DEFENSE THREAT REDUCTION AGENCY

DTRA

Making the World Safer

Current Status of the Nuclear Test Personnel Review (NTPR) Program

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Veterans' Advisory Board on Dose Reconstruction

17 Aug 2005

1400-1445

Briefing Outline

- Overview
- Historical Events
- Recent Events
- Radiogenic Disease
- The Road Ahead

- Projected briefing time: 40 minutes

Overview – DTRA

- The Defense Threat Reduction Agency (DTRA) performs a vital national security mission: reducing the threat of weapons of mass destruction.
- We are a defense combat support agency with more than 2,000 personnel coming from the military services, the federal civil service, universities, non-governmental organizations and corporate America.

Overview – The Beginning

The roots of DTRA can be traced back to the Manhattan Project. After the conclusion of WWII, nuclear weapons development was passed from the military to the Atomic Energy Commission (AEC), which eventually evolved into the Department of Energy (DOE). However, the military had an urgent need to understand the effects of nuclear weapons. Consequently, both AEC and military personnel participated in nuclear weapons tests.

Overview – The Tests

From 1945 to 1962, the AEC conducted some 235 above ground (atmospheric) nuclear weapons tests. This testing occurred primarily in Nevada and the Pacific, with over 200,000 Department of Defense (DoD) military and civilian participants.

Overview – SGT Cooper

In March 1977, 15 years after the last above-ground test, the Veterans Administration (VA) Regional Office in Boise, Idaho, received a claim for disability benefits from retired Army Sergeant Paul R. Cooper. SGT Cooper was a patient at the VA hospital in Salt Lake City, Utah, and he attributed his acute myelocytic leukemia (AML) to radiation exposure he had received when he was a participant in Shot SMOKY of Operation PLUMBBOB. The VA initially denied Cooper's claim but later reversed its decision.

Overview – NTPR Established

- The VA's decision on the Cooper claim initiated a series of events that ultimately involved DoD, DOE, the National Academy of Sciences (NAS), the Department of Health & Human Services (HHS) and the White House.
- This led to questions about the possible radiation doses received by test participants and possible long-term health effects resulting from those doses.
- To help answer these questions, DoD established the Nuclear Test Personnel Review (NTPR) in 1978.

Overview - Mission

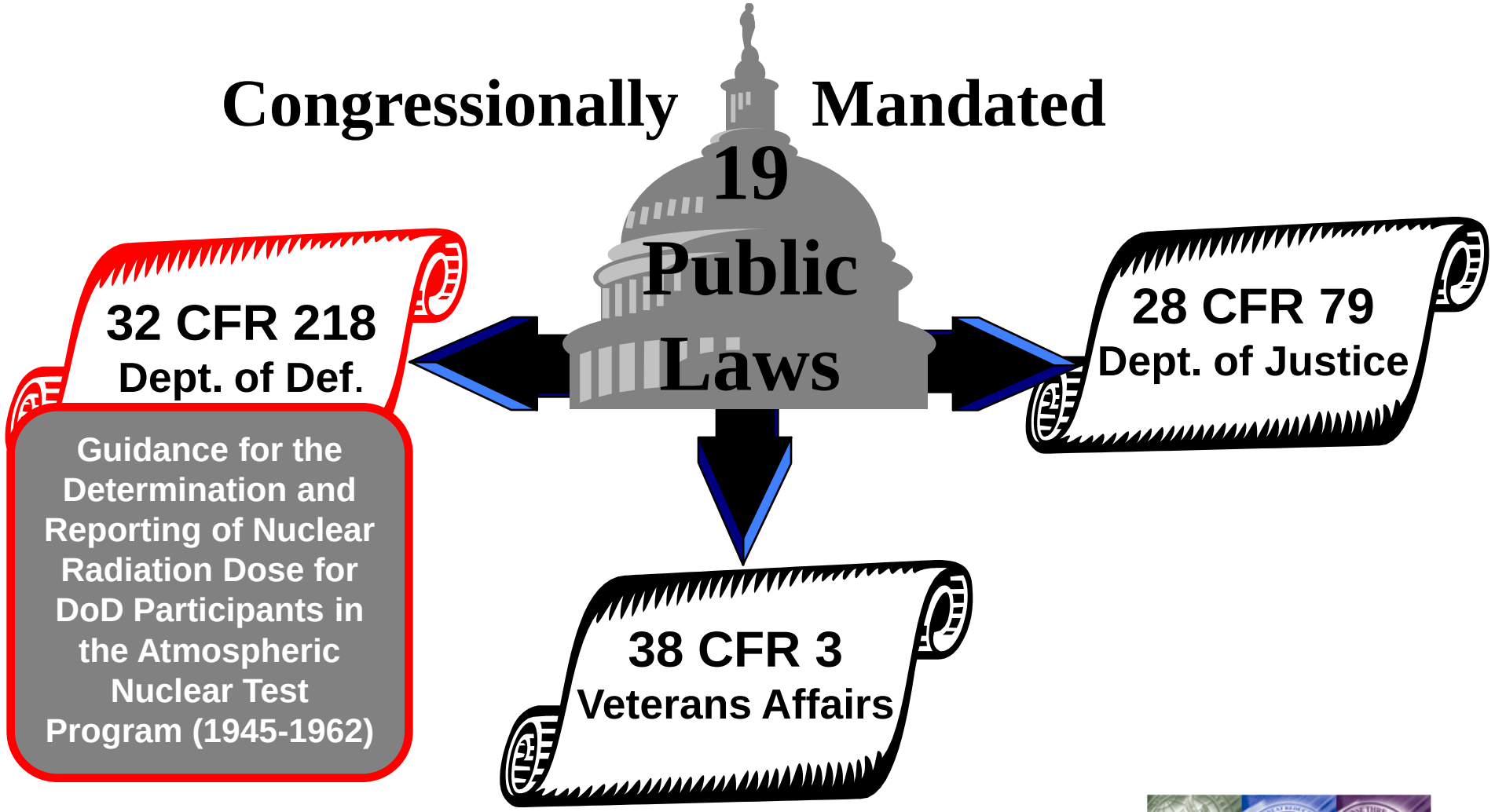
Provide veterans, the VA, and the Department of Justice (DOJ) with confirmation of participation and radiation dose (when applicable) to military and DoD civilian personnel who:

