TAM-A.4

HOMELAND DEFENSE EQUIPMENT REUSE PROGRAM: A REPORT ON THE PILOT PHASE AND NATIONWIDE INITIATIVE. K. Thomas[1] and G. Anastas[2] ([1]U.S. Department of Justice, 810 Seventh Street NW, Washington, DC 20531; [2]Environmental Evaluation Group)

The Homeland Defense Equipment Reuse (HDER) Program achieved a significant milestone recently with the completion of the pilot phase of the project on 31 March 2003. With the program now expanded to include all fifty-six states and territories, this paper discusses the pilot program, address its programmatic achievements and describe the current status of the nationwide effort. The HDER Program is a unique partnership between the United States Department of Justice's (DOJ) Office for Domestic Preparedness (ODP), the United States Department of Energy's (DOE) Office of Assets Utilization, and the Health Physics Society (HPS). The HDER Program was conceived by a small group of Federal employees and members of HPS in the wake of the 11 September 2001, terrorist attacks on the Pentagon and World Trade Center. The overall goal of the program is to provide surplus radiological detection instrumentation and other equipment, as well as training and technical support, to emergency responder agencies nationwide to enhance their ability to respond to terrorist incidents involving the use of nuclear or radiological dispersion devices. To further reduce any costs to the agencies participating in the HDER Program Pilot Project, ODP established a partnership with the Health Physics Society. This partnership built on an existing commitment by the Society to Homeland Security, and sought to leverage the expertise of the Society's 6,000 members for technical support of the equipment redeployed through HDER. Expansion of the program means that emergency responders in all 56 states and territories now have access to HDER equipment, training, and technical support.

TAM-A.5

HOW WILL WE DEAL WITH THE CLEANUP WASTE FROM AN RDD? J.B. Martin and D.J. Strom (Pacific Northwest National Laboratory)

Radiological dispersion devices (RDDs) may or may not be based on an explosive. In any case, RDDs may cause widespread contamination and may affect densely populated areas, valuable real estate, and commerce. If an explosion is involved, people with trauma will need immediate attention from qualified medical and radiation protection personnel. Contaminated people will require less urgent attention, and the "worried-well" will potentially overwhelm the healthcare system. Waste from decontaminating people may be solid or may go to sanitary or storm sewer systems, but it will not comprise the majority of waste. Decontamination of facilities and real estate will generate a relatively larger volume of low-level radioactive waste and decontamination will need to be completed in a minimum amount of time. Decontamination may generate liquid waste that enters storm sewers. In localities in which storm and sanitary sewers are combined, sewage treatment plants need to be prepared and need to continue to operate during and after contamination arrives. Solid radioactive waste disposal sites must be established and approved in advance, and government agencies should agree in advance to take the waste without delay. Decontamination plans and procedures must be developed, trained staff must be identified and organized, and equipment and supplies must be pre-staged in advance or obtainable on short notice. Before an RDD is used, it is important to establish disposal sites, plans, and arrangements that are needed for waste management. We call for a larger effort to expeditiously complete waste management preparedness for an RDD event.

TAM-A.6

HOMELAND SECURITY BLANKETS—CARE PACKAGES FOR THE WORRIED WELL. D.J. Strom and P.S. Stansbury (Pacific Northwest National Laboratory, Environmental Health Sciences, K3-56, P.O. Box 999, Richland, WA 99352-0999)

Much of the initial radiation protection following the use of a radiological dispersion device (RDD) or a terrorist nuclear weapon will be done by non-health physicists. First responders, such as police, fire, emergency medical technicians, municipal workers, national guard, and healthcare workers will do the brunt of the containment, boundary setup, decontamination, etc. The proliferation of survey instruments and training courses ensures that there will be lots of "experts" from fields outside of health physics doing applied radiation protection. What, then, is the role of the professional health physicist? We should bring our comprehensive knowledge of radiation and its effects to bear on the enormous problem of the "worried well," those without trauma injuries, and perhaps without significant contamination or dose, who are predicted to overwhelm the health care system. Our role can be to use our credibility, based on our depth and breadth of interdisciplinary knowledge, to tell people what not to worry about. We should present, and justify, why radiation protection standards and practices differ in emergencies, and why and how intervention after a

HOW WILL WE DEAL WITH THE CLEANUP WASTE FROM A RDD EVENT?

Jerome B. Martin and Daniel J. Strom
Pacific Northwest National Laboratory

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HOW WILL WE DEAL WITH THE CLEANUP WASTE FROM A RDD EVENT?

