

Update on Nuclear Test Personnel Review (NTPR) Program

***Brief for: Veterans' Advisory Board on Dose
Reconstruction (VBDR)***

Briefer: Paul K. Blake, Ph.D.

Time: 1:15 PM – 2:15 PM

Date: April 2, 2008





Briefing Outline

- Program update
- Documentation status
- Dose uncertainty initiatives
- Quality initiatives
- VBDR-DTRA* recommendation status
- The road ahead

Projected Briefing Time: 45 minutes

*DTRA: Defense Threat Reduction Agency





Program Update

- NTPR Program has eliminated its backlog of cases and achieved steady-state condition
 - Almost all inquiries (Veteran, VA, or DOJ) are completed within six months
 - Average inquiry response time: 40 days
 - Congressional inquiries have all but ceased due to elimination of case processing delays



NTPR Response Goals

Type of Inquiry

Time to Complete (Goal)

NTS&PPG Non-Expedite VA Non-Presumptive	} ≤ 6 Months
H&N Non-Expedite VA Non-Presumptive	
NTS&PPG Expedite-SPARE Required VA Non-Presumptive	} < 4 Months
NTS&PPG Expedite-SPARE Not Required VA Non-Presumptive	
Department of Veterans Affairs (VA) Presumptive	} < 2 Months
Department of Justice (DOJ) Presumptive	
Veteran Personal Verification and/or Dose	

