

IV. CHANGING PROGRAM NEEDS

The *Comprehensive Site Plan* (CSP 2000) proposes future physical facilities for the Laboratory to carry out its mission. The CSP identifies the needs of current programs and attempts to accommodate their needs based on current trends in scientific research and development.

Needs Input

The program concepts presented here are based on interviews conducted with program division office representatives and organizations in the Laboratory.

The Nuclear Weapon Program (NWP) Office and its associated line organizations received particular emphasis. Support organizations, including E-Division and the Life Sciences Division, and divisions not under the direct purview of NWP, including the Material Science and Technology (MST) Division, Earth and Environmental Science (EES) Division and Physics (P) Division, provided additional input. The interviews helped to identify potential future directions and proposed possible options. Forecasts are for the 10-year planning horizon of this Comprehensive Site Plan.

DOE Laboratory Strategy

An important change is the Department of Energy (DOE) laboratories strategy. DOE and the Defense Programs (DP) are developing an integrated strategy for the nuclear weapons laboratories. As part of this strategy, Los Alamos National Laboratory will have responsibility for high-performance computing and simulation. The hydrodynamic test infrastructure and support throughout the complex will be consolidated at Los Alamos, including both x-ray-based and proton-based radiography as well as future advanced hydrotesting facilities.

Lawrence Livermore National Laboratory will have responsibility for high-performance computing and simulation and the National Ignition Facility. Sandia National Laboratories will have responsibility for Microelectronic Engineering Sciences and Applications (MESA). By capitalizing on the capability excellence at each laboratory, this integrated plan will address emerging stockpile stewardship requirements, ensure national security, and enhance scientific and research capability at these institutions in a comprehensive, responsive and cost-effective manner.

To rebalance the directed weapons workload, moving the responsibility for the W80 system from Los Alamos to Lawrence Livermore is being addressed. In addition, DOE will direct efforts in pulsed-power facilities such as Pegasus and Atlas toward Nevada and will enhance the capabilities of the Nevada Test Site in the areas of subcritical experiments and advanced diagnostics. The Comprehensive Site Plan will be left flexible to accommodate changes required by this integrated strategy.

Integrated Laboratories Implications for Los Alamos

The implications of the integrated strategy for Los Alamos consist of two main components: super-fast computing, and advanced hydrodynamic testing.

The first component of the DOE integrated strategy for Los Alamos is the development of TeraOps supercomputer capabilities for the Stockpile Stewardship Program. Trends indicate a growing dependence upon larger and faster computational capabilities for the Science-Based Stockpile Stewardship (SBSS) Program and other problems related to national security. Los Alamos will have a major role in this development. Future applications for supercomputers solving problems related to biological, earth, and social sciences.

The second component of the integrated strategy is the designation of Los Alamos to host the Advanced Hydrotest Facility (AHF) for the Science Based Stockpile Stewardship Program. The AHF has two major pieces at the Laboratory. The first piece is the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT), See Figure IV-1, and the second is the Proton Radiographic Facility (P-RAD). The following narrative describes issues gleaned from the interviews for the CSP that identify options and opportunities for facilities and infrastructure related to program needs.

Summary Missions/Alternatives/ Requirements Tables (SMART)

The table at the end of this section relates program missions to facility alternatives and requirements. The table is called Summary Missions/Alternatives/Requirements Table (SMART).

The SMART matrices capture the forecasted 10-year program mission activities and link the activities to required facilities needed to accomplish the work. Related high priority projects (see project list in Section VIII) are

referenced when it is appropriate to link mission requirements with needed facilities. In many cases the SMART Table shows that projects have yet to be defined or funded that will address these mission requirements.

The SMART matrices comprise the distilled program needs assessment of the CSP.

Figure IV-1: DARHT Facility



Program Issues

1. Significant Analytical Chemistry Needs Exist

Presently, the principal facility for a full suite of analytical chemistry capabilities exists at the Chemistry and Metallurgy (CMR) building at TA-03. Because CMR operates as a Category II Nuclear Facility, any non-nuclear analytical chemistry procedure incurs extraordinary costs. Programs with nonnuclear analytical chemistry needs must either develop their own capabilities or have the analysis performed at other laboratories.