- Participated in U.S. atmospheric nuclear testing (1945 to 1962)
- Served with the American occupation forces of Hiroshima and Nagasaki (Aug 1945 to Jul 1946)
- Were interned as POWs (near Hiroshima and Nagasaki) at the end of WWII

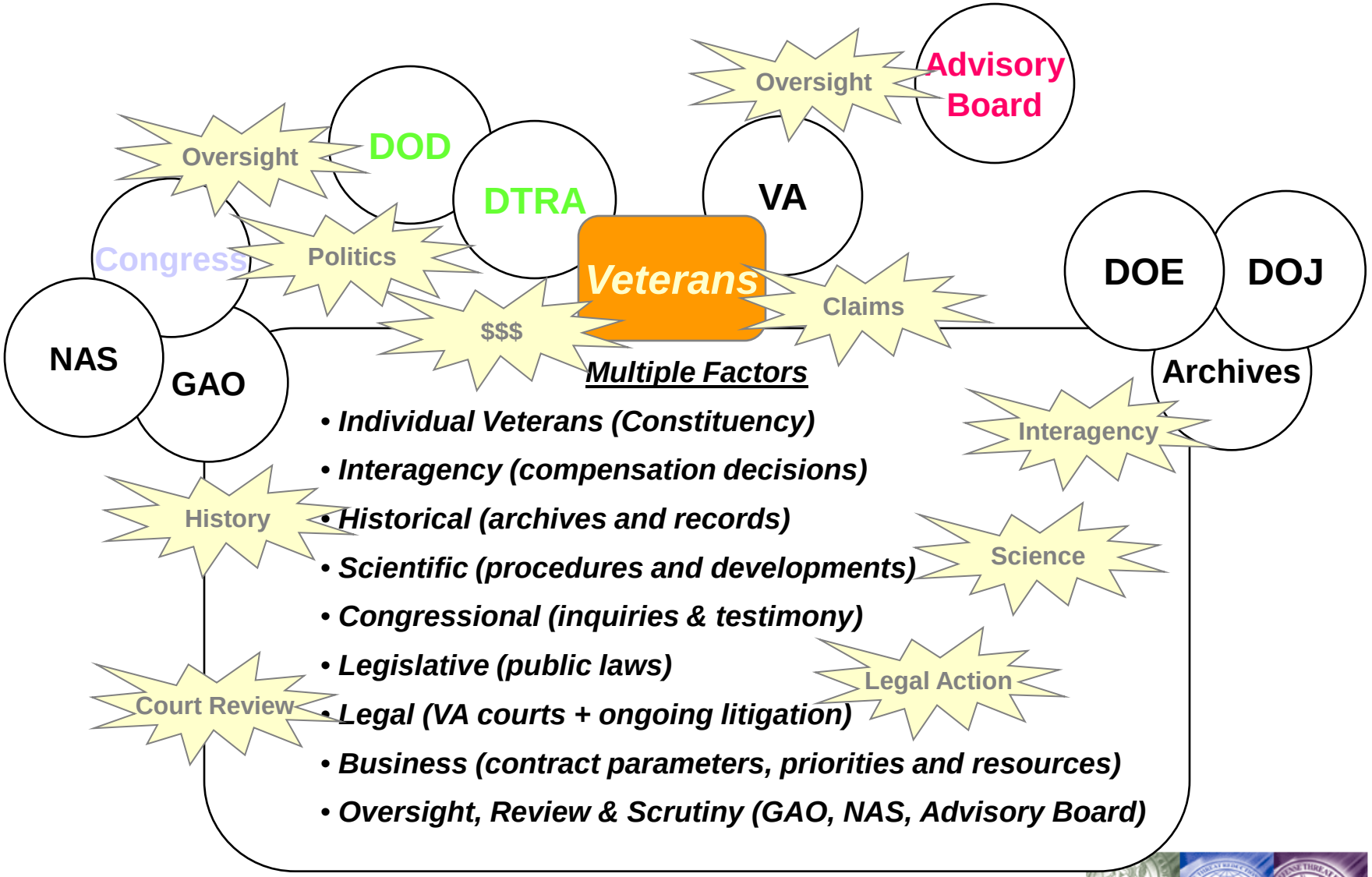
Overview – Program Objectives

- VETERAN ASSISTANCE: Provide timely, complete, and relevant support to individual participants, to the organizations responsible for administering veterans' benefits, and to scientific research organizations chartered to conduct studies of issues relevant to the NTPR.
- DOSE ASSESSMENT: Provide accurate dosimetry (film badge) information and apply dose reconstruction methodologies, when film badge data is not sufficient, for populations supported by the NTPR.
- DATABASE MANAGEMENT: Establish and maintain a credible, comprehensive and accessible repository of personnel, historical, and radiological information for all populations supported by the NTPR.

Overview – Program Requirements



Overview – The Environment



Overview – The Team

NTPR Integrated Product Team:

- Government Staff: 3 board certified health physicists
- Contract: 25 support staff and 14 scientists/engineers
- Located in Northern Virginia, St. Louis, MO, Idaho Falls, ID, and San Diego, CA.

- Program was smaller in recent past. But the program has expanded due to the most recent NAS review (2003).

Historical Events – Realization of Challenge

- In early 1977, due in part to SGT Cooper's VA case, the Centers for Disease Control and Prevention (CDC) initiated an initial epidemiological investigation into abnormal incidence of leukemia among participants in Shot SMOKY.
- At the same time, interagency meetings between DoD, DOE, VA, and the U.S. Public Health Service were initiated to address this problem.
