

Table 2.3 Diversion Path Analysis: Generic Route U-233, Undeclared Facilities

POTENTIAL FACILITY / SOURCES OF MATERIALS	RISK RELEVANT PARAMETERS	THORIUM MINING	THORIUM MILLING	THORIUM CONVERSION	POWER/DUAL PURPOSE/ PRODUCTION REACTOR	RESEARCH & TEST REACTORS	THORIUM REPROCESSING	THORIUM CONVERSION	SMUGGLED THORIUM CYCLE MATERIALS			EXISTING STOCKPILES	
									Thorium Ore	Purified Thorium Compounds	Weapon Grade U-233		
LIKELIHOOD OF FACILITY ANOMALY (L)	NWS	low	low	low	high	low (< 10 MW, LEU fuelled); medium (> 10 MW, D20 moderated HEU fuelled, in-core experimental facilities, high (HEU used in isotope production)	low	low	low	low	low	high	
	NNWSD	low	low	low	high	as above	low	low	low	low	low	very low	
	NNWSU	high	high	high	low	as above	medium	medium	high	medium	high	very low	
IMPORTANCE OF FACILITY ANOMALY TO FINAL MATERIAL ACQUISITION (I)		high	low	low	high	medium, depending on reactor rating and neutron flux	high	high	low	high	low	medium	
DIVERSION SIGNATURES		•extracted from phosphate, monazite sands and uranium mining operations; other signatures as per Table 2.1	•Same as for see Table 2.1	•Medium size chemical reprocessing buildings with liquid wastes	•Same as equivalent Pu-239 facilities, see Table 2.2		•active discharges •active liquid waste tank storage	•small size chemical plant not distinctive •active emissions small	•material transportation shipments involve large volumes	•transportation involves small volumes of material	•transportation involves small volumes of material •radiation shielding needed	•intelligence information	
VERIFICATION METHODS	Technical Means	•Same as equivalent Pu-239 facilities, see Table 2.1			•Optical and infrared satellite reconnaissance	•Optical and infrared satellite reconnaissance	•remote environmental radioactive release monitoring	•not suitable	•intelligence information	•intelligence information	•intelligence information	•none	
	Routine Inspections	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	Special Inspections	•Needed to confirm thorium content	•Needed to confirm thorium separation/ concentration from ore	•Needed to confirm production of thorium and fuel fabrication process	Same as equivalent Pu-239 facilities, see Table 2.2		•U-233 analysis conclusive	•U-233 analysis conclusive	•interception required to confirm	•interception required to confirm	•interception required to confirm	•physical inspection and portable radiation monitoring to confirm Th-233	
EFFECTIVENESS OF VERIFICATION METHODS		Intent of thorium diversion could not be confirmed without mill process special inspection, unless other uses of ore could be discounted	SI needed to confirm separation of thorium	TM not conclusive, SI confirmation needed	Same as equivalent Pu-239 facilities, see Table 2.2		SI needed	SI needed	•Depends on intelligence sources	•Depends on intelligence sources	•Depends on intelligence sources	•ineffective, hidden stockpiles likely small size	
RISK OF DIVERSION (L x I)		Figure 3 gives risk ranking hierarchy. Relative rankings similar to those of Figures 3.2.2a, b and c for the equivalent declared Pu-239 facilities. Absolute risk will be much less than for Pu-239.											
		NWS	8	9	10	2(DP) 4(POW) 6(PROD)	4	3	3	7	5	5	1
		NNWSD	9	10	11	2(DP) 5(POW) 6(PROD)	4	3	3	8	7	7	1
		NNWSU	6	7	8	4(POW)	3	2	2	3	1	1	5