

DEFENSE THREAT REDUCTION AGENCY
NUCLEAR TEST PERSONNEL REVIEW PROGRAM

RADIATION DOSE ASSESSMENT

STANDARD OPERATING PROCEDURE

**RA02 – Expedited Processing of Radiation Dose Assessments
for Atmospheric Nuclear Weapons Testing Veterans**

Revision 3.0

Key to SOP ID Codes

RA (Radiation Assessment - SOP)

ED (External Dose - Standard Methods)

ID (Internal Dose - Standard Methods)

UA (Uncertainty Analysis - Standard Methods)

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Standard Operating Procedure

RA02 – Expedited Processing of Radiation Dose Assessment

1. Purpose and Summary

This standard operating procedure (SOP) describes the roles, responsibilities, and methodology for processing Department of Defense (DOD) Defense Threat Reduction Agency (DTRA) Nuclear Test Personnel Review (NTPR) radiation dose assessments (RDAs). These assessments are performed in response to requests from the U.S. Department of Veterans Affairs (VA) on behalf of atmospheric nuclear weapons testing veterans. In particular, the SOP provides specific criteria and detailed actions to accomplish expedited processing of the majority of atmospheric nuclear weapons testing cases received by DTRA. Expedited processing involves assignment of upper-bound group-based estimated radiation doses to veterans with qualifying potential radiation exposure scenarios. Expedited processing of RDAs supports more timely response to VA requests and more timely decision-making for veterans' claims than if individual-specific, full RDAs were performed for every case. For cases not qualifying for expedited processing under the criteria in this SOP, guidance is provided for conducting further evaluation of those cases, including direction to appropriate DTRA NTPR SOPs. Finally, requirements and procedures for data and records management, and associated quality assurance (QA) activities are provided for completion of case processing.

This SOP is written for qualified NTPR Researchers, DTRA Analysts, and RDA analysts who process and evaluate atmospheric nuclear weapons testing veteran cases received from the VA, and for managers who oversee the entire dose assessment process. The SOP will assure conformance with procedures, methods, quality standards of assessment products, and established NTPR policies and guidelines.

2. Scope

For cases meeting criteria described in this procedure, EP is an acceptable method of providing the VA with requested radiation exposure information regarding U.S. atmospheric nuclear weapons testing at the Pacific Proving Grounds (PPG) or at the Nevada Test Site (NTS).

For the purposes of dose assessment under this procedure, also included in the PPG category are personnel who performed activities related to nuclear testing in the PPG, including:

- inter- or post-operational participants at Enewetak Atoll following Operations SANDSTONE, GREENHOUSE, IVY, CASTLE, REDWING, and HARDTACK I;
- crew of the USS BRUSH potentially exposed February 25-27, 1947 from handling and storage of contaminated souvenirs (non-participants);
- Bikini resurvey personnel from July and August 1947 (non-participants);
- Post-Operation CROSSROADS decontamination workers at U.S. Naval shipyards; and

- personnel in Operations WIGWAM (conducted approximately 500 miles southwest of San Diego) and ARGUS (conducted in the South Atlantic Ocean).

Also included in the NTS category for dose assessments under this procedure are

- participants in the atmospheric detonation, TRINITY, that was conducted at Alamogordo, NM in 1945 and
- inter- or post-operational participants at NTS, including post-TRINITY.

See Case et al. (2011a) for more information regarding these additional, potentially exposed groups.

To be considered for assignment of EP doses as described herein, the veteran's exposure scenario is such that the associated EP total organ radiation dose (TOD) is either well above (in the case of PPG or NTS dose to the skin or lens of the eye) or well below the screening dose calculated using the National Institute of Occupational Safety and Health Interactive RadioEpidemiological Program (NIOSH-IREP) for each cancer condition claimed. Screening doses are equivalent doses of ionizing radiation that correspond to an estimated probability of causation of specific cancers of approximately 50% at the upper 99% credibility limit (Kocher and Apostoaiei, 2007). Assignment of EP doses that are well above or well below the screening dose support timely decision-making by the VA while not affecting the outcome in the determination of service connection.

The approach to dose determination for non-cancerous conditions is generally the same as for cancers unless otherwise indicated in this SOP or otherwise documented in the DTRA Analyst Decision Summary Sheet (DTRA DSS). This provides a consistent methodology that also allows for the possibility that a pre- or non-cancerous condition might later become or be diagnosed as cancerous.

Expedited processing doses incorporate conservative assumptions, theoretical calculations, and supporting technical information associated with wide-ranging exposure scenarios. EP doses result in over-estimates of actual doses received, ensure benefit of the doubt with regard to radiation dose to the veteran, and provide timely, definitive information to the VA. The expedited process addresses all aspects of radiation dose determination to satisfy the requirements of Title 32, Code of Federal Regulations, Part 218, *Guidance for the Determination and Reporting of Nuclear Radiation Dose for DoD Participants in the Atmospheric Nuclear Test Program*. The methodology described in this SOP assures that radiation dose assessments provide full consideration of benefit of the doubt as implemented in response to DTRA's guidance for assuring consistency with Department of Veterans Affairs (38 CFR 3.102) requirements (VA, 1985).

3. Responsibilities

3.1 NTPR Researcher

The NTPR researcher recommends EP doses for PPG or NTS cases solely involving skin, lens of the eye, and/or prostate without exceptions. These recommendations are documented in a response letter to the VA. For other cases, the NTPR researcher identifies the XP organ doses corresponding to the target or surrogate organ. The NTPR researcher completes, when applicable, the input fields of the DTRA DSS that provide historical and dose-related information from the Nuclear Test Review Information System (NuTRIS) database. The NTPR researcher summarizes veteran comments with clarifications and responses based on historical and dose-related information from records. Recommend a Scenario of Participation and Radiation Exposure (SPARE) for cases with complex exposure scenarios. The NTPR researcher documents potential exceptions or other special considerations in the DSS.

3.2 DTRA NTPR Program Manager/Radiation Dose Analyst (DTRA Analyst)

The DTRA NTPR Program Manager or designee in the position of DTRA NTPR radiation dose analyst (DTRA analyst) performs the majority of tasks for the dose assignment process:

- reviewing and authorizing NTPR researcher preliminary EP dose recommendations for PPG or NTS cases solely involving skin, lens of the eye, and/or prostate without exceptions;
- reviewing veteran-provided, historical, NTPR-developed, and other radiation-related information pertinent to the veteran's potential exposure;
- determining the need and request a SPARE;
- determining the need for additional, veteran-specific information;
- determining the applicability of the EP dose assignments to an individual veteran's case;
- requesting and reviewing further evaluation by an RDA analyst if necessary;
- documenting the radiation dose assignment evaluation and decision-making process in the DTRA DSS and/or the VA response letter;
- reviewing the results of QA auditor reviews as applicable; and
- assigning XP doses, as applicable, and documenting the assignment in the DTRA DSS and/or VA response letter.

3.3 Radiation Dose Assessment Analyst

At the request of the DTRA analyst, the radiation dose assessment analyst (RDA analyst) may perform further evaluations to aid in the decision and dose assignment process. These further evaluations are in the form of technical reviews or full RDAs. Request

assistance from the DTRA NTPR Program Manager if additional veteran specific information is necessary to evaluate a case. Technical reviews by an RDA analyst are documented in the form of memoranda with or without any supporting dose calculations. Full RDAs are performed and documented in accordance with RA01 – *Radiation Dose Assessment for Cases Requiring Detailed Analysis*.

3.4 Quality Assurance Auditor

The quality assurance auditor (QA auditor), with the assistance of a QA reviewer as requested, performs and documents independent QA/QC (quality assurance/quality control) reviews of the decision-making process and the resulting dose assignment as documented in the DTRA DSS and/or RDA documentation to assure that they are clear, complete, and in accordance with NTPR policies and procedures. The QA auditor documents the results of the review on a QA/QC Review Report for Decision Summary Sheet and/or an RDA Report Review Checklist. QA auditor reviews are not required on EP dose assignments for cases solely involving the skin, lens of the eye, and/or prostate without exceptions.

4. Definitions

BVA	Board of Veteran’s Appeals
DOD	Department of Defense
Dose component	Potential contributors to total organ dose, including: <ul style="list-style-type: none">▪ Initial external gamma dose▪ Initial external neutron dose▪ Residual external gamma dose▪ Other external dose (e.g., check sources, calibration sources)▪ Internal alpha dose▪ Internal beta-gamma dose.
DSS	Decision Summary Sheet, an electronic Nuclear Test Review Information System (NuTRIS) database report documenting key information and results of the DTRA NTPR dose assignment process, including: <ul style="list-style-type: none">▪ Historical veteran participation and dose-related information from the NuTRIS database▪ A summary of veteran comments with DTRA NTPR clarifications and responses based on historical and dose-related information from records▪ Documentation of the DTRA NTPR evaluation and decision-making process for dose assignment▪ The assigned EP doses.
DTRA	Defense Threat Reduction Agency
EP	Expedited processing, as described under this SOP and as distinguished from the expedited processing (XP) methodology previously described in Rev. 1.2, RA03 – <i>Radiation Dose Assessment for Expedited Cases</i> , October 31, 2008.

EPG	Expedited processing group as documented in Case et al. (2011a & b).
EPG TOD	Expedited processing group total organ dose, the sum of the target or surrogate organ EPG upper-bound dose values for the dose components of external gamma, external neutron, internal alpha, and internal beta plus gamma radiation, as applicable. See also Sections 5.0 and 5.7.
Exclusion	Specific activities of an individual or one or more cohorts for which the documented SPARE or other information developed during research demonstrates that the individual or members of the cohort might have had distinctly higher exposures than those used for the applicable EPG due to special circumstances (Case et al., 2011a).
Expedited processing	An approach to radiation dose assessment by which some or all radiation dose components assigned for the veteran's participation may be group-based default values that have been determined in accordance with this procedure to be upper-bounds to the actual doses received and to be either well above or well below doses that could result in a VA service-connected determination.
Full RDA	An RDA analyst-developed, individual-specific radiation dose assessment that results in a report addressing all radiation dose components to the organ for the veteran's participation.
Further evaluation	May include: <ul style="list-style-type: none">▪ an additional documented DTRA analyst review,▪ a documented RDA analyst technical review that may include individual-specific calculation of only some radiation dose components, or▪ a full RDA prepared in accordance with RDA SOP RA01.
H&N	Hiroshima and Nagasaki, locations included in the NTPR program for selected World War II POWs and post-World War II occupation forces during specified time periods.
LD	Limiting dose, radiation dose values taken from DTRA-TR-10-29 (Case, 2011a).
NIOSH-IREP	National Institute of Occupational Safety and Health Interactive RadioEpidemiological Program, a computer code used to calculate the probability that a cancer was caused by a radiation dose (NIOSH, 2002 and NIOSH, 2014).
NTPR	Nuclear Test Personnel Review
NTS	Nevada Test Site, a site of atmospheric nuclear weapons testing. See Section 2 for the expanded definition of NTS personnel for whom radiation doses may be assigned under this procedure.
NuTRIS	Nuclear Test Review Information System, a computer database of veteran data and assigned doses.

POW	Prisoner of war; a veteran held as a prisoner by the Japanese in World War II.
PPG	Pacific Proving Ground, a site of atmospheric nuclear weapons testing. See Section 2 for the expanded definition of PPG personnel for whom radiation doses may be assigned under this procedure.
PM	Program Manager
QA	Quality Assurance
RDA	Radiation Dose Assessment
SD	Screening dose, radiation dose values taken from DTRA-TR-10-29 (Case, 2011a).
SOP	Standard Operating Procedure
SPARE	Scenario of Participation and Radiation Exposure, a document with detailed information on an NTPR participant's activity scenario during involvement in the U.S. atmospheric nuclear weapon testing program or occupation of or as a prisoner of war (POW) in Japan.
Target organ	The biological organ or tissue that is associated with the specific medical condition for which a radiation dose determination has been requested by the VA.
TOD	Total organ dose, the total of all external and internal dose components for a target organ.
VA	U.S. Department of Veterans Affairs
VBDR	Veterans' Advisory Board on Dose Reconstruction
XP	Expedited processing methodology as documented in Rev. 1.2 RA03 – <i>Radiation Dose Assessment for Expedited Cases</i> . This SOP is revised extensively herein and renamed as Rev. 2.2 RDA SOP RA02. See also Section 5, Procedure: Detailed Activity/Task Description.
XP TOD	Rev 1.2 RDA SOP RA03-based expedited processing total organ dose, the sum of the XP organ or tissue XP dose values for the dose components of external gamma, external neutron, internal alpha, and internal beta plus gamma radiation, as applicable. All XP dose components are considered upper-bound values.

5. Procedure: Detailed Activity/Task Description

The methodology for expedited processing of NTPR cases described in this SOP utilizes both the XP doses previously documented in Rev. 1.2 RA03 – *Radiation Dose Assessment for Expedited Cases* and the more recently-developed, robust technical information and upper-bound doses for expedited processing groups (EPGs) of DTRA-TR-10-29, *A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments* (Case et al., 2011a) and DTRA-TR-11-01, *Compendium of Proposed NTPR Expedited Processing Groups* (Case et al., 2011b). The XP doses were developed for two broadly-defined exposure categories: participation that occurred at the Pacific Proving

Grounds (PPG) and participation at the Nevada Test Site (NTS). EPG doses were developed for 32 more narrowly-defined exposure groups based on similarity of activities and exposure pathways among EPG members participating at the PPG or NTS.

Continued, selected use of XP doses assures consistency with dose assignments previously made under the DTRA NTPR program, assuring veterans that similar exposure conditions will be assigned similar doses for the same organ. Use of well-documented EPG doses for comparison and of other information developed in DTRA-TR-10-29 and DTRA-TR-11-01 assures that XP doses will be assigned only when they are well above (used for PPG or NTS skin and lens of the eye doses only) or well below the screening doses as recommended by the Veterans' Advisory Board on Dose Reconstruction (VBDR). Use of the EPG information also assures that the assigned doses will "almost always be higher than doses that were estimated in previous RDAs for the same condition, thus providing maximum benefit of the doubt to the veteran" (VBDR, 2007b).

As mentioned previously, neither XP nor EPG doses are to be considered accurate representations of doses actually received. In some cases it would be impossible for the veteran to have received doses as high as XP or EPG doses under the actual exposure situation. However, the XP and EPG doses establish an upper-bound to the actual doses received.

A flow diagram is provided in Fig. 1, Expedited Processing of Dose Assessment: Process Overview. These major activities and the responsible NTPR personnel are described in the narrative below.