- By 1978, Congress began to hold hearings on this topic.

Historical Events – Initial Responses

- In 1978, DoD directed the Defense Nuclear Agency (DNA – a DTRA predecessor organization) to stand up the NTPR.
- The NTPR established a toll-free call-in program for veterans to report their participation. This toll-free helpline (800-462-3683) remains in operation today.
- In 1978, the VA authorized physical examinations for nuclear test participants.

Historical Events – NTPR Actions Cont'd.

- In 1981, Congress passed PL 97-72 which provided health care to atmospheric nuclear test participants and the occupation forces of Hiroshima/Nagasaki.
- In 1984, Congress passed PL 98-542, "Veterans' Dioxin and Radiation Exposure Compensation Standards Act":
  - Directed VA to establish radiation compensation standards,
  - Directed VA to establish an environmental hazards advisory committee,
  - Directed DNA to prescribe guidelines for reporting internal and external radiation doses.

Historical Events – NTPR Actions Cont'd.

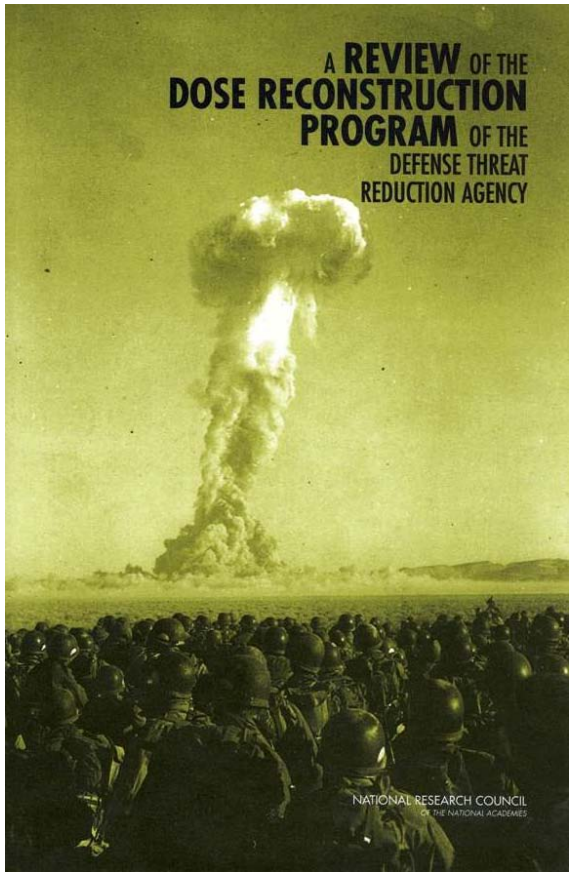
- Congress has continued to be legislatively active in responding to nuclear test participants' concerns.
- Similarly, DoD's NTPR Program has been active in addressing veterans' concerns:
  - NTPR sponsored or co-sponsored eight NAS studies involving human radiation effects. The most recent (BEIR VII) was just published in 2005.
  - Veterans have actively participated in some of these studies. For instance, the National Association of Atomic Veterans (NAAV) contributed medical survey information in the NAS/Institute of Medicine CROSSROADS mortality study (1996).

Historical Events – NTPR Actions Cont'd.