Interviews with organizations that depend upon analytical chemistry suggest that locating their facilities within a Perimeter Intrusion Detection Assessment System (PIDAS) protected “nuclear campus” near TA-55 and other nuclear materials activities would afford special value with regard to materials transfer and security.

2. Transportation and Security Issues

E-Division has proposed the establishment of a non-public road connecting TA-54 with the nuclear campus. From a safeguards and security point of view, this provides for secure transportation of nuclear materials and relieves current public roads from periodic interruptions.

3. Nuclear Campus

The impact of establishing a nuclear campus incorporating TA-55 and portions of TA-35 will have an immediate and potentially negative impact upon the following.

National High Magnetic Field Laboratory (NHMFL)
The Laboratory must resolve the issues of operating any “user” facilities like the NHMFL so proximate to sensitive TA-55 facilities. The potential benefits associated with the research at this facility must be balanced against the cost savings associated with consolidating all Special Nuclear Materials (SNM) into a nuclear campus.

Target Fabrication Facility (TFF) - The Target Fabrication Facility was originally designed as a T₂ facility for performing materials research and development (R&D) and advanced manufacturing in support of the Laboratory’s Inertial Confinement Fusion (ICF) Program. The facility is still used for supporting all high-energy-density physics programs. This facility can continue to operate within a protected area but could perhaps take on a larger role in support of T₂ programs.

Atlas, Pegasus, and Trident - The integrated strategy proposes the relocation of the Atlas and Pegasus facilities from Los Alamos to the Nevada Test Site. The ultimate use of the facilities depends upon the needs of those using the relocated machine, or perhaps another use will be defined. Potential users could include the Non-nuclear Component Manufacturing Facility (NNCMF).

4. Is Bioscience the “Third Pillar” in the Laboratory’s Vision for the Future?

Laboratory management has suggested that the future vision for the Laboratory will be built on three main pillars: National Defense Programs, Strategic/Advanced Computing, and Bioscience.

What are the facilities and capabilities that must exist to make this vision a reality? Where do we locate the Bioscience enterprise? What are the other disciplines that should be accessible to the biological science community to promote synergistic interaction? All these questions suggest colocation of Bioscience into the TA-03 Core with location proximate to the advanced computing capabilities.

5. Do We Have a Plan for CMR Reuse?

The CMR Building located in TA-03 will be empty within the next 10 years. Is the CMR Building adaptable for new programmatic or other uses? NMT-DO personnel have determined that decontamination and decommissioning (D&D) of this building will be expensive. Renovation of the structure will also be costly.

Can CMR be upgraded to be an acceptable facility for housing Bioscience, EES, or for warehousing? Or is the best solution to remove the facility and create a parcel of land for new facilities?

6. Revitalization Strategies – Four Primary Areas

Revitalization of physical facilities focuses on four primary areas of the Laboratory. A brief discussion of revitalization needs for each area follows.

Experimental Engineering Planning Area: This area of the Laboratory constitutes the heart of the Hydrodynamic Test Program. DX and ESA Divisions are working together on the development of upgraded facilities for high explosives (HE) handling/processing/assembly, etc. The science based stockpile stewardship (SBSS) and stockpile management (SM) programs cover this work. DP-1, The Assistant Secretary for Defense Programs, must support the activities at these sites.

Core Planning Area: The Strategic Computing Complex (SCC) is the very heart of the SBSS mission and must be supported by DP-1. In the future, this capability will be critical for Bioscience and other leading-edge research at Los Alamos.

LANSCE Planning Area: LANSCE is the main driver for the Proton Radiography (P-RAD) program at the Laboratory, See Figure IV-2. It is one of the two main components of the Laboratory's integrated strategy. LANSCE hosts multi- and mixed-program, multiorganizational activities. The various groups that occupy and use the site must integrate their facility needs to accomplish their individual missions. There is a critical need for both classified and unclassified laboratory and office space by all occupants at the site.

Pajarito Corridor West Planning Area: This site is primarily a nuclear stockpile management (SM) and materials disposition (MD) site. The site is indispensable for SBSS.