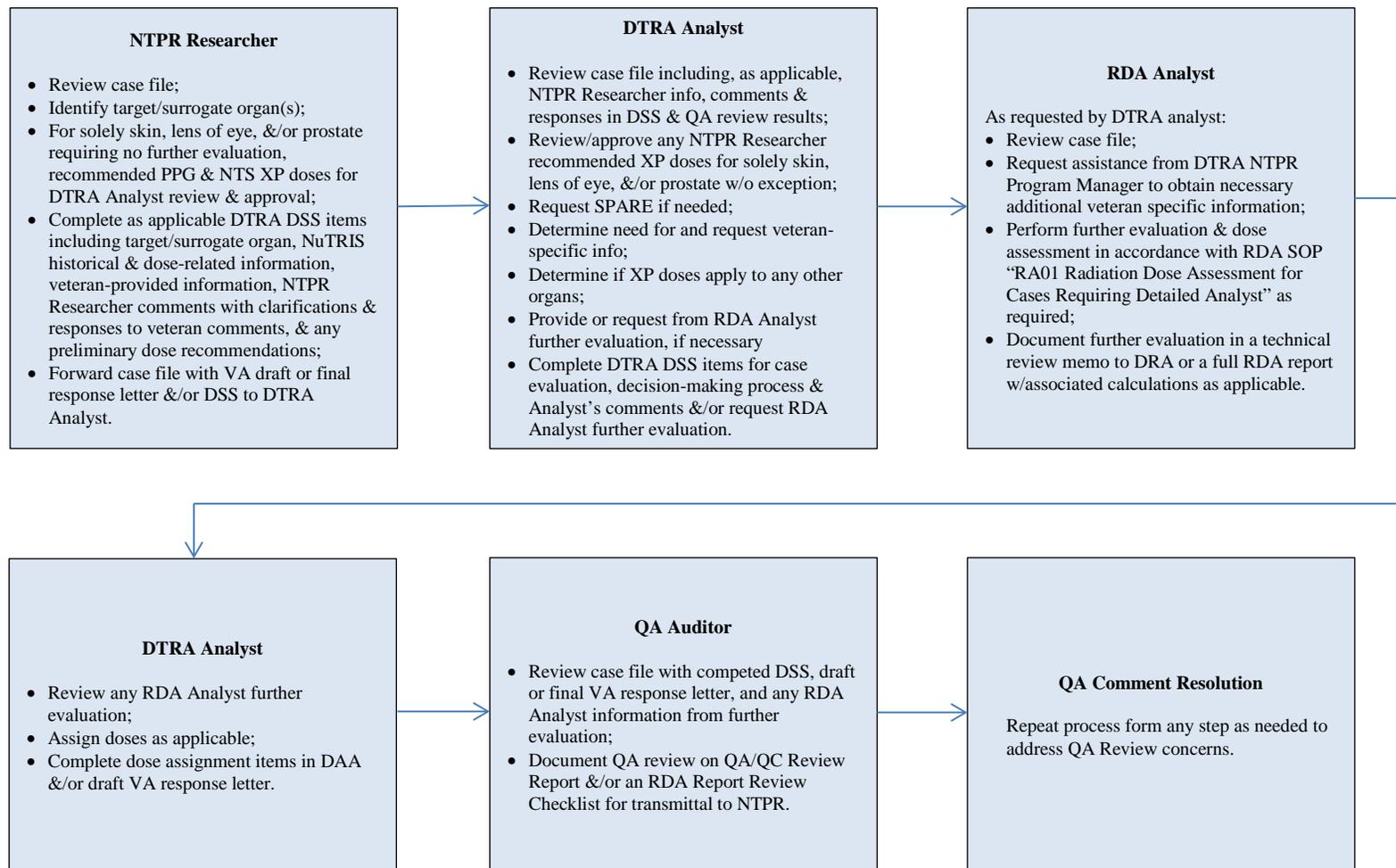


Figure 1. Expedited Processing of Dose Assessment: Process Overview

5.1 NTPR Researcher Case File Review

The decision to expedite or otherwise respond to a VA claim inquiry starts with review by the NTPR researcher of the program participant's identified diseases and the request and receipt of required records and other information in accordance with the NTPR Program Support SOP (DTRA, 2015a).

The NTPR researcher reviews case file information that may include – but is not limited to:

- other historical veteran- and operation-specific information;
- previously-determined veteran-, cohort-, and/or operation-specific radiation doses;
- VA-furnished information, particularly the diseases or target organs for which the doses are requested and the dates of diagnosis of the diseases;
- any additional medical opinion available regarding the diseases or their target organs; and
- veteran-provided information, including comments, identification of unusual exposure conditions, and answers to questionnaires regarding the exposure;
- the SPARE.

5.2 Identification of Target, Surrogate and XP Organ

The NTPR researcher uses the VA dose request which specifies the target organ, tissue, or disease to identify the corresponding surrogate and XP organ or tissue from Attachment 2 – *Cross Reference of NTPR NuTRIS Organ Codes, NTPR Standard Organs, NIOSH-IREP Cancer Risk Models, and XP Organs and Tissues*. The DTRA analyst verifies the XP organ is correctly identified and, if necessary, requests an expert medical opinion.

If there is a question regarding the radiogenicity of a medical condition, the DTRA analyst might seek a medical opinion from a qualified physician knowledgeable in radiogenic illnesses.

5.3 Expedited PPG or NTS Doses to the Skin or Lens of the Eye

The NTPR researcher recommends XP doses for PPG or NTS cases for which the XP organ(s) is solely skin and/or lens of the eye. These recommendations are subject to DTRA analyst review and approval. PPG or NTS XP doses to the skin and lens of the eye have previously been reviewed and approved by DTRA and the VBDR as 550 rem and 28 rem, respectively (VBDR 2006, 2007a). These values reflect the high level of uncertainty associated with determination of doses for which localized beta radiation-emitting contamination can play an important role. Although actual doses may be well less than these XP values, the uncertainties in beta radiation dosimetry prevent ruling out with high confidence that at least some areas might have received inhomogeneous dose

depositions that equal or exceed values that could result in a VA service-connected determination.

The PPG or NTS EP skin dose of 550 rem is well above the NIOSH-IREP screening dose (Kocher and Apostoaei, 2007) and the 28 rem dose to the lens of the eye is considered “as likely as not” to result in cataracts (VA, 2011). A QA auditor review is not required for PPG or NTS XP dose assignments made solely for the skin or lens of the eye, and no DSS is prepared for these dose assignments.

5.4 Expedited Doses to the Prostate without Exceptions

The NTPR researcher identifies and recommends XP doses to PPG or NTS cases for which the XP organ is solely the prostate without exceptions. These recommendations are subject to DTRA analyst review and approval.

Exceptions for prostate-only cases are listed in Table 1. These are EPG exceptions that could potentially raise the dose above the PPG XP TOD (25 rem) and NTS XP TOD (17.5 rem). Note that for the prostate, both are less than the LD (41 rem).

A QA auditor review is not required for PPG or NTS prostate-only cases without exceptions. The Veteran Comments/Researcher Comments and Responses Section of the DSS is not required for these dose assignments, but may be requested if deemed necessary by the DTRA analyst.

Based on historical participation information and NTPR Program RDA experience, it has been determined that EPG exceptions or specifically-identified participant duty assignments for only a few Operations/Shots have the potential to result in prostate doses that exceed the XP TODs of 25 rem (PPG) and 17.5 rem (NTS) and the LD of 41 rem. Table 1 lists veteran participation for which further evaluation, a SPARE if requested by the DTRA analyst, and QA auditor review are required. For all other PPG or NTS prostate-only cases, the NTPR researcher recommends XP doses.

Table 1. PPG or NTS Prostate-Only Exceptions

Exceptions/Operation	Shot	Activity/Duty	Comments
Participation in > 1 testing series (operation) & sum from each relevant EPG of (EPG TODs + initial external γ & n$^{\circ}$ doses) > XP TOD			Exception
Individuals w/film badge records & whose total film badge dose is > the upper-bound external dose determined for their respective EPG			Exception
UPSHOT-KNOTHOLE	SIMON	Volunteer Observer	Exception; Initial n $^{\circ}$ dose > 0.5 rem; TOD \geq XP TOD; TOD \geq LD
	BADGER	Volunteer Observer	Exception; Initial n $^{\circ}$ dose > 0.5 rem
	NANCY	Volunteer Observer	Exception; Initial n $^{\circ}$ dose > 0.5 rem
TEAPOT	APPLE II	Volunteer Observer	Exception; Initial n $^{\circ}$ dose > 0.5 rem; TOD \geq XP TOD
	TESLA	Volunteer Observer	Exception; Initial n $^{\circ}$ dose > 0.5 rem;
	HA	Volunteer Observer	Exception; Initial n $^{\circ}$ dose > 0.5 rem; TOD \geq XP TOD; TOD \geq LD
	BEE	Proj. 5.2 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem
	BEE	Proj. 8.1 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem
PLUMBBOB	DOPPLER	Observers in trenches	Exception; Initial n $^{\circ}$ dose > 0.5 rem;
	DOPPLER	Task Force WARRIOR	Initial n $^{\circ}$ dose > 0.5 rem
	JOHN	Alternate weapon delivery aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem
	JOHN	Project 5.5 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem; TOD \geq XP TOD; TOD \geq LD
	HOOD	Project 5.3 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem; TOD \geq XP TOD
	HOOD	Project 5.4 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem; EPG TOD \geq XP TOD; TOD \geq LD
	PRISCILLA	Project 5.4 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem; TOD \geq XP TOD
HARDTACK I	CACTUS	Project 5.2 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem
	CACTUS	Project 5.3 aircrew	Exception; Initial n $^{\circ}$ dose > 0.5 rem
DOMINIC II	LITTLE FELLER I	Project 9.2 personnel	Initial n $^{\circ}$ dose > 0.5 rem

5.5 NTPR Researcher Completion of Parts 1 and 2 of DSS

For dose assignments for other than solely skin, lens of the eye, and/or prostate without exceptions, the NTPR researcher completes Part 1 and applicable items in Part 2 of the DTRA DSS (Attachment 4), as well as a VA response letter for reporting NTPR dose assignments. In completing Part I, the NTPR researcher summarizes veteran comments particularly those that might pertain to, or that the veteran might expect to pertain to, potential radiation exposure. The NTPR researcher clarifies or responds to issues raised by the veteran when pertinent historical information is available to do so. The NTPR researcher identifies XP doses corresponding to the XP organ. The NTPR researcher forwards the case file, including the DTRA DSS as applicable and the VA draft response letter, to the DTRA analyst for evaluation and dose assignment.

For VA dose requests that are for a specific disease instead of a physical location or organ, such as for chronic lymphocytic leukemia (CLL), the disease should be used in the VA draft response letter and for the “VA Medical Condition (S)/ Target Organ (S)” on part 1 of the DSS.

5.6 DTRA Analyst Case File Review

The DTRA analyst reviews available case file information to determine which EPG is applicable. The DTRA Analyst also reviews any exposure information provided that is specific to the veteran. During this review, the DTRA Analyst:

- reviews case file, including as applicable the NTPR researcher-summarized information, veteran comments, and clarifications and responses to the veteran’s comments that are documented in the DSS;
- determines the need for and requests if needed additional, veteran-specific information.

Information from this review is documented in the DSS as per Section 5.12.

5.7 Determination of Significant Initial Neutron or Gamma Dose

The DTRA analyst reviews Table 1, “Units and Project Elements with Initial Neutron Doses of 0.001 rem or More,” and Table 2, “Doses from Initial Gamma Radiation Calculated for NTPR Participants,” in NTPR-TM-09-01 (Weitz and Egbert, 2010) to determine potential contribution to the veteran’s dose from initial external neutron and/or gamma radiation. The DTRA Analyst requests further evaluation by the RDA analyst if additional information is necessary to make this determination.

Per Weitz and Egbert (2010), for PPG participation, only selected Operation REDWING and Operation HARDTACK I aircrews have initial neutron doses that are potentially above 0.001 rem upper-bound dose, and “...participants in the oceanic test series [PPG] who were present on land or aboard ship at the times of detonation received initial gamma doses of less than 0.001 rem.”

5.8 Comparison of Case File Information

The DTRA analyst compares the case file information and the applicable target/surrogate organ XP TODs in Attachment 3 with:

- Exclusions: general and EPG-specific exclusions listed in Attachment 5;
- LDs: limiting total organ doses (LDs) listed in Attachment 6; and
- EPG TODs: total upper-bound EPG organ doses (Case et al., 2011a & b), with the addition of applicable initial external gamma and neutron doses, per the guidance of DTRA-TR-10-29, DTRA-TR-11-01, and Weitz and Egbert (2010).

EPG TODs excluding external initial gamma and initial neutron doses are listed in Attachment 7; external initial neutron and gamma doses are discussed in Section 5.7 and selected initial doses are listed in Weitz and Egbert (2010). Any exposure cohort for which there is no EPG would require further evaluation as described in Section 5.10.

For four EPGs, it was determined that there was no potential for radiation exposure (Case et al., 2011b):

- Operation ARGUS ship-based personnel,
- Operation HARDTACK I non-exposed support ship personnel,
- Operation DOMINIC I ship-based personnel,
- Operation DOMINIC I land-based personnel.

For veterans in these four EPGs, no comparison with an EPG TOD is required in determining eligibility for EP and they may be assigned the applicable XP TOD.

5.9 Assigning XP Doses

The DTRA Analyst performs dose assignment using the following guidance unless otherwise documented in the Analyst Comments of the DSS. If the conditions below are not met, then determine the need for further evaluation per section 5.10.

- For cases with only one PPG or NTS operation participation, the DTRA analyst assigns the applicable XP dose components for the XP organ if:
 - the veteran's radiation exposure scenario does not include an identified exclusion to the applicable EPG,
 - the XP TOD is less than the LD for the surrogate organ, and
 - the XP TOD is greater than the applicable EPG TOD including initial external gamma and neutron doses.

- For cases with multiple PPG and/or NTS operation participation, the DTRA analyst assigns those applicable XP dose components for the XP organ if:
 - there are no exclusions other than multiple operations,
 - the higher of the applicable PPG or NTS XP TOD is greater than the sum of the EPG TODs including any initial gamma or neutron dose for all operations, and
 - the applicable PPG or NTS XP TOD is less than the LD.

