Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Facility Infrastructure Recapitalization Program
TA-46-577 **505/665-9515** **FAX 505/667-3989** **Mail Stop J590, Drop O1U**

Mission Need Statement
Sanitary Effluent Reclamation Facility Expansion
Critical Decision (CD)-0 Request, R.2

Non-Major System Acquisition Project

March 31, 2009

Originator:	Jeffrey J. Schroeder
Phone Number:	665-9515
Organization:	FIRP-PGIU
Effective Date:	
Controlled Distribution Date:	
Document Control Coordinator:	
Classification:	U
Reviewer:	Jack Ellvinger, ADC
Date:	April 1, 2009

MISSION NEED STATEMENT SIGNATURES

Submitted by:

Jeffrey J. Schroeder
Group Leader, SP-PGIU
Date: _____

Recommended by:

Date: _____

James R. Jones
SP Division Leader

Submitted by:

Michael Saladen
Technical Lead - SERF Expansion Project
ENV-RCRA
Date: _____

Approved by:

Date: _____

Melvin G. Burnett
Design Authority Representative
Engineering Services - System Engineering

Approved by:

Date: _____

Andrew Erickson
Facility Operation Director
Utilities & Infrastructure FOD

Approved by:

Date: _____

Thomas R. McKinney
Associate Director
Project Management and Site Services

Approved by:

Date: _____

James C. Cantwell
Associate Director
Environment, Safety, Health & Quality

Approved by:

Date: _____

Michael B. Mallory
Principal Associate Director
Operations

Approved by:

Date: _____

Joel Leeman
Deputy Principal Associate Director
Weapons Program

Approved by:

Date:

Isaac Valdez
Federal Project Director
NNSA-LASO

Approved by:

Date:

Donald L. Winchell, Jr.
Manager, Los Alamos Site Office
NNSA-LASO

Approved by:

Date:

Robert (Dino) Herrera
Director, Office of Infrastructure and Facilities Management
NNSA HQ

Approved by:

Date:

XX
XX
Management
NNSA-HQ

TABLE OF CONTENTS

TABLES

HISTORY OF REVISIONS

Revision No.	Document Date	Reason for Revision
0	September 5, 2008	Original Issue
1	November 6, 2008	Incorporation of LASO comments.
2	March 31, 2009	Incorporation of IPR Team Comments

ACRONYMS AND ABBREVIATIONS

ADPMSS:	**Project Management & Site Services Directorate**
AOC:	**Area of Concern**
BCP:	**Baseline Change Proposals**
CDR:	**Conceptual Design Report**
DOE:	**U.S. Department of Energy**
ENV:	**LANL Environnemental Protection Division**
EP:	**LANL Environmental Programs Directorate**
EPA:	**U.S. Environmental Protection Agency**
ES&H	**Environment, Safety, and Health**
F&OR:	**Functional and Operational Requirements**
FOD:	**Facility Operations Director**
ISM:	**Integrated Safety Management**
LANL:	**Los Alamos National Laboratory**
LASO:	**U.S. Department of Energy, NNSA Los Alamos Site Office**
LDCC:	**Laboratory Data Communications Center**
MGD:	**Million gallons per day**
NEPA:	**National Environmental Policy Act**
NNSA:	**National Nuclear Security Administration**
NPDES:	**National Pollutant Discharge Elimination System**
O:	**DOE Order**
OPC:	**Other Project Costs**
PCB:	**Polychlorinated biphenyl**
PEP:	**Project Execution Plan**
PR-ID:	**Project Requirements Identification System**
RCRA:	**Resource Conservation and Recovery Act**
RO:	**Reverse osmosis**
RRO:	**Risk Reduction Office**
SCC:	**Strategic Computing Complex**
SERF:	**Sanitary Effluent Reclamation Facility**
SME:	**Subject Matter Expert**
SWMU:	**Solid Waste Management Unit**
SWPP:	**Storm Water Pollution Prevention**
SWWS:	**Sanitary Wastewater System**
TEC:	**Total Estimated Cost**
TPC:	**Total Project Cost**
WBS:	**Work Breakdown Structure**
WET:	**Whole Effluent Toxicity**

