

Exercise 10

Target Analysis

Session Objectives:

After the session the participants will be able to do the following:

1. Understand the basic steps of target identification
2. Describe the SNRI targets in detail
3. Characterize specific targets with more detail
4. Prioritize targets based on guidance documents
5. Understand the graded safeguards concept
6. Identify roll up and understand why it is a concern
7. Recognize the Category for different materials

Estimated Time:

60 minutes in subgroups

+30 minutes in large group discussion

90 minutes total

Exercises:

1. Read the detailed SNRI site information on targets and target locations and fill out the Target Characterization Worksheet for your subgroup's assigned target.
2. Determine if roll up is credible in a particular area of the SNRI using the question that identify roll up. Once roll up is determined, use the Characterization of Nuclear Material Chart to determine what attractiveness and category the material rolls up to.

U.S. Department of Energy Graded Safeguards Table

Table C. Graded Safeguards Table

| | Attractiveness Level | Pu/U-233 Category (kg) | | | | Contained U-235/Separated Np-237/Separated Am-241 and Am-243 Category (kg) | | | | All E Materials Category IV |
|---|----------------------|------------------------|--------|----------|-----------------------|--|-------|--------|-----------------------|-----------------------------|
| | | I | II | III | IV ¹ | I | II | III | IV ¹ | |
| WEAPONS Assembled weapons and test devices | A | All | N/A | N/A | N/A | All | N/A | N/A | N/A | N/A |
| PURE PRODUCTS Pits, major components, button ingots, recastable metal, directly convertible materials | B | ≥2 | ≥0.4<2 | ≥0.2<0.4 | <0.2 | ≥5 | ≥1<5 | ≥0.4<1 | <0.4 | N/A |
| HIGH-GRADE MATERIALS Carbides, oxides, nitrates, solutions (≥25g/L) etc.; fuel elements and assemblies; alloys and mixtures; UF ₄ or UF ₆ (≥50% enriched) | C | ≥6 | ≥2<6 | ≥0.4<2 | <0.4 | ≥20 | ≥6<20 | ≥2<6 | <2 | N/A |
| LOW-GRADE MATERIALS Solutions (1 to 25 g/L), process residues requiring extensive reprocessing; Pu-238 (except waste); UF ₄ or UF ₆ (≥20% < 50% enriched) | D | N/A | ≥16 | ≥3<16 | <3 | N/A | ≥50 | ≥8<50 | <8 | N/A |
| ALL OTHER MATERIALS Highly irradiated ³ forms, solutions (<1g/L), compounds; uranium containing <20% U-235 or <10% U-233 ² (any form, any quantity) | E | N/A | N/A | N/A | Reportable Quantities | N/A | N/A | N/A | Reportable Quantities | Reportable Quantities |

¹The lower limit for Category IV is equal to reportable quantities in this Order.

²The total quantity of U-233 = (Contained U-233 - Contained U-235). The category is determined by using the Pu/U-233 side of this table.

³In this Order "highly irradiated" is defined in Attachment 4(Definitions).

Exercise 1: Read the detailed SNRI site information on targets and target locations and fill out the Target Characterization Worksheet for your subgroup's assigned target.

Instructions:

1. Read the detailed SNRI site information on targets and target locations.
2. Based on the detailed target information you have been provided and your assigned target, complete the Target Characterization Worksheet below with as much information as possible (your team may have to make some assumptions). Any incomplete areas will help to identify what additional information still needs to be collected.

| Target Characterization Worksheet | | |
|--|--------------------|-------------------------|
| Target: | | Target Location: |
| | Description | Comments |
| Material Form | | |
| Category | | |
| Container Characteristics | | |
| Restraints | | |
| Weight | | |
| Portability | | |
| Radiation Level | | |
| Discrete or Roll-up | | |
| Other: | | |

Exercise 2: determine if roll up is credible in a particular area of the SNRI using the questions that identify roll up. Once roll up is determined, use the Categorization Chart to determine what category the material rolls up to.

Instructions:

1. Using the guideline questions for roll up credibility, determine what amount of roll-up there is for your facility/areas.
2. Using the Material Chart, determine what category the material rolls up to.

Large Group Discussion:

1. Each group will present their findings to the group explaining how they determined the level of roll up.
2. Each group will explain what category they assigned to the roll up material.