- For cases with PPG and/or NTS participation plus H&N participation, the DTRA analyst assigns the XP dose components for the XP organ if:
 - H&N doses are determined in accordance with *RA05 – Expedited Processing of Radiation Dose Assessment for NTPR Hiroshima and Nagasaki Veterans*.
 - there are no exclusions other than multiple operations,
 - the higher of the applicable PPG or NTS XP TOD is used for evaluation and as the final XP TOD assignment,
 - the XP TOD is greater than the sum of the PPG and/or NTS EPG TODs including any initial gamma or neutron dose, and H&N EPG or RDA-calculated TOD, and
 - the XP TODs is less than the LD.

- For cases involving solely Benign Thyroid Nodular Disease, the DTRA analyst assigns the applicable XP dose components if:
 - there is not an identified exclusion to the applicable EPG, and
 - the XP TOD is greater than the applicable EPG TOD including initial external gamma and neutron doses.

This assignment is supported by expert medical opinion indicating that radiation doses from 25-36 rem would be unlikely to change the probability of causation for benign thyroid nodular disease from “unlikely” to “as likely as not.” (Reeves, 2012).

5.10 Identifying the Need for Further Evaluation

The DTRA analyst provides for further evaluation to determine the appropriate dose components for assignment if:

- the veteran’s radiation exposure scenario includes an identified exclusion to the applicable EPG other than multiple PPG and/or NTS operations or PPG and/or NTS plus H&N participation,
- the XP TOD or XP plus H&N TOD is greater than the LD for the target organ,
- the XP TOD is less than the applicable EPG TOD (including initial external gamma and neutron doses), or

- there is no EPG for the veteran's exposure cohort.

If further evaluation is required from an RDA analyst, the DTRA analyst documents the reasons further evaluation is required in Part 2 of the DSS and requests the development of a SPARE if deemed necessary to effectively evaluate the scenario.

This further evaluation may include any one or more of:

- A DTRA analyst more detailed review of available information. Typically this more detailed review is used to determine if the veteran's specific scenario clearly indicates that the XP TOD is bounding to the actual TOD received and that the XP TOD is less than the LD.

For any identified General Exclusion other than participation in multiple test series that triggers further evaluation, the DTRA Analyst should determine if the exclusion exceeds the conditions of the EPG as described in the Compendium of Proposed EPGs. (Case et al., 2011b) Indications of exposure beyond the conditions that define the EPG should be addressed and may require an RDA analyst technical review.

Pertinent results of a DTRA analyst review are documented in the Analyst Comments of the DTRA DSS (Attachment 4).

- An RDA analyst technical review. A technical review may be performed by an RDA analyst sufficiently experienced in performing full RDAs when, following review of the case file information, the RDA analyst can determine with few or no detailed calculations that the veteran's specific scenario indicates that the XP TOD is greater than the actual TOD and less than the LD. A technical review may include calculation of only some of the radiation dose components when it is deemed that only those components have significant potential to result in a TOD that exceeds the XP TOD or the LD. An RDA analyst technical review is documented in a memo from the RDA analyst to DTRA and may have attachments associated with detailed dose calculations for the dose components addressed. If the RDA analyst cannot easily make a determination that the technical review criteria are met (actual TOD < XP TOD < LD), the RDA analyst reports this to the DTRA analyst for reassignment of the case for a full RDA.
- An RDA analyst full RDA. A full RDA addresses all radiation dose components, generally with detailed calculations. A full RDA is performed and documented in accordance with RDA SOP RA01. For cases requiring a full RDA, a SPARE is required to ensure the veteran's exposure scenario is clearly documented and the veteran has the opportunity to review the parameters used in his dose determination.

For multiple operations where further evaluation is required for any portion, should the initial further evaluation result in a TOD that exceeds the XP TOD or the LD for the target organ for that operation, the DTRA analyst requests a full RDA for all operations.

5.11 Assigning Dose Components from Further Evaluation

For cases where further evaluation consists of a full RDA, all of the full RDA dose components are assigned. This assignment of full RDA dose components provides maximum accuracy in dose determination while still including the veteran-favorable assumptions of the RDA SOP RA01. Maximum accuracy is important when the TOD is not well below the NIOSH-IREP calculated screening dose and the decision could result in a VA service-connected determination. Since the RDA TOD is the most accurate, veteran-favorable, it does not require comparison to the LD as the LD is only useful in evaluating XP doses.

For cases where further evaluation does not result in a full RDA, the DTRA analyst assigns the XP TOD again assuring that the assigned dose is veteran favorable.

For multiple operations where further evaluation is required for any portion, should the further evaluation result in a TOD that exceeds the XP TOD for the target organ for that operation, the DTRA analyst requests a full RDA for all operations and the total calculated TODs are compared to the LD. Otherwise, where the TOD resulting from the further evaluation is less than the XP TOD, the XP TOD is used and compared to the LD.

5.12 Completion of DSS Parts 2 and 3 and the VA Response Letter

The DTRA analyst completes applicable sections of Parts 2 and 3 of the DSS (Attachment 4) using researcher-documented information from Part 1, the SPARE, veteran-provided information, and other relevant information from the case file. In Part 2, Justification, the DTRA analyst documents the reference document (typically this or another RDA SOP) that is the basis for the decision.

In Analyst Comments, the DTRA analyst documents any specific EPGs used in the decision-making and additional exposure scenarios—including applicable exclusions that are consistent with historical records, different than those of the comparable EPG, and that could potentially result in radiation doses greater than those of the EPG. The DTRA analyst documents whether any such additional exposure scenarios could increase the TOD to above the XP TOD. The DTRA analyst also summarizes the rationale used for the dose assignment, pertinent historical and dose information, and veteran comments and applicable responses in the Analyst Comments.

For VA dose requests that are for a specific disease instead of a physical location or organ, such as CLL, the XP Organ or Tissue from Attachment 2 – *Cross Reference of NTPR NuTRIS Organ Codes, NTPR Standard Organs, NIOSH-IREP Cancer Risk Models, and XP Organs and Tissues* should be used for the Internal Organ on part 2 of the DSS.

The DTRA analyst documents the DSS dose assignment in the VA Response Letter.

5.13 QA Auditor Review

The quality assurance (QA) auditor reviews the case file and documents the performance of the quality review of the decision-making process, the DTRA DSS (Attachment 4), the draft VA Response Letter, RDA documentation (if applicable), and the resulting dose assignment for clarity, completeness, and conformance to NTPR policies and procedures. The QA auditor documents the results of the review on a QA/QC Review Report for Decision Summary Sheet and/or an RDA Report Review Checklist, Attachments 8 and 9, respectively. If corrections or changes are recommended by the QA auditor, actions described above may be repeated as appropriate for the completion and documentation of the dose assignment.

6. Data and Records Management

Documentation resulting from implementation of this SOP is entered into the case file and may include any of the following as applicable:

- Relevant documentation obtained or developed in accordance with NTPR Program Support SOP (DTRA, 2015a);
- NTPR researcher additions to the DTRA DSS (Attachment 4);
- DTRA analyst additions to the DTRA DSS (Attachment 4);
- RDA analyst further evaluation results, including memoranda to the DTRA analyst with or without supporting radiation dose calculations and full RDA reports in accordance with RDA SOP RA01;
- QA auditor QA/QC Review Report for Decision Summary Sheet and/or RDA Report Review Checklist
- Draft and/or final VA Response Letter.

7. Quality Control and Quality Assurance

Expedited processing of dose assignments is performed under DTRA NTPR program management by authorized qualified personnel following SOPs and documenting both the process and the results as described in this and other applicable SOPs (DTRA, 2015a). This and other quality assurance- and RDA-related SOPs have been reviewed by Subcommittees 1 (DTRA Dose Reconstruction Procedures) and 3 (Quality Management and VA Process Integration with DTRA NTPR Program) of the Veterans' Advisory Board on Dose Reconstruction. The VBDR, established in 2003 and through 2013, provided guidance and oversight of the dose reconstruction and claims compensation program for veterans, as well as, assistance to the VA and DTRA in communicating to veterans information on the mission, procedures and requirements of the VBDR.

In addition to performing review of SOPs, the VBDR Subcommittee 1 provided reviews of selected cases processed using historic expedited processing and EP methods as described in this SOP and using full RDAs, performed in accordance with detailed RDA

SOPs. Lessons learned were identified for full RDA processing during these reviews and any recommendations for improvement of expedited or full RDA processing were documented and tracked to completion.

Independent review of the records, process, and results related to radiation dose assignment, including both expedited processing and full RDAs, is performed and documented by the QA auditor. Results of case processing and quality reviews are reported to DTRA NTPR program management during semi-annual NTPR Program Management Reviews and in a Quarterly Quality Report with associated Reported Quality Issues (RQIs) spreadsheet. Areas in need of corrective action are identified and tracked through to correction on the RQI.

8. Referenced SOPs and Standard Methods from this Manual

- (1) SOP Appendix A-1 – Hiroshima and Nagasaki Radiation Dose Assessment
- (2) RA01 – Radiation Dose Assessment for Cases Requiring Detailed Analysis
- (3) RA05 – Expedited Processing of Radiation Dose Assessment for NTPR Hiroshima and Nagasaki Veterans

9. Reference Materials

- (1) Case, D. R., Chehata, M., Dunavant, J. D., Egbert, S. D., Mason, C. L., McKenzie-Carter, M. A., Singer, H. A., and Weitz, R. L., 2011a. *A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments*. DTRA-TR-10-29, Defense Threat Reduction Agency. Fort Belvoir, VA. October 17.
- (2) Case, D. R., Chehata, M., Dunavant, J. D., Mason, C. L., McKenzie-Carter, M. A., Singer, H. A., and Weitz, R. L., 2011b. *Compendium of Proposed NTPR Expedited Processing Groups*. DTRA-TR-11-01, Defense Threat Reduction Agency. Fort Belvoir, VA. November 30.
- (3) DTRA (Defense Threat Reduction Agency), 2008. DTRA NTPR Program – RDA SOP RA03 - Rev. 1.2, Radiation dose Assessment for Expedited Cases, Defense Threat Reduction Agency, Fort Belvoir, VA. October 31. (Superseded by this SOP).
- (4) DTRA (Defense Threat Reduction Agency), 2015a. NTPR Program Support SOP. CDRL-A008, Defense Threat Reduction Agency, Fort Belvoir, VA. March 27.
- (5) DTRA (Defense Threat Reduction Agency), 2015b. RDA SOP RA05, Expedited Processing of Radiation Dose Assessments for NTPR Hiroshima and Nagasaki Veterans, Defense Threat Reduction Agency, Fort Belvoir, VA. June 23.

- (6) Kocher, David C. and Apostoaei, Julian A., 2007. *Screening Doses for Induction of Cancers Calculated with the Interactive RadioEpidemiological Program (IREP)*. DTRA-TR-07-4. Defense Threat Reduction Agency, Fort Belvoir, VA. March.
- (7) Mannis, D. N., Murray, B. L., and Blake, P. K., 2013. *Technical Justification for Revising NTPR SOP RA02 Rev 2.0 to include CLL Cases*. NTPR-TM-13-02, Defense Threat Reduction Agency. Fort Belvoir, VA. December 01.
- (8) NIOSH (National Institute of Occupational Safety and Health), 2002. *NIOSH-Interactive RadioEpidemiological Program (NIOSH-IREP), Technical Documentation, Final Report*. 77 pp. June 18.
- (9) NIOSH (National Institute of Occupational Safety and Health), 2014. *User's Guide for the Interactive RadioEpidemiological Program (NIOSH-IREP), Version 5.7.1* 22 pp. September.
- (10) Reeves, G. to Murray, B. 2012. Electronic mail (email), Subject: Expedited doses for non-malignant thyroid disease. June 28.
- (11) Title 32, Code of Federal Regulations, Part 218, *Guidance for the Determination and Reporting of Nuclear Radiation Dose for DoD Participants in the Atmospheric Nuclear Test Program (1945-1962)*.
- (12) VA. (U.S. Department of Veterans Affairs) (38CFR3.102). Title 38 - Pensions, Bonuses, and Veterans' Relief. Chapter 1 – Department of Veterans Affairs (Continued). Part 3 – Adjudication. Section 3.102 - Reasonable doubt. 50 FR 34458, Aug. 26, 1985, as amended at 66 FR 45630, Aug. 29, 2001.
- (13) VA. (U.S. Department of Veterans Affairs) 2011. "Instructions for VBA Staff for Screening "Worst Case" Posterior Subcapsular Cataract (PSC) compensation Claims from "Radiation-Exposed Veterans." April 25.
- (14) VBDR (Veterans' Advisory Board on Dose Reconstruction). 2006. Letter to Director, Defense Threat Reduction Agency. July 5.
<http://docs.google.com/viewer?url=http://www.vbdr.org/recommendations/vbdr-recommendations-june06.pdf&embedded=true> (accessed on September 9, 2011)
- (15) VBDR (Veterans' Advisory Board on Dose Reconstruction), 2007a. Letter to Director, Defense Threat Reduction Agency. March 28.
http://docs.google.com/viewer?url=http://www.vbdr.org/recommendations/VBDR_Recommendations_March07Mtg.pdf&embedded=true (accessed on September 9, 2011)
- (16) VBDR (Veterans' Advisory Board on Dose Reconstruction). 2007b. Letter to Director, Defense Threat Reduction Agency. May 7. (NOT AVAILABLE on VBDR. ORG.)

- (17) Weitz, Ronald L. and Stephen D. Egbert, 2010. “Compilation of Initial Radiation Doses to Atmospheric Test Participants, Rev. 1,” NTPR-TM-09-01 (R1) Defense Threat Reduction Agency, Fort Belvoir, VA. November 30.

Attachment 1

(reserved)

Attachment 2

Cross Reference of NTPR NuTRIS Organ Codes, NTPR Standard Organs, NIOSH-IREP Cancer Risk Models, and XP Organs and Tissues

This attachment is a version of Table A-1 in Case et al. (2011a) modified to add XP organs and tissues from RDA RA02 Attachment 3, Expedited Processing (XP) Dose Values. Table A-1 provides a listing of NTPR XP and NuTRIS Organ Codes and their associated descriptions cross referenced to the NTPR Standard Organs used in FIIDOS internal dose calculations and the cancer risk models of NIOSH-IREP. Entries in the Surrogate Type column describe whether the assignment in the NTPR Standard Organ column is an actual NTPR Standard Organ used in FIIDOS calculations (FIIDOS), or an NTPR Standard Organ selected as a surrogate for the NTPR NuTRIS Organ Code (Surrogate).

The table contains entries in the “Current NTPR NuTRIS Organ Code” and “Proposed NuTRIS Organ Code” columns. The proposed codes are suggested for future implementation to be used in future dose reconstruction cases to provide improved consistency, eliminate duplicate organ entries, remove entries that are not organs or tissues, and provide the foundations for lookup of NTPR NuTRIS Codes and NTPR Standard Organs / Surrogates.