Figure IV-2: LANSCE Facility



7. The Proposed Advanced Hydrotest Facility (AHF) Includes the Following Components

DARHT will need a major assembly support building with the capability to handle very large containment/confinement vessels for various hydrodynamic shots and dynamic experiments. Large radiographic capabilities that can do static radiography on “full-up” assemblies is also needed (See Figure IV-3).

TA-53 - PRISM/Proton Radiography Facility needs the same capability or a way to share this capability.

Advanced Hydrotest Facility (AHF) support from TA-55 is essential for the program at DARHT or PRISM. There is a programmatic need justifying the replication of at least three modules of PF-4 as being driven by the need to support the AHF Program for SBSS by DP-10 and DP-20 needs. This facility is very important to the SBSS Program, and will need support at the highest levels of DOE and the Congress.

Figure IV-3: Alternate view of DARHT facility



Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Stockpile Stewardship and Management</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Manufacturing					
<10 pits/year	Fabrication and assembly of Plutonium Components	Plutonium Facility (TA-55)		Support Stockpile Requirements (Something less, maybe much less, than 50 pits/year)	Fabrication and assembly of Pu Components
	Analytical Chemistry & Materials Characterization	CMR (TA-03)	By 2010 nuclear weapon missions are to be out of CMR due to facility age & condition.		Optimized Analytical Chemistry & Materials Characterization for Manufacturing Facility should support all aspects of the nuclear weapons missions including waste management activities
	Non-Nuclear Component Fabrication & JTA support. Materials characterization and process development. Material could include depleted Uranium	SIGMA (TA-03)	Capability to perform WR machining does not exist. Need support facility / capabilities. Need to upgrade dimensional inspection		Non-Nuclear Component Fabrication & JTA Support. Material could include depleted uranium
1 Neutron Tube Target Loader, <1000 targets/yr		WETF (TA-16) & TA-21 Support	TA-21 is being closed	2-3 Neutron Tube Target Loaders, 3500-4500 targets/yr.	

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
<p>Facility Upgrades to TA-55 Facility upgrades include refurbishment of existing facilities for Pu component manufacturing and construction of new space, Additional capabilities include a high energy X-Radiography capability as well as cold support laboratory space, change rooms and offices.</p>	<p>Prepare Pajarito Corridor West Area Master Plan to establish program space requirements and identify suitable sites for facility upgrades.</p>	
<p>Replacement of CMR Building functions commensurate with support to future DOE program missions</p>	<p>Define the requirements of the replacement facility including location and floor space. Facility should be sized to support all Laboratory analytical chemistry needs. (e.g., waste mgmt, non-nuclear components, etc.) Design, build and operate as a nuclear Cat III or less facility. Identify the reuse potential for CMR building. Absent a suitable reuse, estimate cost for D&D and removal.</p>	<p>CMR Replacement</p>
<p>Upgraded Sigma building or a new facility to support non-nuclear component manufacturing. A new facility, the Non-nuclear Pit Component Facility (NPCF) has been proposed for construction adjacent to the Sigma Building. This facility will include aspects of SM39, the Laboratory machine shop, and manufacturing capabilities commensurate with limited WR Pit production. Potential reuse of the Antares Hall and surrounding facilities at TA-35 for potential manufacturing facilities.</p>	<p>Identify the location , space and capability requirements for the new NPCF. Determine the affect of new construction on necessary ongoing operations in existing facilities. Can existing buildings at TA-35 currently used for Atlas be reconfigured for NPCF?</p>	
<p>Consolidation of TA-21 capabilities to WETF</p>	<p>Establish relocation space for TA-21 functions to TA-16 (WETF) and define the cost for D&D and removal of TA-21 buildings. Transfer of capability from TA-21 to building 16-450, an addition to the WETF facility. Installation of a third NTT loader in building 450. Reconfiguration of the basement of building 450 for R&D space.</p>	<p>WETF - Roof Upgrades</p>