- Introduction
- Characterization of RDD contamination
- Characterization of RDD ***de***contamination
- Comparison to other decontamination waste
- Existing disposal sites for low-level rad waste
- Storage sites needed for decontamination waste
- Conclusion/Recommendations

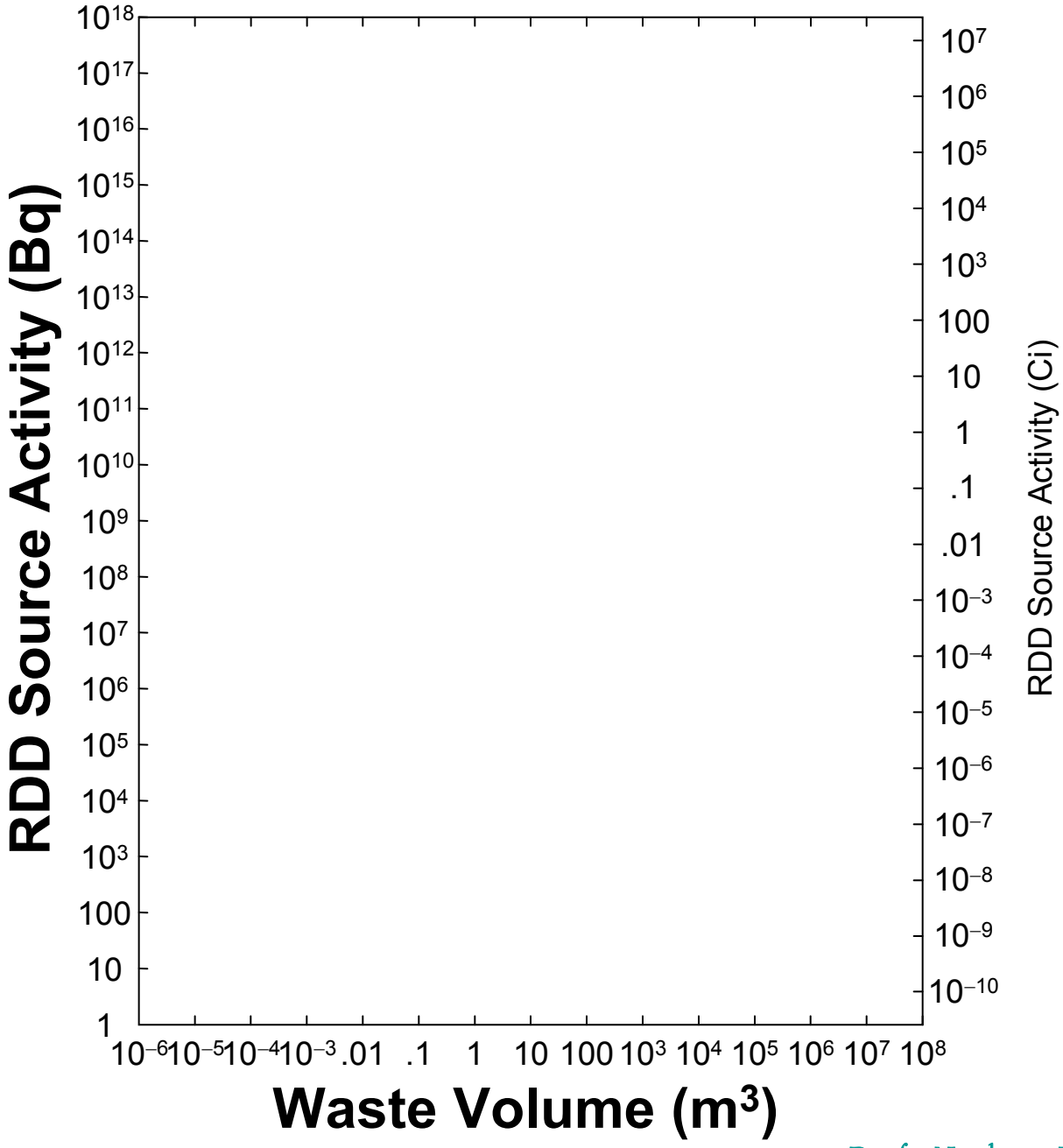
INTRODUCTION

- RDD may be explosive or dispersed by other means
- RDD will be disruptive and expensive to cleanup
- Contamination may be widespread
- The first “D” in RDD is dispersal
  - **large volume of waste may result**