- NTPR has published over 68 historical/technical reports, which are now being posted on the DTRA website. A 41-volume history of each test series was developed and sent to the VA and over 700 public libraries in the U.S.
- NTPR has declassified over 1,000 publications containing information pertinent to the personnel aspects of the U.S. atmospheric nuclear tests. This information resides at:
  - DTRA-NTPR Library (Virginia)
  - National Technical Information Service (Virginia)
  - DOE's Nuclear Test Archive (Nevada)
- Since its inception, the NTPR program has received over 80,000 calls on its toll-free telephone line and released over 210,000 correspondence actions.

Recent Events – The "Green" Book

- In May 2003, the NAS released, "A Review of the Dose Reconstruction Program of DTRA."
- This had a major impact on the NTPR program.
- Implementing the eight NAS recommendations has been challenging.



Recent Events – The NAS Recommendations

#1 Establish independent advisory board for external review and oversight

#2 Re-evaluate methods used to estimate doses and their uncertainties to establish more credible upper bounds

#3 Develop and maintain comprehensive manual of standard operating procedures

#4 Develop and implement state-of-the-art Quality Assurance/Quality Control program

Recent Events – The NAS Recommendations

#5 Apply benefit of the doubt consistently

#6 Improve interaction and communication with atomic veterans

#7 Establish more effective approaches to communicate the meaning of radiation risk to veterans. Provide information to veterans on the significance of their doses in relation to their diseases.

#8 Advise atomic veterans and their survivors when methods of calculating doses have changed so that they can ask for updated dose assessments

Recent Events – Impact of Recommendations

- The NAS study recommendations resulted in a revision to NTPR procedures. No dose reconstructions were performed for approximately six months (May – Oct 2003) while these procedures were being formulated.
- In addition, during the last quarter of 2003, the VA returned over 1,000 dose reconstruction cases to DTRA.
- This created a backlog of dose reconstruction cases that is proving particularly challenging to reduce!

Recent Events – Action Plan

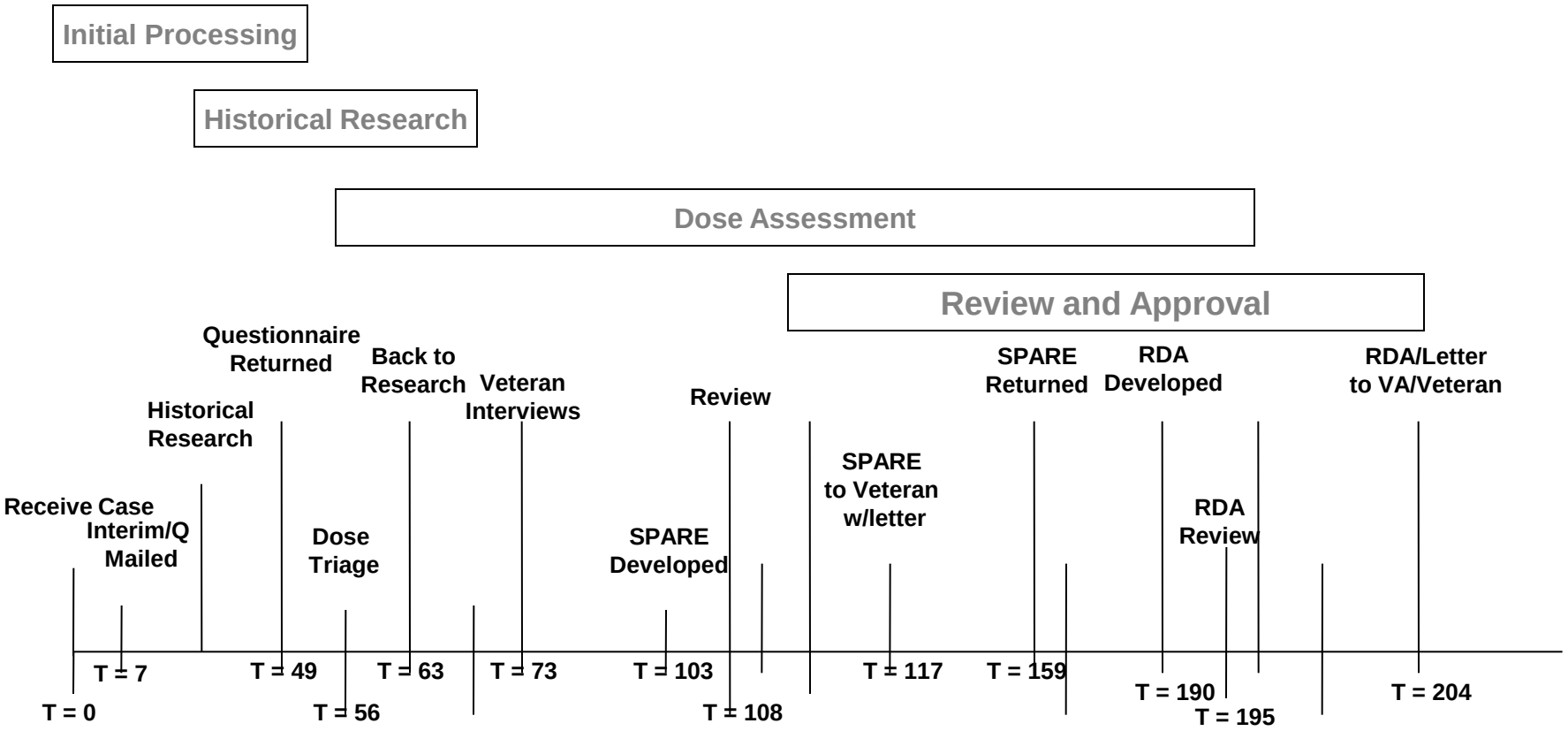
- DTRA's action plan to implement NAS 2003 report recommendations has increased the time in performing dose reconstruction procedures:

  - A new step was added – the "Scenario of Participation and Radiation Exposure (SPARE).