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Stockpile Stewardship and Management</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Manufacturing (cont.)					
Detonator production capable of <3000/yr.	Manufacture of detonators	High Explosive Facilities		Detonator production capable of 6000-8000/yr.	Manufacture of detonators
Fabrication of JTAs & other non-nuclear pit components	Manufacturing	Administrative Support Facilities at TA-03, TA-08, TA-16, & TA-55			Consolidated facilities based upon manufacturing activity
Support of manufacturing processes	Static radiography & non-destructive examinations	Radiography Capabilities		Support of manufacturing processes	Weapons component radiography & non-destructive analysis
	Machine shop support	Main Shops (TA-03)			Machine Shop Support

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Based upon the Directive schedule for fabrication of detonators, there is a forecasted minimum need to double the existing space (43,000 sq. ft.)	New detonator facilities and office space at TA-22. Expand the existing explosives detonator facility space TA-22, bldgs 91 and 93.	
Additional space at manufacturing technical areas including TA-03 and TA-55, TA-35.		
Perform non-destructive evaluations on all assemblies in all stages of manufacturing and development.	Upgraded capabilities or new radiography facility located near DARHT.	DARHT
Upgraded shops and/or relocation to the NPCF. Potential sites are TA-03, TA-35. Facilities need to be upgraded.	Potential use of Antares Hall at TA-35 for non-nuclear manufacturing	

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Stockpile Stewardship and Management</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Surveillance					
20 pits per year	Disassembly of pits and recovery of SNM	Plutonium Facility (TA-55)		40 pits per year	Disassembly of pits and recovery of SNM
	Analytical Chemistry & Materials Characterization	CMR (TA-03)	By 2010 nuclear weapon missions are to be out of CMR		Analytical Chemistry & Materials Characterization
	Non Nuclear Component Surveillance	SIGMA (TA-03)			Non Nuclear Component Surveillance
	Limited Neutron Tube Target Surveillance	WETF (TA-16) & TA-21 Support	TA-21 is being closed		Robust Neutron Tube Target Surveillance
	Limited weapons surveillance (valves), polymer aging, weapons component aging	Engineering Facilities			Multiple weapons surveillance, polymer aging, multiple weapons component aging
Surveillance of 10-12 Detonator sets/yr	Perform surveillance on detonators 800 MeV Neutron source	High Explosive Facilities Accelerator Facilities		Surveillance of 75-150 Detonator sets/yr.	Perform surveillance on detonators 800 MeV Neutron source

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Additional cold laboratory and office space. Increased numbers of retired weapons and increased component age will necessitate the additional diagnostic capabilities in the “hot” laboratory space.	Identify capability and space needs to conduct surveillance program that integrates the Stockpile Stewardship needs with Stockpile maintenance (e.g. connect to the AHF program.)	
Transfer the activities to the facility that replaces the functional capability currently at CMR	Define the requirements of the replacement facility including location and floor space. Identify the reuse potential for CMR building. Absent a suitable reuse, estimate cost for D&D and removal.	CMR Replacement
Transfer of the surveillance activities to an upgraded Sigma building to support non-nuclear manufacturing, or a new facility. The proposed NPCF could/would serve this function.	Determine the projected requirements for non-nuclear component manufacture and surveillance and determine exact facilities/capabilities and location requirements.	
Transfer of the capabilities to WETF	Prepare plan for disposition of facilities at TA-21 Establish relocation space for TA-21 functions to TA-16 (WETF) and define the cost for D&D and removal of TA-21 buildings.	
Consolidated facilities and additional space @ TA-16		
High Explosive Facility consolidation and additional facilities	Prepare LANSCE Mesa Area Master Plan	
Maintenance of LANSCE for hydrodynamic testing and source of protons for radiography cinematography		AHF