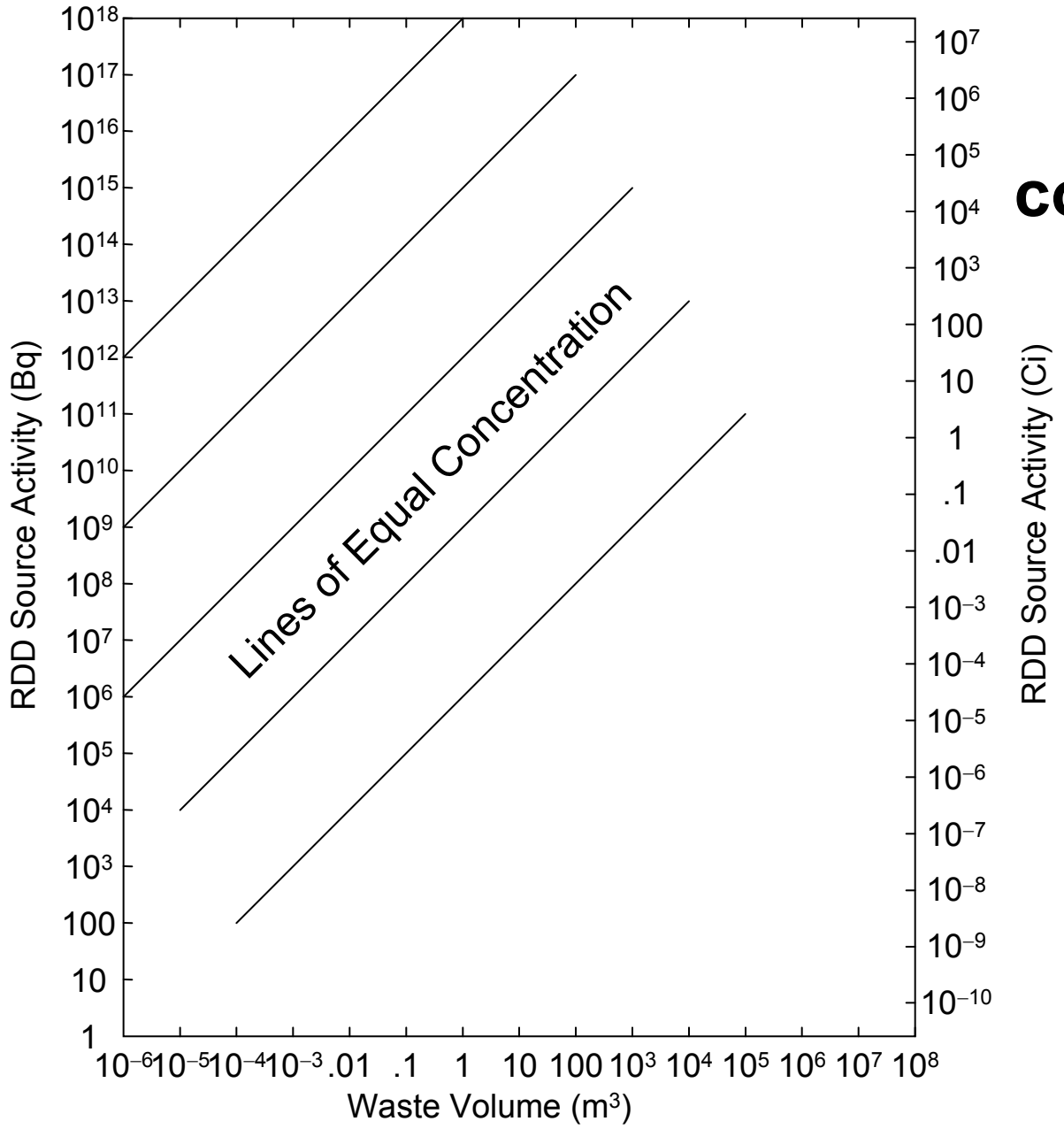
CHARACTERIZATION OF RDD CONTAMINATION/DECONTAMINATION

- Human consequences: injuries, uptakes, skin and clothing contamination; but manageable waste
- Physical consequences: large areas of surface contamination on buildings, streets, and vegetation
- Contaminated rinse water to sewers (e.g., TOPOFF2)
- Contaminated soil stripping and movement
- Cleanup standards (ANSI N13.12)
- Volume and cost is dependent on “How clean is clean enough?”

