

START

Utilizing the Radiological and Nuclear Non-State Adversaries Database (RANNSAD)

A Product of the Project on
Anatomizing Radiological and Nuclear
Non-State Adversaries

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About This Report

The compilers of this brief are Charles P. Blair and Gary A. Ackerman. As a companion piece to the full *Anatomizing Nuclear and Radiological Non-State Adversaries* report, this brief is founded upon the work of Gary A. Ackerman, Maranda Sorrels and Charles P. Blair. The authors would like to thank Danielle Hawkins for her assistance in drafting this document.

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Symons Hall, University of Maryland

The National Consortium for the Study of Terrorism and Responses to Terrorism (START) is a U.S. Department of Homeland Security Center of Excellence, tasked by the Department of Homeland Security's Science and Technology Directorate with using state-of-the-art theories, methods, and data from the social and behavioral sciences to improve understanding of the origins, dynamics, and social and psychological impacts of terrorism. START, based at the University of Maryland, College Park, aims to provide timely guidance on how to disrupt terrorist networks, reduce the incidence of terrorism, and enhance the resilience of U.S. society in the face of the terrorist threat.

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Section 1: Overview

1.I. Introduction

The purpose of this brief is to provide national security practitioners an overview of the Radiological and Nuclear Non-State Adversaries Database (RANNSAD). This brief supplements the database itself—presently available as a beta version in Microsoft Access. Although RANNSAD and this brief collectively comprise a stand-alone product, they are companion pieces to a report entitled *Identifying the Adversary*,¹ which represents the first phase of a larger research effort—*Anatomizing Radiological and Nuclear Non-State Adversaries*—undertaken by the National Consortium for the Study of Terrorism and Responses to Terrorism (START).² Section 1 of this brief explores RANNSAD by explaining the parameters that guided researchers in its construction as well as providing suggestions for use. Section 2 examines the sources consulted in the compilation of RANNSAD, the inclusion criteria employed with regard to data selection and, finally, the structure of the database. Section 3 contains a codebook in which all of RANNSAD’s variables and their respective values are described. Finally, Section 4 presents several descriptive charts that illustrate statistics drawn from RANNSAD. In sum, this brief offers the user an understanding of the methodology, parameters and sources that governed RANNSAD’s construction, detailed qualitative descriptions—in codebook format—of its 55 discrete fields and, finally, statistically derived descriptives demonstrating RANNSAD’s quantitative application. Accordingly, familiarity with this brief will assist users in getting the most out of RANNSAD.

1.II. Parameters, Suggested Use & Citing RANNSAD

Before turning to RANNSAD’s sources and inclusion criteria, it is necessary to briefly describe a) the parameters that—in conjunction with the inclusion criteria examined in Section 2—demarcated the data set’s composition and b) guidelines for citing RANNSAD.

- a) The larger research effort from which RANNSAD derived was conducted under a set of predetermined operating parameters [see Box 1 below]. Therefore, strictly speaking, extrapolative and interpolated data derived from RANNSAD will apply most directly in the context defined by those parameters. This does not mean

¹ Gary A. Ackerman, Charles P. Blair, Jeffrey M. Bale, Victor Asal and R. Karl Rethemeyer, *Anatomizing Radiological and Nuclear Non-State Adversaries: Identifying the Adversary*. Report prepared for the Science and Technology Directorate, Department of Homeland Security, grant number N00140510629 (College Park, MD.: National Consortium for the Study of Terrorism and Responses to Terrorism, 2009).

² START’s website is available at: <http://www.start.umd.edu/start/>

that RANNSAD cannot be used in other contexts, but in these cases it must be used judiciously with due regard to the differences between analytical contexts.

Box 1: RANNSAD Broader Project Parameters

The relevant parameters delimiting the content of RANNSAD are as follows:

1. **Time Period to Which Analysis Applies:** September 2008 (month of project initiation) through 2014.
2. **Nature of Adversaries:** RN end-users—actual users as opposed to intermediaries.
3. **Geographical Scope:** U.S. homeland and overseas territories; *not* threats to U.S. facilities, personnel, or interests abroad.
4. **Types of Materials:** Any nuclear or radiological materials (scope did not include release of radioactive materials from reactors).
5. **Defensive Trajectory Assumptions:** Defensive measures—physical, systemic, or policy related—in place as of September 2008.
6. **Geopolitical Structure Assumptions:** Relevant international developments with the exclusion of major worldwide upheavals (e.g., a global pandemic that leaves 1/6th of the world's population dead).

b) Citation of RANNSAD should take the following form:

Gary A. Ackerman, Charles P. Blair and Maranda Sorrells, *Radiological and Nuclear Non-State Adversaries Database (RANNSAD)*. (College Park, MD: National Consortium for the Study of Terrorism and Responses to Terrorism, 2009).

For more information on this brief, the *Anatomizing Radiological and Nuclear Non-State Adversaries* project, or START's work in general, please contact the lead investigator, Gary Ackerman, at gackerman@start.umd.edu or (301) 405-6656.

Section 2: RANNSAD Methodology

2.I. Background

Recalling that RANNSAD is one component of a larger RN research enterprise—the previously mentioned study entitled *Anatomizing Radiological and Nuclear Non-State Adversaries: Identifying the Adversary*—it is useful to understand how RANNSAD came about. One of the key framing questions which guided the larger effort was perpetrator identification; specifically, *Who are the most likely radiological or nuclear non-state threat actors?*³ Not surprisingly, such a framing mandate required the development of a systematic method of recording detailed information about all *previous* non-state users and attempted users of RN weapons.⁴ Once identified, these data were synthesized in the form of *RN Adversary Profiles*, which were originally recorded as narrative text. The profiles consisted of brief overviews of the actor(s) as well as their motivations and capabilities with respect to RN materials. Researchers quickly understood, however, that narrative profiles alone were inadequate to provide a broad and systematic overview of what previous RN incidents impart for today’s national security practitioner. In consequence, the profiles were systematically coded into a coded data set—RANNSAD. Together the narrative perpetrator profiles and RANNSAD were then used to inform the analytical portions of the broader project. As with any data collection, this effort presented numerous decisions of inclusion and coding, which are explained below.

2.II. Sources

The initial source for establishing a list of former radiological and nuclear non-state actors was the Monterey Institute of International Studies’ Weapons of Mass Destruction Terrorism Database (WMDTDB).⁵ This database represents the most

³ For a full description of the framing questions, see, Ackerman et al., *Anatomizing Radiological and Nuclear Non-State Adversaries*, p. 8-9.

⁴ It is prudent to remind the reader of the difference between “weapon” and “device.” The NATO glossary of chemical, biological, radiological and nuclear terms and definitions specifies that “only devices produced by state-sponsored weapon programmes can be referred to as CBRN *weapons*: A ‘CBRN weapon’ is ‘a fully engineered assembly *designed for employment by the armed forces of a nation state* to cause the release of a chemical or biological agent or radiological material onto a chosen target or to generate a nuclear detonation.” In contrast, a CBRN *device* is defined as “an improvised assembly or process intended to cause the release of a chemical or biological agent or substance or radiological material into the environment or to result in a nuclear detonation’.” Quoted in, Anne Stenersen, *Al-Qaida’s Quest for Weapons of Mass Destruction: The History Behind the Hype* (Saarbrücken, Germany: VDM Verlag Dr. Müller aktinengesellschaft & Co, 2008), p. 4-5. Emphasis in original.

⁵ Project researchers had access to several other related databases, but the WMDTDB provided the greatest breadth of information on actual users and attempted users of RN weapons. For example, while the Database on Nuclear Smuggling, Theft and Orphan Radiation Sources (DSTO) records hundreds of

comprehensive open-source, unclassified data set of non-state actors and CBRN incidents available. The WMDTDB is, however, an *event*-database, which means that while it does record some information on perpetrators (and includes several perpetrator profiles); most of its information is focused on details surrounding individual RN episodes. In addition, since the same actor might be involved in *several* WMDTDB events, it was necessary to consolidate events to identify a set of actors.

2.III. Inclusion Process & Criteria

Scrutinizing the WMDTDB for all RN incidents (including plots, attempted acquisitions, possession of materials, threats with possession and use of RN materials as a weapon) more substantial than a mere threat yielded an initial set of 131 incidents. In addition, project researchers confirmed six additional cases not in the WMDTDB. These were subsequently consolidated into a collection of 80 potential perpetrators.⁶ Since in many of the incidents—34 out of 80—the perpetrator was unknown or only generically specified, such as “Criminal Organization” or “Chechen militants,” researchers conducted a preliminary analysis of each of these incidents. When researchers believed that there was a high probability that multiple incidents with unknown or generic perpetrators were committed by the same actor or actors—based on an assessment of material, location, date and other factors—these incidents were grouped under a single profile. For example, several letters containing uranium ore sent to parties in Belgium within a few days of one another in 2005 were, after considerable research, assumed with reasonable confidence to be the work of the same actor or group of actors.⁷

Furthermore, upon initial inspection, many of the RN incidents (involving 38 of the original 80 potential perpetrators) were found to be clear cases of smuggling or transfer activity with no apparent links to end-users. These incidents and associated actors were excluded from the data set. In four cases it was uncertain whether the incident was purely of the smuggling type, or whether it might have involved actual end-users. These cases were retained, but coded to specify them as possibly involving only smuggling; consequently, they could be included or excluded from analyses depending on requirements. In addition, although attacks on nuclear facilities were not the focus of the broader study, researchers believed that perpetrators of these types of attacks were relevant, if only for their motivational influences, which might in turn drive other types of

incidents, these all pertain to the acquisition and transfer of RN materials rather than their attempted use. Similarly, several general databases of terrorist actors exist (for example, START’s Terrorist Organization Profiles Database (TOPs) available at, <http://www.start.umd.edu/start/data/tops/>), but these do not include many of the *non*-terrorist actors who have been involved with RN materials.

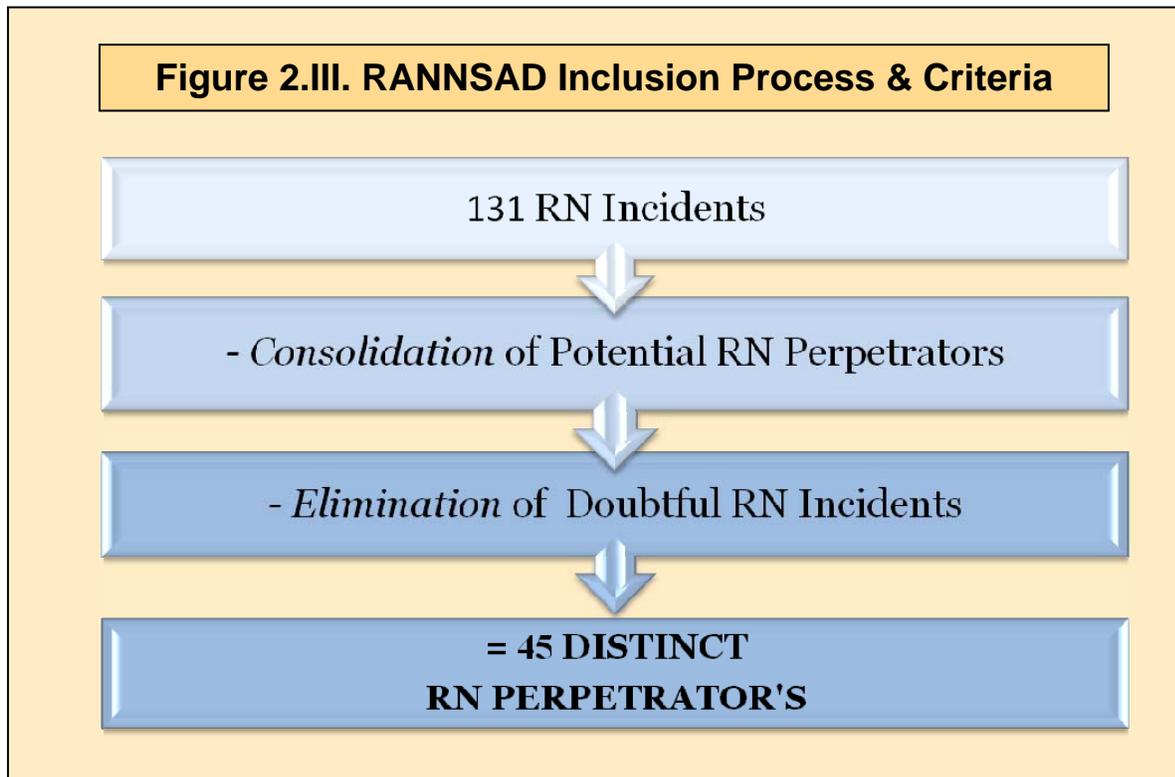
⁶ Perpetrators are defined by RANNSAD as an individual or a group (made up of individuals acting in concert) that have either pursued or used RN materials to cause harm.

⁷ See, RANNSAD ID No. 11, in, Gary A. Ackerman, Charles P. Blair and Maranda Sorrells, Radiological and Nuclear Non-State Adversaries Database (RANNSAD). (College Park, MD: National Consortium for the Study of Terrorism and Responses to Terrorism, 2009).

RN behavior. Therefore eight attacks on nuclear facilities were included but also coded so that they could be filtered out by analysts.

After elimination and consolidation, a total of 45 distinct actors remained (see figure 2.III below). These were then divided between project researchers Ackerman, Bale, Blair, (Nirmalya) Bhowmick and Sorrells, for research and compilation. In addition to utilizing the WMDTDB and the new identified non-WMDTDB case material, this research included surveying open-source news collections (through such repositories as Lexis-Nexis, ProQuest and the Open Source Center), consulting secondary materials and contacting other researchers familiar with the case in question. The amount of time devoted to researching each profile was, however, limited by the time and resource constraints of the overall project (of which this effort was only one component) and obviated, for example, travel to the location of an incident or requisitioning of court records. Therefore, several cases that researchers felt would benefit from additional research (including in-field investigations) were designated as such in order to guide future research.

Research for the profiles was conducted between October and December 2008.



2.IV. Systemization of Profiles

After all known events were distilled into the 45 discrete actor groups, RANNSAD was still one step away from construction. Prior to developing the database, researchers systematically structured and detailed perpetrator profiles in order to enable systematic comparison across actor groups. Thus, each profile, to the extent possible, collected information on the following elements:

1. *Name and organizational affiliation(s) of the perpetrator*, if known. If the identity was suspected or alleged but not certain, the moniker “alleged” or “suspected” was appended to the name or organization.
2. *Demographics*: Any available demographic details about the perpetrator(s) were recorded (especially gender, age, socio-economic level, education, and residence).
3. *RN Materials*: the type(s) and amount(s) of radiological / nuclear material sought / acquired / used.
4. *RN Activity*: This included, where available, the date, intended target and intended delivery method for each attack / plot; each attack / plot is listed separately.
5. *Results*: Degree to which the perpetrators were successful, e.g., how far did the plot proceed (and why did it not proceed further). If the plot was launched successfully, were there casualties, economic damage, etc.? Were the perpetrators apprehended / charged / sentenced?
6. *Why RN*: Based on available data, were any specific reasons given or discovered for selecting RN weapons? What was the perpetrator’s broader motivation for action? (This included grievances, ideology, etc.)
7. *Capability level*: What were the (rough order of magnitude) levels of technical knowledge, financing, logistical backbone, etc. of the perpetrators when they embarked on their plan? What other capabilities, if any, were needed / sought? Where were these capabilities sought / obtained?
8. *How*: How did the perpetrator(s) acquire / intend to acquire the perceived requisite materials for their plot?
9. *Lessons*: What specific lessons can we draw from the experience of this perpetrator? For example: What were the key factors that enabled or prevented the plot? What can be learned about the rationale for selection of potential targets for RN weapons? What were key indicators, if any, that perpetrators were planning to or would use RN weapons?

