Office of Compensation Analysis and Support Program Evaluation Report	Document Number: OCAS-PER-006 Effective Date: 09/15/2006 Revision No. 0
External dosimetry target organ for prostate cancer	Page 1 of 3
Approval: Signature on File Date: 9/15/2006 J.W. Neton, Associate Director for Science	Supersedes: None

ISSUE AUTHORIZATION DATE	EFFECTIVE DATE	REV. NO.	DESCRIPTION
09/15/2006	09/15/2006	0	New document to change external dosimetry target organ for prostate cancer from testes to bladder.

1.0 Description

In May, 2004, OCAS determined that the urinary bladder was the appropriate surrogate external dosimetry target organ for the prostate gland. This superseded OCAS' prior guidance[1] that the testes should be used as the target organ. This decision was based primarily on the location of the prostate gland relative to the testes and the bladder (Figure 1).

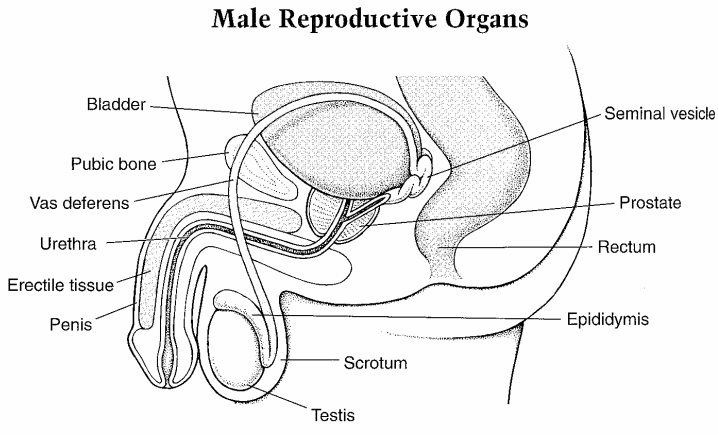

Figure 1: Location of the prostate gland relative to the urinary bladder and testes

As seen in Figure 1, the testes lie very close to the skin surface, and therefore receive shallow dose from nonpenetrating radiation (*e.g.* beta radiation and low energy photon radiation). This is not true for the urinary bladder or the prostate gland, which makes the bladder a more appropriate choice for a prostate surrogate organ.

2.0 Evaluation

The organ-specific dose conversion factor (DCF) used to determine the prostate dose from a dosimeter reading, changed from those used for the testes to those used for the bladder. Since the $DCF_{bladder}<DCF_{testes}$, the resultant calculated prostate organ dose using the bladder as a surrogate organ is less than the organ dose calculated using the testes as a surrogate.

The change in surrogate organ also affects doses assigned from X-rays received as a condition of employment. In general, the dose to the bladder is slightly higher than the dose to the testes. However this increase is trivial when compared to the decrease in organ dose from measured, missed, and unmonitored doses. As an example, the dose from photofluorography at the Savannah River Site would increase to 1.5 mrem from 0.015 mrem[2]. Essentially, 1.5 mrem would be added for each year that a photofluorography was assigned. Similarly at other sites, increases on the order of a few mrem or less can be expected in the medical dose, which are far outweighed by the decreases in recorded, missed and unmonitored dose. For example, a recorded whole body dose of 1 rem of 30-250 keV gamma rays would yield an organ dose of 1.011 rem to the testes, but only 0.873 rem to the bladder, a decrease of 138 mrem (~14%).

OCAS is committed to re-examining any completed dose reconstruction with a probability of causation (POC) <50%, when a change in procedures could result in an increase in POC. The change in prostate surrogate organ from testes to bladder will result in lower organ doses, and consequently lower POC values. Therefore, this change will not result in an increase in POC value for any completed claims, and no cases need to be re-evaluated.

3.0 Resolution/Corrective Action

Guidance on target organ selection is given in two documents. The primary document is the OCAS External Dose Reconstruction Implementation Guideline[3]. A page change was initiated in May, 2004, to enact this change in policy, but due to an oversight it was not officially implemented. This oversight was discovered during the preparation of this PER, and the relevant page change has been issued.

The second relevant guidance document is ORAUT-OTIB-005[4], which specifies internal and external target organs and is widely used by ORAU dose reconstructors. A page change was issued for this document and became effective on May 7, 2004. This page change enacted the modification in target organ for all cancers with an ICD 9 code of 185 (malignant neoplasm of the prostate). An additional page change to this document was implemented for cancers with ICD 9 code of 233.4 (carcinoma in situ of the prostate) or 236.5 (uncertain behavior neoplasm, prostate) on December 2, 2005.

Finally, a notation will be added to the administrative record of each completed prostate dose reconstruction with a POC<50% which used the testes as a surrogate organ. This notation will read, “This dose reconstruction was performed using testes as the target organ for external doses to the prostate. NIOSH subsequently determined that the urinary bladder was a more suitable target organ, so NIOSH evaluated the effect of this

change on this DR in Program Evaluation Report 6 (PER-6), “External dosimetry target organ for prostate cancer. NIOSH has determined that the effect of application of PER-6 to this dose reconstruction would be to slightly decrease the probability of causation. Since this dose reconstruction currently has a probability of causation less than 50%, no change is warranted at this time. Should the dose reconstruction ever need to be re-opened for other reasons, this change will be applied.” A list of cases to which this notation has been added will be provided to the Department of Labor.

4.0 References

1) National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, *External Dose Reconstruction Implementation Guideline*, OCAS-IG-001, Rev 0, (May, 2002).

2) ORAU Team, *Technical Basis Document for the Savannah River Site to be Used for EEOICPA Dose Reconstructions*, ORAUT-TKBS-0003 Rev 01 (8/21/2003).

3) National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, *External Dose Reconstruction Implementation Guideline*, OCAS-IG-001, Rev 1, (August, 2002).

4) ORAU Team, Technical Information Bulletin: IMBA Organ, External Dosimetry Organ, and IREP Model Selection by ICD-9 Code, ORAUT-OTIB-0005 Rev 02 PC-1 (02/10/2006).