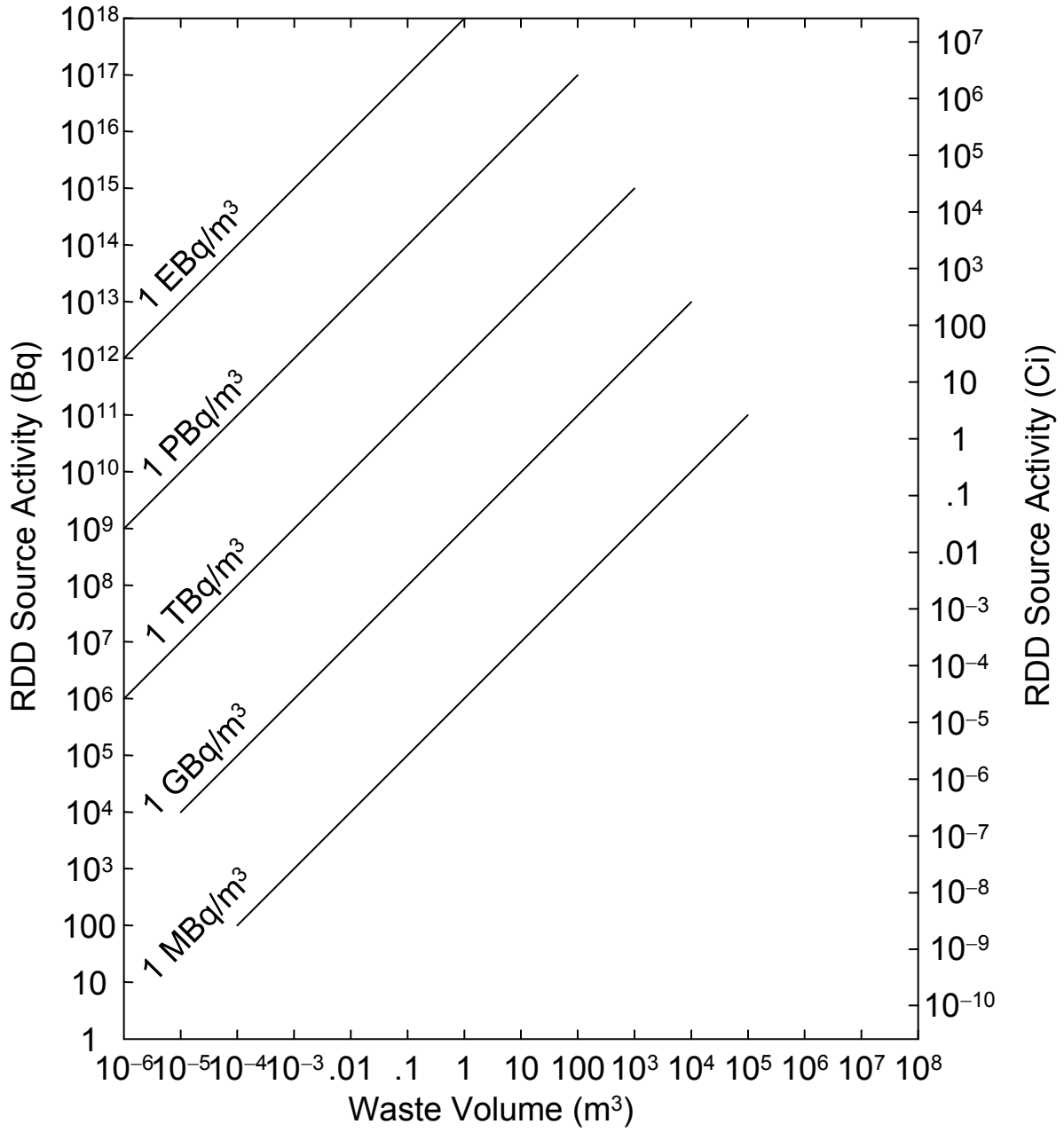
Activity vs. Volume



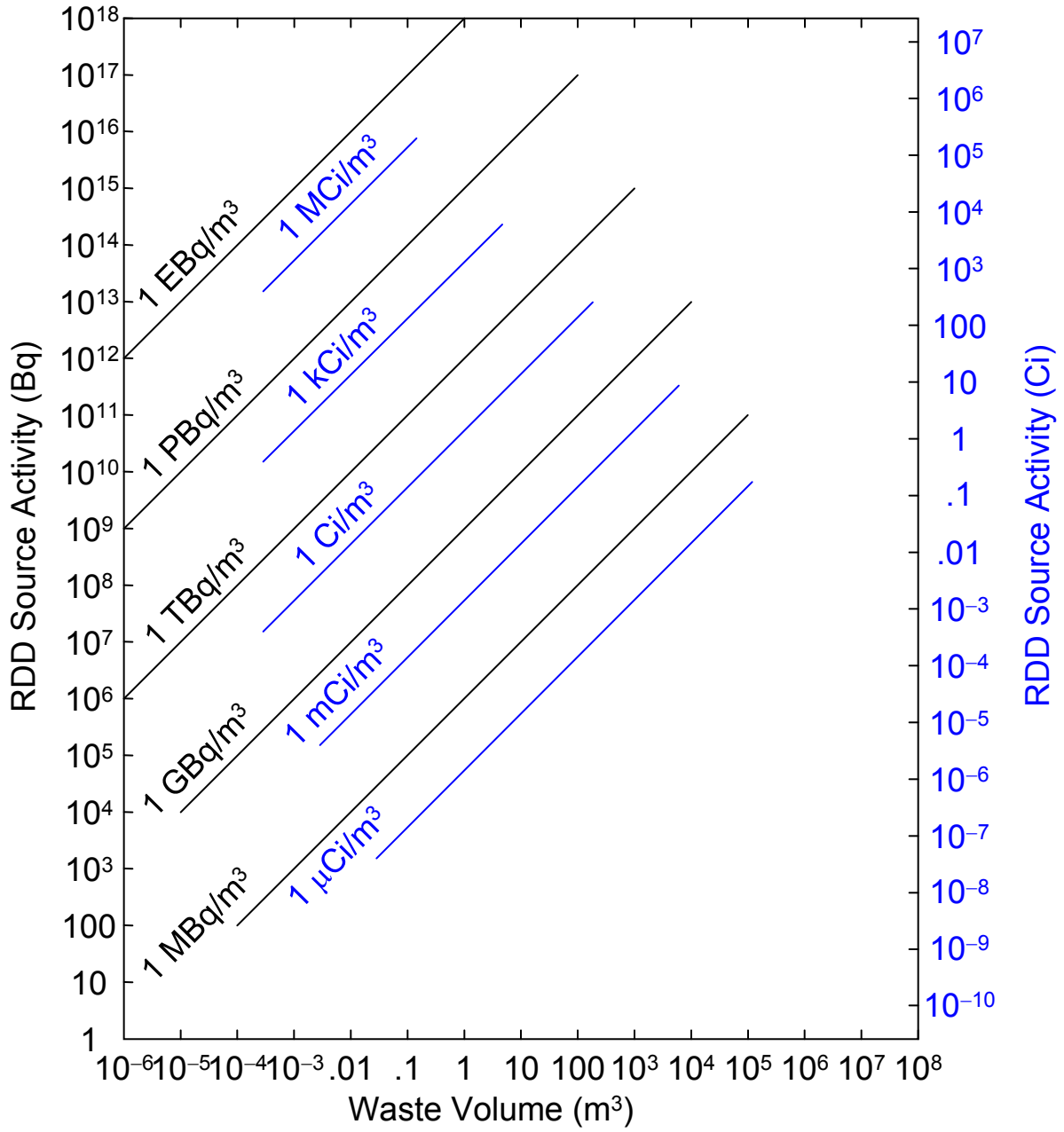
Iso-concentration Lines



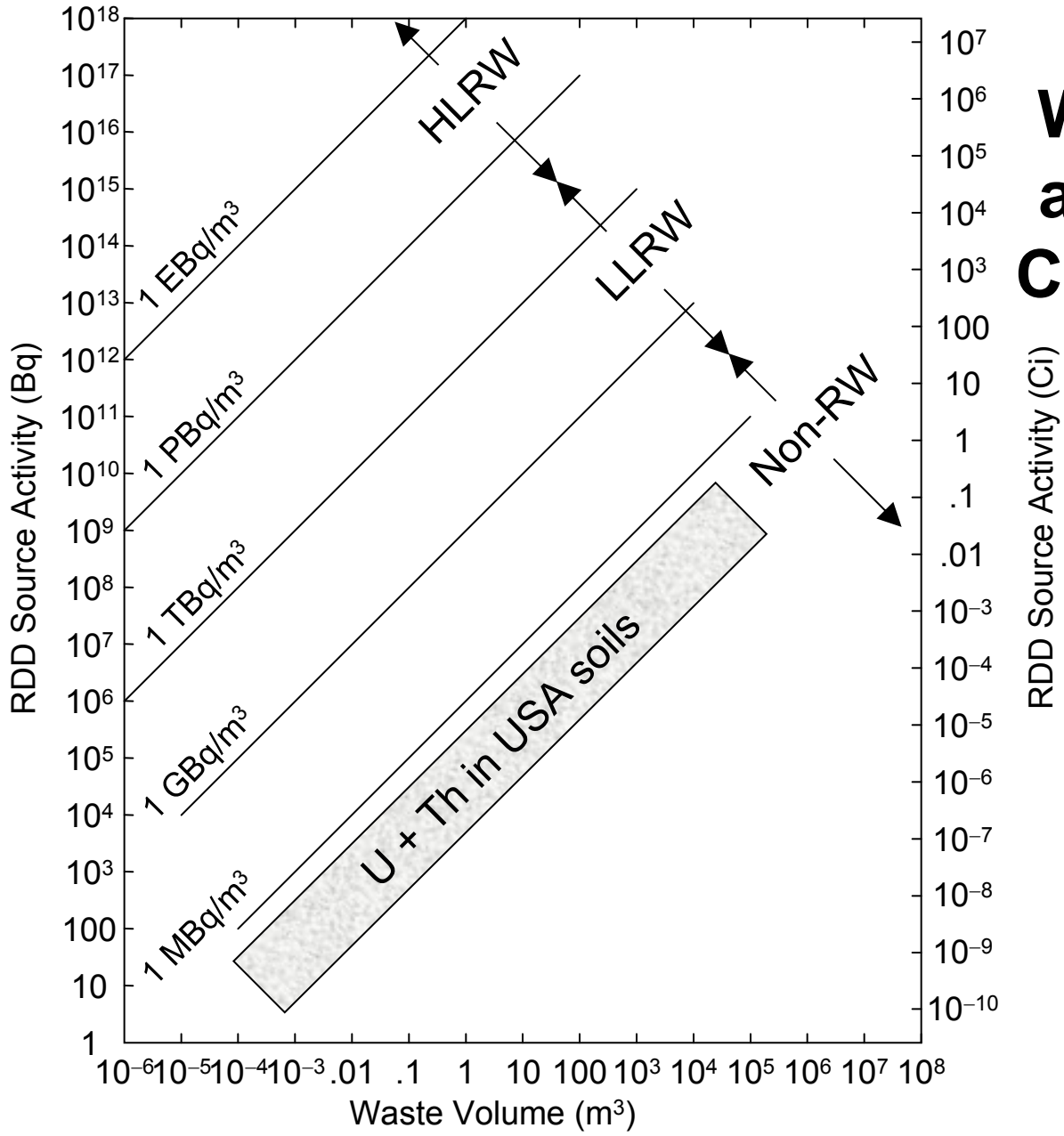
SI Units


RDD Source Activity (Bq)
RDD Source Activity (Ci)
Waste Volume (m³)
1 EBq/m³
1 PBq/m³
1 TBq/m³
1 GBq/m³
1 MBq/m³
10¹⁸
10¹⁷
10¹⁶
10¹⁵
10¹⁴
10¹³
10¹²
10¹¹
10¹⁰
10⁹
10⁸
10⁷
10⁶
10⁵
10⁴
10³
100
10
1
10⁷
10⁶
10⁵
10⁴
10³
100
10
1
.1
.01
10⁻³
10⁻⁴
10⁻⁵
10⁻⁶
10⁻⁷
10⁻⁸
10⁻⁹
10⁻¹⁰
10⁻⁶ 10⁻⁵ 10⁻⁴ 10⁻³ .01 .1 1 10 100 10³ 10⁴ 10⁵ 10⁶ 10⁷ 10⁸