96 Incoming Inquiries - (Feb 2008)

SPARE: Scenario of Participation And Radiation Exposure

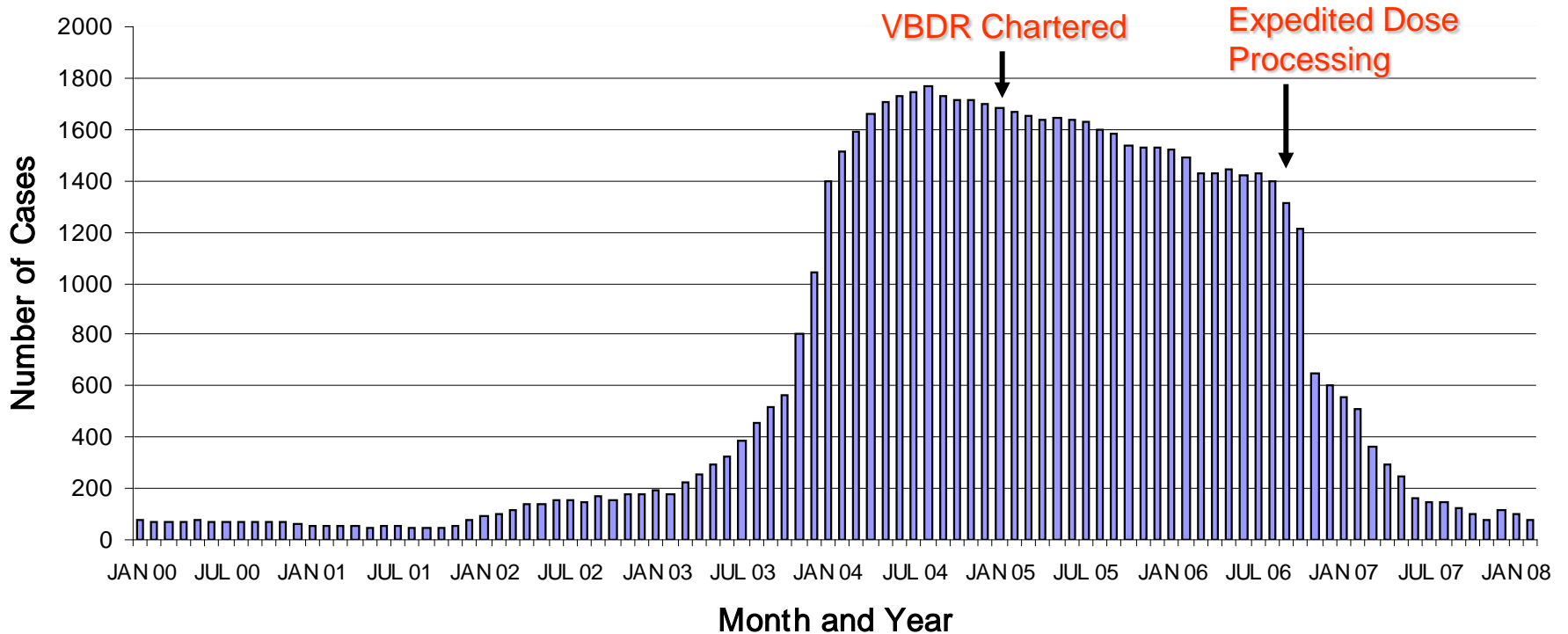
H&N: Hiroshima & Nagasaki

NTS&PPG: Nevada Test Site & Pacific Proving Ground



NTPR Pending Case Load History

Historical Actual Non-Presumptive Pending Case Load (January 2000- February 2008)





Impact of Expedited Processing

- % Favorable VA Atomic Veteran Medical Opinions
 - Pre-Expedite¹: 9%
 - Post-Expedite¹: 29%

Note: Most of the favorable opinions are associated with skin and cataract disease claims due to the dose uncertainty associated with fallout beta emitters in contact with the veteran's body.

¹: Based on data (Sep 2003 through Oct 2007) presented by Neil Otchin, MD at Veterans Advisory Committee on Environmental Hazards meetings.



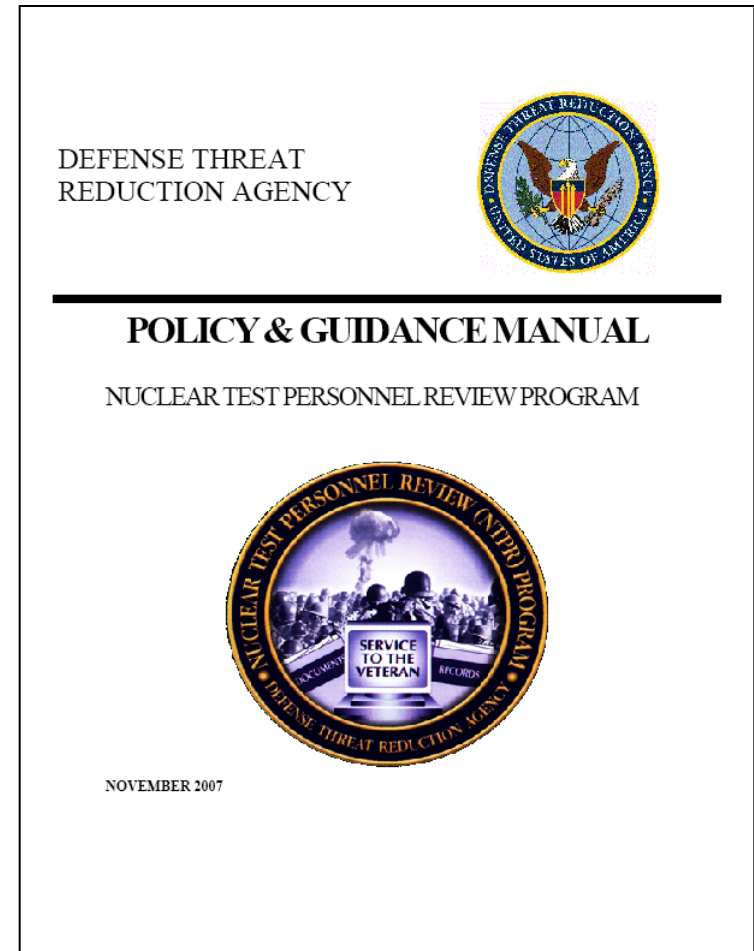
Documentation Status

1. Policy documents
 - a. External: Code of Federal Regulations
 - b. Internal: NTPR Policy and Guidance Manual
2. Implementing documents
 - a. Procedures
 - b. Technical guidance
 - c. Training materials
3. Operating documents
 - a. Worksheets
 - b. Forms