In addition, 15 new combinations, shown in *italics* in Table Att 2-1, are included based on an assessment of cancer models and associated organs found in NIOSH-IREP documentation. These suggestions have been developed in the interest of possible future implementation to improve harmonization of references within the VA and DTRA processes.

Some comments in parentheses are included for entries that require clarification or further study before the NTPR Standard Organ and NIOSH-IREP cancer risk model(s) can be selected.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues*

(Italicized rows are proposed additions for future implementation)

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
ART-TIS	ART-TIS	Arthritic Tissue	Bone Surface	Surrogate	Connective Tissue (171)	Bone
BILE-D	BILE-D	Bile Duct	Liver	Surrogate	Gallbladder (156)	Other and ill-defined sites
BLDR	BLDR	Bladder	Urinary Bladder Wall	Surrogate	Bladder (188)	Pancreas, bladder, nervous system (including brain)
BLOOD	BLOOD	Blood, bone marrow , leukemia, red marrow , yellow marrow,	Red Marrow	FIIDOS Surrogate	Leukemia (204-208)	All leukemia (except CLL+) including lymphoma, multiple myeloma, and non-Hodgkin lymphoma
BONE	BONE	Bone , ankle, elbow , endosteum, femur , hand, jaw, joints, pelvis , shoulder, spine, surface , vertebrae	Bone Surface	FIIDOS Surrogate	Bone (170)	Bone

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues (cont.)**(Italicized rows are proposed additions for future implementation)*

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
BRAIN	BRAIN	Brain , anterior commissure, brain stem, cranial nerve	Brain	FIIDOS Surrogate	Nervous System (191-192)	Pancreas, bladder, nervous system (including brain)
BREAST	BREAST	Breast	Breast	FIIDOS	Breast (174-175)	Other and ill-defined sites
<i>None</i>	<i>CERVIX</i>	<i>Cervix</i>	<i>Uterus</i>	<i>Surrogate</i>	<i>Female Genitalia (179-182, 184)</i>	Other and ill-defined sites
None	CLL	CLL	Spleen	Surrogate	CLL (204.1)	Other and ill-defined sites
CONTISS	CON-TIS	Connective tissue	Muscle	Tentative	Connective Tissue (171)	Other and ill-defined sites
ENDOCR	ENDOCR-1	Endocrine glands, hypothalamus, other endocrine glands not included below	Specific diseased organ must be known.	Surrogate	Other endocrine glands (194)	Endocrine glands (including thyroid)
ENDOCR	ENDOCR-2	neuroendocrine system, pituitary gland, pineal gland	Brain	Surrogate	Other endocrine glands (194)	Endocrine glands (including thyroid)
ENDOCR	ENDOCR-3	thyroid	Thyroid	FIIDOS	Thyroid (193)	Endocrine glands (including thyroid)

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues (cont.)*

(Italicized rows are proposed additions for future implementation)

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
ENDOCR	ENDOCR-4	parathyroid	Thyroid	Surrogate	Other endocrine glands (194)	Endocrine glands (including thyroid)
ENDOCR	ENDOCR-5	Adrenal gland	Adrenals	FIIDOS	Other endocrine glands (194)	Endocrine glands (including thyroid)
EPIG	ETR-1	Epiglottis, gum, hypopharynx, lip, mouth, nasal cavity, nasolabial fold (specific disease needed if not skin cancer), nasopharynx, oral cavity, oropharynx, palate, parotid gland, pharynx, salivary gland, throat, tongue, tonsil, uvula	ET Region ⁺	Surrogate	Oral Cavity and Pharynx (140-149)	Oral cavity and pharynx (including lip)
ESOPH	ETR-2	Esophagus	ET Region ⁺	FIIDOS	Esophagus (150)	Oral cavity and pharynx (including lip)

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues (cont.)**(Italicized rows are proposed additions for future implementation)*

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
GLOTTIS	ETR-3	Glottis, larynx, sinus, sinus (maxillary), sinus (nasal), vocal cords	ET Region ⁺	Surrogate	Other Respiratory (160, 161, 163-165)	Respiratory tract other than lung
NASALT	ETR-4	Nasal tip (specific disease needed if not skin cancer),	ET Region ⁺	Surrogate	Oral Cavity and Pharynx (140-149)	Respiratory tract other than lung
EYE	EYE	Eye, choroid, retina	Brain	Surrogate	Eye (190)	Eye
EYE-MUS	EYE-MUS	Eye muscle, eyelid muscle	Muscle	Surrogate	Cancers of other and ill-defined sites (195)	Other and ill-defined sites
GAL-BD	GAL-BD	Gallbladder, bile duct	Liver	Surrogate	Gallbladder (156)	Other and ill-defined sites
HEART	HEART	Heart, aorta, atrial sarcoma	Muscle	Surrogate	Other Respiratory (160, 161, 163-165)	Respiratory tract other than lung
LLI	INT-LRG	Colon, large intestine, lower large intestine	LLI Wall ⁺	FIIDOS Surrogate	Colon (153)	Colon
SMINST	INT-SML	Small intestine, duodenum	SI Wall ⁺	FIIDOS Surrogate	All Digestive (150-159)	Other and ill-defined sites

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues (cont.)**(Italicized rows are proposed additions for future implementation)*

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
ULI	INT-ULI	Appendix, cecum, upper large intestine	ULI Wall ⁺	FIIDOS Surrogate	Colon (153)	Colon
KIDNEY	KIDNEY	Kidney	Kidney	FIIDOS	Urinary Organs, excluding Bladder (189)	Other and ill-defined
LIPOMA	LIPOMA	Lipoma (Not a malignant neoplasm)	Muscle	Surrogate	N/A	Other and ill-defined sites
LIVER	LIVER	Liver	Liver	FIIDOS	Liver (155)	Other and ill-defined sites
LUNG	LUNG	Lung , trachea	Lung	FIIDOS Surrogate	Lung (162)	Lung (including trachea and bronchus)
LYMSYS	LYM-SYS	Lymph system, lymph gland, lymph nodes, lymphatic tissue, lymphoma	Thymus (If this is primary disease)	Surrogate	Lymphoma and Multiple Myeloma (200-203)	All leukemia (except CLL+) including lymphoma, multiple myeloma, and non-Hodgkin lymphoma
<i>None</i>	<i>MIDEAR</i>	<i>Middle ear</i>	<i>Brain</i>	<i>Surrogate</i>	<i>Other Respiratory (160, 161, 163-165)</i>	<i>Respiratory tract other than lung</i>

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues (cont.)**(Italicized rows are proposed additions for future implementation)*

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
MUSCLE	MUSCLE	Muscle , eye muscle, eyelid muscle, neuro-muscular, thigh muscle	Muscle	FIIDOS Surrogate	Cancers of Other and Ill-Defined Sites (195)	Other and ill-defined sites
MUS-PC	MUS-PC	Muscle peritoneal cavity, peritoneum	Muscle	Surrogate	All Digestive (150-159)	Other and ill-defined sites
NRVSYS	NRV-SYS	Nervous system, spinal cord, spine nerves	Brain	Surrogate	Nervous System (191-192)	Pancreas, bladder, nervous system (including brain)
<i>None</i>	<i>OVARY</i>	Ovary	<i>Ovary</i>	FIIDOS	<i>Ovary (183)</i>	Other and ill-defined sites
PANCRS	PANCRS	Pancreas	Pancreas	FIIDOS	Pancreas (157)	Pancreas, bladder, nervous system (including brain)
<i>None</i>	<i>PLEURA</i>	<i>Pleura</i>	<i>Lung</i>	<i>Surrogate</i>	<i>Other Respiratory (160, 161, 163-165)</i>	Respiratory tract other than lung
RECTUM	RECTUM	Anus, anal canal, rectum	LLI Wall ⁺	Surrogate	Rectum (154)	Rectum (including anus and anal canal)
RESPOTH	RESPOTH	Respiratory other than Lung	ET Region ⁺	Surrogate	Other Respiratory (160, 161, 163-165)	Respiratory tract other than lung

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Table Att 2-1. Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, NIOSH-IREP Cancer Models, and XP Organs or Tissues (cont.)*

(Italicized rows are proposed additions for future implementation)

Current NuTRIS Organ Code	Proposed NuTRIS Organ Code	Description	NTPR Standard Organ	Surrogate Type[†]	NIOSH-IREP Cancer Model (ICD-9)	XP Organ or Tissue
ST-ARM	SOFT-TI	Soft tissue, hip, shoulder, thigh, upper arm	Muscle	Surrogate	Cancers of Other and Ill-Defined Sites (195)	Other and ill-defined sites
SPLEEN	SPLEEN	Spleen	Spleen (Use only if solid cancer of spleen is the primary disease)	FIIDOS	Cancers of Other and Ill-Defined Sites (195)	Other and ill-defined sites
STMACH	STMACH	Stomach	Stomach Wall	FIIDOS	Stomach (151)	Other and ill-defined sites
TESTES	TESTES	Testes , penis, prostate, scrotum	Testes	FIIDOS Surrogate	All Male Genitalia (185-187)	Prostate
THYMUS	THYMUS	Thymus	Thymus	FIIDOS	Other Respiratory (160, 161, 163-165)	Respiratory tract other than lung
U-TRCT	URINARY	Urinary tract , urethra, ureter	Urinary Bladder Wall	FIIDOS Surrogate	Urinary Organs, Excluding Bladder (189)	Pancreas, bladder, nervous system (including brain)

* Modified from Table A-1, Cross-Reference List of NTPR NuTRIS Codes, NTPR Standard Organs, and NIOSH-IREP Cancer Models from DTRA-TR-10-29, A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments, October 2011.

+ ET=extra-thoracic, LLI=lower large intestine, SI=small intestine, ULI = upper large intestine, CLL=chronic lymphocytic leukemia.

† FIIDOS (in bold) means that there is a dose conversion factor for the organ. Surrogate means that a dose conversion factor for the NTPR Standard organ is used for the diseased organ.

Attachment 3

Expedited Processing (XP) Dose Values

Table Att 3-1. Expedited Processing (XP) Dose Values (rem)

External, Penetrating Whole Body

Organ or Tissue	Gamma		Neutron	
	PPG	NTS	PPG	NTS
All	18	16	0.5	0.5

External, Non-Penetrating Eye and Skin

Organ or Tissue	PPG or NTS (Beta + Gamma)
Lens of the eye (posterior subcapsular cataract)	28
Skin	550

Internal

Organ or Tissue	PPG or NTS			
	Alpha		Beta + Gamma	
Oral cavity and pharynx (including lip)	0.3		2	
Colon	0.1		2	
Rectum (including anus and anal canal)	0.1		8	
Pancreas, bladder, nervous system (including brain)	0.1		0.1	
Lung (including trachea and bronchus)	1		3	
Respiratory tract other than lung	3		8	
Bone	8		0.3	
Eye	0		1.3	
Endocrine glands (including thyroid)	0.1		7	
All leukemia (except CLL)* including lymphoma, multiple myeloma, and non-hodgkin's lymphoma	0.3		3	
Other and ill-defined sites	1.5		8	
Prostate	PPG	NTS	PPG	NTS
	4.5	0	2	1

*Expedited processing doses for CLL are assigned from Other and ill-defined sites.

Table Att 3-1. Expedited Processing (XP) Dose Values (rem) (cont.)

Total (External + Internal) Organ Dose (rem)		
Organ or Tissue	PPG	NTS
	Alpha + Beta + Gamma + Neutron	Alpha + Beta + Gamma + Neutron
Oral cavity and pharynx (including lip)	20.8	18.8
Colon	20.6	18.6
Rectum (including anus and anal canal)	26.6	24.6
Pancreas, bladder, nervous system (including brain)	18.7	16.7
Lung (including trachea and bronchus)	22.5	20.5
Respiratory tract other than lung	29.5	27.5
Bone	26.8	24.8
Eye	19.8	17.8
Endocrine glands (including thyroid)	25.6	23.6
All leukemia (except CLL)* lymphoma, multiple myeloma, and non-hodgkin's lymphoma	21.8	19.8
Other and ill-defined sites	28	26
Prostate	25	17.5

*Expedited processing doses for CLL are assigned from Other and ill-defined sites.

Attachment 4

Example Blank DTRA Decision Summary Sheet

Version 6.0 (06/02/2015)

Decision Summary Sheet

6/5/2015

Part 1

Veteran's Name:

KeyNum:

Service:

Date Of Birth:

Operation(s):

Unit Information:

Series:

Veteran Provided Information:

Questionnaire Sent

Questionnaire Received

SPARE Mailed

SPARE Received

00/00/0000

00/00/0000

00/00/0000

00/00/0000

SPARE (Scenario of Participation and Radiation Exposure) Section:

SPARE Required:

SPARE Mailed:

SPARE Received:

SPARE Rec No Comment:

Veteran Comments/Researcher Comments and Response:

Version 6.0 (06/02/2015)

Decision Summary Sheet

6/5/2015

Part 2

Veteran's Name:

KeyNum:

I. Determine if this case is eligible for expedited processing.

1. Is this a Board of Veterans' Appeals (BVA) or non-participant case? (Y or N Required)
2. Is this a non-participant case for which the BVA is conceding presence at the test site? (Y or N Required)

3. Exposure Locations

- a. Exposure at Continental Sites (Y or N Required)
- b. Exposure at Oceanic Sites (Y or N Required)
- c. Exposure at Hiroshima/Nagasaki (Y or N Required)
- d. Veteran participated in more than one test series(Operations) (Y or N Required)

4. For PPG/NTS prostate only cases

- a. Veteran was a member of an exclusion group listed in Table 1 (Y or N Required)
If 'a' is N - stop DSS not required
- b. Does the sum of the EPG TODs for each relevant EPG plus initial gamma and neutron doses XP TOD exceed LD? (Y or N Required)
- c. Does the veteran's film badge dose exceed the XP TOD? (Y or N Required)

If a-c above are all No, assign XP Dose, DSS not required.

If any of a-c above are yes, continue with item 6, DSS required.

5. For H/N: is the dose expeditable per RA05 Table 1-1 and/or For Atmospheric Testing: is the dose assessment for one or more of the following skin, lens of the eye (cataract) or any expeditable internal organ?

- Yes: go to item 6
- No: not eligible for expedited processing; radiation dose assessment (RDA) require

II. Determine dose to be assigned

6. Did veteran claim additional exposure beyond the standard templates?

- Yes: go to item 7
- No: assign expedited dose.