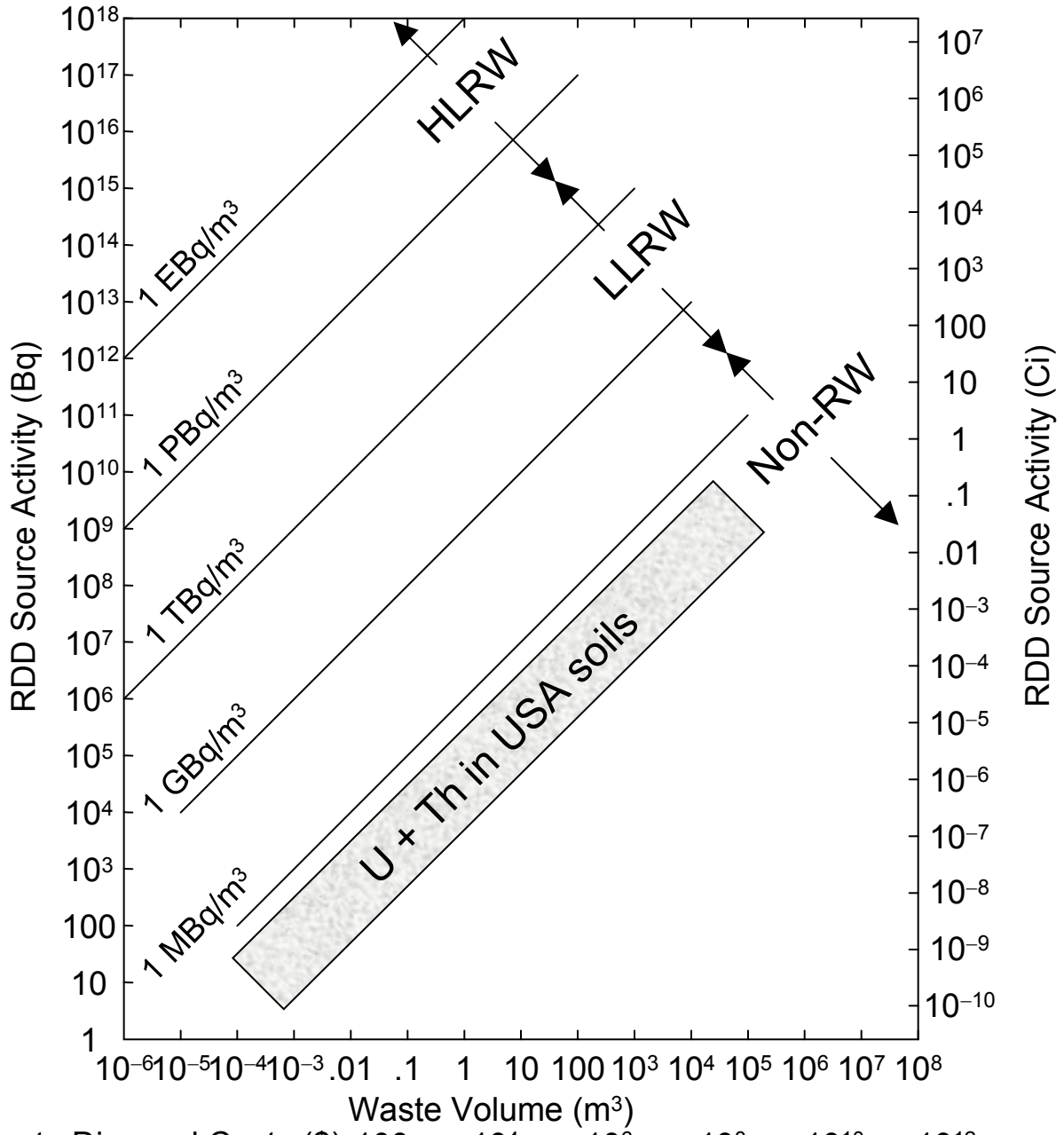
SI and Traditional Units



Waste Types and U.S. Soil Concentration



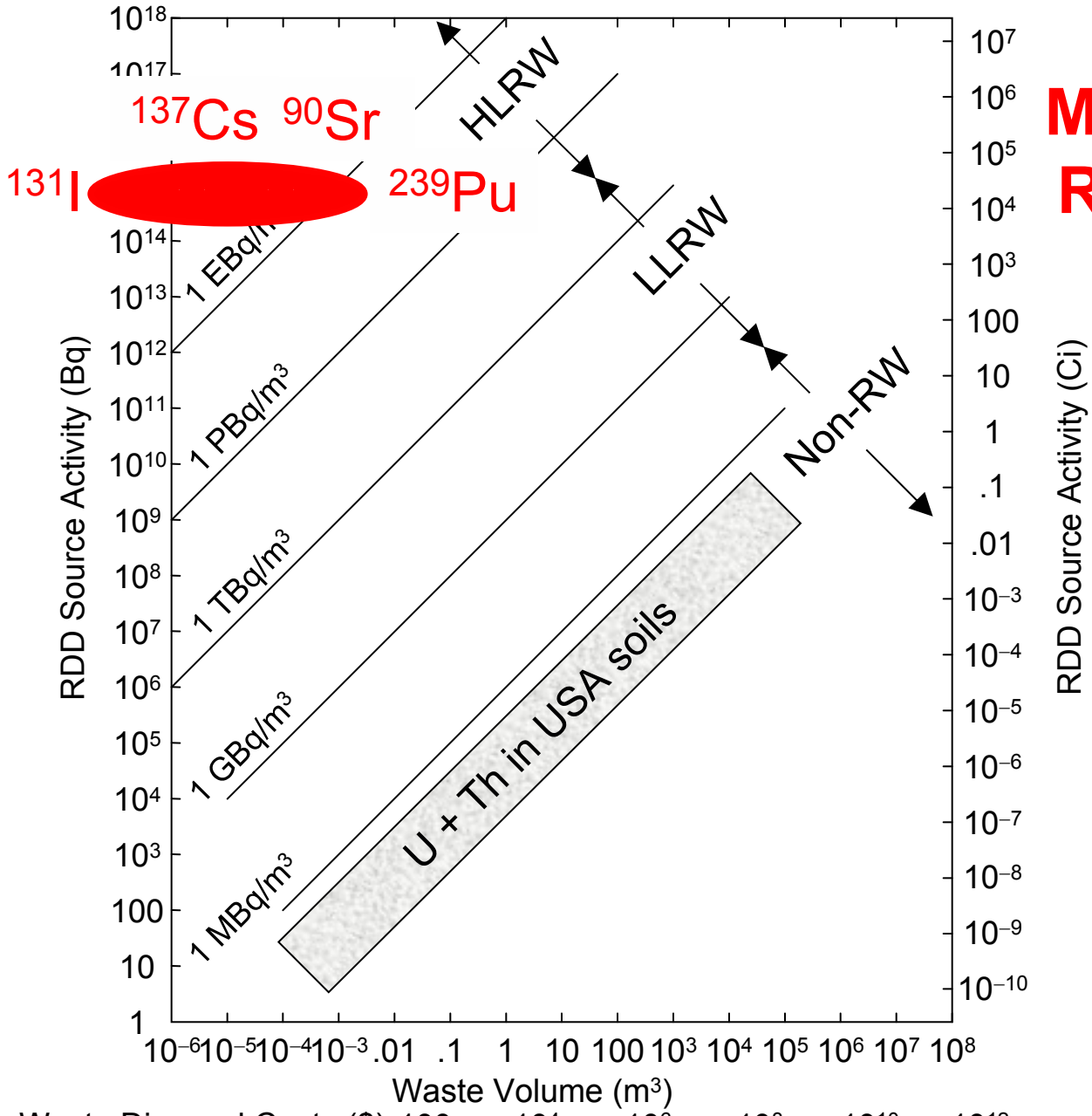
Disposal Costs



Rad. Waste Disposal Costs ($) 100 10^4 10^6 10^8 10^{10} 10^{12}

Non-Rad. Waste Disposal Costs ($) 100 10^4 10^6 10^8 10^{10}

Multi-kilocurie RDD *Sources*



Rad. Waste Disposal Costs ($) 100 10^{4} 10^{6} 10^{8} 10^{10} 10^{12}

Non-Rad. Waste Disposal Costs ($) 100 10^{4} 10^{6} 10^{8} 10^{10}

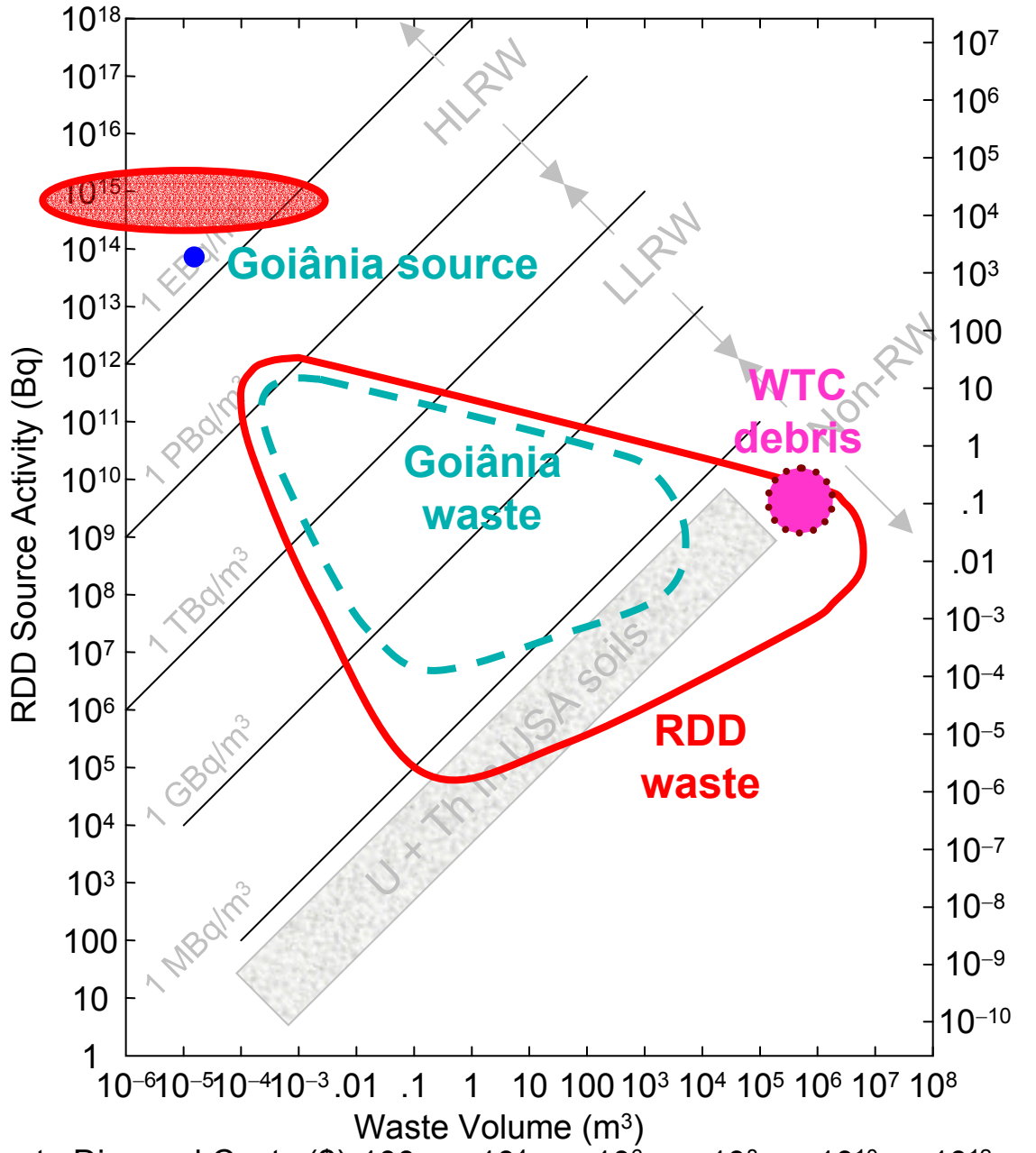
COMPARISON TO OTHER DECON WASTE

- Goiânia accident: 1375 Ci (51TBq)
  - 112,000 people monitored, 249 contaminated (4 deaths, 28 with radiation burns)
  - Decon required 550 workers, 4 months
  - 159 houses monitored, 85 deconned, 7 demolished
  - Waste volume was 3500 m^3
  - Temporary storage site was critical to expedited clean-up