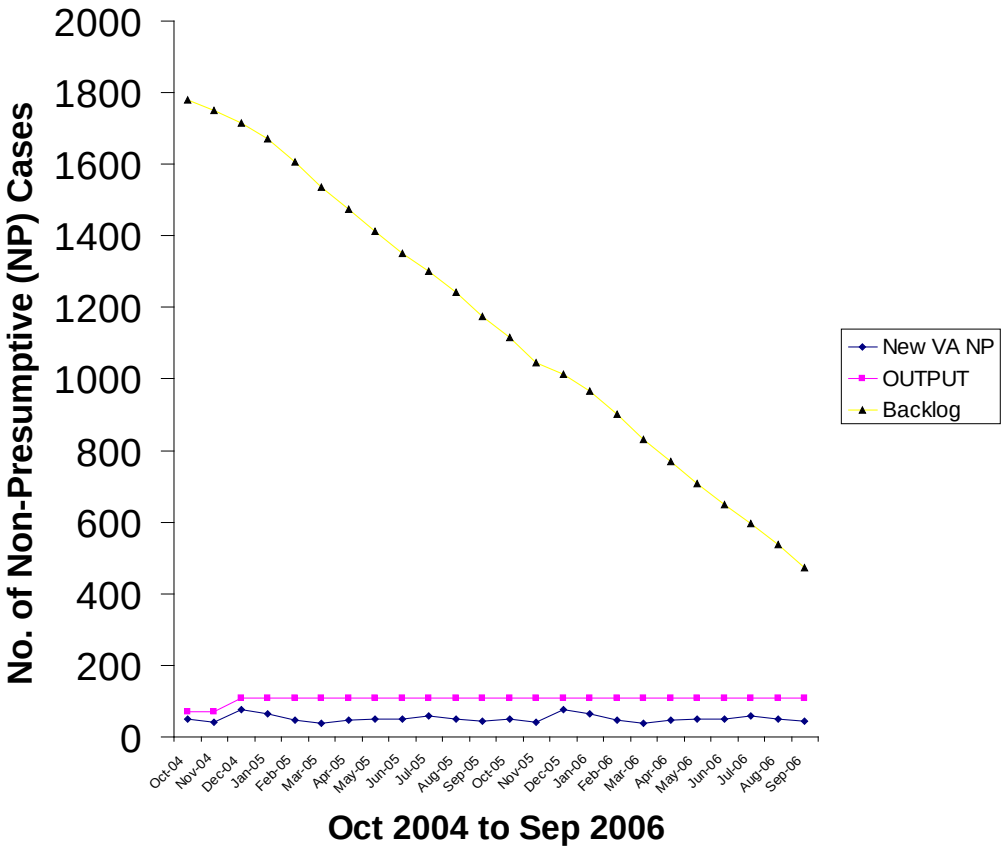
  - In addition, the final Radiation Dose Assessment (RDA) has become a more extensive product.