Since the profiles were not intended to constitute all-encompassing case studies, researchers were instructed to be as concise as possible. Completed profiles were fully reviewed, vetted and compiled into a single document.⁸

⁸ See, Ackerman et al., *Radiological and Nuclear Non-State Adversary Profiles*.

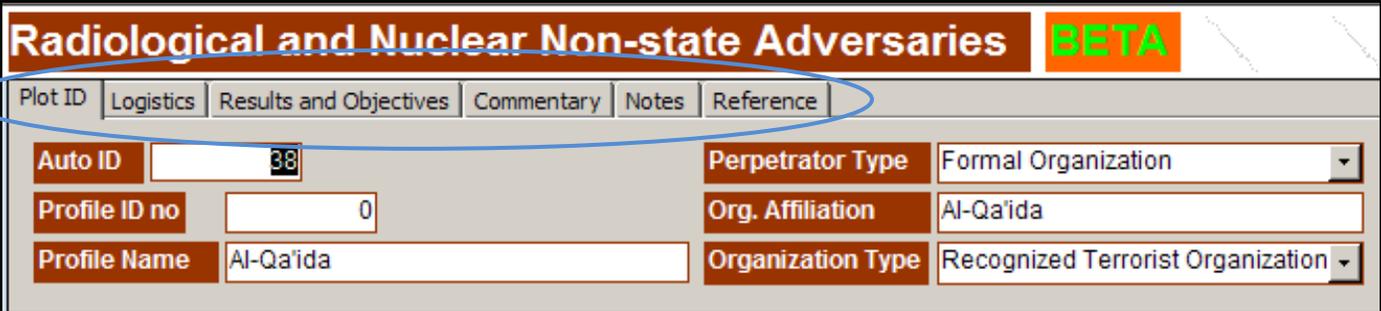
Section 3: RANNSAD Codebook

3.I. Overview

Once the 45 perpetrator profiles had been completed, the next step was to code each one in a manner that would allow for quantitative analysis. A codebook was developed to capture and systemize the relevant variables and an associated database was created using Microsoft Access. Each of the 45 profiles was then coded. In all, fifty variables were coded for each profile, with several more added depending on the number of perpetrators and agents involved. It is this coded data collection, therefore, that constitutes the *Radiological and Nuclear Non-State Adversaries Database* (RANNSAD).

The graphic below is a partial screen-shot taken of RANNSAD (Beta). Note the tabs circled near the top of the screen: 1) **Plot ID**, 2) **Logistics**, 3) **Results and Objectives**, 4) **Commentary**, 5) **Notes** and 6) **Reference**. Using this same sequential order, the codebook below defines the variables and, when applicable, the values of the respective variables.

FIGURE 3.I: The Six Broad Components of RANNSAD



The screenshot displays the RANNSAD (Beta) interface. At the top, the title "Radiological and Nuclear Non-state Adversaries" is shown in a dark red box, with "BETA" in a green box to its right. Below the title is a navigation bar with six tabs: "Plot ID", "Logistics", "Results and Objectives", "Commentary", "Notes", and "Reference". The "Plot ID" tab is circled in blue. The main content area contains several form fields:

Auto ID	<input type="text" value="38"/>	Perpetrator Type	<input type="text" value="Formal Organization"/>
Profile ID no	<input type="text" value="0"/>	Org. Affiliation	<input type="text" value="Al-Qa'ida"/>
Profile Name	<input type="text" value="Al-Qa'ida"/>	Organization Type	<input type="text" value="Recognized Terrorist Organization"/>

RANNSAD CODEBOOK

3.II. PLOT ID

3.II.A. Auto ID

Function: This field automatically generates a unique, sequential incident identifier.

3.II.B. Profile ID no

Function: This field provides a unique profile identification number (not presently employed on Beta version).

3.II.C. Profile Name

Function: This field provides a quick reference name for the profile. Profiles are titled first by the organization that is involved in the incident(s), if an organization is unavailable, this field records either “Lone Actor(s)” or “Unknown” and a sequential identifier.

3.II.D. Perpetrator Type

Function: This field identifies one of four possible RANNSAD perpetrator types associated with the profile.

Value Labels:

- **Lone Actor**
- **Small Unaffiliated Cell:** defined in RANNSAD as a group not operationally part of any larger formal organization. In addition, such a cell often does not seek to establish an enduring identity, and may operate for only a brief time; for example, only the length of time to plan, manage and (attempt to) carry-out a single attack.
- **Formal Organization:** defined in RANNSAD as one with a codified structure (even if extremely loose) that is intended to persist over some period of time. Such an organization can self-identify as such and thus usually takes a name, but not in all cases.
- **Unknown:**

3.II.E. Organization Affiliation

Function: This field records the organization with which the listed perpetrator is affiliated. In the case of a formal organization, the organization’s name is listed. If the profile is of a lone actor, this field is blank. If the profile is of an incident in which the perpetrator is unknown, this field is blank.

3.II.F. Organization Type

Function: This field records whether the organization is traditionally regarded as a terrorist organization, a criminal organization or, in the event the type is uncertain, an “Unknown.” For lone actor entries, this field is blank.

Value Labels:

- **Recognized Terrorist Organizations**
- **Criminal Organizations**
- **Unknown**

3.II.G. Ideology

Function: This field provides a categorical description of the general ideology to which the organization or perpetrator adheres. In cases where an actor's ideology falls into more than one category, the dominant ideological category is recorded.

Value Labels:

- **Criminal**
- **Ethno-Nationalist**
- **Generic (Non-Religious) Anti-Government**
- **Personal/Idiosyncratic**
- **Religious**
- **Right-Wing**
- **Secular Left-Wing**
- **Secular Right-Wing**
- **Single Issue**
- **State Sponsored**
- **Identifiable but Outside Existing Categories**
- **Unidentifiable**

3.II.H. Sub-Type

Function: This field provides a further categorization of the organization's or perpetrator's primary ideology. In cases where an actor's sub-type falls into more than one category, the dominant sub-type is recorded. Where there is no sub-type or the sub-type is unknown, this field is blank.

Value Labels:

- **Anarchist/ Libertarian**
- **Anti-Abortion**
- **Anti-Catholic**
- **Anti-Communist**
- **Anti-Ecology/Pro-Development**
- **Buddhist (Ultranationalist, Apocalyptic)**
- **Christian**
- **Christian - Catholic Traditionalist**
- **Christian - Christian Identity**
- **Christian - Christian Reconstruction**
- **Christian - Eastern Orthodox**
- **Christian - Protestant Evangelical**
- **Cult**
- **Cult (Buddhist)**
- **Cult (Christian)**
- **Cult (Hindu)**
- **Cult (Islamic)**
- **Cult (Jewish)**
- **Cult (Pagan)**
- **Cult (UFO)**
- **Ecological/Anti-Technology / Primitivist / Animal Liberation**
- **Fascist/Neo-Fascist (really a mixture of right- and left-wing ideological elements)**
- **Gun Rights**
- **Hindu (Hindu Nationalist, Fundamentalist)**
- **Islamic**
- **Islamic - Islamist (Shi`i)**
- **Islamic - Islamist (Sunni)**
- **Islamic (Shi`i)**
- **Islamic (Sunni)**
- **Jewish**
- **Jewish - Orthodox**
- **Occult (including Satanist)**
- **Pagan/Polytheist (Odinist, etc)**
- **"Pacifist" / Anti-War**
- **Racial Supremacist/Racial Separatist**

- **Radical Nationalist and**
- **Right Libertarian**
- **Sikh (Fundamentalist)**
- **Socialist / Communist / Marxist / Maoist**
- **Tax Protest**
- **Xenophobic / Nativist / Anti-Immigrant**

3.II.I. Alleged/Suspected

Value Labels:

- **Yes:** A checked Alleged/Suspected box indicates either that (1) the incident(s) discussed in the profile has not been corroborated by an external source and, thus, there are no available open-source reports confirmations that it definitely occurred or (2) there is some doubt that the perpetrator listed in the profile is definitively responsible for perpetrating the incident.
- **No:** An unchecked box indicates a high degree of confidence that the incident occurred and that the listed perpetrator is the most probable culprit.

3.II.J. Further Research Needed

Value Labels:

- **Yes:** A checked Further Research Needed box indicates a belief by researchers that the profile would benefit from further research and/or that there are likely to be updates that may not have been available at the time the profile was created.
- **No:** An unchecked box indicates that, barring intensive further research, the profile is essentially complete.

3.II.K. Perpetrator Demographics

A separate set of 12 demographic variables is collected for each individual perpetrator identified in the RANNSAD profiles. They are as follows:

3.II.K.1. Name

Function: This field records the name of the perpetrator if it is known. If a name was not provided by available open-sources, this field records "Unknown."

3.II.K.2. Gender

Function: This field records whether the perpetrator involved was male or female. If a gender was not provided by available open-sources, this field records "Unknown."

3.II.K.3. Age

Function: This field records the age of the perpetrator at the time of the incident with which they were involved. If they were involved in more than one incident, the age at the beginning of the first incident is which they were involved is given. If the age was not provided by available open-sources, this field is blank.

3.II.K.4. Country of Origin

Function: This field records the country from which the perpetrator originated (was a national of). If no originating country was provided by available open-sources, this field records "Unknown."

Value Labels:

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- Afghanistan
- Albania
- Algeria
- American Samoa
- Andorra
- Angola
- Antigua and Barbuda
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bhutan
- Bolivia
- Bosnia and Herzegovina
- Botswana
- Brazil
- Brunei Darussalam
- Bulgaria
- Burkina Faso
- Burundi
- Cambodia
- Cameroon
- Canada
- Central African Republic
- Chad
- Chile
- China
- Colombia
- Congo
- Cook Islands
- Costa Rica
- Cote D'Ivoire
- Croatia
- Cuba
- Cyprus
- Czech Republic
- Democratic Republic of Congo
- Denmark
- Djibouti
- Dominica
- Dominican Republic
- Ecuador
- Egypt
- El Salvador
- Equatorial Guinea
- Eritrea
- Estonia
- Ethiopia
- Micronesia
- Fiji
- Finland
- France
- French Polynesia
- Gabon
- Gambia
- Georgia
- Germany
- Germany (East)
- Germany (West)
- Ghana
- Greece
- Grenada
- Guatemala
- Guinea
- Guinea-Bissau
- Guyana
- Haiti
- Holy See
- Honduras
- Hungary
- Iceland
- India
- Indonesia
- Iran
- Iraq
- Ireland
- Israel
- Italy
- Jamaica
- Japan
- Jordan
- Kazakhstan
- Kenya
- Kiribati
- Kuwait
- Kyrgyzstan
- Laos
- Latvia
- Lebanon
- Lesotho
- Liberia
- Libya
- Liechtenstein
- Lithuania
- Luxembourg
- Macedonia
- Madagascar
- Malawi
- Malaysia
- Maldives
- Mali
- Marshall Islands
- Mauritania
- Mauritius
- Mexico
- Moldova
- Monaco
- Mongolia
- Morocco
- Mozambique
- Myanmar
- Namibia
- Nauru
- Nepal
- Netherlands
- New Zealand
- Nicaragua
- Niger
- Niger
- Nigeria
- North Korea
- Northern Ireland
- Norway
- Oman
- Palestine
- Pakistan
- Panama
- Papua New Guinea
- Paraguay
- Peru
- Philippines
- Poland
- Portugal
- Qatar
- Romania
- Russian Federation

- Rwanda
- San Marino
- Sao Tome and Principe
- Saudi Arabia
- Senegal
- Serbia and Montenegro
- Seychelles
- Sierra Leone
- Singapore
- Slovakia
- Slovenia
- Solomon Islands
- Somalia
- South Africa
- South Korea
- Spain
- Sri Lanka
- St Kitts and Nevis
- St Lucia
- Sudan
- Suriname
- Swaziland
- Sweden
- Switzerland
- Syria
- Taiwan
- Tajikistan
- Tanzania
- Thailand
- Timor-Leste
- Togo
- Tonga
- Trinidad and Tobago
- Tunisia
- Turkey
- Turkmenistan
- Tuvalu
- Uganda
- Ukraine
- Union of Soviet Socialist Republics
- United Arab Emirates
- United Kingdom
- United States of America
- Uruguay
- Uzbekistan
- Vanuatu
- Venezuela
- Vietnam
- Western Samoa
- Yemen
- Yugoslavia
- Zambia
- Zimbabwe
- Unknown
- Worldwide

3.II.K.5. Residence

Function: If indicated in the available open-sources, this field records the location (to the city / village level if possible) where the perpetrator was residing at the time of the incident. If the perpetrator is unknown, “Unknown” is recorded.

3.II.K.6. Education Level

Function: This field records the highest known education level of the perpetrator.

Value Labels:

- **High School:** High school refers to completion of basic education prior to college.
- **Undergraduate College:** Undergraduate College refers to a four-year degree of a baccalaureate nature.
- **Postgraduate College:** Postgraduate college refers to the completion of a Master’s or Ph.D. program. If a source specifies that the perpetrator has a Ph.D., the observation is noted in the Education Details field (see § 3.II.K.8.).
- **Unknown:** If the perpetrator’s level of education was not provided by available open-sources, the Education Level field records “Unknown.”

3.II.K.7. Education Discipline

Function: If indicated in the available open-sources, this field records the subject area to which the perpetrator concentrated on during his / her academic studies.

3.II.K.8. Education Details

Function: If indicated in the available open-sources, this field records any further details that might be pertinent to understanding the perpetrator’s education level; for instance, whether he / she performed or engaged in studies of a given subject without pursuing a specific degree program.

3.II.K.9. Vocation Type

Function: Using one of five values, the primary objective for this field is to distinguish between those actors for whom criminal or violent actions are routine and those who are involved in “one-off” RN events. This field therefore records whether the perpetrator belonged to a terrorist or criminal organization and if that particular (terrorist or criminal) profession was his / her full-time or part-time activity. If the perpetrator had an additional civilian job while working for the terrorist or criminal organization, his / her other position is recorded in the Vocation Details field (see § 3.II.K.10).

Value Labels:

- **Full-time terrorist**
- **Full-time criminal**
- **Part-time terrorist**
- **Part-time criminal**
- **Other:** perpetrator was not part of a terrorist or criminal organization, but held another position. See also Vocational Details immediately below (§ 3.II.K.10.).
- **Unknown:** Perpetrator’s vocation is not indicated in available open-sources.

3.II.K.10. Vocation Details

Function: If indicated in the available open-sources, this field records the perpetrator’s specific vocation. If the field above, Vocation Type (§ 3.II.K.9) is “Unknown,” however, this field is blank.

3.II.K.11. Other Information

Function: This field is reserved for any available additional open-source information pertaining to the specific perpetrator that is not captured in other fields and might offer a better understanding of the perpetrator’s role in the particular incident(s). If no other information is available, this field is blank.