COMPARISON TO OTHER CLEANUP WASTE

- World Trade Center (9/11/2001)
  - 1.6 million tons of steel and debris
  - Waste volume ~500,000 m^3
  - Moved to 160 acre site on Staten Island
  - Disposal site quickly approved
  - Required 1.7 million person-hours
  - Cleanup took almost 1 year
  - Cost $72 million
  - **But waste was not radioactive!**

Goiânia, World Trade Center, and Potential RDD Waste



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Pacific Northwest National Laboratory
U.S. Department of Energy

Battelle

EXISTING DISPOSAL SITES FOR LOW-LEVEL RADIOACTIVE WASTE

- Commercial Sites
  - **Chem-Nuclear in Barnwell, SC**
  - **Envirocare in Clive, UT**
  - **US Ecology in Richland, WA**
- Commercial sites can't handle 500,000 m^3
- Only US Dept. of Energy has large sites (e.g., ERDF at Hanford)

Hanford's ERDF: > 1,000,000 m^3 Capacity

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- Only US Dept. of Energy has large sites (e.g., ERDF at Hanford)
- No new sites have been approved in years
- Temporary storage sites should be approved before an RDD event occurs

TEMPORARY STORAGE SITES NEEDED FOR RDD DECONTAMINATION WASTE

- New approach is needed:
  Dept. of Homeland Security
  Nuclear Regulatory Commission
  State and local governments

- HPS assistance:
  Governmental Relations Program
  Scientific and Public Issues Committee
  ad hoc Committee on Homeland Security

CONCLUSIONS / RECOMMENDATIONS

- Preparations for cleanup of RDD waste
  - Decontamination plans and procedures
  - Identify and organize trained staff
  - Acquisition of supplies and equipment

…other recommendations?