Changes in Policy Documents

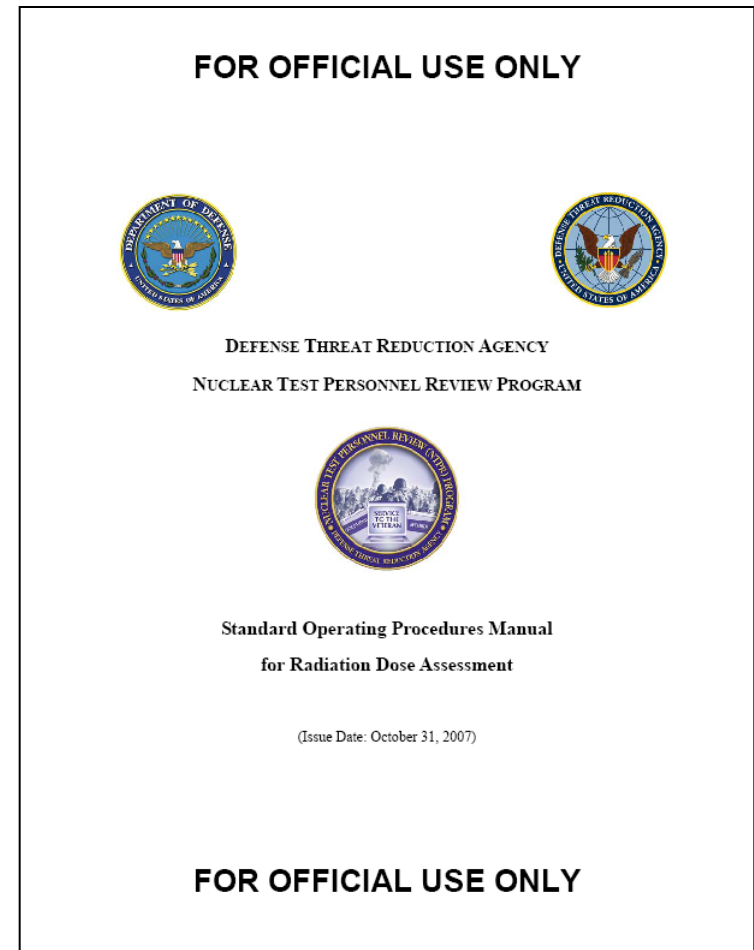
NTPR's Policy and Guidance Manual has been reduced in size as material has been moved to the NTPR Standard Operating Procedures (SOPs).





Changes in Implementing Documents

- Three NTPR SOPs have been written, reviewed, and implemented:
 - Radiation Dose Assessment (RDA) SOP
 - Quality Assurance SOP
 - Program Management SOP





Changes in Operating Documents

- NTPR Mathcad worksheet standardization:
 - 1.0 Worksheet Information
 - 2.0 General Description of the Case
 - 3.0 Definitions and Data
 - 4.0 Dose Calculations – External Doses
 - 5.0 Dose Calculations – Internal Doses
 - 6.0 Dose Calculations – Skin Doses
 - 7.0 Dose Calculations – Eye Doses
 - 8.0 Dose Summary and Upper Bound Doses
 - 9.0 References
 - A. Data Annex



Standardized Mathcad Worksheet

- Similar Subsection Structure, e.g.:
 - 3.0 Definitions and Data
 - 3.1 Dates and Times
 - 3.2 Film Badge Data
 - 3.3 General Exposure Variables
 - 3.4 Fallout Intensities
 - 3.5 Inhalation Dose Data and Variables
 - 3.6 Ingestion Dose Data and Variables
 - 3.7 Skin Dose Data and variables
 - 3.8 Eye Dose data and Variables



Standardized Mathcad Worksheet

Sample
Mathcad
Output:

3.5.2 Inhalation Dose Conversion Factors for Shot ROMEO

Inhalation Alpha DCF:

$DCF_{Inh_ROMEO\alpha} :=$ CASTLE INHALATION FBE DCFs.xls

$CED_{Inh\alpha_ROMEO}^{(OI)} := DCF_{Inh_ROMEO\alpha}^{(Organus_{OI})}$

$CED_{Inh\alpha_ROMEO}(t_{Shot}, OI) := \text{interp}\left(\text{cspline}\left(TI, CED_{Inh\alpha_ROMEO}^{(OI)}, TI, CED_{Inh\alpha_ROMEO}^{(OI)}, t_{Shot}\right)\right)$

$CED_{Inh\beta\gamma_ROMEO}(t_{Shot}, OI) := \text{interp}\left(\text{cspline}\left(TI, CED_{Inh\beta\gamma_ROMEO}^{(OI)}, TI, CED_{Inh\beta\gamma_ROMEO}^{(OI)}, t_{Shot}\right)\right)$

Inhalation beta+gamma DCF:

$DCF_{Inh_ROMEO\beta\gamma} :=$ CASTLE INHALATION FBE DCFs.xls

$CED_{Inh\beta\gamma_ROMEO}^{(OI)} := DCF_{Inh_ROMEO\beta\gamma}^{(Organus_{OI})}$

3.5.3 Inhalation Dose Conversion Factors for Shot NECTAR

Inhalation Alpha DCF:

$DCF_{Inh_NECTAR\alpha} :=$ CASTLE INHALATION FBE DCFs.xls

$CED_{Inh\alpha_NECTAR}^{(OI)} := DCF_{Inh_NECTAR\alpha}^{(Organus_{OI})}$

$CED_{Inh\alpha_NECTAR}(t_{Shot}, OI) := \text{interp}\left(\text{cspline}\left(TI, DCF_{Inh_NECTAR\alpha}^{(OI)}, TI, DCF_{Inh_NECTAR\alpha}^{(OI)}, t_{Shot}\right)\right)$

$CED_{Inh\beta\gamma_NECTAR}(t_{Shot}, OI) := \text{interp}\left(\text{cspline}\left(TI, CED_{Inh\beta\gamma_NECTAR}^{(OI)}, TI, CED_{Inh\beta\gamma_NECTAR}^{(OI)}, t_{Shot}\right)\right)$

Inhalation beta+gamma DCF:

$DCF_{Inh_NECTAR\beta\gamma} :=$ CASTLE INHALATION FBE DCFs.xls

$CED_{Inh\beta\gamma_NECTAR}^{(OI)} := DCF_{Inh_NECTAR\beta\gamma}^{(Organus_{OI})}$

3.6 Ingestion Dose Data and Variables

Specify organ, dose factors, interpolation functions, soil density, soil intake rate, plate parameters, water ingestion rate, etc., as needed from DTRA 2007a.

Food Ingestion Dose Calculation Parameters

Calculations are for the ingestion of food at the average deposition rate of contaminants during the fallout period (DTRA 2007a, ID01).

The area of a 9-in round plate is: $Area := \pi \left[\left(\frac{9}{2} \right) \frac{2.54}{100} \right]^2$ $Area = 4.1 \times 10^{-2} \text{ m}^2$

Ingestion time = 15 min: $IngTime := \frac{15}{60}$ $IngTime = 0.25 \text{ hr}$

Factor_{timestep} := 0.1



Dose Uncertainty Initiative

- NTPR's RDA SOP Chapter on Dose Uncertainty and Upper Bound Determinations specifies nominal uncertainty factors:
 - External Gamma/Beta (Shine) Dose: X3
 - External Neutron Dose: X2
 - Internal Dose: X10
- **Mar 2008:** Draft DTRA Technical Report on Dose Uncertainty released
- **01 Apr 2008:** VBDR SC1 briefed on progress
- **Jul 2008:** Complete Report, Update SOP, System Integration