Recent Events - Case Processing Goals

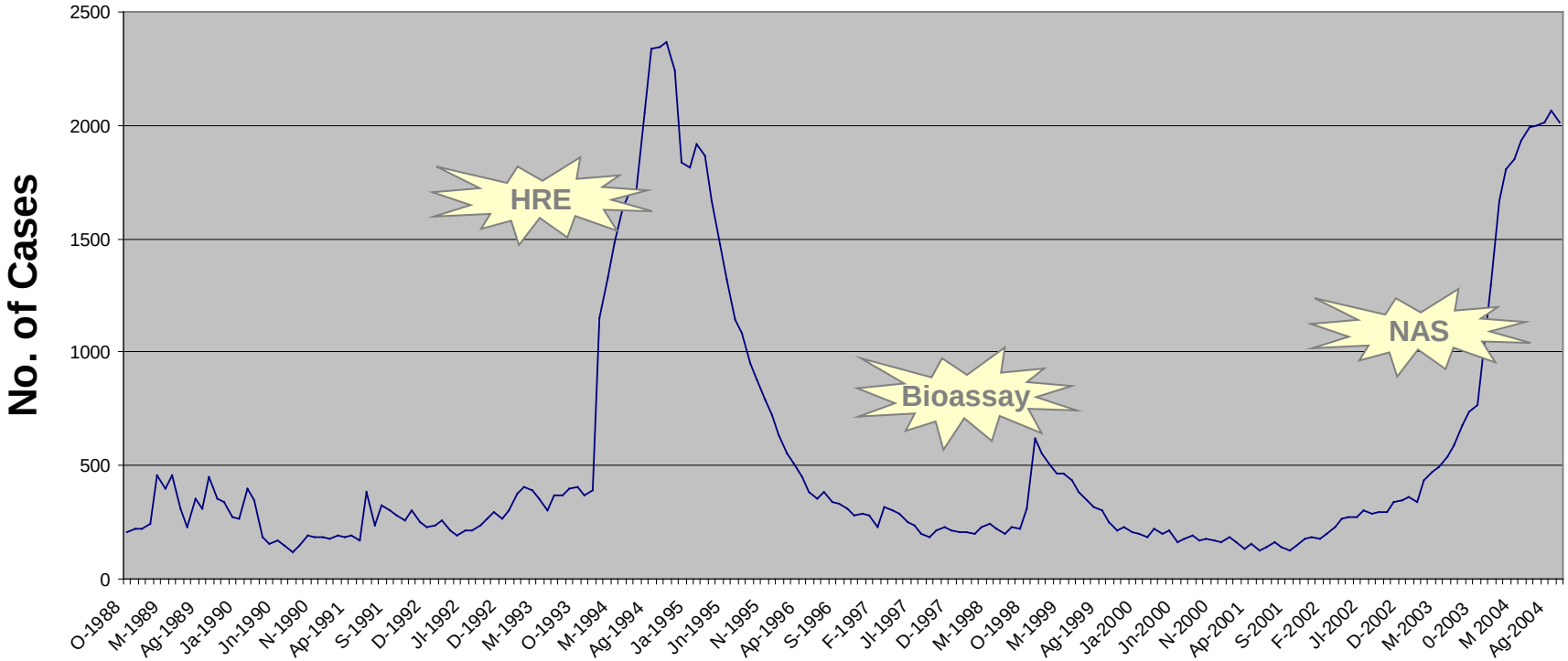
VA Non-Presumptive (Dose Required)



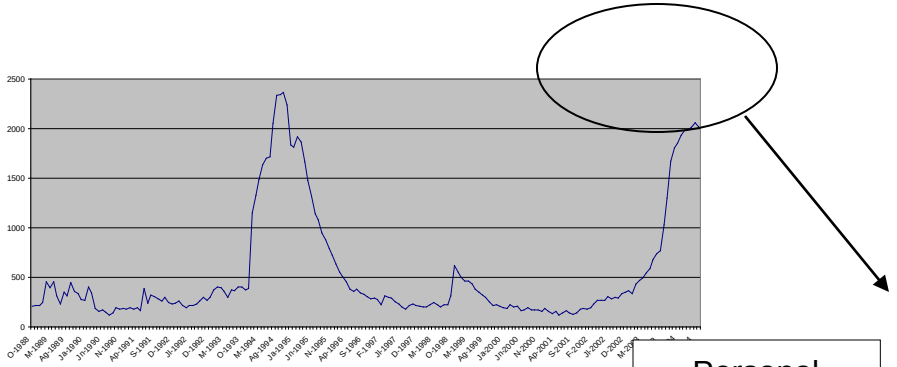
Recent Events – Backlog discussions with VA



Recent Events - Workload in Perspective (1988 - 2004)



Recent Events - Pending Workload - By Cases



Personal
(No Dose)

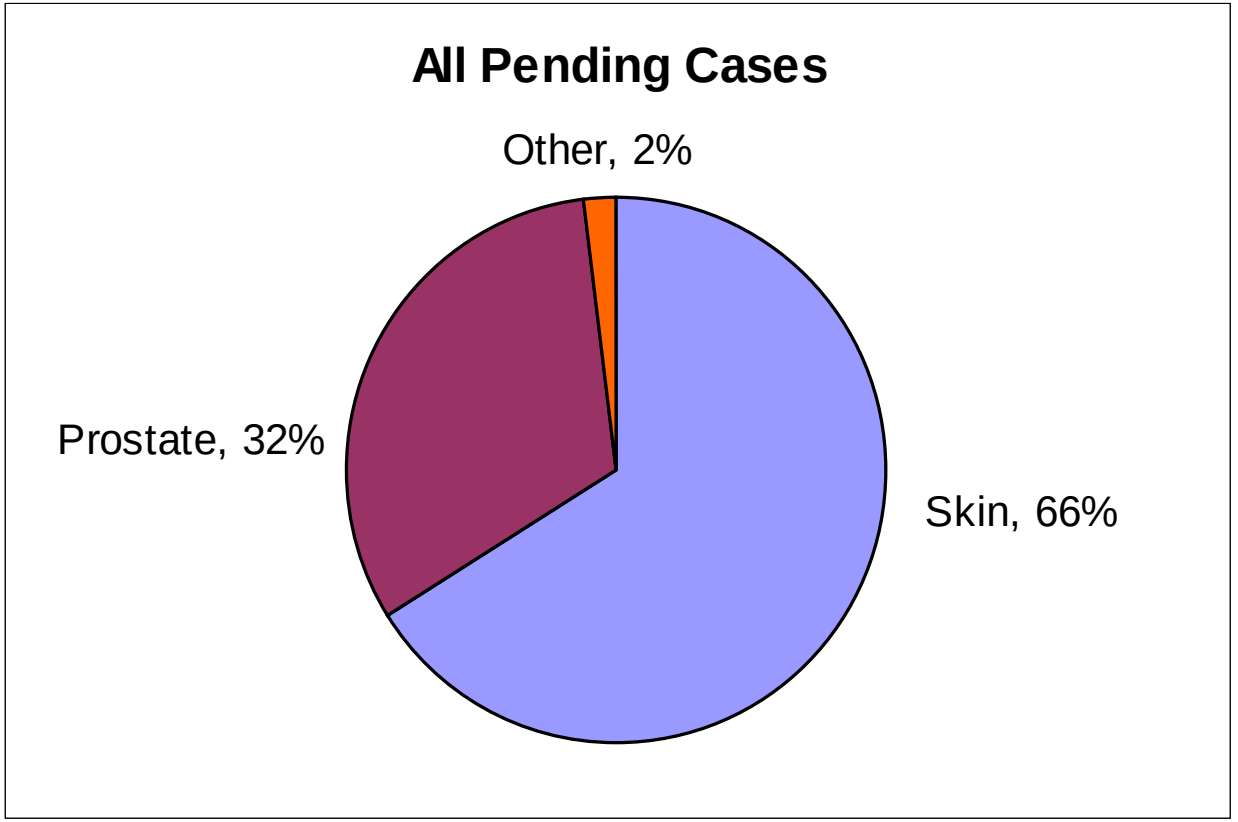
DOJ
(No Dose)

