



**Reliable Replacement Warhead (RRW) Program**





- Continually repairing the old car ... or buying a replacement one that has the same performance, but built more efficiently and has enhanced safety and security like anti-lock brakes, air bags, and modern anti-theft features? What makes sense?

The car replacement example; a favorite NNSA metaphor for the Reliable Replacement Warhead program

## Nuclear Weapons Life Extension Programs and Modifications

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LEP strategy meeting at  
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## The Issue

- RRW program portrayed as only solution for long-term maintenance, reliability, and improvement of safety and security features on nuclear warheads
- How much is done and can be done with existing or future LEP and Alt programs?
- How much is enough?

The following is data from forthcoming report on warhead maintenance and production plans. Information from FOIA documents and private conversations



## Past/Current LEPs (by FPU date)

- **W87/Mk21**: LEP authorized in 1996. Rushed because of discovery of serious design defect in 1980s. LEP First Production Unit in 1999. Accepted as stockpile item in 2001. LEP completed in 2004. Changes made to both primary and secondary to “enhance structural integrity of warhead.” Same Mod-number. Life extended through 2030
- **B61-7/11**: LEP authorized around 2003. Production began 2005. FPU deliver in 2006. B61-11 completed (CSA replacement); B61-7 ongoing. Same Mod-numbers. Life extended through 2030
- **W80-0/1**: LEP authorized in 2004. FPU scheduled for 2008. New Mod-numbers: Mod-2/3. LEP halted in 2007 and deferred for future decision
- **W76**: Authorized around 2004. FPU in 2008. Production end in 2021. LEP of 63% of W76 stockpile (~2,000 warheads). New Mod-number: W76-1/Mk4A. Enhanced military capabilities on Trident D5 and new “surety devices for enhanced nuclear detonation safety.” Life extended for 20+ years



## Planned LEPs

- **B61-3/4:** NNLEP planned to begin 2009, with production in 2012. Includes GTS, UC, NG, and some radar replacement. Depends on future of European deployment; NEP LEP planned for 2023
- **W76:** NEP/AF&F LEP 2008-2014; same or “alternate design” 2015-2021
- **W78:** NEP in 2016. Replace GTS, CHE. NEP. Probably new Mod number
- **W80-1:** NEP LEP. Decision/date deferred. W80-3 or “alternate design.” W80-0 future in doubt
- **B83-1:** LEP planned for B83-1 in 2013. New NG
- **W87:** NG LEP 2018. Electrical components/firing sets. NEP LEP in 2030
- **W88:** W88/Mk5 production to begin 2009. NG/NEP LEP in 2021
  - After W88 pit production, continue with W87, B61-7, and B83





## Future LEPs and Alts

Fiscal Year	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
B61.3/4/10				6.2-6.2A		6.3-6.5		(NNLEP)																							
		6.3-6.5		Alt 356											6.2-6.2A		6.3-6.5		NEP												
B61.7/11		6.3-6.5		Alt 358/359													6.2-6.2A		6.3-6.5		NEP										
				6.2-6.2A		6.3-6.5		(NNLEP)																							
		6.3-6.5		Alt 357																											
W62	No Refurbishment Activity Planned																														
W76	6.3-6.5	W76-1 Base Design: AF&FNEP						W76-1 Base or Alternate Design																							
W78							6.2-6.2A		6.3-6.5	NEP																					
W80	6.3-6.5			W80-3 Base Design			W80-3 Base or Alternate Design			Web 2										6.2-6.2A		6.3-6.5	NEP								
B83.1							6.2-6.2A	6.3-6.5	(Alt 353)																						
				6.2-6.2A		6.3-6.5	NG																								
W84	No Refurbishment Activity Planned																														
W87							6.2-6.2A	6.3-6.5	(Alt 360)												6.2-6.2A		6.3-6.5	NEP							
		(Alt 345)						6.2-6.2A		6.3-6.5	NG																				
W88																6.2-6.2A		6.3-6.5	NG												



# Examples of Alterations (Alts)

- Alts can be LEP, part of LEP, or separate
  - Alt 345 GTS for W87/SERV; runs through mid-2009
  - Alt 353 GTS for B83-1
  - Alt 356 Spin rocket motor for B61-3/4/10; runs through 2011
  - Alt 357 “CSA LEP” for B61-7/11 to “correct serious concerns than could impact weapon reliability.”
  - Alt 358 Spin rocket motor for B61-7; runs through mid-2009
  - Alt 359 Spin rocket motor for B61-11; runs through mid-2009
  - Alt 360 GTS for W87





## What's Possible

- Replacement and improvement of primary, secondary, neutron generator, gas transfer system, pit backfill gas, potting, wiring, fuze, radar.
- Safety and Surety Features: Significant improvements can be made; CMD on B61-3/4, END on W76-1.
- New Insensitive High Explosives with more power, to “provide adequate margins in weapons having fixed delivery vehicle volumes and throw weights, while providing advanced safety and surety features that can take volume and add to the warhead weight.”
- Hydrodynamic tests used to develop new technologies faster: RRW design to first hydrodynamic test timeline was significantly shorter than during live nuclear testing program.



## What's Underway

- First-generation stockpile transformation technologies:
  - RRW-1 study
- Second-generation stockpile transformation technologies beyond RRW-1:
  - New pit materials and manufacturing
  - Enhanced surety
  - New radiation case materials and manufacturing
  - New high explosives development
- New primaries





## Some Questions to Ask

- How many of the RRW-features were already underway in LEP and Alt programs?
- Is RRW-1 version of Navy's Warhead Replacement Program?
- How is Advanced Certification Program different from SSP/LEP?
- Can conventional HE be replaced with new more compact IHE?
- Is requirement for new warhead security features to reduce cost of warhead storage site protection?
- How much security is enough? Who sets the bar?
- If safety and security is so critical, why was W84 retired and not W80?
- To what extent can hydrodynamic tests be used to proof test new or altered warhead designs?