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Stockpile Stewardship and Management</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Surveillance (cont.)					
Surveillance of 10-12 Detonator sets/yr	Non nuclear component surveillance	Administrative Support Facilities at TA-03, TA-8, TA-16		Surveillance of 75-150 Detonator sets/yr.	Consolidated facilities based upon manufacturing activity
Surveillance of 100 RTGs/yr	Recover Pu 235	Facilities at TA-55		Similar as current	Continue as current
	Analytical Chemistry & materials characterization	CMR (TA-03)	By 2010 nuclear weapon missions are to be out of CMR		Continue as current
Two dimensional radiography, 5-10 experiments/yr	Weapons component radiography & non-destructive analysis	Radiographic Facilities		Three dimensional radiography, 10-20 experiments/yr.	Weapons component radiography & non-destructive analysis & Heavy assembly facilities for containment /confinement tests at DARHT and PRISM
	800 MeV Neutron source	Accelerator Facilities			800 MeV Neutron source
Two dimensional hydrodynamic calculation support	Pulse power drives ICF experiment	Pulsed-Power Facilities		Three dimensional hydrodynamic calculation support	

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Additional space at surveillance technical areas		
Advanced Hydrotest Facility (AHF) as embodied in proton radiography techniques and DARHT/Diagnostic “X” capabilities for advanced hydrotesting upgraded capabilities or new radiography facility	Complete second axis of DARHT and build additional support laboratories	DARHT AHF
Maintenance of the LANSCE facility and capability		TA-53 Cooling Tower TA-53 RLW
Relocation of the Atlas pulsed power machine to NTS relocation of Pegasus to UNLV	Facilities are necessary for the conduct of high energy density physics experiments necessary to understand phenomena occurring in nuclear weapons.	Atlas

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Stockpile Stewardship and Management</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Surveillance (cont.)					
Limited weapons certification / surveillance and sub-critical experiment support (<1/ month).	Visual examination and measurements	Engineering Facilities		Multiple weapons certification /surveillance for manufacturing and multiple sub-critical experiment support (2-3 month).	Visual examination and measurements
Certification					
Annual weapon certification to the nation	In Progress-Pit Manufacturing Process Certification	Plutonium Facility (TA-55)		Similar as current	Robust Certification program for Pit Manufacturing
	In Progress-Analytical Chemistry and Materials Characterization Process Certification	CMR (TA-03)	By 2010 nuclear weapon missions are to be out of CMR		Certified Analytical Chemistry and Materials Characterization Processes
	In Progress-Non-Nuclear Manufacturing Process Certification	SIGMA (TA-03)			Certified Non-Nuclear Manufacturing Processes
	Limited Neutron Tube Target Certification	WETF (TA-16) & TA-21 Support	TA-21 is being closed		Robust Neutron Tube Target Certification

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Consolidate engineering facilities at TA-16, build additional manufacturing support facilities, including enhanced non-destructive evaluation (NDE) capability.	Prepare Experimental Engineering Area Master Plan to refine program space requirements and select suitable sites for required facilities.	
Additional cold laboratory and office space.	Identify program space and capability requirements. Select a location within the proposed nuclear campus. Prepare Pajarito West Area Master Plan.	
Transfer of certified processes to the replacement facilities for the CMR Building	Define the requirements of the replacement facility including location and floor space. Identify the reuse potential for CMR building. Absent a suitable reuse, estimate cost for D&D and removal.	CMR Replacement CMR Upgrades
Transfer of the certification activities to an upgraded Sigma building to support non-nuclear manufacturing or to a new facility	Incorporate into program for upgrading the Sigma building, or defining a new facility.	
Transfer of the certification activities to WETF	Establish relocation space for TA-21 functions to TA-16 (WETF) and define the cost for D&D and removal of TA-21 buildings.	

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Stockpile Stewardship and Management</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Certification (cont.)					
Annual weapon certification to the Nation	Weapons Certification Facility Infrastructure	Administrative Support Facilities		Similar as current	Weapons Certification Facility Infrastructure
Certification of 1000 detonators/yr		High Explosive Facilities		Certification of 2000 –3000 detonators/yr.	
		Supercomputing Facilities			
Nuclear Materials					
Pit and Plutonium /Uranium storage	Constrained Pit and Plutonium/Enriched Uranium Storage	- Plutonium Facility (TA-55) - TA-18		Pit and Plutonium/ Uranium storage	Robust Pit storage and Reduced Uranium and Plutonium Inventories
Plutonium /Uranium storage	Constrained Plutonium and Enriched Uranium Storage	CMR (TA-03)		Plutonium/ Uranium storage	Reduced Uranium and Plutonium Inventories
Depleted Uranium storage	Constrained Depleted Uranium Storage	SIGMA (TA-03)		Materials for non-nuclear components and hydro tests	Reduced Depleted Uranium Inventory
Tritium storage and handling	Sub-optimized Tritium storage and Handling	WETF (TA-16) TA-21 Support	TA-21 is being closed	Boost systems, tritium R&D.	Optimized Tritium operations

