

North Korea's Nuclear Arsenal: Today, yesterday and tomorrow

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Today - estimated current nuclear capabilities (S.S. Hecker)

Nuclear Capability	December 2020 (Rough estimates)
Plutonium	25 – 48 kg
HEU (highly uncertain)	~650 – 900 kg
Tritium	Very limited
Nuclear devices (sufficient material)	~45 (20 to 60)* (Very few hydrogen bombs)
Nuclear device deliverable by SCUD & Nodong missiles	Yes
Nuclear device deliverable by IRBMs & ICBMs	Hwasong-12, 14, 15, 16? Not yet militarily useful.

* Numbers based on amount of bomb fuel available – may not all be weaponized

DPRK nuclear arsenal - yesterday

- **2000: End of Clinton administration – no nukes in DPRK**
- **2008: End of Bush administration – 4 to 6 nukes* (one nuclear test)**
- **2016: End of Obama administration – ~ 25 nukes (four more tests, missile advances)**
- **2020: End of Trump administration – ~45 nukes (one likely H-bomb test, major ICBM advances)**

* Refers to estimates of sufficient fissile materials for that number of nuclear bombs.

DPRK nuclear arsenal - yesterday

- **2000: End of Clinton administration – no nukes in DPRK**
 - No plutonium production
 - Missile test moratorium (after 1998 satellite launch)
 - Covert, nascent uranium enrichment program
- **2008: End of Bush administration – 4 to 6 nukes (one nuclear test)***
 - Restart plutonium production (likely also tritium)
 - Resumed missile testing
 - Accelerated uranium centrifuge program
- **2016: End of Obama administration – ~ 25 nukes (four more tests)**
 - Stopped and resumed plutonium production (also tritium)
 - Revealed and greatly scaled up uranium centrifuge program (HEU)
 - Greatly accelerated missile testing
- **2020: End of Trump administration – ~45 nukes (likely H-bomb test)**
 - Continued plutonium (and tritium) production – halted in 2018
 - Continued uranium centrifuge program (HEU)
 - Major missile advances – including ICBMs

* Refers to estimates of sufficient fissile materials for that number of nuclear bombs.

Tomorrow - possible nuclear capabilities (S.S. Hecker)

Nuclear Capability	December 2020 (Rough estimates)	December 2024 (Potential capabilities)
Plutonium	25 – 48 kg	25 – 65 kg
HEU (highly uncertain)	~650 – 900 kg	~1250 – 1600 kg
Tritium	Very limited	Greater supply
Nuclear devices (sufficient material)	~45 (20 to 60) (Very few hydrogen bombs)	~ 65 (40 to 90) Rand-Asan 151-242 by 2027 Not reasonable
Nuclear device deliverable by SCUD & Nodong missiles	Yes	Solid-fueled missiles Progress to submarines
Nuclear device deliverable by IRBMs & ICBMs	Hwasong-12, 14, 15, 16? Not yet militarily useful.	Potential nuclear-tipped ICBMs

A risk management framework – steps already taken by Kim Jong-un (blue)

Risk posed by nuclear assets/activities – red (very high, must be addressed), yellow (moderate – can be managed)