Quality Initiatives

- Double blind intercomparison studies of NTPR RDAs continue:
 - The RDA is performed independently by three groups:
 1. NTPR Program
 2. Independent Consultant #1
 3. Independent Consultant #2
 - VBDR SC1 and SC3 have noted a continued improvement:
 - This improvement is due to the significant progress in NTPR documentation
 - NTPR has implemented assessment of results by pre-defined metrics



Quality Initiatives

- Independent review of expedited RDAs has been implemented:
 - The DTRA analyst's decision to expedite an RDA is now captured in a Decision Summary Sheet (DSS).
 - The DSS and other documentation supporting this decision is now being reviewed by a non-DTRA health physicist. This should add only 1-2 weeks to the process.



VBDR-DTRA Recommendations

- 18 Recommendations:
 - Jun 2006: 4 recommendations
 - Nov 2006: 2 recommendations
 - Mar 2007: 3 recommendations
 - Apr 2007: 3 recommendations
 - Sep 2007: 6 recommendations
- Status:
 - 11 Completed
 - 7 Ongoing



VBDR-DTRA Recommendation #1

- Jun 2006: “NTPR develop a screening procedure for skin radiation dose assessments that would allow expedited processing of those cases for which the doses are well below or well above the level likely to result in a successful claim. Worst case upper bounds should be used...to provide...maximum benefit of the doubt.”
- Status: **Completed.**



VBDR-DTRA Recommendation #2

- Jun 2006: “NTPR also develop a screening procedure for prostate cancer cases that would allow expedited processing of those cases for which the doses are well below the level likely to result in a successful claim.”
- Status: **Completed.**



VBDR-DTRA Recommendation #3

- Jun 2006: “NTPR undertake a comprehensive analysis of uncertainties for all beta dose exposure scenarios.”
- Status: **Ongoing.**
 - NTPR has initiated a comprehensive RDA uncertainty analysis. SC1 was briefed in Jan 2008 and preliminary results have been provided to the Board at this meeting. Target for completion: Jul 2008.



VBDR-DTRA Recommendation #4

- Jun 2006: “NTPR hire a consultant to write a quality assurance (QA) plan. The VBDR further recommends that NTPR develop and implement a QA program on a schedule that allows it to be integrated into the contracting process...and the development of a comprehensive manual of standard operating procedures (SOPs) that address the necessary QA elements, including metrics.”
- **Status: Completed.**
 - QA plan completed. SOPs completed. Plan and SOPs continue to be revised as appropriate.



VBDR-DTRA Recommendation #5

- Nov 2006: “NTPR include, at a defined frequency...the processing of a double blind radiation dose assessment...by at least two independent analysts, and the assessment of the...results by pre-defined metrics. Key requirements...are the allowable relative differences between the...point estimates...and ...upper bound estimates for each of the reported doses. Pre-established actions to be taken if an allowable difference is exceeded should be defined and documented.”
- Status: **Completed.**
 - Three rounds of double blind RDAs have been completed to date. Continuing improvement noted.



VBDR-DTRA Recommendation #6

- Nov 2006: “After NTPR’s implementation of the QA Plan, Program and Procedures Manual...NTPR submit the following key QA tracking results to Subcommittee 3 on a quarterly basis: performance and QA metrics, QA corrective actions, and audit reports.”
- Status: **Ongoing.**
 - Awaiting VBDR SC3 feedback. Target for completion: Jul 2008.



VBDR-DTRA Recommendation #7

- Mar 2007: “That a detailed Standard Operating Procedure (SOP), including incorporated Standard Methods (SMs), be developed that ensure the appropriate treatment of upper bounds, and:
 - That specifies how and when the default upper bound factors...other than those for neutron exposures, are to be applied and when specific uncertainty estimates should be made,
 - That the current uncertainty estimates for gamma doses based on cohort film badge data, and for beta skin doses based on beta to gamma ratios, be re-evaluated, and in the interim, appropriate default upper bound factors should be developed and applied,
 - That the SOP specify in detail when uncertainty estimates from individual sources should be assumed independent or correlated and when and how uncertainties should be propagated, and
 - That the current procedure for estimating the upper bound ingestion dose be re-evaluated to determine whether it is unreasonably conservative.”
- **Status: Ongoing.**
 - RDA SOP released Oct 2007. Target for completion: Jul 2008.