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Certification Facilities at various technical areas		
New Detonator Facility and support space		
Supercomputing Complex at TA-03	Under construction	SCC
Additional vault space at TA-55 and disposition of excess nuclear materials offsite —Disposition of all nuclear materials out of TA-18	Laboratory and DOE must work together to identify a site for the storage of SNM that is in excess of programmatic needs. A site should be chosen that already incurs large security cost and which will be minimally impacted by a larger volume of SNM. Identify a site either at another location or within the Laboratory, where critical experiments can be performed.	
Disposition of all nuclear materials out of CMR and TA-03. Should move to have material out of TA-03 within 12 – 18 months.	Removal of SNM from TA-03 will reduce security cost at CMR, thus making CMR building more attractive for other occupants. Potential rehab could lead to reuse by the Biosciences Division or others.	
Disposition of excess nuclear materials offsite, or relocate into a new facility located at Pajarito West, i.e. TA-35 Atlas facility	Laboratory must identify capability needs and facility and site location	
Ensures the capability maintenance necessary to have a strong R&D base in tritium technology.	Identify capabilities and facility requirements at existing TA-16 site	

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Research and Technology Development</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Basic/Applied Research and Technology Development					
Maintain core competencies to design, test, & manufacture nuclear weapons	Pit Manufacturing Process Development	-Plutonium Facility (TA-55) -Sigma Complex (TA-03) -Machining and Inspection TA-03, TA-16		Maintain core competencies to design, test, & manufacture nuclear weapons	Pit Manufacturing Process Development
	Analytical Chemistry and Materials Characterization Process Development	CMR (TA-03)			Analytical Chemistry and Materials Characterization Process Development
	Non-Nuclear Materials and Manufacturing Process Development	SIGMA (TA-03)			Non-Nuclear Materials and Manufacturing Process Development
	Tritium Process Development	WETF (TA-16) & TA-21 Support	TA-21 is being closed		Tritium Process Development
	Criticality Experiments	TA-18			Criticality Experiments

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Additional cold laboratory and office space.	Laboratory capabilities and additional facility space must be defined and appropriate siting must be selected. Support for hydro testing and surveillance activities will require new space. Prepare Pajarito West Area master Plan.	
Transfer of activities to the replacement facilities for the analytical chemistry and characterization facilities currently located in CMR building.	Identify the facility and capabilities necessary to support the total NWP.	CMR Replacement
Transfer R&D activities in materials and processes to an upgraded Sigma building to support manufacturing and process development for all aspects of the nuclear weapons program.	Conduct trade studies to determine cost effectiveness of buying components from other DOE sites, commercial suppliers, or establish new capabilities at the Lab. Investigate the cost effectiveness of reuse of facilities like the Atlas Facility at TA-35 for a manufacturing laboratory for the NWP.	
Transfer of the R&D Activities currently done at TA-21 to WETF	Identify capabilities and facility requirements at existing TA-16 site. Capabilities should include both the advanced engineering and research aspects of tritium science.	
Relocation to another site. The DAF at NTS has been identified as a potential location. Some functions could be retained in the Pajarito West Planning Area while other criticality machines could be relocated to NTS. One critical assembly machine may be retained at Los Alamos.	Identify a site either at another location or within the Laboratory, where nuclear criticality experiments can be performed. Identify new location and physical space requirements for resulting buildings. Identify impacts upon the new site and disposition of the existing site and physical space requirements for resulting facilities.	