VA Presumptive
(No Dose)

VA Rework
Revised Dose

VA Non-Presumptive
(Dose Required)

Recent Events - Pending Workload - By Disease



Radiogenic Disease – Life Span Study of Hiroshima & Nagasaki Survivors

- The Japanese survivors of the Hiroshima & Nagasaki serve as a major source of information for evaluating health risks from exposure to ionizing radiation.
- 421 excess deaths have been determined in the 50,113 survivors who received at least 0.5 rem during the period of 1950-1990. 2.4% of the group had whole body exposures exceeding 100 rem.

Ref: Zaider, M. and Rossi, H. (2001) Radiation Science for Physicians and Public Health Workers (citation 42)

Radiogenic Disease – Historical Veterans' Radiation Exposure Levels

- The average whole body dose for DoD participants in U.S. atmospheric nuclear tests (primarily in Nevada and the Pacific Ocean) was **0.6 rem**.
- Of the veterans that participated in the post-WW II occupation of Hiroshima and Nagasaki, Japan (or were POW in these areas), **95% received doses below 0.1 rem**.
- Only those Nagasaki occupation forces that regularly entered the Nishiyama area had the **potential to receive doses up to 1 rem**.
- In comparison, the average member of the general public in the U.S. receives a background radiation dose (natural and artificial) of approximately 0.36 rem per year.

Ref: DNA Reports 5512F and 6041F, NCRP Report 93

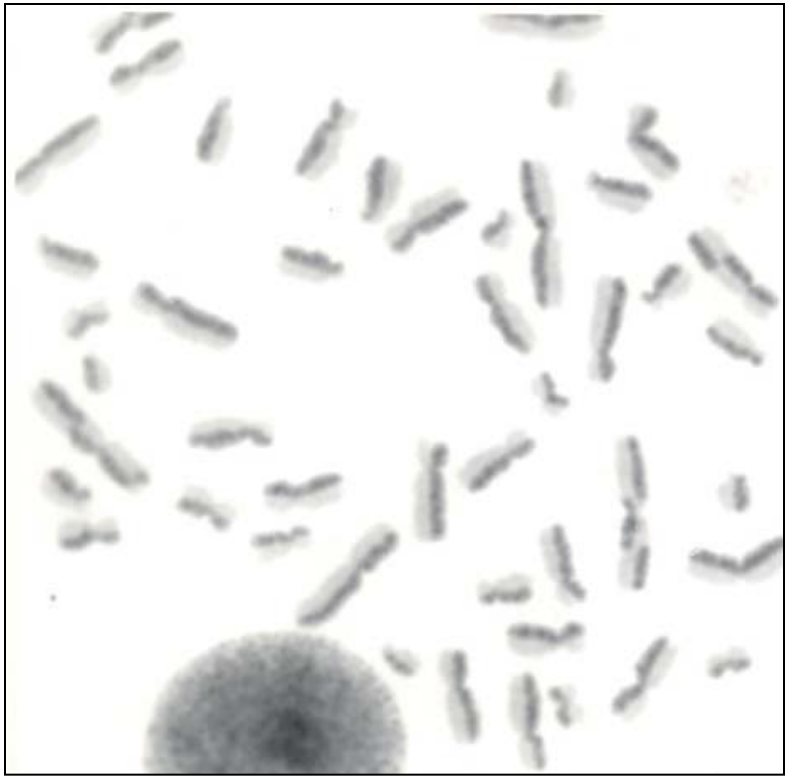
Radiogenic Disease – Green Book Executive Summary

"Rather, the committee hopes that the veterans will understand that their radiation exposure probably did not cause their cancers in most cases and that reasonable changes in methods of dose reconstruction in response to this report are not likely to greatly increase their chance of a successful claim for compensation in most cases when a dose reconstruction is required."