3.II.K.12. Additional Perpetrators

Function: This field records whether there are additional perpetrators associated with the profile that are not listed on the profile display page. Although additional perpetrators can be included in the database, there is insufficient room to display more than four. If additional open-source information is available on more than four perpetrators, this field contains a checkmark and users should refer to the data table that is tied to this particular form or the Additional Notes tab. If additional perpetrators numbering more than four are not part of the profile, the box is unchecked.

3.III. LOGISTICS

3.III.A. RN Activity Start

Function: This field records the earliest date on which the perpetrator became involved with RN materials or weapons, according to available open-sources. If no date is ascertainable, this field is blank. If only a partial date is available (for example, month and year, but not day), the system defaults to the first day of the

month or year. If this field is blank, the RN Activity Details section can be consulted to obtain a better idea of the timeline.

3.III.B. RN Activity End

Function: This field records the latest date, according to available open-source reports, on which the perpetrator showed involvement with RN materials or weapons. If no date is ascertainable from available sources, this field is blank. If only a partial date is available (for example, month and year, but not day), the system defaults to the first day of the month or year. If this field is blank, the RN Activity Details section can be consulted to obtain a better idea of the timeline. If a perpetrator is taken into custody and there are no reports of further activity, the End Date is recorded as the date of the arrest.

3.III.C. Type of Agent(s) Involved

Function: This field records the type of agent(s) with which the actor(s) involved themselves. If the details of a case imply that the RN agent involved was to be used for a specific purpose (e.g. plutonium in an RDD), the type of material relating to the single purpose is listed, even if the agent is theoretically capable of fueling both a radiological and, given enough quantity and specific isotopic predominance, a nuclear device.⁹

Value Labels:

- **Radiological:** refers to potentially harmful ionizing agents.
- **Nuclear:** refers to fissionable materials.¹⁰
- **Radiological & Nuclear:** refers to both harmful radioisotopes and fissionable isotopes.
- **Indeterminate:** refers to situations in which it was not possible to discern what type of radiological and/or nuclear agent was involved.

3.III.D. Type of Agent Involved 2

Function: Same as above but allows for Boolean analysis.

⁹ With regard to fissionable materials, specific quantities, relating to a variety of technical considerations, are required to enable a super-critical chain reaction—a nuclear explosion. RANNSAD does *not* require that a notional requisite quantity of the fissile material in question be present in the incident to consider that material “nuclear.” For example, if a perpetrator is apprehended after obtaining two kilograms of highly enriched uranium (HEU), that material can be considered “nuclear” despite the fact that well over 50 kg of HEU would be required to fuel a crude nuclear device (one that did not utilize an initiator or a reflector). Furthermore, RANNSAD assumes that perpetrators are theoretically capable of “purifying,” or separating certain materials in order to yield usable fissionable material; for example, separating uranium from research reactor fuel. For more on this last point see, Ackerman et al., *Anatomizing Radiological and Nuclear Non-State Adversaries*, p. 77. For required amounts of fissile materials needed to fuel an improvised nuclear device (IND) in a variety of situations, see Charles P. Blair, *Jihadists and Nuclear Weapons*, in, Gary Ackerman and Jeremy Tamsett, Eds., *Jihadists and Weapons of Mass Destruction: A Growing Threat* (Boca Raton: CRC Press, 2009), p. 195-204.

¹⁰ While several isotopes are *theoretically* fissionable, RANNSAD defines fissionable isotopes as either uranium-233 or 235; plutonium 238, 239, 240, 241, or 242, or Americium-241. See, Ackerman et al., *Anatomizing Radiological and Nuclear Non-State Adversaries: Identifying the Adversary*, p. 99-101.

Value Labels:

- **Radiological**
- **Nuclear**
- **Indeterminate**

3.III.E. Highest Activity Type

Function: This field records the highest level of RN activity attained by the perpetrator.

Value Labels:

- **Plot only:** refers to perpetrators who were arrested or abandoned the activity before they were able to carry out an attack.
- **Attempted Acquisition of Material:** refers to perpetrators who were interdicted before they acquired any material, either because they voluntarily abandoned the plot or because they were discovered.
- **Acquisition of material:** refers to perpetrators who were successful, at least in part, in acquiring the RN material(s) in question.
- **Attempted use of material:** refers to perpetrators who were interdicted before they employ any material.
- **Use of material:** refers to perpetrators who were able to utilize the material in some nefarious fashion before escaping or being apprehended.
- **Unknown:** refers to an unknown highest RN activity level by the perpetrator.

3.III.F. Facility Attack

- **Yes:** A checked box indicates that the specific incident represented an attack on a facility containing significant amounts of radiological or nuclear material, e.g., a nuclear power plant or research facility.
- **No:** An unchecked box indicates that the incident did not involve an attack on a facility containing significant amounts of radiological or nuclear material.

3.III.G. Activity Details

Function: This field provides a description of the RN incident(s) with which the perpetrator is associated. If indicated in the available open-sources, this field lists the date, intended target, and intended delivery method for each attack/plot. Each discrete plot/attack is listed consecutively in this field.

3.III.H. Type of (Intended) Acquisition

Function: This field records the method and source of RN acquisition or, in the case of interdicted or abandoned plots, the *intended* acquisition source and method. If the entity that provided or was to provide the material is not indicated in the available open-sources this field records "Unknown."

Value Labels:

- **Gift from State**
- **Gift from Terrorist Group**
- **Gift from Criminal Organization**

- Gift from Other
- Theft from State
- Theft from Terrorist Group
- Theft from Criminal Organization
- Theft from Other
- Purchase from State
- Purchase from Terrorist Group
- Purchase from Criminal Organization
- Purchase from Other

3.III.I. Type of (Intended) Ultimate Use

Function: This field records the manner in which the RN material was utilized or, in the case of interdicted or abandoned plots, *intended* to be utilized. If no available open-source information indicates by which method the perpetrator intended to use the material, this field records “Unknown.”

Value Labels:

- Blackmail or other coercion
- Passive exposure
- Radiological Dispersal Device (RDD)
- Nuclear explosion
- Contamination of food / water / consumer products

3.III.J. Use/Acquisition Details

Function: This field records how the perpetrator was able to obtain the material. If no available open-sources provided information as to how the material was obtained, this field is blank.

3.III.K. Specific Agent 1, 2, ...

Function: If indicated in the available open-sources, this field records the specific type of RN agent connected to the incident. If multiple agents were associated with the incident, then additional “Specific Agent” fields provide the names of the supplementary materials.

3.III.L. Amount of Agent 1, 2, ...

Function: If provided for by available open-sources, this field records the amount of agent involved in the incident in kilograms for solid RN materials and cubic centimeters for liquid materials. If a specific amount is not ascertainable, this field is blank.

3.III.M. Agent Details

Function: This field provides further information about the material(s) involved in the incident, the level of threat these may pose if used in an attack, what kind of activities the materials are traditionally used for, etc.

3.III.N. Capability RN

Function: This field provides any pertinent details specifically associated with the perpetrator’s demonstrated or suspected capability to acquire, work with, deploy and/or employ RN materials.

3.III.O. Capability: Knowledge of Explosives

Value Labels:

- **Yes:** If it appears likely that the group or individuals had such knowledge, the value is recorded as “Yes.”
- **No :** In cases where knowledge of explosives seems unlikely, the value is recorded as “No.”
- **Unknown:** In instances when a definitive determination could not be made, the value is recorded as “Unknown.”

3.III.P. Capability General

Function: If ascertainable, this field records the general capability of the perpetrator in committing acts of violence or sophisticated operations and is not restricted to considerations of expertise associated with RN materials alone.

3.III.Q. Target Type

Function: This field records what category of target the perpetrator was intending to affect through his / her actions. If multiple actions are directed to multiple targets, the entity most commonly targeted is listed with additional entities described in the Target Details field (see § 3.III.R). If the intended target was not indicated in the available open-sources, this field records “Unknown.”

Value Labels:

- **Government**
- **Ethnic / Religious / National Group**
- **Commercial Entity**
- **Individual**
- **Other**
- **Unknown**

3.III.R. Target Details

Function: If indicated in the available open-sources, this field provides additional pertinent information about a perpetrator’s intended target(s).

3.IV. RESULTS AND OBJECTIVES

3.IV.A. Results Type

Function: This field records the extent to which a perpetrator was able to carry out his / her plot. When multiple plots / attacks occurred, the highest level of success attained is listed.

Value Labels:

- **Plot Terminated:** Used to indicate a plot that ends prior to completion because the perpetrators voluntarily abandon their plans.

- **Plot Interdicted:** Used to indicate a plot that is interdicted or was otherwise involuntarily halted before perpetrators were able to carry it out (i.e., authorities intervened).
- **Failed Use Attempt:** Used to indicate an attempt where the perpetrators endeavored to use the material in an attack but were unsuccessful in this attempt.
- **Successful Use:** Used to indicate an attack where the perpetrators were successful in carrying out their plot; this includes attacks that are only partially successful.
- **Various:** A combination of the other values.
- **Unknown:** Used to indicate that open-sources did not provide information as to the conclusion of the plot(s) / attack(s).

3.IV.B. Fatalities

Function: This field records the number of people recorded by available open-sources that died from the perpetrator's use of RN materials. This number only includes target fatalities—not perpetrator fatalities. Zero ("0") is recorded if there were no fatalities.

3.IV.C. Non-fatal injuries

Function: This field records the number of people recorded by available open-sources that were injured but did not die from the perpetrator's use of RN materials. This number only includes target injuries—not perpetrator injuries. Zero ("0") is recorded if there were no injuries.

3.IV.D. Disruption Level

Function: This field provides a broad, subjective estimate of the degree of disruption that the actor(s) have collectively caused through all the RN incidents with which they have been associated. It includes consideration of economic, social and infrastructural disruption caused by the perpetrator(s).

Value Labels:

- **None**
- **Unknown**
- **Mild**
- **Moderate**
- **Severe**
- **Catastrophic**

3.IV.E. Apprehended?

Function: This field records whether the perpetrator(s) were apprehended as a consequence of their involvement with RN materials.

3.IV.F. Charged?

- **Yes:** A checked field indicates that one or more suspects were charged with one or more counts related to their involvement with RN materials.
- **No:** An unchecked box indicates no one was charged.

3.IV.G. General Goals

Function: This field provides a narrative regarding the perpetrator's broader reasons for action and strategic objectives. It also provides further information about his / her ideology and how those goals relate to his / her overall motivation. If no such information on general goals was ascertainable, this field is empty.

3.IV.H. Specific Motive¹¹

Function: If indicated in available open-sources, this field records the perpetrator's specific motive for involving (or attempting to involve) RN materials in their activities. It differs from the general goals narrative in that it focuses on why RN materials were selected rather than other weapons / means of harm. If sources provided no information on specific motive, this field is empty.

3.IV.I. Sentence (Penal)

Function: This field records any specific actions, if there were any, that were taken against the perpetrators—including whatever charges were laid against the perpetrator(s), whether the perpetrator(s) was indicted, and, finally, if any sentences were levied.

3.IV.J. Results Details

Function: This field provides a narrative description of the effects and results of the incident(s), if there were any. If available open-sources did not provide any relevant information, this field is blank.

3.IV.K. Possible Smuggling Only?

- **Yes:** A box is checked in those instances where there is a significant likelihood that the perpetrator was involved in smuggling RN materials *only*, rather than being an end-user. While clear cases of nuclear smuggling are not included in RANNSAD, in instances where researchers believed there to be at least a minimal likelihood of the perpetrator being an end-user, the actor is

¹¹ It has been noted that, "Ideology provides a motive—and possibly a formula—for action." C.J.M Drake, *Terrorists' Target Selection* (New York: St. Martin's, 1998), p. 16. In that regard, Jeffrey Bale has observed that, "Ideologies, unlike the vague conceptions held by most people about how the world operates, are structured, relatively coherent, and often all-encompassing worldviews that purport to explain what is wrong with the world, identify those who are to blame for perpetrating those wrongs, and provide a guide for action that is designed to right those wrongs and thereby usher in a better world for the broader constituencies whose interests the ideologues and their followers claim to represent. In this way, ideologies not only act as crucial perceptual filters through which all external information is refracted and processed, but also as important drivers of the actual behaviors of those who adhere to them." Ackerman et al., *Anatomizing Radiological and Nuclear Non-State Adversaries*, p. 16. Emphasis added.

included, and this box is checked to indicate that the suspected smuggling incident is involved.

- **No:** An unchecked box indicates that the perpetrator was the end-user.

3.V. COMMENTARY

Function: This field includes analytical lessons and comments provided by project researchers as they relate to the information contained in the specific profile. They also provide recommendations for additions or improvements to current counter-RN policies.

3.VI. NOTES

Function: This field records any additional notes researchers thought might be pertinent to understanding the case. It also may provide a list of additional perpetrator demographics where there are too many perpetrators to fit into the Plot ID page (see § 3.II.K.)

3.VII. REFERENCE

Function: This field provides a list of citations and sources used to build the profile. The letter in brackets refers to the letter cited as the source in the narrative portions of the profile (see example below).

EXAMPLE OF RANNSAD REFERENCES:

Narrative Portion of RANNSAD (partial):

On December 29, 1998, a “booby-trapped” or “mined” container of unidentified radiological material was discovered by police close to a railway track in Argun, Chechnya, which is located approximately 14.5 kilometers due east of the Chechen capital of Groznyy.[A,B] The discovery of the container was announced over Chechen television by Ibragim Khultygov, Chechen director of security services.[A]

Respective RANNSAD Reference Page (partial):

[A] “Mined Radioactive Container Found in Chechnya,” Agence France Presse (29 December 1998): 08:31 GMT.

[B] “Mined Radioactive Container Found in Chechnya: security official,” Agence France Presse (29 December 1998): 08:56 GMT.