7. Identify additional exposure scenarios (check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Target ship reboarding | <input type="checkbox"/> Handled contaminated equipment/buoys, etc |
| <input type="checkbox"/> Small boat scenario | <input type="checkbox"/> Evaporator maintenance |
| <input type="checkbox"/> Hull scraping | <input type="checkbox"/> Cloud tracking, and sampling missions |
| <input type="checkbox"/> Cloud-sampling aircraft handling | <input type="checkbox"/> Maneuver different from main body |
| <input type="checkbox"/> Wheeled/tracked vehicle movement | <input type="checkbox"/> Heliborne operations |
| <input type="checkbox"/> Radiological monitoring | <input type="checkbox"/> Construction work |
| <input type="checkbox"/> H-N prisoner of war (POW) | <input type="checkbox"/> Decontamination and decommissioning or other clean-up operations |

Other:

Version 6.0 (06/02/2015)

Decision Summary Sheet

6/5/2015

Part 2

Veteran's Name:

KeyNum:

8. Can any additional exposure scenarios consistent with historical records increase organ dose above the expedited dose?

- Yes: complete H-N RDA with additional scenarios added; submit NTS or PPG for technical review & recommendation to Defense Threat Reduction Agency (DTRA) whether full RDA is required.
- No: Assign maximum applicable expedited dose.

Assigned Expedited Doses:

Dose Decision: EXP RDA

EXP - Expedited Dose Calculation, RDA - Radiation Dose Assessment.

Justification: RA02, Revision 2.2

EXTERNAL	Gamma (rem)	Gamma Upper (rem)	Neutron (rem)
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INTERNAL ORGAN (S)	Alpha (rem)	Alpha Upper (rem)	Beta+Gamma (rem)	B + G Upper (rem)
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Version 6.0 (06/02/2015)

Decision Summary Sheet

6/5/2015

Part 2

Veteran's Name:

KeyNum:

Analyst Comments:

DTRA Approval:

DTRA Date:

Version 6.0 (06/02/2015)

Decision Summary Sheet

6/5/2015

Part 3

Veteran's Name:

KeyNum:

Service:

Date of Birth:

Operation(s):

Current Mathcad Version: 05/29/2009

Section 3. 1. 2 Date:

StartDate (mm/dd/yyyy)	EndDate (mm/dd/yyyy)	Hours/Day
00/00/0000	00/00/0000	

Section 3. 5. 1 Organ Specifications:

Section 3. 7. 1 Skin Dose Locations:

Additional Variables:

All other variables are default values

Mathcad External Dose By Date Range			Mean Dose (REMS)	Upper Bound Dose (REMS)
Location	Start Date	End Date		

Attachment 5

General and EPG-Specific Exclusions to Expedited Processing Groups

Note: The following attachment is from Appendix B, “Proposed NTPR Expedited Processing Groups,” Tables B-1 through B-15 of DTRA-TR-10-29, *A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments* (Case et al., 2011a). Introductory narrative and table numbers have been re-numbered and modified from Appendix B of DTRA-TR-10-29 to Attachment 5 of this procedure for consistency with and application to this procedure.

Within attachment Tables Att 5-1 through 5-15 are references to Case et al. (2011b), which is DTRA-TR-11-01, *Compendium of Proposed NTPR Expedited Processing Groups*. Defense Threat Reduction Agency. Fort Belvoir, VA. November 2011.

Also referenced are

Operation-specific Appendices to DTRA (Defense Threat Reduction Agency), 2008. *NTPR Standard Operating Procedures Manual, Revision 1.2*, October 31.

Weitz, R., Thomas, C., Klemm, J., Stuart, J., Knowles, M., Goetz, J., Muller, E., and Landay, A., 1982a. *Analysis of Radiation Exposure for Naval Units of Operation CROSSROADS; Volume 1-Basic Report*. DNA-TR-82-05-V1. Defense Nuclear Agency, Washington, D.C. March 3.

Goetz, J., Klemm, J., Kaul, D., and McGahan, J.T., 1979. *Analysis of Radiation Exposure for Task Force Warrior-Shot Smoky-Exercise Desert Rock VII-VIII Operation PLUMBBOB*. DNA 4747 F. Defense Nuclear Agency, Washington, D.C. May 31.

Mason, C., 2009. *Doses Accrued at the Residence Islands of Enewetak Atoll from Previous Operations*. NTPR-TM-09-02. Defense Threat Reduction Agency, Fort Belvoir, VA. December 31.

Highest-Dose Cohort

Expedited Processing Groups (EPGs) are listed in Tables Att 5-4 to 5-13 for participants in test operations conducted in the Pacific Proving Ground, in Table Att 5-14 for participants in test operations conducted at the Nevada Test Site, and in Table Att 5-15 for individuals who were residents of Enewetak Atoll during post-operational periods. In these tables, the column labeled “Highest-Dose Cohort External Residual Gamma Dose” includes doses previously assessed and documented in the publications referred to as NTPR White Books, Blue Books or other technical reports. These doses are not the proposed expedited doses for the expedited processing groups (EPG) in Case et al. (2011b). They do, however, help identify the cohort receiving the highest external gamma dose from residual radioactive material. The schedules and activities of the “highest-dose cohort” are used as a starting point for a scenario of participation and radiation exposure for an EPG. Refer to Section 3 of Case et al. (2011a) for further discussion regarding the “highest-dose cohort.”

Treatment of Exclusions

NTPR participants are excluded from an EPG if they had the potential for higher doses than the EPG or if there is insufficient information regarding their activities. One or more cohorts having well-characterized, common activities may be organized into a separate EPG. Cohorts are organized into separate EPGs if their overall exposure is deemed distinct from the members of the EPG.

Participants or cohorts excluded from EPGs based on operational activities that are specific to the group are shown in the column labeled “Exclusions (Units, cohorts, activities, etc.).” These exclusions are either organized as a separate EPG or identified for further, case-specific evaluation, and possibly a full RDA. Personnel and activities to be excluded are grouped into three general categories of participation as listed in Tables Att 5-1 to 5-3. These exclusions apply unless otherwise stated for a specific EPG as described in the Compendium of EPGs (Case et al., 2011b).

Table Att 5-1. General Exclusions Applicable to Pacific Proving Ground Ship-Based Personnel*

Activity or Cohort
Participation in more than one test series (operation)
Decontamination of any equipment (except for CROSSROADS target ship crews)
Personnel who performed maintenance or repair on contaminated equipment prior to decontamination
Personnel who were topside during one or more fallout events and thus may have inhaled descending fallout
Personnel whose regular assignment was to a small boat crew
Divers
Crews of cloud-tracking or cloud-sampling aircraft
Involvement in or near heliborne operations (crew members or passengers)
Radioactive sample recovery, handling, or preparation
Personnel who were assigned to support scientific projects (e.g., weapon development projects or effects experiments)
Personnel whose regular assignment was to a Radiological Safety (Rad-Safe) unit
Flight drone or sounding rocket operations
Personnel assigned to ships that experienced evaporator or potable water system failures that lead to contaminated drinking water
Shore excursion to any island where a test shot was performed
Consumption of meals while topside during episodes of descending fallout
Individuals with film badge records and whose total film badge dose is greater than the EPG external dose determined for their respective EPG

* These exclusions apply unless otherwise stated for a specific EPG as described in the Compendium of Proposed EPGs (Case et al., 2011b).

Table Att 5-2. General Exclusions Applicable to Pacific Proving Ground Land-Based Personnel*

Activity or Cohort
Participation in more than one testing series (operation)
Decontamination of aircraft, helicopters, vehicles, or equipment
Personnel who performed maintenance or repair on contaminated aircraft, helicopters, vehicles, or equipment prior to decontamination
Personnel whose regular assignment was to a small boat crew
Divers
Crews of cloud-tracking, cloud-sampling, or air delivery aircraft
Involvement in or near heliborne operations (crew members or passengers)
Radioactive sample recovery, handling, or preparation
Personnel who were assigned to support scientific projects, e.g., weapon development projects or effects experiments (except if participation was as Bikini Resurvey personnel in 1947)
Personnel whose regular assignment was to a Radiological Safety (Rad-Safe) unit
Flight drone or sounding rocket operations
Excursion to any island where a test shot was performed
Consumption of meal(s) while outside during episodes of descending fallout at their location
Individuals with film badge records and whose total film badge dose is greater than the EPG external dose determined for their respective EPG

* These exclusions apply unless otherwise stated for a specific EPG as described in the Compendium of Proposed EPGs (Case et al., 2011b).

Table Att 5-3. General Exclusions Applicable to Participants During Testing at the Nevada Test Site*

Activity or Cohort
Participation in more than one testing series (operation)
Volunteer observers
Participation in decontamination of aircraft, helicopters, vehicles, or equipment
Personnel who performed maintenance or repair on contaminated aircraft, helicopters, vehicles, or equipment prior to decontamination
Crews of cloud-tracking, cloud-sampling, or air-delivery aircraft
Members of helicopter crews
Radioactive sample recovery, handling, or preparation
Personnel whose regular assignment was to a Radiological Safety (Rad-Safe) unit
Personnel who were assigned duties in the forward test area for any reason other than to observe a shot or participate in a maneuver (e.g., Instructor/Control, Signal, Transportation, Engineering, etc.)
Personnel who were assigned to support scientific projects (e.g., weapons development projects and military or civil effects projects)
Consumption of meals while outside during episodes of descending fallout
Individuals with film badge records and whose total film badge dose is greater than the maximized upper-bound external dose determined for their respective EPG

* These exclusions apply unless otherwise stated for a specific EPG as described in the Compendium of Proposed EPGs (Case et al., 2011b).

Table Att 5-4. Proposed Expedited Processing Groups for Operation CROSSROADS (1946)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem) [‡]	Number of Participants (Approx.)
CROSSROADS Support Ship-Based Personnel	Crews of CROSSROADS support ships (those included in Weitz et al., 1982b), and crews of the re-manned target ships USS BLADEN, USS CORTLAND, USS FILLMORE, USS GENEVA, USS NIAGARA, and USS LCI(L)615.	<ul style="list-style-type: none"> • Target ship boardings after BAKER (distinct EPG, see below). • Flight/drone operations aboard USS SHANGRI-LA and USS SAIDOR. • USS BRUSH (distinct EPG, see below). • Ammunition Disposal Units at Kwajalein (Post-XRD). • Bikini resurvey (distinct EPG, see below). • Crew member of the USS ACHOMAWI, USS COUCAL, and USS O'BRIEN. 	USS RECLAIMER [†]	1.7 (Weitz et al., 1982a, Table 7-1)	30,000

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† Crews of USS O'BRIEN received limited fallout after ABLE, in addition to BAKER's. The corresponding external dose when added to that due to exposure to BAKER fallout is smaller than that for the USS RECLAIMER. USS ACHOMAWI and possibly other support ships had faulty evaporators that may have resulted in an additional internal dose due to ingestion of contaminated drinking water.

‡ These are not assigned doses to members of EPGs (see introductory narrative of this [attachment]).

Table Att 5-4. Proposed Expedited Processing Groups for Operation CROSSROADS (1946) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)‡	Number of Participants (Approx.)
CROSSROADS Land-Based Personnel	Land-based personnel at Kwajalein and Enewetak Atolls and weather station islands (there were no land-based personnel at Bikini Atoll).	<ul style="list-style-type: none"> • Decontamination of target ships moored at Kwajalein Island. • Towing of target ships to Kwajalein Island. • Small boat operations involving contaminated target or support ships moored at Kwajalein Island. • Performing surveys, construction, or experiments on Bikini Atoll after Shot ABLE. • Unloading, inspecting, handling, moving, and decontaminating ammunition on target ships moored at Kwajalein Island. • Handling of contaminated clothing, waste, or equipment created during ammunition inspection and unloading operations at Kwajalein Island. 	Army Air Group TG 1.5	0.1 (DTRA, 2008, Appendix B-1, Operation CROSSROADS)	2,600

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ These are not assigned doses to members of EPGs (see introductory narrative of this [attachment]).

Table Att 5-4. Proposed Expedited Processing Groups for Operation CROSSROADS (1946) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)‡	Number of Participants (Approx.)
CROSSROADS Target Ship-Based Personnel	Crews that boarded contaminated target ships after Shot BAKER.	<ul style="list-style-type: none"> • Crews of six re-manned target ships that did not receive topside contamination from Shot BAKER: USS BLADEN, USS CORTLAND, USS FILLMORE, USS GENEVA, USS NIAGARA, and USS LCI(L) 615. These personnel are included in the CROSSROADS Support Ship-Based Personnel EPG. • Crew members of any target ships who did not participate in target ship boardings after Shot BAKER – these personnel are included in the CROSSROADS Support Ship Crew EPG. • Crew members of any target ships who were subsequently assigned to Ammunition Disposal Units and participated in ammunition unloading at Kwajalein. • Personnel who were crew members of target submarines. 	USS CARTERET	2.9 (previous RDA)	8,000

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ These are not assigned doses to members of EPGs (see introductory narrative of this [attachment]).

Table Att 5-4. Proposed Expedited Processing Groups for Operation CROSSROADS (1946) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)‡	Number of Participants (Approx.)
USS BRUSH Crew (February 25-27, 1947)	Crew of USS BRUSH in Kwajalein Lagoon, February 1947.	<ul style="list-style-type: none"> Personnel who transferred to USS BRUSH after the ship's departure from Kwajalein Atoll on February 27, 1947. 	Crew members who participated in excursions to target ships.	0.07 (previous RDA)	250
Bikini Resurvey Personnel July-August 1947	Crew members of USS CHILTON, USS COUCAL and LCI(L) 615 who participated as members of the Bikini Resurvey team in July and August 1947.	<ul style="list-style-type: none"> None specific to this group. 	Navy Construction Battalion Detachment 1800.	0.8 (previous RDA)	700

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ These are not assigned doses to members of EPGs (see introductory narrative of this [attachment]).

