

The Future of Radiological and Nuclear (RN) Defense Programs and Capabilities

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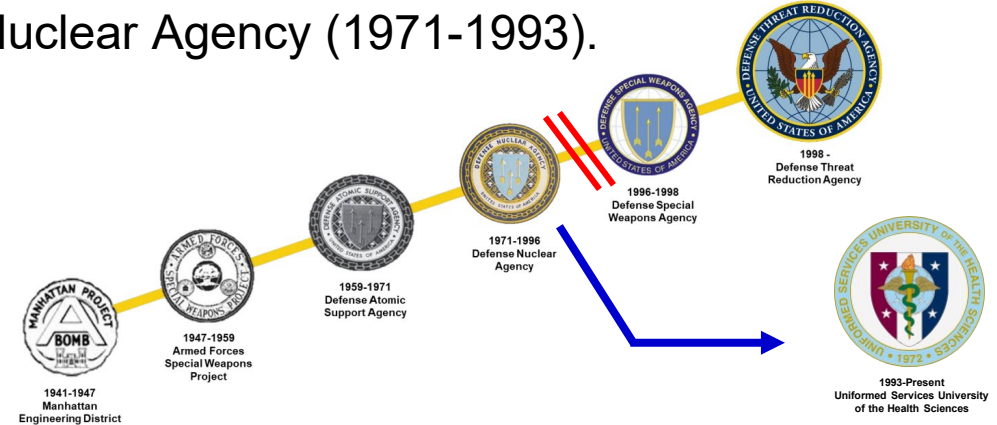
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AFRRI's History



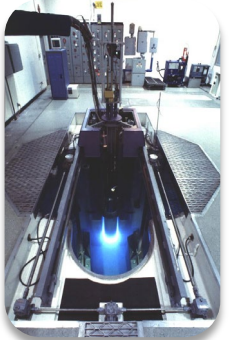
Airdrop 21-kiloton yield at NTS 1NOV51

- AFRRI began operations during the Cold War as a part of the Defense Atomic Support Agency (1961-1971) followed by the Defense Nuclear Agency (1971-1993).



- Established following above ground nuclear testing moratorium and development of an enhanced radiation weapon.
- Realigned with USU from 1993 to the present following a shift from mutual deterrence to “denuclearization”.
- Remains DOD’s only RN medical defense research institute.

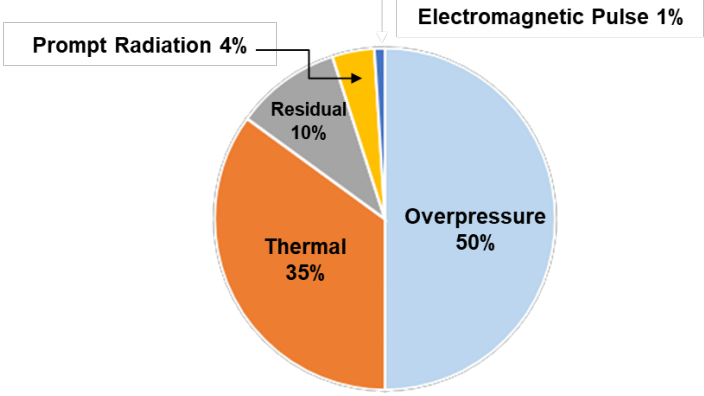
AFRRI - Facilities and Capabilities



TRIGA Reactor
Prompt neutron and gamma



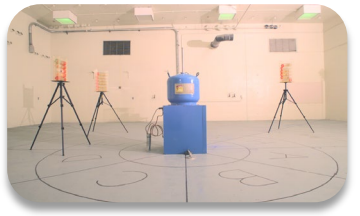
Linear Accelerator
Partial body high-energy photon and electron



- Murine Model =
- Porcine Model =
- Primate Model
- Operating Rooms



High Level Cobalt-60
Delayed photon



Low Level Cobalt-60
Delayed photon



SARRP
Partial body low-energy photon



Radiation Medical Countermeasures (MCMs)

Combined Injury (CI)

Biodosimetry

Internal Contamination

Low-Dose Effects



Assess - Diagnose - Intervene

Overview of Diagnose and Intervene Priorities

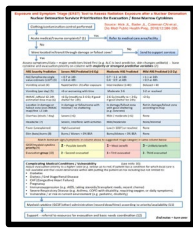
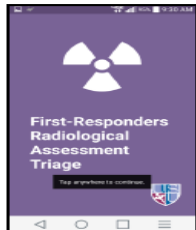
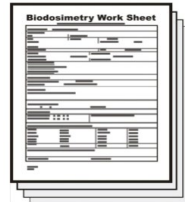
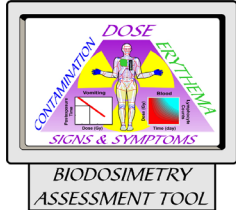
Effective RN Medical Defense:
Assess threat environment using measurements and modelling.
Diagnose radiation and combined injuries.
Intervene pre or post-exposure to save lives.

Intervene

AFRRI currently performs research on >20 drugs:

- Nplate (H-ARS prophy)
- Bio-300 (H-ARS prophy)
- GT-3 (H-ARS prophy)
- Captopril (H-ARS)
- 5-AED (H-ARS)
- YK-4-250 (GI-ARS)
- Bone marrow mesenchymal stem cells (CI)
- Ghrelin (CI)
- Proprietary Drug + Gentamicin + Levofloxacin (CI)
- Ciprofloxacin (CI)
- Ketone-ester-R3KE (low-dose)

Diagnose



Smart Decision Tools



Forward Deployable
 Biodosimetry

RN Medical Readiness Assessment Based on Current Threats



The Army Science Board

Fiscal Year 2021 Study

An Independent Assessment of the Army's Ability to Fight and Win on a Nuclear Battlefield

Final Report

September 2023

Department of the Army
Office of the Assistant Secretary of the Army
(Acquisitions, Logistics and Technology)
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Assess - Diagnose - Intervene