Section 4: Descriptive Statistics Derived from RANNSAD

While RANNSAD can be used to perform sophisticated quantitative analyses, in this section we provide some illustrative examples of how the database can even yield descriptive insights. RANNSAD contains some records which are dubious as to actual cases of RN end-user plots or attacks (e.g., likely cases of smuggling), as well as several facility attacks, which are not the focus of this analysis but might nonetheless provide some insight as to future RN perpetrators. However the following six graphics (§ 4.1-6) represent only a sample of the characteristics of previous RN perpetrators under a single condition (excluding dubious end-users and likely apocryphal cases, as well as facility attacks or plots directed towards facilities.¹² Second, the individual-level data in RANNSAD, while illustrative, should not be taken as necessarily representative of the broader population. Individual-level data for many profiles remain unknown and certain profiles contain several individuals (presumably engaged in different tasks related to the RN incidents), while others contain a single lone actor responsible for an entire incident. Third, there are obvious differences between radiological and nuclear events. In certain cases, it is relatively clear that a perpetrator was involved with either nuclear or radiological materials, but in others the available information is indeterminate with regard to whether the perpetrator sought nuclear or radiological materials or both. It is thus not a simple matter to parse the available data cleanly between radiological and nuclear categories and certain profiles were labeled as indeterminate.¹³

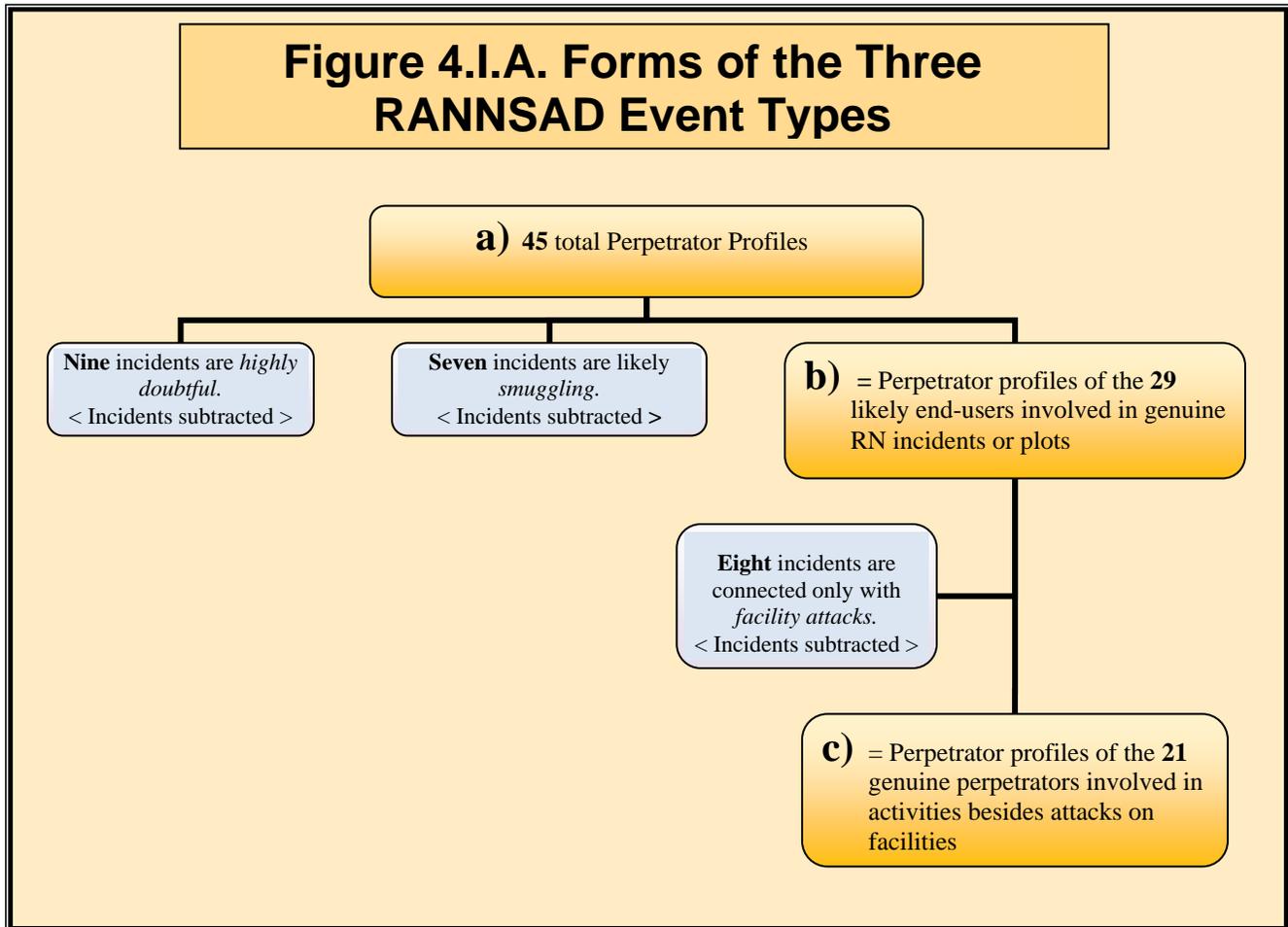
4.1.Event Type

RANNSAD's 45 perpetrator profiles represent 68 separate RN incidents, since several perpetrators found in RANNSAD have been involved in more than one incident. Out of RANNSAD's 45 profiles, researchers have been able to find at least some individual-level information on 63 lone actors and members of organizations. Of these 45 profiles, there are 9 cases that are regarded as highly dubious and probably apocryphal and a further 7 cases for which the activity was felt to more likely than not involve smuggling as opposed to end-use. Of the remaining 29 cases for which the research team was

¹² Users should note that two other types of statistical descriptives, in this regard, can be drawn from RANNSAD: a) characteristics derived from *all* cases in RANNSAD and b) characteristics derived with the *exclusion* of dubious end-user and likely apocryphal cases. The full sets of figures, and their respective analyses, are available in, Ackerman et al., *Anatomizing Radiological and Nuclear Non-State Adversaries*.

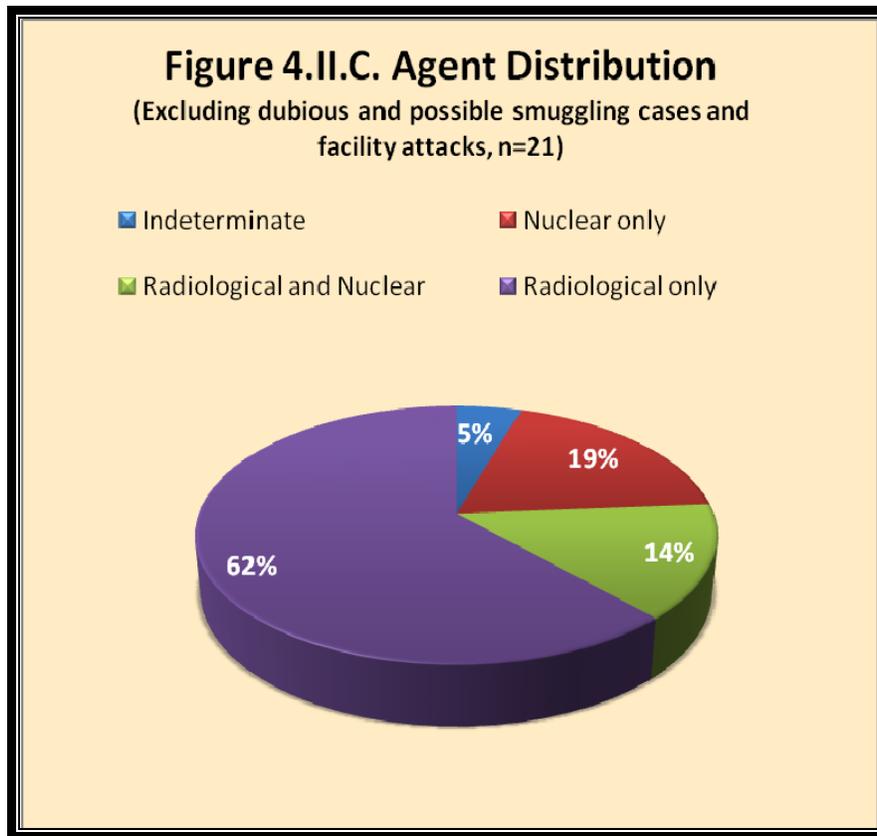
¹³ An example of the latter are several RANNSAD cases where perpetrators were apprehended with uranium, but the available open-sources did not report what the enrichment level or isotope was and it is thus unclear whether the perpetrator intended to use the uranium as part of a radiological or nuclear plot.

confident that end-users were involved in genuine RN incidents or plots, 8 involved actors connected with only facility attacks, leaving 21 profiles of genuine RN perpetrators involved in activities besides attacks on facilities (see figure 4.1.A below). It is this latter data set—the 21 profiles—that is represented in all of the following eight charts (§ 4.1-6).



4.II. Agent Type

In Figure 4.II.C (below) note that actors involved only with radiological weapons are far likelier than either those actors involved only with nuclear weapons or those involved with both or indeterminate agent types. This is to be expected, based on the far greater availability of harmful radioisotopes versus strictly fissile materials and the far more demanding technical capabilities necessary to utilize nuclear materials in an improvised nuclear device (IND).



4.III. Perpetrator Type

With regard to the type of actor involved, Figure 4.III.C below demonstrates that the most common type of known perpetrator is the lone actor, followed by formal organizations and small unaffiliated cells. However, this does not hold across weapon types. Table 4.III.A includes facility attacks and demonstrates that while lone actors dominate the exclusively radiological weapons profiles, formal organizations are most prolific in terms of involvement with nuclear (and combination) events. In fact, START researchers could find no unequivocal cases where lone actors pursued nuclear materials—a finding that is consistent with the greater level of access and expertise required to utilize nuclear materials in an IND.

Moreover, in terms of the type of formal organization involved, the table displays that there were no available open-source reports of recognized *criminal* organizations as end-users; indeed, all the formal organizations were recognized terrorist organizations.

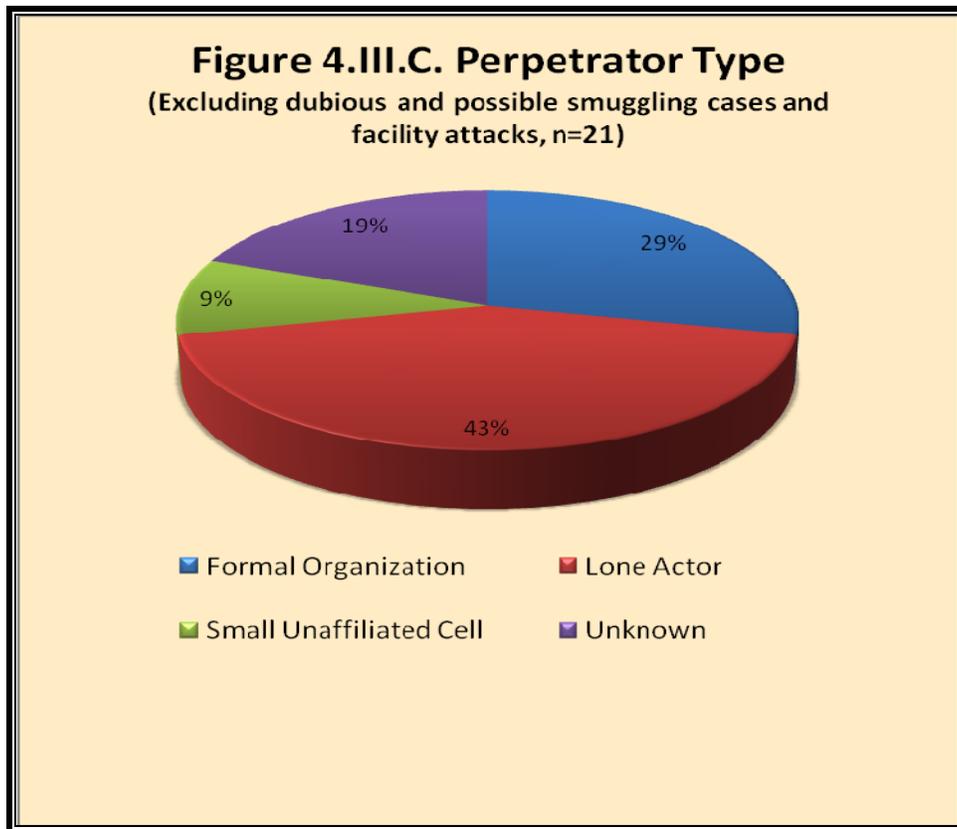


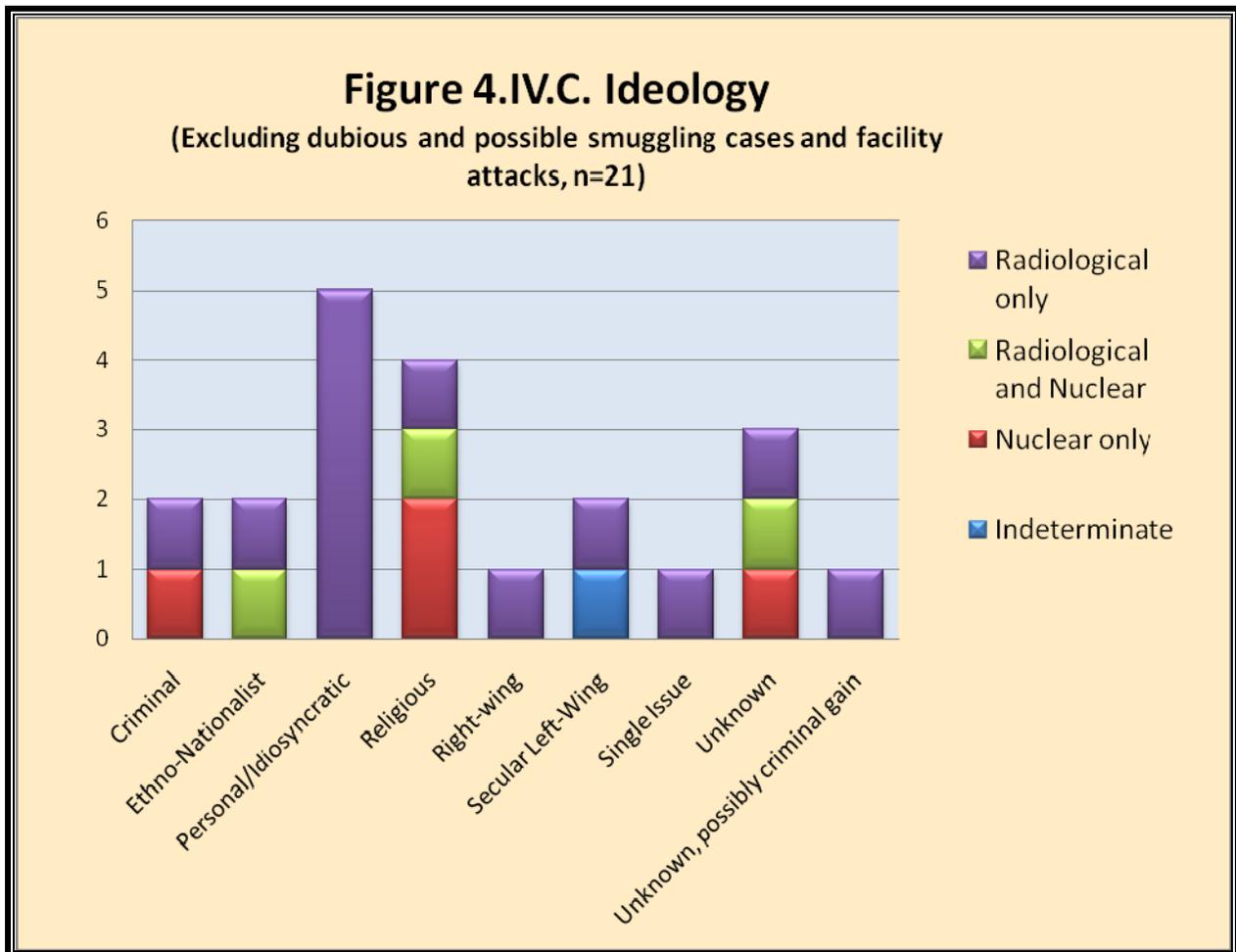
Table 4.III.A. Perpetrator Type

(Excluding dubious events and possible smuggling *but including facility attacks*, n=29)

Perpetrator Type	Radiological only	Nuclear only	Radiological and Nuclear	Indeterminate	Total
Formal Organization	1	2	4	1	8
Lone Actor	10	0	1	1	12
Recognized Criminal Org.	0	0	0	0	0
Small Unaffiliated Cell	1	1	0	0	2
Unknown	3	2	1	1	7
Total	15	5	6	3	29

