

## Detailed Description of Key NIF Milestones for NNSA

Short Description	NIC EP Rev 4.0 Approved Title	Completion criteria	Due Date	MRT*
Facility approved for ignition shots	Complete Contractor Readiness Assessment for high yield	Complete Contractor Readiness Assessment for Phase 4 operations as defined in the Safety Evaluation Report for the Safety Basis Document	Q2 FY2011	4069
Diagnostics available for ignition shots	Complete operational qualification of the first set of NIC ignition diagnostics	Operationally qualify ignition diagnostics [Neutron Activation Detector (Cooper), Magnetic Recoil Spectrometer, Neutron Time-of-Flight (20 m), Gamma Reaction History, Neutron Imager, Neutron-Time-of Flight (4.5m) Bang Time, and hardened Gated X-ray Imager] to perform measurements of neutron yield, neutron spectrum, neutron image, and capsule bang time in tuning targets	Q2 FY2011	4076 Multi-Site
Systems, diagnostics and experimental capabilities demonstrated	Begin First Integrated Ignition Experiments	Complete MRT 360 criteria that represents the facility, systems, diagnostics and measurement capabilities can meet the requirements for ignition experiments	Q4 FY2011	360 Level 1
Preparing the fuel to for ignition	Conduct first THD Tuning experimental campaign to optimize Ignition Threshold Factor (ITF)	Conduct the first ITF/ITFX tuning campaign using a variety of experimental platforms to measure and tune adiabat, symmetry, implosion velocity and mix as well as yield and areal density to characterize target performance. Document the generalized Lawson criteria achieved, ITF and ITFX, and further document the remaining challenges to achieving ignition.	Q4 FY2011	4073
Demonstrating we can light the “match” – alpha heating	Conduct first DT implosion experimental campaign to demonstrate limited alpha heating	Demonstrate cryogenic layered DT experiments producing a neutron yield of $10^{16}$ which corresponds to about 30kJ of yield	Q2 FY2012	N/A
Completing the laser operations to give maximum head room	Demonstrate 1.8 MJ operations	Demonstrate that NIF operates at 1.8 MJ as defined in the Primary Criteria and Functional Requirements	Q2 FY 2012	N/A

Demonstrating ignition (burn)	Conduct DT implosion experimental campaign to produce Gain of 1	Demonstrate cryogenic layered DT experiments producing a neutron yield greater than $4 \times 10^{17}$ (Gain = 1). The definition of ignition, Gain = 1, is that used in the 1997 National Academy of Sciences review of the ICF Program, i.e., fusion energy output is greater than or equal to laser energy delivered to the target	Q3 FY2012	N/A
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\*MRT = Milestone Reporting Tool, which NNSA uses to support quarterly status reporting of NIC Level 1-2 milestones