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Research and Technology Development</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Basic/Applied Research and Technology Development (cont.)					
Maintain core competencies to design, test, & manufacture nuclear weapons	Engineering Science	Engineering Facilities		Maintain core competencies to design, test, & manufacture nuclear weapons	Engineering Science
	Stockpile Explosives evaluation & R&D	Stockpile Explosives evaluation & R&D			Advanced Explosives development & R&D
	Stockpile weapons code development	Supercomputing Facilities			Advanced Computing & Architecture, weapons code design & development
	Administrative, Facility & Infrastructure Support	Administrative Support Facilities			Administrative, Facility & Infrastructure Support
	Machine shop support	Main Shops (TA-03)			Machine Shop Support
	Actinide Science & Seaborg Institute	Plutonium Facility at (TA-55) CMR(TA-03)			Actinide Science & Seaborg Institute
	Materials Science	SIGMA (TA-03)			Materials Science
	Tritium Science	WETF (TA-16) & TA-21 Support	TA-21 closing		Tritium Science

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Additional R&D space and office space	Activities related to all aspects of surveillance and certification must be used to justify enhanced capabilities.	
Additional high explosive R&D space and heavy assembly facilities are required to conduct the Advanced Hydro Program		
New Supercomputing complex. Activities in the SCC must be supported by benchmarking experiments in upgraded facilities	Enhance the “collision probability” between scientists in all areas of science based stewardship to improve predictive capabilities without nuclear testing.	SCC
Revitalization of TA-03 and other administrative support facilities at The Laboratory		
Potential sites include the Atlas facility in TA-35	Upgraded shops and/or relocation.	
Additional cold laboratory and office space located in the proposed “Nuclear Campus” of TA-55. Transfer of activities to the replacement facilities for the CMR Building	Laboratory capabilities and additional facility space must be defined and appropriate sites selected.	CMR Replacement
Transfer of the S&T activities to an upgraded Sigma building to support non-nuclear manufacturing or a new facility	Define the capabilities required and identify the facilities and siting requirements consistent with the trade studies performed for NWP support.	
Transfer of the S&T activities to WETF	Identify capabilities and facility requirements at existing TA-16 site.	

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Research and Technology Development</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Basic/Applied Research and Technology Development (cont.)					
Maintain core competencies to design, test, & manufacture nuclear weapons	Criticality Experiments	TA-18		Maintain core competencies to design, test, & manufacture nuclear weapons	Criticality Experiments
	International Atomic Energy Agency (IAEA) Interactions	-Nonproliferation & Arms Control Facilities -International Technology & Security Facilities			IAEA Interactions
Advanced Hydrodynamic Testing					
Hydrotesting of simulated nuclear weapons components	Hydrotesting is the most important diagnostic for nuclear weapons performance short of nuclear testing	PHERMEX	Scheduled for closure		
	Two dimensional radiography, 5-10 experiments/yr	DARHT Facilities		Dual axis motion picture flash X-rays	Three dimensional radiography, 10-20 experiments/yr.
	Two dimensional hydrodynamic testing and calculation support	LANSCE		Multiple axis Proton Radiography for full 4 π assemblies	-Three dimensional hydrodynamic testing and calculation support -Proton Radiography cinematography

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Relocation to another site	Identify a site either at another location or within the Laboratory, where critical experiments can be performed.	
		NISC
	PHERMEX is scheduled for mothballing	
The completion of DARHT and it's supporting facilities is at the heart of the Laboratory's hydrotest program. There are no viable options. Advanced Hydrotest Facility (AHF) and advanced proton radiography techniques Upgraded capabilities or new radiography facility	Completion of 2 nd axis of DARHT Diagnostic "X" Completion of assembly support facilities to utilize this facility	AHF
Proton Radiography using LANSCE as the source of diagnostic protons	Use LANSCE accelerator at TA-53. Consider relocation to NTS	AHF