4.IV. Ideology Type

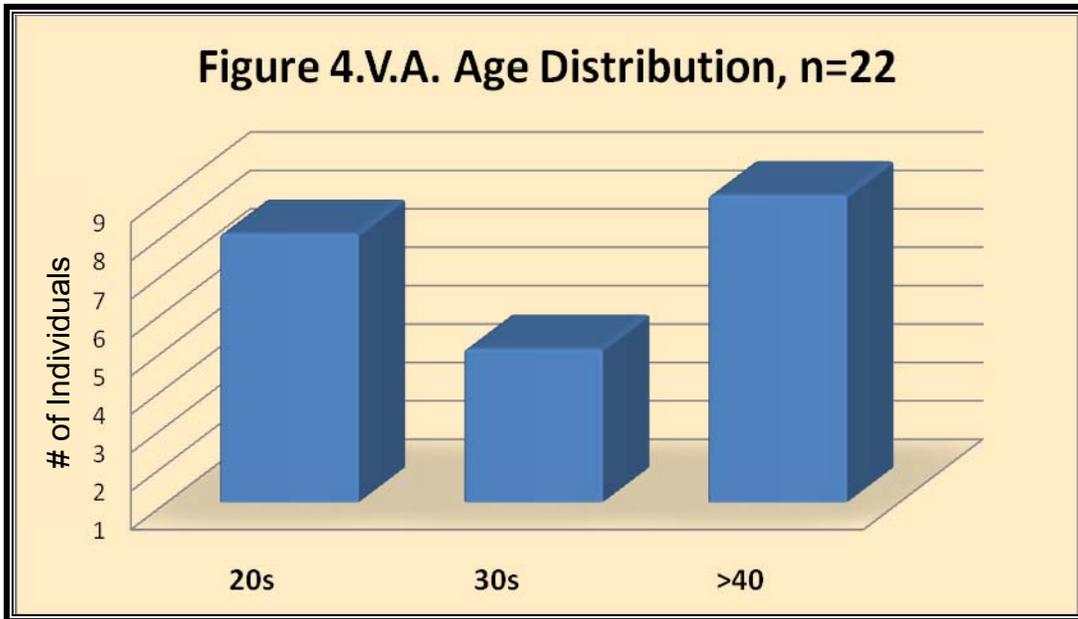
Figure 4.IV.C below displays the distribution of ideology across the profiles. The first element to note in the ideology figures is that there is a relatively broad range of ideologies, covering much of the ideological spectrum. This contradicts the often-held belief that the threat is limited to religious extremists and mentally unbalanced individuals. However, the data does make clear that these two groups are *prominent* in that the two leading motivations across the samples were personal / idiosyncratic motives (technically, not necessarily constituting a specific ideology) and religious ideologies. Personal/idiosyncratic motives are associated exclusively with radiological, rather than nuclear materials, whereas religiously motivated actors seem to be interested in both radiological and nuclear materials. It is interesting to note that, even eliminating possible smuggling incidents, there are still both nuclear and radiological perpetrators with criminal motives; for example, using nuclear weapons for blackmail purposes. Unpacking the “religious” category further, users find that besides the single case of a religious cult (Aum Shinrikyō), all other religious perpetrators were Sunni Islamists.



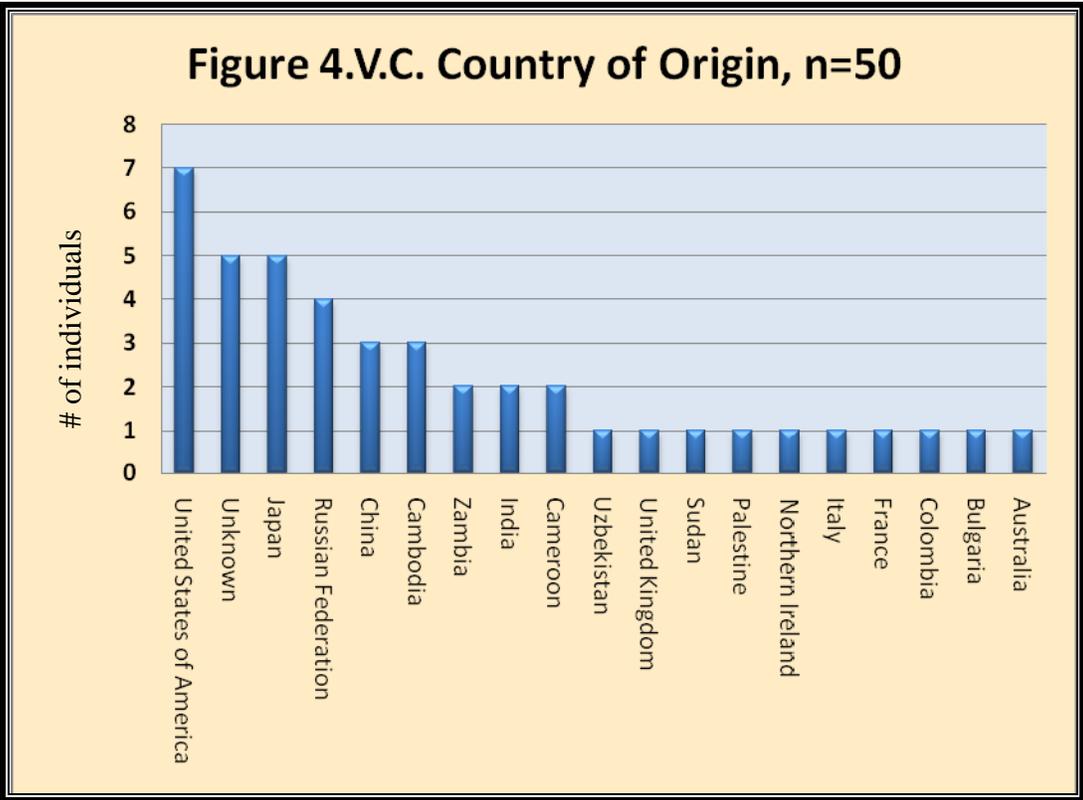
4.V. Individual Demographics

As mentioned previously, differences in levels of analysis and numbers of actors involved with each perpetrator make it impossible to reliably extrapolate characteristics from the individual level to the perpetrator level with any assurance. However, it is illuminating to take a closer look at some of the known characteristics of the 63 individuals involved as a single set.

- Gender:* Of the 57 individuals in RANNSAD where the gender is known, all of them are male.
- Age:* RANNSAD has data on the age of 22 individuals. These ages range from 22 to 50, with a mean of 35.6 years and a median value of 38 years. A basic distribution is given below.

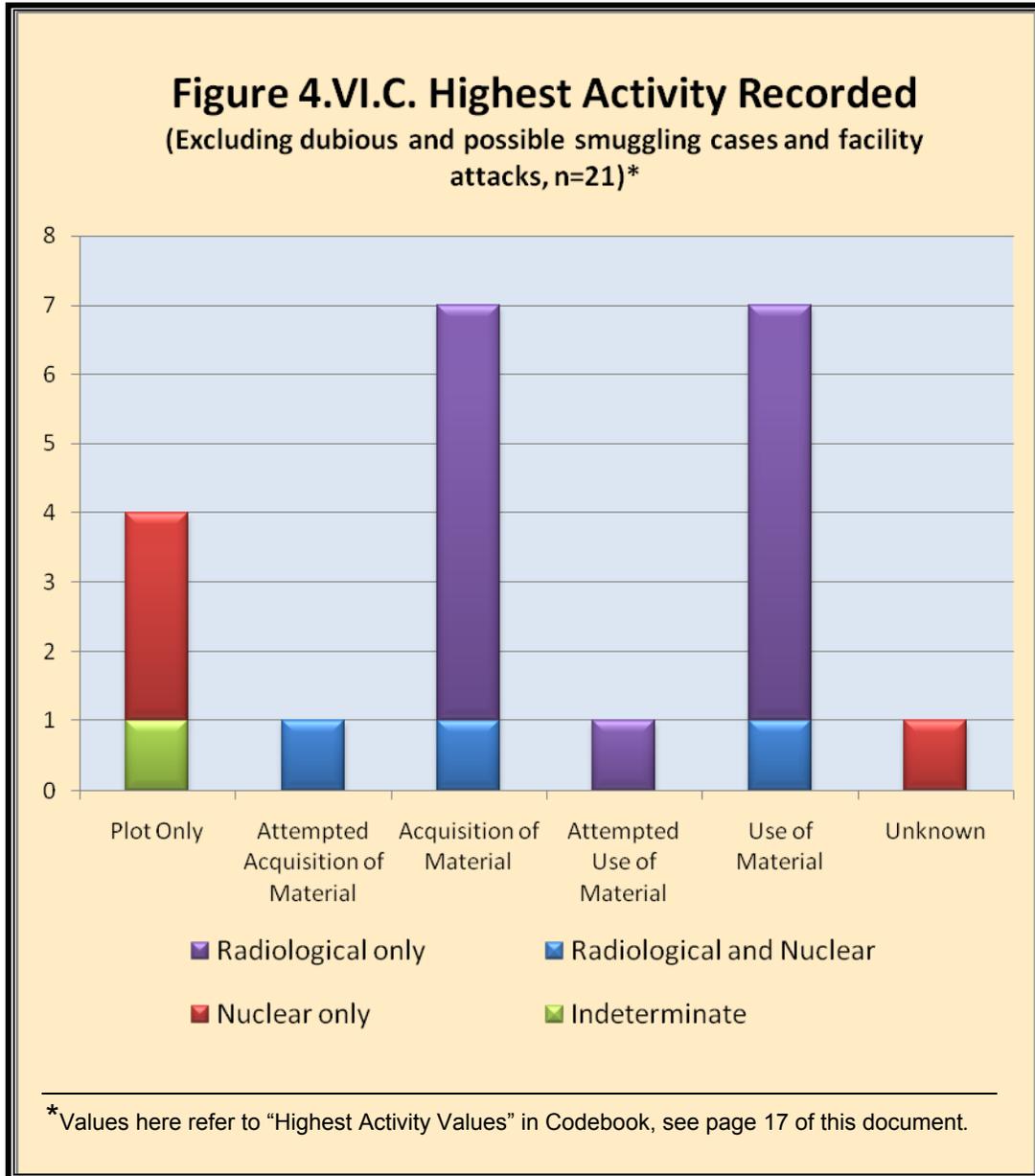


Country of Origin: The country of origin (see figure 4.V.C. below) could be determined for 50 individuals in the data set. It displays a wide variety of countries, both in the developed and developing world. Nationals from the United States, Russia (primarily Chechnya) and Japan are most common in terms of individuals known to be involved in RN incidents.



4.VI. Perpetrator Success Level

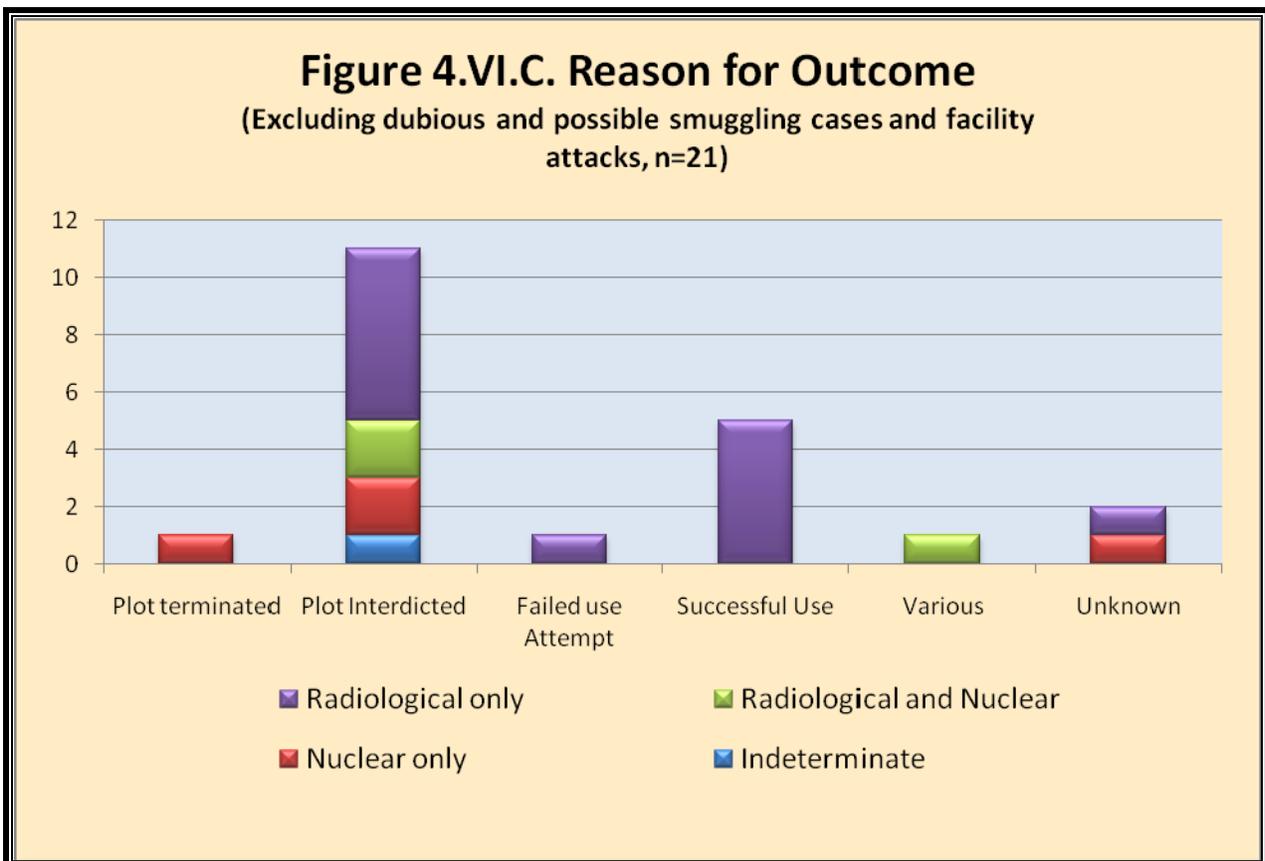
Although several perpetrators were involved in more than one incident, the database records the greatest degree of “success” achieved by each perpetrator.



As can be expected, there are no perpetrators who have unequivocally proceeded beyond the acquisition of material stage for nuclear weapons. Even where highly enriched uranium (HEU) was acquired, it was in very small

quantities, and there are no available open-source reports of non-state actors succeeding in acquiring sufficient fissile material for a functional nuclear device (i.e., a yield bearing blast). In the single combination case where the highest activity was use of material that lists the perpetrator as engaged in both R and N activities (the Chechen case), the case relates to the use of radiological and not nuclear materials. It is interesting to note that when perpetrators embarked upon the acquisition of a radiological weapon, they generally succeeded in reaching at least the acquisition of material stage and in many cases the use stage as well.

The following chart displays the reasons (where known) why plots did not succeed, as well as the number of successful plots. The majority of unsuccessful plots were interdicted, although the possibility of selection bias must be recognized in that these are the most likely plots (besides successes) to appear in available open-source reports.