Table Att 5-5. Proposed Expedited Processing Groups for Operation SANDSTONE (1948)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
SANDSTONE Ship-Based Personnel	Personnel on ships during Operation SANDSTONE to include transient ships.	<ul style="list-style-type: none"> • Individuals who participated in Enewetak and Bikini Atoll resurveys (Post-SANDSTONE). • Individuals who Boarded Operation CROSSROADS target ships moored at Kwajalein. • Individuals who participated in a special project known as Operation FITZWILLIAM that involved laboratory measurements of radioactive samples. 	USS HENRY W. TUCKER	0.05 (DTRA, 2008, Appendix B-2, Operation SANDSTONE)	6,400

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-5. Proposed Expedited Processing Groups for Operation SANDSTONE (1948) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
SANDSTONE Land-Based Personnel	Army, Navy, and Air Force personnel stationed at Enewetak and Kwajalein Atolls.	<ul style="list-style-type: none"> • Individuals who participated in Enewetak and Bikini Atoll resurveys (Post-SANDSTONE). • Individuals who boarded Operation CROSSROADS target ships moored at Kwajalein. • Individuals who participated in a special project known as Operation FITZWILLIAM that involved laboratory measurements of radioactive samples. • Individuals who were stationed at Majuro Atoll, Rongerik Atoll, or Wake Island. 	TG 7.4 (Air Force) at Kwajalein Atoll	0.08 (DTRA, 2008, Appendix B-2, Operation SANDSTONE)	5000

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-6. Proposed Expedited Processing Groups for Operation GREENHOUSE (1951)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
GREENHOUSE Ship-Based Personnel	Personnel on ships during Operation GREENHOUSE including transient ships.	<ul style="list-style-type: none"> No specific exclusions. 	USNS SGT. C. E. MOWER	0.68 (DTRA, 2008, Appendix B-3, Operation GREENHOUSE)	4,700
GREENHOUSE Land-Based Personnel	Army, Navy, and Air Force personnel stationed at Enewetak Atoll, Kwajalein Atoll, and weather station islands.	<ul style="list-style-type: none"> Individuals who participated in clothing contamination tests. 	Headquarters, Joint Task Force-3	3.1 (DTRA, 2008, Appendix B-3, Operation GREENHOUSE)	4,700

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-7. Proposed Expedited Processing Groups for Operation IVY (1952)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
IVY Ship-Based Personnel	Personnel on ships during Operation IVY including transient ships.	<ul style="list-style-type: none"> None specific to this group. 	USS LIPAN	0.036 (DTRA, 2008, Appendix B-4, Operation IVY)	4,700
IVY Land-Based Personnel	Army, Navy, and Air Force personnel stationed at the residence islands of Enewetak Atoll, Kwajalein Atoll, and weather station islands.	<ul style="list-style-type: none"> None specific to this group. 	7126 th Army Unit on Enewetak Atoll.	0.059 (DTRA, 2008, Appendix B-4, Operation IVY)	4,700

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-8. Proposed Expedited Processing Groups for Operation CASTLE (1954)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
CASTLE High-Dose Ship-Based Personnel	Personnel on Operation CASTLE ships that received heavier fallout.	<ul style="list-style-type: none"> Personnel on Operation CASTLE ships that received light fallout to include transient ships (distinct EPG, see below). Shore excursions on Rongelap or Rongerik Atolls. Crew members of YAG 39 (USS GEORGE EASTMAN), USS PATAPSCO (AOG 1), or YAG 40 (GRANVILLE S. HALL). 	USS PHILIP (average crew)	3.56 (DTRA, 2008, Appendix B-5, Operation CASTLE)	1350
CASTLE Low-Dose Ship-Based Personnel	Personnel on ships at Operation CASTLE that received light fallout and transient ships.	<ul style="list-style-type: none"> Personnel on Operation CASTLE ships that received heavy fallout (distinct EPG, see above). Shore excursions on Rongelap or Rongerik Atolls. Were crew members of YAG 39 (USS GEORGE EASTMAN), USS PATAPSCO (AOG 1), or YAG 40 (GRANVILLE S. HALL). 	USS ESTES	1.76 (DTRA, 2008, Appendix B-5, Operation CASTLE)	4,300

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-8. Proposed Expedited Processing Groups for Operation CASTLE (1954) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
CASTLE Land-Based Personnel	Army, Navy, and Air Force personnel stationed at Enewetak Atoll, Kwajalein Atoll, and weather station islands.	<ul style="list-style-type: none"> Excursions on Rongelap or Rongerik Atolls. 	7126 th Army Unit stationed at Enewetak Island	1.09 (DTRA, 2008, Appendix B-5, Operation CASTLE)	2,600

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-9. Proposed Expedited Processing Group for Operation WIGWAM (1955)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
WIGWAM Ship- Based Personnel	All participants.	<ul style="list-style-type: none"> Individuals who performed large scale ship decontamination. 	USS CHANTICLEER	0.13 (DTRA, 2008, Appendix B-6 Operation WIGWAM)	6,200

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-10. Proposed Expedited Processing Groups for Operation REDWING (1956)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
REDWING Ship-Based Personnel	Military personnel who were assigned to a ship that participated in Operation REDWING activities including transient ships.	<ul style="list-style-type: none"> None specific to this group. 	USS SILVERSTEIN	1.4 (DTRA, 2008, Appendix B-7, Operation REDWING)	est. 6,000
REDWING Land-Based Personnel	Military personnel who supported Operation REDWING and resided on Enewetak Atoll, Kwajalein Atoll, or weather station islands during Operation REDWING.	<ul style="list-style-type: none"> None specific to this group. 	7126 th Army Unit	3.6 (DTRA, 2008, Appendix B-7, Operation REDWING)	4,000

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-11. Proposed Expedited Processing Groups for Operation HARDTACK I (1958)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)‡	Number of Participants (Approx.)
HARDTACK I Ship-Based Personnel	Personnel on ships at Operation HARDTACK I including transient ships.	<ul style="list-style-type: none"> • Crew Members of ships that only participated in shots at Johnston Island (distinct EPG, see below). • Crew Members of ships that served as unmanned target vessels for the underwater shots WAHOO and UMBRELLA to include three destroyers (KILLEN, HOWORTH, and FULLAM), a liberty ship (SS MICHAEL MORAN), and a submarine (BONITA). 	USS ARIKARA	0.8 (DTRA, 2008, Appendix B-8, Operation HARDTACK I)	6,000
HARDTACK I Non-exposed Ship-Based Personnel	All ships that only participated in Shots at Johnston Atoll.	<ul style="list-style-type: none"> • Individuals with non-zero film badge doses. 	USS EPPERSON (DDE-719)	NPE† (DTRA, 2008, Appendix B-8, Operation HARDTACK I)	1,000

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† NPE stands for no potential for exposure.

‡ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-11. Proposed Expedited Processing Groups for Operation HARDTACK I (1958) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)†	Number of Participants (Approx.)
HARDTACK I Land-Based Personnel	Personnel resident on Parry and Enewetak Islands of Enewetak Atoll and Eneu Island of Bikini Atoll.	<ul style="list-style-type: none"> • Personnel who resided on Japtan Island during the operation. • Personnel assigned to Johnston Island. 	TG 7.1 (Scientific Group stationed on Parry Island)	1.9 (DTRA, 2008, Appendix B-8, Operation HARDTACK I)	3,500

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† NPE stands for no potential for exposure.

‡ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-12. Proposed Expedited Processing Groups for Operation ARGUS (1958)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[‡]	Number of Participants (Approx.)
ARGUS Ship-Based Personnel	All participants in ARGUS.	<ul style="list-style-type: none"> None specific to this group. 		NPE [†] (DTRA, 2008, Appendix B-9 ARGUS)	4,369

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† NPE stands for no potential for exposure.

‡ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-13. Proposed Expedited Processing Groups for Operation DOMINIC I (1962)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[‡]	Number of Participants (Approx.)
DOMINIC I Personnel	All participants in DOMINIC I.	<ul style="list-style-type: none"> • Crewmembers of USS SIOUX (ATF 75), USC&GSS PIONEER (OSS-31), and USS MONTICELLO (LSD-35) during Shot SWORDFISH. • Personnel involved in the recovery/handling of radioactively contaminated instrumented pods and rocket nose cones associated with successful THOR missile and rocket launches. • Personnel involved in recovery and decontamination operations after any of the THOR missile incidents during Shots BLUEGILL, STARFISH, BLUEGILL PRIME. • Personnel involved in recovery, servicing, or boarding of target rafts after airdrop shots. • Personnel involved in the recovery and handling of other contaminated with radioactive materials due to neutron activation. 	N/A	NPE [†] (DTRA, 2008, Appendix B-10 DOMINIC I)	25,000

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† NPE stands for no potential for exposure.

‡ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-14. Proposed Expedited Processing Groups for Nevada Test Site (NTS)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem) [§]	Number of Participants (Approx.)
NTS Observer and Maneuver Troops, 1951–1962	Personnel that participated as a member of ground-based official EDR observer groups or maneuver groups during NTS shots from 1951 through 1962, including Exercise IVY FLATS at DOMINIC II. Members of 505th Military Police Battalion that performed traffic control or march guide activities during UPSHOT-KNOTHOLE (1953) or TEAPOT (1955).	<ul style="list-style-type: none"> • Individuals who participated in one of the Volunteer Observer Programs conducted during some of the test series. • Any individuals who participated in more than one maneuver group at more than one shot. • The following maneuver groups are excluded and are each evaluated as a distinct EPG: <ul style="list-style-type: none"> - The 2nd MCPAEB at Operation UPSHOT-KNOTHOLE, Shot BADGER - Task Force WARRIOR at Operation PLUMBBOB, Shot SMOKY. 	UPSHOT-KNOTHOLE SIMON BCT-A	3.2 (DTRA, 2008, Appendices C-3 to C-7)	42,600

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ Members of 1st Battalion 8th Marines of the 2nd MCPAEB received a higher total dose from external residual radiation (4.7 rem) than did the 2nd MCPAEB HQ personnel. However, no internal dose was accrued concurrently with approximately half of this total dose that was due to direct radiation from the BADGER stem as it passed the troops. Most of the dose to 2nd MCPAEB HQ personnel was from fallout, for which internal dose was concurrently accrued.

§ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-14. Proposed Expedited Processing Groups for Nevada Test Site (NTS) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[§]	Number of Participants (Approx.)
NTS Participants with no Forward Area Activities, 1951–1962	Support personnel stationed at Camp Desert Rock, Camp Mercury, Indian Springs Air Force Base, or Nellis Air Force Base during any single operation from 1951 through 1962 who did not conduct any activities in any NTS forward area. Inter-operational personnel at CDR, Camp Mercury, and Indian Springs Air Force Base.	<ul style="list-style-type: none"> None specific for this group. 	UPSHOT-KNOTHOLE CDR support troops	0.02 (DTRA, 2008, Appendices C-3 to C-7; various NTPR technical memos)	Unknown

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ Members of 1st Battalion 8th Marines of the 2nd MCPAEB received a higher total dose from external residual radiation (4.7 rem) than did the 2nd MCPAEB HQ personnel. However, no internal dose was accrued concurrently with approximately half of this total dose that was due to direct radiation from the BADGER stem as it passed the troops. Most of the dose to 2nd MCPAEB HQ personnel was from fallout, for which internal dose was concurrently accrued.

§ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-14. Proposed Expedited Processing Groups for Nevada Test Site (NTS) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[§]	Number of Participants (Approx.)
Operation UPSHOT-KNOTHOLE 2 nd Marine Corps Provisional Atomic Exercise Brigade (2MCPAEB)	Marines that participated in the maneuver at UPSHOT-KNOTHOLE Shot BADGER (1953).	<ul style="list-style-type: none"> • Marine Helicopter Transport Group 16 that conducted air operations during the 2MCPAEB activities at Shot BADGER. • Personnel in the 2MCPAEB Provisional Helicopter Atomic Test Unit that participated in the Operational Helicopter Test Program at several shots including Shot BADGER. 	2 nd MCPAEB HQ [‡]	3.7 (DTRA, 2008, Appendix C-5)	2,167

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ Members of 1st Battalion 8th Marines of the 2nd MCPAEB received a higher total dose from external residual radiation (4.7 rem) than did the 2nd MCPAEB HQ personnel. However, no internal dose was accrued concurrently with approximately half of this total dose that was due to direct radiation from the BADGER stem as it passed the troops. Most of the dose to 2nd MCPAEB HQ personnel was from fallout, for which internal dose was concurrently accrued.

§ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-14. Proposed Expedited Processing Groups for Nevada Test Site (NTS) (cont.)

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[§]	Number of Participants (Approx.)
Operation PLUMBBOB Task Force WARRIOR (TFW)	Army infantry troop test Task Force WARRIOR conducted at PLUMBBOB Shot SMOKY (1957).	<ul style="list-style-type: none"> • Canadian Army Platoon (7th Platoon, Queen’s Own Rifles). • 3rd Transportation Battalion (Helicopter). • Personnel not in an element of Company C, 1st Battle Group whose activities are not encompassed by the TFW highest-dose cohort scenario. 	2 nd Platoon	0.7 (Goetz et al., 1979))	350

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

‡ Members of 1st Battalion 8th Marines of the 2nd MCPAEB received a higher total dose from external residual radiation (4.7 rem) than did the 2nd MCPAEB HQ personnel. However, no internal dose was accrued concurrently with approximately half of this total dose that was due to direct radiation from the BADGER stem as it passed the troops. Most of the dose to 2nd MCPAEB HQ personnel was from fallout, for which internal dose was concurrently accrued.

§ These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Table Att 5-15. Proposed Expedited Processing Groups for PPG Post Operations

Proposed EPG*	EPG Members	Exclusions (Units, cohorts, activities, etc.)	Highest-Dose Cohort	Estimated External Residual Gamma Dose for the Highest-Dose Cohort (rem)[†]	Number of Participants (Approx.)
Post-SANDSTONE Enewetak Atoll	Residents of Enewetak Atoll on the islands of Enewetak, Parry and Japtan.	• None specific for this group.	Residents of Enewetak Island	0.05 (Mason, 2009)	1,900
Post-GREENHOUSE Enewetak Atoll	Residents of Enewetak Atoll on the islands of Enewetak, Parry and Japtan.	• None specific for this group.	Residents of Parry Island	2.4 (Mason, 2009)	2,600
Post-IVY Enewetak Atoll	Residents of Enewetak Atoll on the islands of Enewetak, Parry and Japtan.	• None specific for this group.	Residents of Enewetak Island	0.028 (Mason, 2009)	600
Post-CASTLE Enewetak Atoll	Residents of Enewetak Atoll on the islands of Enewetak, Parry and Japtan.	• None specific for this group.	Residents of Enewetak Island	0.25 (Mason, 2009)	1,000
Post-REDWING Enewetak Atoll	Residents of Enewetak Atoll on the islands of Enewetak, Parry and Japtan.	• None specific for this group.	Residents of Parry Island	1.9 (Mason, 2009)	4,500
Post-HARDTACK I Enewetak Atoll	Residents of Enewetak Atoll on the islands of Enewetak and Parry.	• Individuals who resided on Japtan Island.	Residents of Enewetak Island	0.56 (Mason, 2009)	973

* Detailed descriptions with complete lists of ships, cohorts, excluded units, etc., are included in the EPG Compendium (Case et al., 2011b).

