110	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
111	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
112	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
113	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
114	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
115	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
116	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
117	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
118	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
119	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
120	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
121	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
122	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
123	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
124	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
125	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
126	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
127	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
128	[redact]	chronic	photons E>250keV	Constant	0.000	0.000	0.000
129	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
130	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
131	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
132	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
133	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
134	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
135	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
136	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
137	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
138	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
139	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
140	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
141	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
142	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
143	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
144	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
145	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
146	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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Appendix A-8: IREP Input – [Redact] [Redact] #8 (continued)

Exposure #	Exposure Year	Exposure Rate	Radiation Type	Dose Distribution Type	Parameter 1	Parameter 2	Parameter 3
147	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
148	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
149	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
150	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
151	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
152	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
153	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
154	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
155	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
156	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
157	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
158	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
159	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
160	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
161	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
162	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
163	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
164	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
165	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
166	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
167	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
168	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
169	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
170	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
171	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
172	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
173	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
174	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
175	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
176	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
177	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000
178	[redact]	chronic	electrons E>15keV	Constant	0.000	0.000	0.000

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