Section 5: Qualitative Analysis of Adversary Profiles

The project team used RANNSAD to conduct qualitative analyses of past instances of perpetrators using or pursuing RN weapons. Each profile in RANNSAD provides detailed information on each particular case, but it is instructive to summarize and analyze the profiles as a whole. At this stage, the analysis will distinguish between radiological and nuclear weapons, but will still consider the three threat components separately.

5.I. Nuclear Weapons

1. Motivations

Table 5.I.1. Nuclear Motivations of Perpetrators Reflected in Adversary Profiles

Table 5.I.1: Nuclear Motivations of Perpetrators Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Perpetrator Name	Motivations of Perpetrators to Date
Criminal (Individual)	Lone Actor 5	<ul style="list-style-type: none"> • Financial gain (\$16,000 for the delivery of RN material from Kyrgyzstan to the UAE) • Motivations unknown if material was intended for use
Criminal (Individual)	Lone Actor 18	<ul style="list-style-type: none"> • Intended to use the uranium-laden device as “a paper weight”
Criminal (Unconfirmed) (Individuals)	Lone Actor 19	<ul style="list-style-type: none"> • Financial gain (suspected that the uranium offered by actor was a sample aimed at potential clients)
Ethno-Nationalist / Religious: Sunni Islamist	Chechen Rebels	<ul style="list-style-type: none"> • Threatened use for blackmail purposes against authorities • Gain publicity for cause and group • Financial gains (specifically for the Chechen Mafia; the relationship between the Chechen rebels and the mafia is unclear) • Presumably use, if Chechen rebels could construct device
Socialist/Communist	Fuerzas Armadas Revolucionarios de Colombia (FARC)	<ul style="list-style-type: none"> • Most likely financial gain (re-selling the uranium to an unspecified government at an inflated price) • Specific motivations unknown if material was intended for use
Ethno-Nationalist	(Provisional) Irish Republican Army	<ul style="list-style-type: none"> • Specific motivation unknown, but Provisional IRA may have intended to acquire nuclear or radiological material for

Table 5.I.1: Nuclear Motivations of Perpetrators Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Perpetrator Name	Motivations of Perpetrators to Date
	(Provisional IRA)	future use
Ethno-Nationalist	Real Irish Republican Army (Real IRA)	<ul style="list-style-type: none"> Specific motivation unknown, but Real IRA may have intended to acquire nuclear or radiological device for future use
Religious: Sunni Islamist	Al-Tawhid	<ul style="list-style-type: none"> Specific motivation unknown, but al-Tawhid is ideologically similar to al-Qā`ida in Iraq and al-Qā`ida, and thus share similar ideological motivation for use of RN materials in terrorist attacks
Religious: Sunni Islamist	al-Qā`ida	<ul style="list-style-type: none"> Refer to Section 2 of this report
Religious: Sunni Islamist	Islamic Jihad	<ul style="list-style-type: none"> Specific motivation unknown, but presumed to be used to carry out RDD or IND terrorist attack. Interviews with captured Palestinian Islamic Jihad members (who may or may not be related to the Islamic Jihad involved in RN activity) revealed that they claimed no interest in WMD and that members had concerns that such weapons were banned by the Qur'an
Religious: Sunni Islamist	Salafiyya Jihadiyya	<ul style="list-style-type: none"> Specific motivation unknown, but presumed to be used in IND, or a release of radioactive material into the environment Reporting indicates that Salafiyya Jihadiyya is linked to al-Qā`ida, and thus Salafiyya Jihadiyya and al-Qā`ida may share similar ideological motivation for use of RN materials in terrorist attacks
Socialist/Communist (Marxist-Leninist, Maoist, Stalinist, etc)	Red Army Faction	<ul style="list-style-type: none"> Specific motivation unknown

The motivational aspects of those VNSAs that sought (or may have sought) nuclear weapons or materials to construct those weapons can be summarized as follows:

- a) *VNSAs Probably Seeking Nuclear Weapons and Materials for Detonation Purposes*
- Jihadists: the largest number of reported cases (as seen from the above table) of attempts to obtain weapons or the materials for weapons are attributable to Sunni Islamist organizations, specifically al-Qā`ida and

Chechen jihadist groups operating under the direction of Shamil Basayev. At an earlier stage in the Chechen conflict, when the Chechens were primarily driven by ethno-nationalist concerns, it seems that much of their activities surrounding nuclear weapons were based on innuendo and threat – more out of a desire to coerce Moscow than use a nuclear weapon. However, since the “jihadization” of the Chechen conflict, it has become more likely that Chechens might actually detonate any nuclear weapon that comes into their possession. The reasons why jihadists might detonate a nuclear weapon have been laid out in detail in Section 2.

- Apocalyptic Cult: the Japanese apocalyptic millenarian group Aum Shinrikyō, which actually carried out several attacks with chemical agents in the mid-1990s, also made efforts to acquire nuclear materials from Russia (see, authors account of Aum’s RN actions in, *RN Adversary Profiles* (College Park, MD: START, 2009). The techno-fetishism of Aum’s leader, together with heavy emphasis on purifying the world by initiating a global nuclear exchange, and its demonstrated willingness to use chemical and biological weapons, makes it plausible that Aum would actually have detonated an IND if it had succeeded in acquiring one.

b) *VNSAs Likely Seeking Nuclear Weapons for Non-detonation Purposes*

- Ethno-Nationalists and Far-Left-Wing Actors: there is one (unsubstantiated) case involving the Real IRA seeking to steal plutonium and another involving a FARC scheme to buy uranium. While the precise motives for both of these plots are unknown, it seems most probable that there was no real desire to detonate a weapon. Even if verified, the most likely explanations for these cases were to construct an RDD for the Real IRA and to make a profit (or perhaps to fabricate an RDD) in the case of FARC. Alternatively, both of these actors could have conceived of using the material to blackmail or coerce their opponents.
- Sale: there is a single case for which the apparent motive (assuming that the perpetrators were seriously considering stealing a nuclear-armed submarine, which remains in doubt) was not to detonate a weapon, but rather to sell it to the highest bidder. However, even in this case, there were reports that the perpetrators considered detonating the weapon to cover their escape.

c) *Unknown*

- The remainder of the incidents involving fissile materials (or potentially fissile materials where the enrichment level of uranium was not measured) are associated with an unknown motive. The majority of these cases are likely to involve smuggling rather than end-use and are thus of less relevance here.

In short, only a relatively small subset within today’s vast galaxy of political and religious extremist groups is likely to be motivated to carry out nuclear attacks, and, as discussed below, an even smaller number of groups within that motivated subset are likely to have sufficient capabilities to actually follow through and launch such attacks.

2. Capabilities

Analyses of the radiological/nuclear (RN) profiles created by START reveal several patterns with regard to the nexus of violent non-state actors (VNSAs) and capabilities to procure nuclear materials or weapons. Capabilities attributed to historical perpetrators that are relevant to future threat considerations are reflected in Table 3.II.2 below.

Table 3.II.2. Nuclear Capabilities Reflected in Adversary Profiles

Table 5.1.2 Nuclear Capabilities Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Perpetrator Name	Capabilities Suggested to Date
Criminal (Individual)	Lone Actor 5	<ul style="list-style-type: none"> • Access, perhaps unwittingly, to plutonium
Criminal (Individual)	Lone Actor 18	<ul style="list-style-type: none"> • Insider access to the Oak Ridge Y-12 plant
Criminal (Unconfirmed) (Individuals)	Lone Actor 19	<ul style="list-style-type: none"> • Availability to acquire uranium enriched to 80 percent
Ethno-Nationalist / Religious: Sunni Islamist	Chechen Rebels	<ul style="list-style-type: none"> • Some sources indicate high financial reserves • Access to Russian nuclear smugglers • Access to organized crime • Alleged access to Russian nuclear fuel repositories • Alleged access to Russian fissile materials in general • The capability to reconnoiter Russian nuclear weapon facilities • The capability to attempt to penetrate facilities that house fissile materials • Alleged access to nuclear weapons from the FSU including portable nuclear devices (PNDs), so called “suitcase nukes” • A <i>perceived</i> operational capability that arguably includes the technical ability to manufacture an IND
Socialist/Communist	Fuerzas Armadas Revolucionarias de Colombia (FARC)	<ul style="list-style-type: none"> • Capability to generate between \$200 and \$400 million per year • Inventive and capable with regard to conventional explosives

Table 5.1.2 Nuclear Capabilities Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Perpetrator Name	Capabilities Suggested to Date
Ethno-Nationalist	(Provisional) Irish Republican Army (Provisional IRA)	<ul style="list-style-type: none"> • Extremely inventive and capable with regard to conventional explosives • Ability to potentially link with mafia intermediaries and Russian officials • Alleged capability to link with other paramilitary groups
Ethno-Nationalist	Real Irish Republican Army (Real IRA)	<ul style="list-style-type: none"> • While not thought to be as proficient with explosives as the Provisional IRA, the Real IRA is believed to have extensive expertise with explosives.
Religious: Sunni Islamist	Al-Tawhid	<ul style="list-style-type: none"> • Inventive reconnoitering strategies with regard to a research reactor likely to house HEU
Religious: Sunni Islamist	al-Qā`ida	<ul style="list-style-type: none"> • Access to isolated and poorly guarded border crossings • Potential access to fissile materials in the FSU • Potential access to spent nuclear fuels • Potential access to research reactors • Alleged access to intact nuclear weapons from FSU • Access to Pakistani nuclear weapon scientists • Alleged large financial reserves • Potential ability to move RN materials transnationally (e.g., from Central Asia to Mexico) • Capability to identify that plutonium is incapable of generating a large yield when employed in gun-type nuclear device • Capability to adopt new operational methods quickly (e.g., acquiring nuclear material closer to target to avoid detection)
Religious: Sunni Islamist	Islamic Jihad	<ul style="list-style-type: none"> • Potential access to Russian nuclear workers who may have had access to weapons-grade plutonium and HEU
Religious: Sunni Islamist	Salafiyya Jihadiyya	<ul style="list-style-type: none"> • Experience with complex terrorist operations; for example, the May 2003 attacks in Casablanca • Capability to effectively reconnoiter nuclear transportation links and knowledge of some nuclear facilities is likely • Not believed to have the capability to carry out an IND attack
Socialist/Communist (Marxist-Leninist, Maoist, Stalinist, etc)	Red Army Faction	<ul style="list-style-type: none"> • Ability to have potentially attacked a U.S. Army base in Germany that likely stored U.S. tactical nuclear weapons

The above profile information can be summarized in the four categories below:

a) *Awareness of Location of Nuclear Materials / Weapons*

- The capability to reconnoiter Russian nuclear weapon storage facilities
- One case involved inventive reconnoitering strategies with regard to a research reactor likely to house HEU
- Capability to effectively reconnoiter nuclear transportation links.

b) *Access to Nuclear Weapons*

- Alleged access to nuclear weapons from the FSU including portable nuclear devices (PNDs), so-called suitcase nukes
- Potential access to Russian nuclear weapon storage facilities
- Ability to have potentially attacked a U.S. Army base in Germany that likely stored U.S. tactical nuclear weapons

c) *Access to Nuclear Materials*

- Alleged access to Russian fissile materials in general, including Russian nuclear fuel repositories
- Potential access to spent nuclear fuels, including theft / seizure of spent nuclear fuels from nuclear power stations
- Potential access to research reactors
- Demonstrated ability to acquire plutonium and HEU (possibly non-Russian)
- Capability to assault and penetrate a moderately well guarded nuclear facility that housed HEU
- Potential access to Russian nuclear workers who may have had access to weapons-grade plutonium and HEU

d) *Logistical Capabilities*

- Insider knowledge or access.
- Access to Russian nuclear smugglers
- Access to organized crime
- Access to nuclear weapon scientists
- Ability to potentially link with Russian officials
- Large financial reserves
- Demonstrated access to technical knowledge

- High financial reserves
- Demonstrated skill with conventional explosives
- Knowledge relevant to exploiting isolated and poorly guarded border crossings
- Ability to move RN materials long distances and without detection

3. Opportunities

The perpetrator profiles provide information on the opportunities available to non-state adversaries for procuring nuclear weapons and fissile materials suitable for employment in an improvised explosive device (IND). These are reflected in Table 3.II.3 below.

Table 5.I.3. Nuclear Opportunities Reflected in Adversary Profiles

Table 5.I.3. Nuclear Opportunities Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Perpetrator Name	Opportunities Suggested to Date
Businessman ("Mineral materials" broker)	Lone Actor 1	<ul style="list-style-type: none"> • Access to thorium via private dealers and traders that transact business with scrap metals and "mineral materials"
Criminal (Individuals)	Lone Actor 2	<ul style="list-style-type: none"> • Insider knowledge
Criminal (Individual)	Lone Actor 5	<ul style="list-style-type: none"> • Availability of fissile materials in the FSU
Criminal (Individual)	Lone Actor 18	<ul style="list-style-type: none"> • Insider access
Criminal (Unconfirmed) (Individuals)	Lone Actor 19	<ul style="list-style-type: none"> • Availability of fissile materials in the FSU
Ethno-Nationalist Religious: Sunni Islamist	Chechen Rebels	<ul style="list-style-type: none"> • Access to Russian nuclear smugglers • Access to organized crime • Alleged access to Russian nuclear fuel repositories • Alleged access to Russian fissile materials in general • Alleged access to nuclear weapons from the FSU including portable nuclear devices (PNDs), so called "suitcase nukes"
Socialist/Communist	Fuerzas Armadas Revolucionarias de Colombia (FARC)	<ul style="list-style-type: none"> • Potential access to intermediaries that are more willing to sell RN materials if they believe the VNSA has non-violent intentions (e.g., profit)
Ethno-Nationalist	(Provisional) Irish Republican Army (Provisional IRA)	<ul style="list-style-type: none"> • Potential access to possible fissile materials (plutonium) allegedly from FSU

Table 5.1.3. Nuclear Opportunities Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Perpetrator Name	Opportunities Suggested to Date
		<ul style="list-style-type: none"> • Potential mafia intermediary
Ethno-Nationalist	Real Irish Republican Army (Real IRA)	<ul style="list-style-type: none"> • Alleged interest in theft / seizure of spent nuclear fuels from nuclear power stations (While this case alleges that such materials were putatively for use in an RDD, they could theoretically be used in an IND as well.)
Religious: Sunni Islamist	Al-Tawhid	<ul style="list-style-type: none"> • Potential vulnerability of research reactors
Religious: Sunni Islamist	al-Qā`ida	<ul style="list-style-type: none"> • Isolated and poorly guarded border crossings • Potential access to fissile materials in the FSU • Potential access to spent nuclear fuels • Potential access to research reactors • Alleged access to intact nuclear weapons from FSU
Religious: Sunni Islamist	Islamic Jihad	<ul style="list-style-type: none"> • Potential access to Russian nuclear workers • Availability of fissile materials in the FSU
Religious: Sunni Islamist	Salafiyya Jihadiyya	<ul style="list-style-type: none"> • Potential vulnerability of fissile materials in transport
UFO-related	Long Island UFO Network	<ul style="list-style-type: none"> • Insider access
Socialist/Communist (Marxist-Leninist, Maoist, Stalinist, etc)	Khmer Rouge	<ul style="list-style-type: none"> • Potential access to uranium allegedly "Made in USA"
Socialist/Communist (Marxist-Leninist, Maoist, Stalinist, etc)	Red Army Faction	<ul style="list-style-type: none"> • Presence of US nuclear weapons in NATO countries
"Terrorist Group" (Likely Ethno-Nationalist)	Unknown 18 (likely Chechen Militants)	<ul style="list-style-type: none"> • Potential access to Russian nuclear weapon storage facilities

The above profile information can be summarized below:

a) *Prominent Geographic Regions*

- Russia
- Other states of the FSU
- South Asia (India, Bangladesh, Pakistan)

b) *Potential Sources of Nuclear Weapons*

- Portable nuclear devices (PNDs), so called “suitcase nukes,” from FSU
- Potential access to Russian nuclear weapon storage facilities
- U.S. nuclear weapons in NATO countries
- Availability of fissile materials in the FSU

c) *Potential Sources of Fissile Materials*

- Uranium originating from the U.S. but dispersed globally sometime in previous decades.
- Russian nuclear fuel repositories (including spent nuclear fuel)
- Spent nuclear fuels from nuclear power stations worldwide
- Research reactors that employ highly enriched uranium (HEU)
- Fissile materials held at universities
- Fissile materials in transport
- Organized criminal networks
- Access to private dealers and traders that transact business with scrap metals that may contain fissile materials

d) *Other*

- Isolated border crossings facilitating transport of materials / weapons.