Summary Missions/Alternatives/Requirements Table

<i>Nuclear Weapons Research and Technology Development</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Advanced Hydrodynamic Testing (cont.)					
Hydrotesting of simulated nuclear weapons components	Flyer plates, pin shots, etc.	Multiple specialized firing sites for experiments of various types	Maintaining integrity of buffer zones is an issue Protection of wildlife and environment		Flyer plate, EOS, specialized testing of explosives and materials
Nuclear Weapons Simulation and Computing					
Improve data representation of 3D simulation codes	Develop and deploy tera-scale technology for visualization and large scale simulations	LDCC		Improve data representation of 3D simulation codes	Develop and deploy tera-scale technology for visualization and large scale simulations
1-5 TeraOp Regime	Computing	Supercomputing Facilities		250-500 TeraOps Regime	Computing
Inertial Confinement Fusion and Radiation Physics (ICF & RP)					
Fundamental understanding of weapons physics	Supplies basic data on ignition and TN burn	Pulsed-Power Facilities Pegasus & Atlas		Similar as current	Continue as current
Accelerator Production of Tritium					
Tritium supply R&D	Formerly produced in production reactor	None	Now tritium supply needed in next 6-10 years.		Continue as current

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Potential to create new contained firing facilities		
Continue to develop networked systems. Develop higher speed platforms.	Continue development of 30-teraOps and 100-teraOps computer platforms. Build the SCC. Construct the SCC as the lynch pin (along with NISC) of TA-3 Revitalization	SCC NISC
Supercomputing Complex @ TA-03	Under construction	SCC
Atlas facility move to NTS Pegasus move to UNLV	How to prepare Los Alamos experiments for conduct in Nevada?	Atlas
Two commercial light-water reactors in TN by TVA. APT is designated backup technology for tritium supply.	Continue APT engineering development and demonstration activities.	APT

Summary Missions/Alternatives/Requirements Table

<i>Threat Reduction</i>					
<i>Current Requirements</i>	<i>Current Functions/Capabilities</i>	<i>Current Facilities</i>	<i>Current Issues/Concerns</i>	<i>Forecasted Requirements</i>	<i>Forecasted Functions/Capabilities</i>
Non Proliferation and International Security					
Provide technology to prevent global proliferation of nuclear, chemical, and biological weapons & materials	Detector development, JTOT	Nonproliferation & Arms Control Facilities		Provide technology to prevent global proliferation of nuclear, chemical, and biological weapons & materials	Detector development, JTOT
	Analytical chemistry and characterization	CMR (TA-03)	Current state of the facility		
	Nuclear nonproliferation training	SIGMA (TA-03)			Nuclear nonproliferation training
	Critical Experiments, JTOT activities	Critical Experiments (TA-18)			Critical Experiments, JTOT activities
	Detector development and international security	International Technology & Security Facilities			Detector development and international security
	Nuclear threat reduction	-Nonproliferation & Arms Control Facilities			Nuclear, biological, and chemical threat reduction
	Nonproliferation Surveillance	-International Technology & Security Facilities			Nonproliferation Surveillance
	Nuclear, Chemical, & Biological Surveillance				Nuclear, Chemical, & Biological Surveillance
Materials Disposition					
	The Laboratory has the nation's only mixed oxide fuel production capability.	ARIES glove box line at TA-55	Increases in stockpiles of surplus fissile materials due to US and Russian arms-control implementation	Training center and fuel fabrication demonstrations	Demonstrate technology for pit dismantlement and Pu conversion

<i>Alternatives/Options</i>	<i>Facility Strategies</i>	<i>Related Projects</i>
Nonproliferation and International Security Center, upgraded & possible relocated JTOT facilities		NISC
		CMR Replacement
Relocation of training activity to another site		
Relocation to more secure location. Suggested siting at DAF/NTS.		
Nonproliferation and International Security Center (NISC)	Construction of NISC as part of NISC TA-03 revitalization	NISC
New NIS Center and supporting facilities Definition of facility needs for controlling weapons of mass destruction, (i.e., nuclear, biological, chemical)	Potential reuse application of the CMR building? Can this building be retrofitted for some of this work?	CMR Upgrades
New NIS Center and supporting facilities		NISC
New NIS Center and supporting facilities		NISC
Storage and disposal of surplus weapons-usable fissile materials, including Pu ceramic vitrification and burning in reactors	Use ARIES at TA-55 as training center for operators of future Pit Disassembly and Conversion Facility.	