† These are not assigned doses to members of EPGs (see the introductory narrative of this [attachment]).

Attachment 6

Organ Doses Corresponding to the Limiting Dose (PC=40 percent) and Screening Dose (PC=50 percent) for Selected Cancers

Note: The following Attachment was taken from Table 3 of DTRA-TR-10-29, *A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments*. Defense Threat Reduction Agency. Fort Belvoir, VA. October 2011. NTPR-TM-13-02, *Technical Justification for Revising NTPR SOP RA02 to include CLL Cases* provided the guidance for cases involving Chronic Lymphocytic Leukemia (CLL).

Table Att 6-1. Organ Doses Corresponding to the Limiting Dose (PC=40 percent)

Cancer of Organ	Limiting Dose (rem) at 40% PC*	Screening Dose (rem) at 50% PC*†
Oral cavity and Pharynx	66	98
Esophagus	22	35
Stomach	18	27
Colon	26	39
Rectum	72	110
All digestive (other than esophagus, stomach, colon, rectum/anus)	44	66
Liver	7.7	11
Gallbladder	11	17
Pancreas	61	89
Lung (never smokers)	30	44
Other Respiratory	67	100
Bone	32	48
Connective tissue	34	50
Male breast	36	53
All male genitalia	41	60
Bladder	33	49
Urinary organs, excluding bladder	31	46
Eye	32	49
Nervous system	64	95
Thyroid	5.1	7.5 (≥ 10 years)
Other endocrine glands	30	45
Cancers of other and ill-defined sites	34	51
Lymphoma and multiple myeloma	41	61
Leukemia, excluding ALL, AML, CML, and CLL	29	41 (30 years)
Acute Lymphocytic Leukemia (ALL)	14	24 (30 years)
Acute myeloid leukemia (AML)	20	29 (30 years)
Chronic myeloid leukemia (CML)	41	57 (30 years)
Chronic Lymphocytic Leukemia (CLL) [‡]	45	68

* PC calculated for exposure at age 18 and attained age of 50 (or elapsed time shown).

† From Kocher and Apostoaiei (2007).

‡ From Mannis et al. (2013).

Attachment 7

Expedited Processing Groups Upper-Bound Doses Excluding Initial Gamma and Initial Neutron Doses

Note: The following Attachment was taken from Tables 4 through 7 of DTRA-TR-10-29, *A Technical Approach to Expedited Processing of NTPR Radiation Dose Assessments*. Defense Threat Reduction Agency. Fort Belvoir, VA. October 2011.

Neither Operation DOMINIC I nor Operation ARGUS is included in these tables because it was determined that, with the exception of exclusions from the DOMINIC I expedited processing group (EPG), there was no potential for radiation exposure identified for either operation. For additional information see Attachment 5, General and EPG-Specific Exclusions to Expedited Processing Groups, and the EPGs described in DTRA-TR-11-01, *Compendium of Proposed NTPR Expedited Processing Groups*. Defense Threat Reduction Agency. Fort Belvoir, VA. November 2011.

Table Att 7-1. Estimated Radiation Dose (rem) for Ship-Based Personnel at the Pacific Proving Ground*

EPG Name		Radiation Type†	Adrenals	Bone Surface	Brain	Breast	Stomach wall	Small Intestine wall	Upper Large Intestine Wall	Lower Large Intestine Wall	kidneys	Liver	Extra-Thoracic Region	Lung	Muscle	Pancreas	Red Marrow	Spleen	Testes	Thymus	Thyroid	Urinary Bladder Wall
XRDS Target Ships		UB α	0.09	47	0.09	0.09	0.09	0.09	0.09	0.09	0.2	11	0.5	1	0.09	0.09	3	0.09	0.7	0.09	0.09	0.09
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.3	3	0.2	0.2	0.9	2	8	19	0.4	0.7	9	19	0.3	0.3	0.9	0.3	0.2	0.3	45	0.6
3	9	total	9	58	9	9	10	11	17	28	10	20	19	28	9	9	12	9	10	9	53	10
XRDS Support Ships		UB α	0.003	2	0.003	0.003	0.003	0.003	0.003	0.003	0.006	0.3	0.02	0.03	0.003	0.003	0.07	0.003	0.02	0.003	0.003	0.003
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.009	0.1	0.005	0.006	0.04	0.08	0.4	0.9	0.02	0.03	0.2	0.4	0.009	0.01	0.04	0.008	0.007	0.007	2	0.03
3	9	total	9	10	9	9	9	9	9	10	9	9	9	9	9	9	9	9	9	9	10	9
USS BRUSH		UB α	0.09	51	0.09	0.09	0.1	0.1	0.2	0.2	0.3	11	0.5	1	0.09	0.09	3	0.09	0.7	0.09	0.09	0.09
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.3	3	0.2	0.2	0.5	1	5	13	0.3	0.6	0.5	4	0.2	0.3	0.8	0.2	0.2	0.2	0.2	0.3
0.08	0.3	total	0.6	53	0.5	0.5	0.9	2	5	13	0.7	12	2	5	0.6	0.6	4	0.6	2	0.6	0.6	0.6
SANDSTONE Ships		UB α	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB $\beta+\gamma$	<0.001	0	<0.001	<0.001	<0.001	0.002	0.006	0.02	<0.001	<0.001	0.02	0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03	<0.001
0.09	0.3	total	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
GREENHOUSE Ships		UB α	<0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03	0.001	0.003	<0.001	<0.001	0.005	<0.001	0.002	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.02	0.2	0.01	0.02	0.1	0.2	0.7	2	0.02	0.03	2	3	0.02	0.02	0.06	0.02	0.009	0.02	3	0.06
3	7	total	7	7	7	7	7	7	7	8	7	7	9	9	7	7	7	7	7	7	9	7
IVY Ships		UB α	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB $\beta+\gamma$	<0.001	0	<0.001	<0.001	0.002	0.004	0.02	0.04	<0.001	0.004	0.05	0.08	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.05	<0.001
0.07	0.2	total	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2
CASTLE Ships (High)		UB α	0.009	5	0.009	0.009	0.009	0.009	0.009	0.009	0.03	1	0.05	0.2	0.009	0.009	0.3	0.009	0.07	0.009	0.009	0.009
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.2	5	0.08	0.2	1	2	7	13	0.3	0.8	21	24	0.2	0.2	0.5	0.2	0.2	0.2	16	0.5
8	23	total	23	32	23	23	24	25	30	36	23	25	43	47	23	23	24	23	23	23	38	23
CASTLE Ships (Low)		UB α	0.02	7	0.02	0.02	0.02	0.02	0.02	0.02	0.03	2	0.07	0.2	0.02	0.02	0.4	0.02	0.1	0.02	0.02	0.02
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.08	5	0.04	0.07	0.4	0.7	3	6	0.2	0.9	8	12	0.07	0.08	0.4	0.07	0.08	0.09	7	0.2
4	12	total	12	22	12	12	12	13	15	17	12	14	20	23	12	12	13	12	12	12	18	12

* The total organ doses do not sum up to their components due to rounding.

† UB means upper bound dose for the given radiation type: internal alpha (α), internal beta plus gamma ($\beta+\gamma$), or total (external γ dose plus internal α and $\beta+\gamma$ dose, excluding any initial external γ dose).

Table Att 7-1. Estimated Radiation Dose (rem) for Ship-Based Personnel at the Pacific Proving Ground (cont.)*

EPG Name		Radiation Type†	Adrenals	Bone Surface	Brain	Breast	Stomach wall	Small Intestine wall	Upper Large Intestine Wall	Lower Large Intestine Wall	kidneys	Liver	Extra-Thoracic Region	Lung	Muscle	Pancreas	Red Marrow	Spleen	Testes	Thymus	Thyroid	Urinary Bladder Wall
WIGWAM Ships		UB α	<0.001	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03	0.002	0.003	<0.001	<0.001	0.006	<0.001	0.002	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB β+γ	0.007	0.1	0.004	0.006	0.04	0.07	0.3	0.5	0.007	0.009	0.8	0.7	0.006	0.007	0.02	0.006	0.004	0.007	1	0.03
0.3	0.6	total	0.6	0.8	0.6	0.6	0.6	0.7	0.9	1	0.6	0.6	2	2	0.6	0.6	0.6	0.6	0.6	0.6	2	0.6
REDWING Ships		UB α	<0.001	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.02	<0.001	0.002	<0.001	<0.001	0.005	<0.001	0.002	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB β+γ	0.01	0.1	0.005	0.008	0.05	0.09	0.4	0.8	0.02	0.02	2	2	0.009	0.01	0.03	0.008	0.005	0.02	2	0.03
3	7	total	7	7	7	7	7	7	7	7	7	7	8	8	7	7	7	7	7	7	8	7
HARDTACK I Ships		UB α	0.003	2	0.003	0.003	0.003	0.003	0.003	0.003	0.007	0.4	0.02	0.04	0.003	0.003	0.08	0.003	0.03	0.003	0.003	0.003
Ext Dose	Upper Bound	UB β+γ	0.03	0.4	0.02	0.03	0.08	0.2	0.8	2	0.2	0.09	3	3	0.03	0.03	0.09	0.2	0.02	0.03	3	0.2
2	6	total	6	8	6	6	6	6	7	8	6	7	9	9	6	6	6	6	6	6	9	6
HARDTACK I Non-Exposed Ships		UB α	No Potential for Exposure																			
Ext Dose	Upper Bound	UB β+γ	No Potential for Exposure																			
NPE†	NPE†	total	No Potential for Exposure																			
ARGUS Ships		UB α	No Potential for Exposure																			
Ext Dose	Upper Bound	UB β+γ	No Potential for Exposure																			
NPE†	NPE†	total	No Potential for Exposure																			
DOMINIC I Ships		UB α	No Potential for Exposure																			
Ext Dose	Upper Bound	UB β+γ	No Potential for Exposure																			
NPE†	NPE†	total	No Potential for Exposure																			

* The total organ doses do not sum up to their components due to rounding.

† UB means upper bound dose for the given radiation type: internal alpha (α), internal beta plus gamma (β+γ), or total (external γ dose plus internal α and β+γ dose, excluding any initial external γ dose).

+ NPE means no potential for exposure.

Table Att 7-2. Estimated Radiation Doses (rem) for Land-Based Personnel at the Pacific Proving Ground*

EPG Name		Radiation Type†	Adrenals	Bone Surface	Brain	Breast	Stomach wall	Small Intestine wall	Upper Large Intestine Wall	Lower Large Intestine Wall	kidneys	Liver	Extra-Thoracic Region	Lung	Muscle	Pancreas	Red Marrow	Spleen	Testes	Thymus	Thyroid	Urinary Bladder Wall
CROSSROADS Land		UB α	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ext Dose	Upper Bound	UB $\beta+\gamma$	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.03	0.09	total	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
BIKINI Resurvey		UB α	0.09	49	0.09	0.09	0.09	0.09	0.09	0.09	0.3	11	0.5	1	0.09	0.09	3	0.09	0.7	0.09	0.09	0.09
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.02	1	0.007	0.01	0.02	0.03	0.1	0.3	0.01	0.3	0.2	3	0.008	0.01	0.08	0.01	0.02	0.02	0.008	0.008
0.8	3	total	3	52	3	3	3	3	3	3	3	14	3	6	3	3	5	3	4	3	3	3
SANDSTONE Land		UB α	<0.001	0.5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.1	0.005	0.01	<0.001	0.002	0.03	0.003	0.006	<0.001	0.002	<0.001
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.007	0.07	0.003	0.006	0.02	0.03	0.2	0.3	0.005	0.02	0.4	0.8	0.005	0.006	0.03	0.005	0.003	0.007	0.6	0.01
0.2	0.6	total	0.6	1	0.6	0.6	0.6	0.6	0.7	0.8	0.6	0.7	0.9	2	0.6	0.6	0.6	0.6	0.6	0.6	1	0.6
GREENHOUSE Land		UB α	0.005	3	0.005	0.005	0.005	0.005	0.005	0.005	0.02	0.6	0.03	0.06	0.005	0.005	0.2	0.005	0.04	0.005	0.005	0.005
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.2	2	0.08	0.2	0.9	2	5	8	0.2	0.3	12	15	0.2	0.2	0.5	0.2	0.06	0.2	16	0.4
7	21	total	21	25	21	21	22	23	26	29	21	22	33	36	21	21	22	21	21	21	36	22
IVY Land		UB α	0.002	2	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.3	0.02	0.03	0.002	0.002	0.06	0.002	0.02	0.002	0.002	0.002
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.02	0.7	0.007	0.02	0.04	0.08	0.4	0.7	0.02	0.2	1	3	0.02	0.02	0.08	0.02	0.009	0.02	0.8	0.02
0.2	0.4	total	0.4	3	0.4	0.4	0.4	0.5	0.7	1	0.4	0.7	2	3	0.4	0.4	0.5	0.4	0.4	0.4	2	0.4
CASTLE Land		UB α	0.02	7	0.02	0.02	0.02	0.02	0.02	0.02	0.03	2	0.07	0.2	0.02	0.02	0.4	0.02	0.1	0.02	0.02	0.02
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.1	5	0.05	0.08	0.5	0.9	4	7	0.2	0.9	11	15	0.08	0.09	0.4	0.08	0.08	0.1	8	0.2
2	5	total	5	16	5	5	6	6	8	12	5	7	16	20	5	5	6	5	5	5	13	5
REDWING Land		UB α	0.02	9	0.02	0.02	0.02	0.02	0.02	0.02	0.04	2	0.09	0.2	0.02	0.02	0.5	0.02	0.2	0.02	0.02	0.02
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.2	5	0.2	0.2	2	3	9	16	0.4	0.9	25	30	0.2	0.2	0.7	0.2	0.2	0.3	23	0.6
6	18	total	19	31	18	18	20	21	27	34	19	21	43	48	18	18	19	18	19	19	41	19
HARDTACK I Land		UB α	0.02	12	0.02	0.02	0.02	0.02	0.02	0.02	0.06	3	0.2	0.3	0.02	0.02	0.6	0.02	0.2	0.02	0.02	0.02
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.2	3	0.07	0.2	0.4	0.8	4	8	0.6	0.6	12	11	0.2	0.2	0.5	0.5	0.08	0.2	11	0.6
3	8	total	8	22	8	8	8	9	12	16	9	11	20	19	8	8	9	9	8	8	19	9
DOMINIC I Land		UB α	No Potential for Exposure																			
Ext Dose	Upper Bound	UB $\beta+\gamma$	No Potential for Exposure																			
NPE ⁺	NPE ⁺	total	No Potential for Exposure																			

* The total organ doses do not sum up to their components due to rounding.