5.II. Radiological Weapons

1. Motivations

Table 5.II.1. Radiological Motivations of Perpetrators in Adversary Profiles

Table 5.II.1. Radiological Motivations of Perpetrators in Adversary Profiles		
Group / Individual Type & Sub-Type	Group Name	Motivations of Perpetrators to Date
Anarchist (Unstable Individual)	Lone Actor 17	<ul style="list-style-type: none"> • Actor had a terminal illness • Anarchist beliefs • Desire for a memorable death experience

Table 5.II.1. Radiological Motivations of Perpetrators in Adversary Profiles

Group / Individual Type & Sub-Type	Group Name	Motivations of Perpetrators to Date
Businessman ("mineral materials" broker)	Lone Actor 1 (Individual: Tsugio Uchinishi)	<ul style="list-style-type: none"> Individual claimed he committed the activity to stop alleged smuggling of uranium by a foundation affiliated with Japanese Education Ministry to North Korea Also possible that individual was "excluded from profitable sales negotiations" and therefore committed the activity based on personal animosity
Criminal (Individual)	Lone Actor 11	<ul style="list-style-type: none"> Personal animosity (clashing over the management of a laser treatment facility and related financial matters)
Criminal (Individual)	Lone Actor 18	<ul style="list-style-type: none"> Intended to use the uranium-laden device as "a paper weight"
Criminal (Drug Peddlers: Individuals)	Lone Actor 13	<ul style="list-style-type: none"> Specific motivation unknown
Ethno-Nationalist Religious: Sunni Islamist	Chechen Militants	<ul style="list-style-type: none"> Revenge as motivation, stated by leaders of the militants Threatened use for blackmail purposes against authorities (although these were empty threats) Possibly a form of deterrence against Russian authorities Use in operations
Socialist/Communist	Fuerzas Armadas Revolucionarios de Colombia (FARC)	<ul style="list-style-type: none"> Most likely financial gain (re-selling the uranium to an unspecified government at an inflated price) Specific motivations unknown if material was intended for use
Ethno-Nationalist	(Provisional) Irish Republican Army (Provisional IRA)	<ul style="list-style-type: none"> Specific motivation unknown, but the Provisional IRA may have intended to acquire nuclear or radiological device for future use
Ethno-Nationalist	Real Irish Republican Army (Real IRA)	<ul style="list-style-type: none"> Specific motivation unknown, but Real IRA may have intended to acquire nuclear or radiological device for future use
Mentally Ill (Individual)	Lone Actor 20	<ul style="list-style-type: none"> Actor was mentally ill Motive was perhaps an attention-seeking goal
Religious: Sunni Islamist	al-Qā`ida	<ul style="list-style-type: none"> Refer to Section 2 of this report
Religious: Sunni Islamist	Jamiat-ul-Mujahideen / Shahadat-ul-Hikma	<ul style="list-style-type: none"> Specific motivation unknown Possible RN material was to be used in RDD Possible RN material was to be sold or given to another group

Table 5.II.1. Radiological Motivations of Perpetrators in Adversary Profiles		
Group / Individual Type & Sub-Type	Group Name	Motivations of Perpetrators to Date
Religious: Sunni Islamist	Salafiyya Jihadiyya	<ul style="list-style-type: none"> • Specific motivation unknown, but presumed to be used in IND, or a release of radioactive material into the environment • Reporting indicates that Salafiyya Jihadiyya is linked to al-Qā'ida, and thus Salafiyya Jihadiyya and al-Qā'ida may share similar ideological motivation for use of RN materials in terrorist attacks
UFO-related	Long Island UFO Network	<ul style="list-style-type: none"> • Belief in conspiracy regarding government cover-up, and attempted murder of individual believed to block actor's participation in running for public office • Suspected that one member may have sold RN material to fellow member for financial gain (to pay off debt)
Unknown (possibly Ethno-Nationalist or Religious: Sunni Islamist)	Unknown 12 (possibly Chechen Militants)	<ul style="list-style-type: none"> • Specific motivation unknown

The motivational aspects of those seeking radiological weapons can be summarized as follows:

a) *Use of Radiological Materials as a Weapon*

- Jihad: as is the case with nuclear weapons, Sunni jihadists have been prominent in reported attempts to acquire and use radiological weapons.
- Mental Illness: although terrorist groups ordinarily do not contain any greater proportion of mentally ill members than the general population, this seems not to be the case when it comes to individuals interested in radiological weapons. There are several cases of individuals who disseminate or attempt to disseminate radiological materials who seem to exhibit clear signs of mental illness, including disassociation or delusions.
- Publicity: several of the perpetrators (including Uchinishi in Japan and the unknown sender of uranium-laced envelopes in Belgium) seem to have been cognizant of the degree of public anxiety regarding radiological agents and specifically selected these agents because they knew it would enhance the attention brought to their message or cause.

- Personal Vendetta: there are several prior cases involving disgruntled individuals with more or less idiosyncratic personal motives trying to acquire or use radiological materials. Individuals seeking to exact revenge on acquaintances have utilized radiological substances to attempt to bring harm to the targets of their vengeance. Although most of these cases involve individuals with prior access to radiological materials, the capability to covertly cause harm seems to be prominent, since in most of these cases the perpetrator did not want to be discovered.
- Assassination: the Litvinenko case is problematic in a number of respects (see the profile for more details), but it does show that radiological materials can be used as an effective and fear-inducing means of assassination.

b) *Use of Radiological Materials for Other Purposes*

- Coercion: a handful of perpetrators have sought to use radiological materials in an attempt to coerce their opponents, including the individual(s) who attempted to obtain the release of Bernard Goetz by threatening to contaminate water supplies with plutonium, and numerous Chechen threats to spread radiological materials, including the “demonstration” in Ismailovsky Park in 1995.
- Financial gain: excluding likely smuggling incidents, the case of the alleged FARC purchase of uranium is interesting in that it potentially represents an instance where a terrorist group tried to acquire radiological material either for re-sale or to blackmail governments into paying for the material’s return.

c) *Opportunity and Access as Motivating Factors*

- Some of the perpetrators may have had their interest in radiological weapons awakened or increased by opportunity or prior access. These include the case of the “Justice Guerillas,” several of the perpetrators motivated by personal grudges, and potentially the Provisional IRA, who allegedly were offered radiological materials by Russian organized crime figures. Most of these actors may have engaged in some form of violence in any event, but it seems as if access to radiological materials (at a place of work, through business connections, or merely stumbling upon them) moved them in the direction of using these materials to cause harm or gain publicity.

d) *Unknown*

- As with the nuclear cases, there are many perpetrators whose motives are simply unknown. Many of these are assumed to be cases of smuggling but were included in RANNSAD because there was believed to be some non-zero probability that the cases might involve more than only smuggling activities.

2. Capabilities

Analyses of the radiological/nuclear (RN) profiles created by START reveal several patterns with regard to the nexus of non-state actors (NSAs) and capabilities to procure radiological materials. Relevant findings are listed below in Table 3.II.4.

Table 5.II.2. Radiological Capabilities Represented in Adversary Profiles

Table 5.II.2. Radiological Capabilities Represented in Adversary Profiles		
Group / Individual Type & Sub-Type	Group Name	Capabilities Suggested to Date
Anarchist (Unstable Individual)	Lone Actor 17	<ul style="list-style-type: none"> • Very low capability with regard to understanding the necessary types and amount of radiological materials to fuel even a moderately deadly RDD (e.g. use of smoke detectors as a source of americium-241)
Businessman ("Mineral materials" broker)	Lone Actor 1 (Individual: Tsugio Uchinishi)	<ul style="list-style-type: none"> • Access to thorium via private dealers and traders that transact business with scrap metals and "mineral materials"
Criminal (Individual)	Lone Actor 11	<ul style="list-style-type: none"> • Insider access and high familiarity with radiological materials
Criminal (Individual)	Lone Actor 18	<ul style="list-style-type: none"> • Insider access (Oak Ridge's Y-12 plant)
Criminal (Drug Peddlers: Individuals)	Lone Actor 13	<ul style="list-style-type: none"> • Access to dealers and traders that transact business with scrap metals that contain uranium
Ethno-Nationalist Religious: Sunni Islamist	Chechen Militants	<ul style="list-style-type: none"> • Some sources indicate high financial reserves • Access to Russian nuclear smugglers • Access to organized crime • Alleged access to Russian nuclear fuel repositories • Alleged access to Russian fissile materials in general • The capability to attempt to penetrate facilities that house radioactive materials • Capability to handle radiological material and render it safe • In one incident (#9) no capability (or, possibly, desire) to utilize radiation shielding equipment
Socialist/Communist	Fuerzas Armadas Revolucionarios de Colombia (FARC)	<ul style="list-style-type: none"> • Capability to generate between \$200 and \$400 million per year • Inventive and capable with regard to conventional explosives
Ethno-Nationalist	(Provisional) Irish Republican Army (Provisional IRA)	<ul style="list-style-type: none"> • Extremely inventive and capable with regard to conventional explosives • Ability to potentially link with mafia intermediaries and Russian officials • Alleged capability to link with other paramilitary groups

Table 5.II.2. Radiological Capabilities Represented in Adversary Profiles		
Group / Individual Type & Sub-Type	Group Name	Capabilities Suggested to Date
Ethno-Nationalist	Real Irish Republican Army (Real IRA)	<ul style="list-style-type: none"> While not thought to be as proficient with explosives as the Provisional IRA, the Real IRA is believed to have extensive expertise with explosives.
Mentally Ill (Individual)	Lone Actor 20	<ul style="list-style-type: none"> Insider access and knowledge of radiological material (iodine-125)
Religious: Sunni Islamist	al-Qā`ida	<ul style="list-style-type: none"> Access to isolated and poorly guarded border crossings Alleged large financial reserves Potential ability to move radiological materials transnationally (e.g., from Central Asia to Mexico) Capability to adapt to new operational methods quickly (e.g., acquiring radiological material closer to target to avoid detection) At times a low capability with regard to understanding the necessary types and amount of radiological materials to fuel even a moderately deadly RDD (e.g., use of smoke detectors as a source of americium-241) The above point notwithstanding, al-Qā`ida is generally perceived to have the capability to carry out acts of radiological terrorism with RDDs
Religious: Sunni Islamist	Jamiat-ul-Mujahideen / Shahadat-ul-Hikma	<ul style="list-style-type: none"> Access to an alleged RDD "user's manual" Operational expertise with explosives, "making it a strong candidate for successfully employing a dirty bomb" Alleged access to criminal cartels
Religious: Sunni Islamist	Salafiyya Jihadiyya	<ul style="list-style-type: none"> Experience with complex terrorist operations; for example, the May 2003 attacks in Casablanca Capability to effectively reconnoiter nuclear transportation links and knowledge of some nuclear facilities is likely
UFO-related	Long Island UFO Network	<ul style="list-style-type: none"> Insider access Potentially creative radiological contamination capabilities (use of cars, food and toothpaste to administer radium)
Unknown (possibly Ethno-Nationalists)	Unknown 12 (possibly Chechen Militants)	<ul style="list-style-type: none"> Possible sophisticated weaponization of an RDD (based on how long it took authorities to disable the device) Tactical depth (possession of sufficient materials to duplicate attack efforts)

Capabilities already demonstrated by non-state actors, can be summarized as follows:

a) *Technical Expertise*

- High familiarity with radiological materials
- Access to an alleged RDD “user’s manual”
- Sophisticated weaponization of an RDD
- Potentially creative radiological contamination planning (use of cars, food and toothpaste to administer radium)

b) Access to Radiological Materials

- Insider access (including alleged access to Russian nuclear fuel repositories)
- Access to radiological and fissile materials via private dealers and traders that transact business with scrap metals and mineral materials

c) Logistical Capabilities

- Capability to effectively reconnoiter nuclear transportation links and knowledge of some nuclear facilities
- Links to organized crime (both Russian and non-Russian)
- Potentially, the ability to move radiological materials transnationally
- Substantial financial reserves
- Inventive and sophisticated use of conventional explosives
- Experience with complex terrorist operations
- Tactical depth
- Access to isolated and poorly guarded border crossings

3. Opportunities

Analyses of the radiological/nuclear (RN) profiles created by START reveal several patterns with regard to the nexus of non-state actors (VNSAs) and opportunities to procure radiological materials. The opportunities represented in the data are reflected in the following table:

Table 5.II.3. Radiological Opportunities Reflected in Adversary Profiles

Table 5.II.3. Radiological Opportunities Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Group Name (From Perpetrator Profiles)	Opportunities Suggested to Date

Table 5.II.3. Radiological Opportunities Reflected in Adversary Profiles

Group / Individual Type & Sub-Type	Group Name (From Perpetrator Profiles)	Opportunities Suggested to Date
Anarchist (Unstable Individual)	Lone Actor 17	<ul style="list-style-type: none"> Access to non-harmful quantities of americium-241 (could generate panic)
Businessman ("Mineral materials" broker)	Lone Actor 1 (Individual : Tsugio Uchinishi)	<ul style="list-style-type: none"> Private dealers and traders that transact business with large quantities of scrap metals and "mineral materials" that might contain radioactive elements.
Criminal (Individual)	Lone Actor 5	<ul style="list-style-type: none"> Potential availability of fissile materials in the FSU
Criminal (Individual)	Lone Actor 11	<ul style="list-style-type: none"> Insider access and knowledge
Criminal (Individual)	Lone Actor 18	<ul style="list-style-type: none"> Insider access
Criminal (Unconfirmed Individuals)	Lone Actors 19	<ul style="list-style-type: none"> Potential availability of fissile materials in the FSU
Criminal (Unknown Individuals)	Unknown 20	<ul style="list-style-type: none"> Potential availability of radiological materials in the FSU
Criminal (Drug Peddling Individuals)	Lone Actors 13	<ul style="list-style-type: none"> Access to dealers and traders that transact business with scrap metals that contain uranium
Ethno-Nationalist Religious: Sunni Islamist	Chechen Militants	<ul style="list-style-type: none"> Access to commercial medical, agricultural and oil well logging equipment that employ radiological materials Access to Russian nuclear smugglers Access to organized crime Alleged access to Russian nuclear fuel repositories Access to radon special combines in the FSU Seizure or theft of radiological materials in the FSU
Socialist/Communist	Fuerzas Armadas Revolucionarios de Colombia (FARC)	<ul style="list-style-type: none"> Potential access to intermediaries willing to sell RN materials
Ethno-Nationalist	Real Irish Republican Army (Real IRA)	<ul style="list-style-type: none"> Planned theft / seizure of spent nuclear fuels from nuclear power stations
Mentally Ill (Individual)	Individual: Justice Guerillas	<ul style="list-style-type: none"> Radiological materials housed in commercial facilities
Mentally Ill (Individual)	Lone Actor 20	<ul style="list-style-type: none"> Insider access to iodine-125
Religious: Sunni Islamist	Al-Tawhid	<ul style="list-style-type: none"> Potential vulnerability of research reactors
Religious: Sunni Islamist	al-Qā`ida	<ul style="list-style-type: none"> Access to isolated and poorly guarded border crossings Access to FSU scrap metal high in radioactivity Potential access to spent nuclear fuels Potential access to research reactors