	Specific facilities or activities	HALT - short term < 1 year	ROLL BACK- medium term 2 to 5 years	ELIMINATE or SET LIMITS - long term – 6 to 10 years
Nuclear weapons	Nuclear arsenal	Cap	Declare & reduce	Eliminate & verify. Join NPT
Nuclear personnel	Scientists, engineers, techs	Assist in halting operations	Assist in roll back	Redirect to civilian programs
Nuclear tests	Nuclear tests	Moratorium/suspend	Ban	Ban (sign CTBT)
	Tunnels	Suspend activity	Close	Destroy
	Test infrastructure	Suspend activity	Dismantle	Dismantle & verify
Missile tests	IRBM & ICBM	Moratorium/suspend	Declare , disable & monitor	Destroy missiles, no developm.
	SLBM & Solid rocket motors	Moratorium/suspend	Declare, disable & monitor	Destroy missiles, no developm.
	New engine tests	Suspend	Halt & monitor	Ban tests and development
	SR & MR Missiles	Short term suspension	TBD – set allowable limits	TBD – set allowable limits
	Space Launch Vehicles	Short term suspension	TBD – establish protocol	TBD – establish acceptable limits
Plutonium	Inventory	Cap	Cap, declare & monitor	Eliminate
	5MWe reactor	Halt	Dismantle	Decommission
	ELWR	Halt or don't start	Inspect & future TBD	TBD
	IRT-2000	Halt	Dismantle	Decommission, possibly replace
	Reprocessing facility	Don't operate	Dismantle front end (no new fuel)	Dismantle & decommission
	Metal fuel fab facilities	Don't operate	Dismantle	Decommission
Fusion (H-bomb) fuels	Tritium	Halt reactors (as above)	Dismantle reactors & hot cells	Eliminate
	Lithium-6	Halt production	Dismantle production facilities	Eliminate
Uranium enrichment	HEU inventory	Limit (halt support facilities)	Cap, declare & monitor	Eliminate
	YB centrifuge facility	Halt & inspect	Inspect & future TBD	TBD
	Covert centrifuge facilities	Limit (halt support facilities)	Declare & inspect	Eliminate
No export	Nuclear & missile technology	No export pledge	No nuclear export. Join MTCR	No nuclear export. Join MTCR

A risk management framework – cooperate on civilian use (green)

Risk posed by nuclear assets/activities – red (very high, must be addressed), yellow (moderate – can be managed)

	Specific facilities or activities	HALT - short term < 1 year	ROLL BACK- medium term 2 to 5 years	ELIMINATE or SET LIMITS - long term – 6 to 10 years
Nuclear weapons	Nuclear arsenal	Cap	Declare & reduce	Eliminate & verify. Join NPT
Nuclear personnel	Scientists, engineers, techs	Assist in halting operations	Assist in roll back	Redirect to civilian programs
Nuclear tests	Nuclear tests	Moratorium/suspend	Ban	Ban (sign CTBT)
	Tunnels	Suspend activity	Close	Destroy
	Test infrastructure	Suspend activity	Dismantle	Dismantle & verify
Missile tests	IRBM & ICBM	Moratorium/suspend	Declare , disable & monitor	Destroy missiles, no developm.
	SLBM & Solid rocket motors	Moratorium/suspend	Declare, disable & monitor	Destroy missiles, no developm.
	New engine tests	Suspend	Halt & monitor	Ban tests and development
	SR & MR Missiles	Short term suspension	TBD – set allowable limits	No nuclear capable
	Space Launch Vehicles	Short term suspension	TBD – establish protocol	Joint ROK space program
Plutonium	Inventory	Cap	Cap, declare & monitor	Eliminate
	5MWe reactor	Halt	Dismantle	Decommission
	ELWR	Halt or don't start	Inspect & future TBD	LWR prototype
	IRT-2000	Halt	Dismantle	Replace for isotope production
	Reprocessing facility	Don't operate	Dismantle front end (no new fuel)	Dismantle & decommission
	Metal fuel fab facilities	Don't operate	Dismantle	Decommission
Fusion (H-bomb) fuels	Tritium	Halt reactors (as above)	Dismantle reactors & hot cells	Eliminate
	Lithium-6	Halt production	Dismantle production facilities	Eliminate
Uranium enrichment	HEU inventory	Limit (halt support facilities)	Cap, declare & monitor	Eliminate
	YB centrifuge facility	Halt & inspect	Inspect & future TBD	Technical, economic, political ?
	Covert centrifuge facilities	Limit (halt support facilities)	Declare & inspect	Eliminate
No export	Nuclear & missile technology	No export pledge	No nuclear export. Join MTCR	No nuclear export. Join MTCR