VBDR-DTRA Recommendation #8

- Mar 2007: “VBDR receives final drafts of the SOP and quality assurance plan according to the schedule provided to Subcommittee 3 as a response to the November 2006 VBDR recommendations.”
- Status: **Completed.**



VBDR-DTRA Recommendation #9

- Mar 2007: “NTPR submit an appropriate modified expedited radiation dose assessment process for posterior subcapsular cataracts to Subcommittee 1 for review as soon as possible.”
- Status: **Completed.**



VBDR-DTRA Recommendation #10

- Apr 2007: “NTPR develop...procedures... for most other cancers, where scientifically justified, that would allow expedited processing of those cases for which the doses are either well below or well above the level likely to result in a successful claim.”
- Status: **Completed.**



VBDR-DTRA Recommendation #11

- Apr 2007: “NTPR complete as soon as possible the development of a large number of these templates as well as improve the annotation of the calculations and equations used in the templates.”
- Status: **Completed.**



VBDR-DTRA Recommendation #12

- Apr 2007: “For most cases...only a minimum amount of information is required. Additional information need be requested only if a detailed SPARE is required. We recommend that the number of questions be minimized and tailored to a specific disease (organ dose assessment), age at exposure, age at diagnosis, and any special exposure scenarios/activities encountered by the veteran.”
- Status: **Completed.**



VBDR-DTRA Recommendation #13

- Sep 2007: “NTPR develop a Decision Summary Sheet (DSS) as a device for integrating its Standard Operating Procedures (SOPs) and quality documents. The DSS would be employed with radiation dose assessments, including expedited cases, and associated audits.”
- Status: **Completed.**



VBDR-DTRA Recommendation #14

- Sep 2007: “NTPR discontinue the use of default upper bound factors for...non-expedited radiation dose assessments and develop procedures to perform full probabilistic uncertainty analyses for these assessments. NTPR standard operating procedures should specify whether uncertainty estimates from individual sources are independent or correlated and when and how uncertainties should be propagated.”
- **Status: Ongoing.**
 - NTPR initiated a comprehensive RDA uncertainty analysis in late 2007. RDA SOP includes section on treatment of uncertainties. Target for completion: Jul 2008.



VBDR-DTRA Recommendation #15

- Sep 2007: “NTPR ensure its external review entity conducts spot checks of specific calculations and computer programs (e.g., MathCAD template output).”
- Status: **Ongoing.**
 - Target for completion: Jul 2008.



VBDR-DTRA Recommendation #16

- Sep 2007: “NTPR document its justification to expedite a case in the case file and that external Quality Assurance (QA) audits comment on appropriateness of the decision to expedite.”
- Status: **Ongoing.**
 - Target for completion: Jul 2008.



VBDR-DTRA Recommendation #17

- Sep 2007: “NTPR expand its technical bases and criteria for expedited case processing.”
- Status: **Ongoing.**
 - Target for completion: Jul 2008.



VBDR-DTRA Recommendation #18

- Sep 2007: “VA and DTRA formalize an advisory role for VBDR in the development of any communications efforts regarding atomic veterans. [W]e recommend that a meeting be held with VBDR and appropriate representatives of outreach and public affairs from both DTRA and VA this fall. [P]rior to the meeting...inventory all communications regarding atomic veterans...as each agency thinks might also benefit from risk communication input from VBDR.”
- Status: **Completed.**
 - NTPR collected and submitted samples of all correspondence and forms to VBDR in Oct 2007.



The Road Ahead

- Update 32 CFR 218, “DTRA Dose Reconstruction Policy”
- Complete work on VBDR-DTRA recommendations by Sep 2008
- Support potential VBDR transition