Table 5.II.3. Radiological Opportunities Reflected in Adversary Profiles		
Group / Individual Type & Sub-Type	Group Name (From Perpetrator Profiles)	Opportunities Suggested to Date
		<ul style="list-style-type: none"> • Alleged access to intact nuclear weapons from FSU
Religious: Sunni Islamist	Islamic Jihad	<ul style="list-style-type: none"> • Potential access to Russian nuclear workers • Availability of fissile materials in the FSU
Religious: Sunni Islamist	Jamiat-ul-Mujahideen / Shahadat-ul-Hikma	<ul style="list-style-type: none"> • Alleged access to uranium from FSU • Alleged access to criminal cartels
Religious: Sunni Islamist	Salafiyya Jihadiyya	<ul style="list-style-type: none"> • Potential vulnerability of radioactive materials in transport
Socialist/Communist (Marxist-Leninist, Maoist, Stalinist, etc)	Khmer Rouge	<ul style="list-style-type: none"> • Access to uranium allegedly “Made in USA”
“Terrorist Group” (Likely Ethno-Nationalist)	Unknown 18 (likely Chechen Militants)	<ul style="list-style-type: none"> • Potential access to Russian weapons-storage facilities
Unknown (Likely criminal)	Lone Actor 20	<ul style="list-style-type: none"> • Insufficient security for radiological materials at universities
Unknown (Possibly Religious: Sunni Islamist)	Unknown 23 (possibly linked to al-Qā`ida)	<ul style="list-style-type: none"> • Access to commercial oil well logging equipment that employs radiological materials

Demonstrated opportunity factors of concern can be summarized as follows:

a) Potential Physical Sources of Radiological Material

- FSU
- “Orphaned” uranium potentially produced in the United States
- Nuclear fuel repositories
- Spent nuclear fuels from nuclear power stations
- Research reactors
- FSU scrap metal high in radioactivity
- Radiological materials housed at universities
- Commercial medical, agricultural and oil well logging equipment that employ radiological materials
- Radiological materials housed in commercial facilities
- Radioactive materials in transport

b) *Potential Human Sources of Radiological Material*

- Russian nuclear workers
- Organized crime/criminal cartels
- Intermediaries willing to sell radiological materials, including Russian and other “nuclear smugglers”
- Private dealers and traders that transact business with scrap metals and/or other mineral materials that have low radioactivity

5.III. Comparing Empirical Data with Existing Literature

After extracting insights from the RANNSAD profiles, it is valuable to consider the extent to which these insights accord with the conclusions that appear in the existing literature, which collectively represents the “conventional wisdom” among scholars. Even though much of the literature is based on empirical data, it is often not clear whether scholars were aware or made use of a comprehensive set of previous RN-related VNSAs. This comparison therefore serves as something of a validation of the literature, while highlighting any features that we did not see in the existing corpus of work in this area. The comparison will be made according to weapons type, with the understanding that some repetition is unavoidable, especially with respect to motivations.

5.III.1. Nuclear Weapons

1. **Motivations: Empirical Findings v. “Conventional Wisdom”**

- a. **Similarities.** There are so few historical cases which unequivocally involve nuclear materials or weapons and for which the motivation is known or can be inferred (at most, 11 RANNSAD cases), that the empirical record cannot serve as a robust test of conventional wisdom one way or another. However, the rare cases seem to support some of the conclusions drawn from the literature. Most importantly, the largest number of reported cases of attempts to obtain materials for such weapons are attributable to Sunni jihadist organizations, specifically al-Qā`ida and Chechen jihadist groups operating under the direction of Shamil Basayev. The danger posed by apocalyptic groups is borne out by the Aum Shinrikyō case, but as this single case is the source of many commentators’ concerns about this type of group, its appearance in the empirical record does not lend much weight to the literature’s proposition. Two potential motives that usually receive less detailed examination in the literature, but for which there is tentative evidence in the case profiles, are the utilization of nuclear weapons for blackmail

purposes (the initial Chechen threats) and for financial gain (the USS Trepang case).

- b. **Differences.** There are no substantial discrepancies between the conventional wisdom and empirical evidence, at least with respect to motivations for pursuing or attempting to use nuclear weapons.

2. Capabilities: Empirical Findings v. “Conventional Wisdom”

- a. **Similarities:** With regard to nuclear capabilities, areas of concordance between the empirical evidence and “conventional wisdom” include:
- Agreement that no extant VNSA is capable of manufacturing an improvised nuclear device (IND) from first principles (including extracting and processing or enriching fissile materials).
 - Both sources illuminate the potential vulnerability of fissile materials during transportation.
 - The empirical evidence gives weight to the conventional wisdom that al-Qā`ida has fallen victim to numerous fissile material sales scams revealing that they may not (at least in the past) have possessed the relatively inexpensive equipment required to test putative nuclear material.
 - The empirical evidence supports the conventional *perception* that Chechen rebels have periodically attempted to penetrate Russian nuclear facilities in a quest to acquire weapons-grade fissile materials and intact nuclear weapons.
 - The empirical evidence may give credence to the conventional wisdom that the purchase of putatively available intact nuclear weapons would cost tens of millions of dollars. Similarly, both detail alleged sales or planed sales of supposed plutonium-239 with costs that hover around \$1 million for 10 pounds.
 - The empirical evidence gives some support to the conventional wisdom that insider help gives VNSAs an advantage in overcoming security, evading detection and identifying specific fissile material storage areas.
 - The empirical evidence may give weight to the conventional wisdom that VNSAs have the capability to reconnoiter nuclear facilities without immediate detection.
- b. **Differences:** With regard to nuclear capabilities, no substantive areas of difference exist between the empirical data and conventional

wisdom. However, while a large amount of books and journal articles have explored the *potential* nuclear capability of VNSAs, the empirical data reveals a paucity of incidents illuminating *authentic* VNSA nuclear capabilities.

3. Opportunities: Empirical Findings v. “Conventional Wisdom”

- a. **Similarities:** With respect to nuclear opportunities, areas of concordance include:
- Both empirical data and conventional wisdom account for a burgeoning VNSA interest in nuclear materials that increased steadily from the 1980s through the early twenty-first century.
 - Similarities exist between the empirical data and conventional wisdom regarding a relationship between the rise of jihadist ideology to nuclear opportunities. Both sources reflect a trend line that begins in the early to mid-1990’s and increases unabated through the mid-part of this decade.
 - Similarities between the two exist as well in the prominence of al-Qā’ida’s activities related to opportunities to acquire nuclear weapons.
 - When comparing actual physical nuclear opportunities, the empirical data and conventional wisdom generally agree in the opportunities that are afforded to terrorists by: 1) spent nuclear fuels, 2) research reactors, 3) state officials (e.g., the military or intelligence agencies) and 4) criminal non-state intermediaries.
 - The importance of the human component in nuclear opportunities is also a common refrain in the empirical data and conventional wisdom. The latter consistently warns of the dangers of inside access or collusion with VNSAs; the former outlines specific incidents where insider access has provided significant nuclear opportunities for VNSAs. The same trend exists with regard to organized crime and nuclear smugglers: the empirical data demonstrates what conventional wisdom frequently warns of.
 - Geographically, both focus primarily on the former Soviet Union (FSU) as the source of most nuclear opportunities.
- b. **Differences:** While there are no clear differences between the two sources in relation to nuclear opportunities, the empirical evidence suggests additional areas of concern that are not often highlighted in the literature:
- The possibility of non-Muslim ethno-nationalist groups exploiting nuclear opportunities (reports implicating the Provisional Irish

Republican Army [Provisional IRA] and Real Irish Republican Army [Real IRA]).

- A greater emphasis on perceived nuclear opportunities not only in the FSU and the United Kingdom, but Spain, Serbia, France, Croatia and Australia as well. The empirical data also draws attention to South Asia and Southern Africa as additional regions of concern.

5.III.2. Radiological Weapons

1. Motivations: Empirical Findings v. “Conventional Wisdom”

- a. **Similarities**. With regard to motivations for using radiological weapons, an examination of RANNSAD shows that areas of concordance between the empirical evidence and “conventional wisdom” include:
 - The motivations for terrorist groups to use radiological or nuclear weapons are diverse.
 - VNSAs are familiar with the fear-inducing properties of radiological weapons.
 - VNSAs often seek radiological weapons not to cause injury, but for coercion or publicity purposes.
 - Opportunity can be a powerful motivating factor in the selection of radiological weapons from the spectrum of other means of causing harm.
 - Jihadists are among those with the greatest interest in radiological weapons.
- b. **Differences**. There are obviously some areas of discrepancy between conventional wisdom and the empirical evidence:
 - The literature pays far less attention to lone actors as possible perpetrators than is suggested by the historical evidence.
 - Mental illness coupled with prior access to radiological materials is not emphasized in the literature, but several profiles reflect this combination is relevant.
 - The literature does not highlight revenge or personal grudges as a driving factor in using radiological materials, although these appear prominently in the perpetrator profiles.

2. Capabilities: Empirical Findings v. “Conventional Wisdom”

- a. **Similarities.** With regard to radiological capabilities, areas of concordance between the empirical evidence and “conventional wisdom” include:
- Availability of crude bomb making instructions.
 - Occasional access to RDD “user’s manuals.”
 - After having obtained radiological materials, an emphasis by both on sophisticated VNSA’s ability to engage in radiological attacks.
 - The theoretical ability of VNSAs to transport radiological materials for use in RDDs across borders and continents is present in both the empirical data and conventional wisdom.
 - Both sources explore VNSA interest in acquiring radiological materials closer to their final target so as to avoid detection.
 - Indications in both sources, both implicit and explicit, that RDD construction methods will soon become far less difficult for unsophisticated VNSAs.
 - Links between the illicit drug trade and a VNSA’s ability to obtain and weaponize radiological materials.
 - Cases in which VNSAs have putatively sought uranium for an RDD despite the fact that other radiological agents are far better suited for such a weapon.
 - Both sources explore RDD-capable VNSAs that have demonstrated tactical and strategic depth.
 - Both conventional wisdom and empirical evidence explore and demonstrate the hazards of non-shielded interactions with some radiological materials. Similarly, both investigate the impact that suicidal VNSAs have on radiation shielding requirements.
 - Both sources examine and demonstrate overall Chechen rebel capabilities with regard to RDDs.
- b. **Differences.** With regard to radiological capabilities, areas of difference exist between the empirical data and conventional wisdom. Consequently, conclusions in the literature that may require revisiting include:
- Potential or actual RDD seeking VNSAs that are linked to trans-national arms purchases (e.g., the Provisional IRA).
 - *Other* radiological delivery mechanisms, as described in the perpetrator profiles, e.g., mail, food and toothpaste, are not discussed in the literature.
 - The empirical evidence suggests that specific VNSAs may be capable of constructing not only crude bombs but, in

contrast to the conventional wisdom, relatively sophisticated RDDs as well (i.e., the December 1998 incident in Argun, Chechnya).

- The empirical data demonstrates the importance of a VNSA's ability to network and their "connections" vis-à-vis the ability to acquire materials for an RDD. Conventional wisdom, in contrast, does not place as much of an emphasis on this as a method of radiological material acquisition.
- The empirical evidence demonstrates that VNSAs frequently have little to no understanding of radioactive materials; conventional wisdom does not adequately address this crucial knowledge gap.

3. Opportunities: Empirical Findings v. "Conventional Wisdom"

- a. **Similarities.** With regard to radiological opportunities, areas of concordance are as follows:
- Reports of incidents relating to violent non-state actor involvement with radiological materials began in earnest in the 1970s, steadily increasing throughout the 1980s, 1990s and the early twenty-first century.
 - With the exception of some types of lone actors, the types of perpetrators that the literature points to as being of major concern are those that took advantage of radiological opportunities, i.e., criminals, Ethno-nationalists, jihadists, the mentally ill, right-wing extremists and "unknown" perpetrators.
 - Both the conventional wisdom and historical cases emphasize the increasing involvement of jihadists in attempting to create and exploit opportunities to acquire radiological materials. Both sources reflect a trend line that begins in the early to mid-1990s and increases unabated through 2007.
 - Similarities between the two exist as well in their focus on al-Qā`ida -related radiological opportunities. (However, as noted below, differences exist in how the two treat other jihadist groups.)
 - When comparing the potential sources of radiological opportunities, the empirical data and conventional wisdom generally agree that high-threat areas are: 1) spent nuclear fuels; 2) research reactors; 3) acquisition of commercial sources, i.e., medical, agricultural and oil-well logging equipment that employ radiological materials; 4) the dangers emanating from dealers and traders of scrap metals; and 5) acquisition from state officials (e.g. the military or Russia's FSB).

- Geographically, both primarily focus on the Former Soviet Union (FSU) as the source of most radiological opportunities.
- b. **Differences.** With regard to radiological opportunities, the empirical record differs from conventional wisdom in that:
- The empirical data contains more incidents of lone actor involvement, vis-à-vis radiological materials, than one would expect if the literature is viewed as the benchmark.
 - The empirical data present several cases of potentially contaminated junkyards and dealers and traders that transact business with potentially radioactive materials. In contrast, most open-sources focus solely on the 1987 incident in Goiania, Brazil, in which 1,375 curies of cesium-137 killed four and injured over 200.¹⁴
 - Conventional wisdom places much more emphasis on orphaned radiological sources, licensing fraud and the possibility of seizure during times of political or societal unrest than is reflected in the empirical data.
4. With regard to radiological opportunities, additional insights from the profiles (and other empirical information) that should be added to the findings from the literature survey include:
- The impact that media reporting of opportunities has on VNSAs access to radiological materials (i.e., does perceived opportunity lead to actual opportunities availing themselves?).

For more information on this brief, the *Anatomizing Radiological and Nuclear Non-State Adversaries* project, or START's work in general, please contact the lead investigator, Gary Ackerman, at gackerman@start.umd.edu or (301) 405-6656.

¹⁴ See, for example, Peter D. Zimmerman and Cheryl Loeb, "Dirty Bombs: The Threat Revisited," *Defense Horizons* No. 38 (January 2004), p. 3-4 and Charles D. Ferguson and William C. Potter, *The Four Faces of Nuclear Terrorism* (New York: Routledge: 2005), p. 270.