Ref: NAS/NRC (2003) A Review of the Dose Reconstruction Program of the Defense Threat Reduction Agency, pg. 13.

Radiogenic Disease – Biomarkers vs. Probability

Biomarkers (such as chromosomal aberrations) are laboratory indicators of environmentally caused cancers. Unfortunately, current technology is not sufficiently reliable to state that a particular cancer was caused by ionizing radiation versus some other cause. Hence, the scientific community has fallen back on the less exact approach of probability analysis.



Radiogenic Disease – Cancer Statistics

- The leading cause of death in this country is heart disease, followed by cancer
- Lifetime risk of being *diagnosed* with cancer (all causes):
  - 47% for males
  - 38% for females
- Lifetime risk of *fatal* cancer:
  - 24% for males
  - 21% for females
- 76% of all cancers are diagnosed in persons 55 or older

Ref: Jamal, A. et al. (2004) Annual Report to the nation on the status of cancer…Cancer, Vol 101, Iss 1, pp 3-27.
Cancer Facts & Figures 2005, American Cancer Society.

Radiogenic Disease – Cancer Prevalence

- The leading cancers occurring among men:
  - 1. prostate
  - 2. lung cancer
  - 3. colorectal cancer
- The leading cancers occurring among women:
  - 1. breast
  - 2/3. lung/colorectal (prevalence – based on race)

Ref: Jamal, A. et al. (2004) Annual Report to the nation on the status of cancer…Cancer, Vol 101, Iss 1, pp 3-27.

Radiogenic Disease – Veterans' Advisory Committee on Environmental Hazards

- Since 1985, this Committee's mission is to provide advice to the VA Secretary on adverse health effects that may be associated with exposure to ionizing radiation and to make recommendations on proposed standards and guidelines regarding VA benefit claims based upon exposure to ionizing radiation.
- Based on this advice, the Veterans' Health Administration has changed their procedures. The most recent change was the adoption of the Interactive RadioEpidemiological Program (IREP) software.

Radiogenic Disease – Basis for IREP

- The IREP is a computer code developed at the request of the National Cancer Institute (NCI) as part of the effort to update the 1985 Radioepidemiological Tables report.

  http://www.irep.nci.nih.gov/

- A variant of this code (the NIOSH-IREP) is used by the Department of Labor (DOL) to determine probability of causation for a cancer claim under the Energy Employees Occupational Illness Compensation Act of 2000.

Radiogenic Disease – IREP Development

The 1985 tables were mandated by the 1983 “Orphan Drug Act” (PL 97-414) which instructed HHS to “devise and publish radioepidemiological tables that estimate the likelihood that persons who have or have had any of the radiation-related cancers and who have received specific doses prior to the onset of such disease developed cancer as a result of these doses.”

Radiogenic Disease - VA Compensation Decisions

VA radiogenic disease compensation decisions are now based on Internet-accessible software that determines the probability of causation (PC) for a disease based on occupational radiation exposure.

$$PC = \frac{(\text{Risk from Radiation})}{(\text{Risk due to all Causes})}$$

Radiogenic Disease – Uncertainty Analysis

Some persons exposed to a large dose of carcinogens, for example, lifetime cigarette smoking, will develop lung cancer; others will not. Whether any particular smoker will develop cancer appears to be largely random. Scientific studies of cigarette smoking allow us to state that a lifetime of smoking will increase an individual's risk of developing cancer, but we cannot absolutely state that a particular cancer was derived from smoking. Hence, we are uncertain concerning the causation of a smoker's lung cancer.

Radiogenic Disease – Uncertainty Analysis

- Uncertainty is applied in the favor of the veteran at both DTRA and VA. Specifically:
- Per 32 CFR 218, DTRA determines the veteran's mean dose, and then assigns a larger dose equal to 95% probability that actual exposure did not exceed the assigned dose.
- Similarly, the VHA uses a 50% PC threshold at the 99% upper confidence level when performing IREP PC determination.

Radiogenic Disease – Reasonable Doubt

- **38 CFR 3.102 (VA Guidance)**: When, after careful consideration of all procurable and assembled data, a reasonable doubt arises regarding service origin, the degree of disability, or any other point, such doubt will be resolved in favor of the claimant
- This concept has been incorporated into DTRA's NTPR Policy & Guidance Manual

Public Law 108-183 - Overview

- Enacted in December 2003, subsequent to reviews by GAO (2000) and NAS (2003)
- Required Secretaries of Defense and Veterans Affairs to:
  - Jointly conduct a review of the mission, procedures, and administration of the dose reconstruction program
  - Ensure on-going independent review and oversight, including the establishment of an advisory board

The Road Ahead

- My number one priority is serving our veterans.
- My program staff and I are continually striving to identify new ways to reduce the time necessary to complete dose reconstructions.
- I look forward to the VBDR's input and assistance in improving our program.