† UB means upper bound dose for the given radiation type: internal alpha (α), internal beta plus gamma ($\beta+\gamma$), or total (external γ dose plus internal α and $\beta+\gamma$ dose, excluding any initial external γ dose).

+ NPE means no potential for exposure.

Table Att 7-3. Estimated Radiation Doses (rem) for Post-Operations Personnel at the Pacific Proving Ground*

EPG Name		Radiation Type†	Adrenals	Bone Surface	Brain	Breast	Stomach wall	Small Intestine wall	Upper Large Intestine Wall	Lower Large Intestine Wall	kidneys	Liver	Extra-Thoracic Region	Lung	Muscle	Pancreas	Red Marrow	Spleen	Testes	Thymus	Thyroid	Urinary Bladder Wall
POST-SANDSTONE		UB α	<0.001	0.08	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.02	<0.001	0.002	<0.001	<0.001	0.004	<0.001	0.002	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.002	0.02	<0.001	0.002	0.002	0.002	0.009	0.03	<0.001	0.003	0.03	0.2	<0.001	<0.001	0.005	<0.001	<0.001	0.002	0.009	<0.001
0.05	0.2	total	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
POST-GREENHOUSE		UB α	0.004	3	0.004	0.004	0.004	0.004	0.004	0.004	0.009	0.5	0.03	0.05	0.004	0.004	0.1	0.004	0.03	0.004	0.004	0.004
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.06	0.6	0.02	0.05	0.07	0.2	0.5	2	0.04	0.1	2	7	0.04	0.05	0.3	0.04	0.02	0.06	2	0.04
3	8	total	8	10	8	8	8	8	8	9	8	8	9	14	8	8	8	8	8	8	9	8
POST_IVY		UB α	<0.001	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03	0.002	0.003	<0.001	<0.001	0.006	<0.001	0.002	<0.001	<0.001	<0.001
Ext Dose	Upper Bound	UB $\beta+\gamma$	<0.001	0.07	<0.001	<0.001	<0.001	<0.001	0.004	0.009	<0.001	0.02	0.02	0.05	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.01	<0.001
0.03	0.09	total	0.09	0.3	0.09	0.09	0.09	0.09	0.09	0.1	0.09	0.2	0.1	0.2	0.09	0.09	0.1	0.09	0.09	0.09	0.1	0.09
POST-CASTLE		UB α	0.006	3	0.006	0.006	0.006	0.006	0.006	0.006	0.02	0.7	0.03	0.07	0.006	0.04	0.006	0.2	0.006	0.006	0.05	0.006
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.008	2	0.005	0.008	0.008	0.02	0.04	0.1	0.008	0.4	0.2	0.8	0.006	0.03	0.007	0.08	0.005	0.007	0.03	0.009
0.3	0.8	total	0.8	6	0.8	0.8	0.8	0.8	0.8	0.9	0.8	2	0.9	2	0.8	0.8	0.8	1	0.8	0.8	0.8	0.8
POST-REDWING		UB α	0.02	8	0.02	0.02	0.02	0.02	0.02	0.02	0.04	2	0.08	0.2	0.02	0.02	0.4	0.02	0.2	0.02	0.02	0.02
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.05	3	0.02	0.05	0.06	0.09	0.4	1	0.04	0.5	2	7	0.03	0.04	0.3	0.04	0.04	0.06	0.8	0.03
2	6	total	6	16	6	6	6	6	7	7	6	8	7	12	6	6	7	6	6	6	7	6
POST-HARDTACK I		UB α	0.006	4	0.006	0.006	0.006	0.006	0.006	0.006	0.02	0.7	0.04	0.08	0.006	0.006	0.2	0.006	0.05	0.006	0.006	0.006
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.009	0.5	0.004	0.007	0.02	0.02	0.2	0.4	0.06	0.1	0.4	1	0.005	0.007	0.05	0.05	0.007	0.008	0.02	0.02
0.4	1	total	1	5	1	1	1	1	2	2	2	2	2	3	1	1	2	2	2	1	1	1

* The total organ doses do not sum up to their components due to rounding.

† UB means upper bound dose for the given radiation type: internal alpha (α), internal beta plus gamma ($\beta+\gamma$), or total (external γ dose plus internal α and $\beta+\gamma$ dose, excluding any initial external γ dose).

Table Att 7-4. Estimated Radiation Doses (rem) for Personnel at the Nevada Test Site*

EPG Name		Radiation Type †	Adrenals	Bone Surface	Brain	Breast	Stomach wall	Small Intestine wa	Upper Large Intestine Wall	Lower Large Intestine Wall	kidneys	Liver	Extra-Thoracic Region	Lung	Muscle	Pancreas	Red Marrow	Spleen	Testes	Thymus	Thyroid	Urinary Bladder Wall
NTS Obs/Man		UB α	0.008	5	0.008	0.008	0.008	0.008	0.008	0.008	0.02	1	0.05	0.1	0.008	0.008	0.3	0.008	0.06	0.008	0.008	0.008
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.02	0.2	0.006	0.01	0.05	0.07	0.2	0.4	0.009	0.03	0.7	2	0.009	0.02	0.05	0.01	0.005	0.02	0.8	0.02
4	10	total	10	14	10	10	10	10	10	10	10	11	11	11	10	10	10	10	10	10	11	10
NTS Support Troops		UB α	0.007	4	0.007	0.007	0.007	0.007	0.007	0.007	0.02	0.8	0.04	0.08	0.007	0.007	0.2	0.007	0.05	0.007	0.007	0.007
Ext Dose	Upper Bound	UB $\beta+\gamma$	<0.001	0.05	<0.001	<0.001	0.006	0.009	0.03	0.05	<0.001	0.02	0.09	0.09	<0.001	<0.001	0.004	<0.001	0.001	0.001	0.2	0.003
0.04	0.1	total	0.2	4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.9	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.2
2MCPAEB		UB α	0.003	2	0.003	0.003	0.003	0.003	0.003	0.003	0.007	0.4	0.02	0.04	0.003	0.003	0.09	0.003	0.03	0.003	0.003	0.003
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.03	0.3	0.02	0.02	0.2	0.2	0.6	2	0.02	0.04	2	3	0.02	0.02	0.08	0.02	0.009	0.03	2	0.05
6	17	total	17	19	17	17	17	17	17	18	17	17	19	20	17	17	17	17	17	17	19	17
TF WARRIOR		UB α	0.02	10	0.02	0.02	0.02	0.02	0.02	0.02	0.05	2	0.2	0.4	0.02	0.02	0.5	0.02	0.2	0.02	0.02	0.02
Ext Dose	Upper Bound	UB $\beta+\gamma$	0.09	2	0.06	0.07	0.7	1	3	4	0.08	0.4	9	8	0.08	0.09	0.4	0.08	0.06	0.1	9	0.3
2	5	total	5	16	5	5	6	6	8	9	5	7	13	12	5	5	6	5	5	5	13	5

* The total organ doses do not sum up to their components due to rounding.

† UB means upper bound dose for the given radiation type: internal alpha (α), internal beta plus gamma ($\beta+\gamma$), or total (external γ dose plus internal α and $\beta+\gamma$ dose, excluding any initial external γ dose).

Attachment 8

QA/QC Review Report for DTRA Decision Summary Sheet

 <p>OAK RIDGE ASSOCIATED UNIVERSITIES</p>	<p>QA/QC Review Report for Decision Summary Sheet</p>	<p>Nuclear Test Personnel Review Program Support</p>
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Name: [] Key #: [] DSS Date: [] ORAU Batch Date: []

Recommended Disposition:

Recommended for Release

- 1) Case meets DTRA guidance
- 2) Editorial changes required prior to release

Not Recommended for Release

- 3) Comments to be discussed with NTPR RDA analyst
- 4) Resolve administrative issues
- 5) Case does not meet DTRA guidance

Reviewer Comments:

[]

QA Report Approval Signature: _____ Date: []

Name
Title
Organization

|

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Decision Summary Sheet Review Checklist

Name: _____ **Key #:** _____ **DSS Date:** _____ **ORAU Batch Date:** _____

Instructions: Further explanation of any “No” responses for items 1 through 9 or a “Yes” response for item 10 should be included in Comments. Reference the item number. Other pertinent comments also may be added.

Eligibility for expedited processing

1. Is the determination regarding Board of Veteran’s Appeal or non-participant case status correct and documented? Yes No
2. Are the following exposure conditions correctly identified and documented?
 - a. Operations and tests, including multiple-test operations: Yes No
 - b. Veteran’s duty assignment: Yes No
 - c. Veteran’s applicable work, residence and recreation locations: Yes No
3. Are target/surrogate organs correctly identified? Yes No
4. Is eligibility for expedited processing correctly determined? Yes No

Determination of dose to be assigned

5. Are additional potential exposure scenarios correctly identified, correctly addressed in doses, and clearly documented as to impact on dose? Yes No NA
6. Are Hiroshima/Nagasaki case radiation dose assessments (RDAs) accurately calculated and Mathcad input information correctly documented? Yes No NA
7. Are correct expedited doses assigned? Yes No NA

Additional supporting documentation

8. Are responses to veteran’s comments and claims clear, complete, responsive, and accurate? Yes No NA
9. Is pertinent historical dose information accurately and clearly documented? Yes No NA
10. Are there any remaining exposure, dose, or administrative issues that should be addressed? Yes No

Comments (include item number): _____

DSS Reviewer Signature: _____ **Date:** _____
Name (printed): _____

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Attachment 9

RDA Report Review Checklist

	RDA Report Review Checklist Privacy Act Data	ORAU TEAM NTPR Program Support Project
<p><u>Name:</u> <u>Key #:</u> <u>RDA Date:</u> <u>ORAU Batch Date:</u></p>		
<p><u>Recommended Disposition:</u></p>		
1) 2) 3) 4) 5)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	No comments; forward to DTRA Make editorial changes and forward to DTRA Comments to be discussed with analyst before decision Resolve administrative issues and resubmit for review Revise RDA per comments and resubmit for review
<p>Comments:</p>		
<p>Signature: _____ Date: _____ Name, Title Organization</p>		
<p>ORAUT-NTPR-FORM-0001 Rev. 09, Effective 2 March 2010 Page 1 of 5</p>		

**RDA Report Review Checklist (Continued)
Privacy Act Data**

Name: Key #: RDA Date: ORAU Batch Date:

Verify that each of the following correspond with the SPARE and/or are correctly used in the report:

<i>Dose Reconstruction Overview</i>	<u>Yes</u>	<u>No</u>	<u>N/A</u>
1. Site/Series/Shot name included?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Participation dates as noted in veteran's records?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Additional dates noted by veteran included?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Additional dates noted in dosimetry records included?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Rating, grade, position or job title included?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Other positions/titles noted by veteran considered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Veteran's statements considered vs. unit records?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Veteran's material statements addressed in the RDA?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the exposure scenario complete?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Is the RDA consistent with the SPARE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is the appropriate target organ for RDA identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Is the total dose assigned to the target organ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Is the benefit of the doubt consistently applied?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Dose Estimate</i>			
14. Discussion of veteran's locations and exposures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Discussion of exposure sources and scientific principles?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Discussion of gamma exposure included?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Discussion of neutron exposure (if applicable)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Discussion of skin/eye dose (if applicable)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Discussion of internal dose (if applicable)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Does dose summary table include all radiation types discussed in the RDA report?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Are α , β , γ and neutron doses reported separately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RDA Report Review Checklist (Continued)						
Privacy Act Data						
<u>Name:</u>	<u>Key #:</u>	<u>RDA Date:</u>	<u>ORAU Batch Date:</u>			
Individual Film Badge Data (FBD)				<u>Yes</u>	<u>No</u>	<u>N/A</u>
22.	Was individual FBD used if available and appropriate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
23.	Consideration of when and how long badge(s) worn?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
24.	Benefit of doubt given for uncertain issue/turn-in dates?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
25.	Are gaps in film badge data addressed?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
26.	Overlapping mission and permanent badges considered?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
27.	Was archived film reviewed for damage?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
28.	Was damaged film value used if justified?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
29.	Was upper bound of film badge dose properly estimated?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
External Gamma-ray Dose Reconstruction						
30.	Was cohort FBD used if available and appropriate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
31.	Dose reconstruction done if no film badge data?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
32.	Consideration of individual departures from unit dose?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
33.	All sources of gamma exposure included?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
34.	Reasonable locations assigned for gamma exposure?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
35.	Benefit of doubt given for upper bound, e.g., 3x?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Neutron Dose Estimate						
36.	Is potential for neutron exposure assessed?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
37.	Is neutron dose assigned if appropriate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Beta Dose (external ambient exposure)						
38.	Beta dose assigned for skin cancer/eye disease?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
39.	Beta dose based on upper bound of gamma dose?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
40.	Ship-based exposure included if appropriate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
41.	Land--based exposure included if appropriate?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

RDA Report Review Checklist (Continued)						
Privacy Act Data						
<u>Name:</u>	<u>Key #:</u>	<u>RDA Date:</u>	<u>ORAU Batch Date:</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Beta Dose (dermal contamination)						
42.	Exposure from descending fallout included?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43.	Topside/outdoors location assumed for direct deposition of descending fallout?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44.	Exposure from resuspended fallout included?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45.	Exposure to old fallout resuspended by blast (NTS only)?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46.	Discussion of resuspension factor used?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	Exposure from contaminated water if appropriate?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48.	Reasonable time to showering assumed?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49.	Upper bound of uncertainty assigned to beta dose?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Dose--inhalation						
50.	Exposure from inhalation of descending fallout included?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51.	Topside/outdoor location assumed for direct inhalation of descending fallout?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52.	Inhalation of resuspended fallout included?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53.	Inhalation of old fallout resuspended by blast (NTS only)?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54.	Discussion of resuspension factor used?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55.	Upper bound (factor of 10) of uncertainty used?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Dose--ingestion						
56.	Exposure from ingestion of descending fallout included?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57.	Exposure from ingestion of contaminated water included?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58.	Upper bound (factor of 10) of uncertainty used?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
References						
59.	Are all references cited in the report listed?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60.	Are all references used appropriate citations?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RDA Report Review Checklist (Continued)

Privacy Act Data

Name: **Key #:** **RDA Date:** **ORAU Batch Date:**

Comments (include item number—mandatory for all “No” blocks checked):

Signature: _____ **Date:** _____

Name (printed):