Executive Summary

The National Nuclear Security Administration (NNSA) is responsible for maintaining the nation's nuclear weapons stockpile in support of the United States' nuclear deterrence policy. The NNSA's national security objectives are integrated and coordinated across the nuclear weapons complex. Los Alamos National Laboratory (LANL), an NNSA laboratory, is an important element in the nation's security strategy. It is a multi-program laboratory with the central mission of reducing the global nuclear danger by utilizing the following major elements:

- stockpile stewardship activities that ensure the United States has safe, secure, and reliable nuclear weapons through research and development, life extension program and a number of campaigns and directed stockpile work;
- nuclear materials management to ensure availability or safe disposal of plutonium, highly enriched uranium, and tritium;
- development of effective nonproliferation and antiproliferation technologies to deter, detect, and respond to the proliferation of weapons of mass destruction; and
- environmental stewardship projects that provide for the remediation and reduction of wastes from the nuclear weapons complex.

During the course of performing this work, LANL discharges more than 175 million gallons of treated wastewater per year through 15 permitted outfalls under its National Pollutant Discharge Elimination System (NPDES) permit. These outfalls support mission-critical research and development and waste management operations. In August 2007 LANL was issued a new NPDES Outfall permit by the U.S. Environmental Protection Agency (EPA Permit #NM0028355). Stricter effluent limitations along with July 2010 and July 2012 compliance deadlines will result in compliance issues for LANL if present discharges are not addressed. The stricter effluent limitations contained in the new permit cannot be met with existing treatment facilities at the Laboratory. Failure to resolve these compliance issues by the compliance deadlines could disrupt Laboratory operations and possibly expose NNSA and LANS to civil and criminal liability.

Within TA-03 there are four of these outfalls which serve facilities that support the NNSA mission. The means by which the Laboratory has selected to resolve the compliance issues associated with these outfalls is to minimize and/or eliminate the four outfalls located in TA-03. This outfall elimination will be accomplished by treating the wastewater released from the Sanitary Wastewater System (SWWS), the Strategic Computing Complex (SCC), the Laboratory Data Communications Center (LDCC), and the existing boiler at the TA-03 Power Plant and reusing it at various locations throughout TA-03. Cooling towers at the SCC, LDCC, and the Power Plant cooling tower and boiler will receive the treated effluent. In order to adequately treat this effluent, the existing Sanitary Effluent Reclamation Facility (SERF) will need to be expanded to provide increased capacity. Along with the SERF expansion capability, a new lift station may be installed and associated piping will need to be installed to transport the effluent to and from the SERF, the TA-03 cooling towers, and the Power Plant cooling tower and boiler.

1.0 Statement of Mission Need for the SERF Expansion Project

The mission need for the Sanitary Effluent Reclamation Facility (SERF) Expansion is to allow reuse of the effluent generated from the Sanitary Wastewater System (SWWS) plant, the cooling towers at the Strategic Computing Complex (SCC) and Laboratory Data Communications Center (LDCC), and the TA-03 Power Plant boiler and cooling tower. Boiler blowdown, cooling tower blowdown, reverse osmosis (RO) reject and other Power Plant wastewaters, which are currently discharged to an NPDES outfall, will be treated to meet reuse requirements. The existing SERF was originally constructed in 2003 to supply reclaimed sanitary effluent for use at the SCC. The existing SERF does not have the capacity to treat the expected amount of effluent and will need to be expanded. The expansion of SERF will provide treatment capacity, both in terms of volumetric flow and degree of treatment. This will allow the SWWS, SCC, LDCC, and Power Plant effluent to be treated and reused. This reuse will greatly reduce the amount of water that must be discharged to the environment, and will allow NPDES permit effluent limits to be met.

Along with the SERF expansion, additional piping will be needed to transport the effluent to the various facilities. Adequate pumping capacity will be required. The treatment and reuse of this effluent will result in elimination of discharges to Outfalls 03A027 and 03A199 and minimization of discharges to Outfall 001. Outfall 13S will be retained for emergency discharge use only.

In summary, the current and foreseeable regulatory environment at LANL creates uncertainty over the ability to meet increasingly stringent permit conditions with existing technology. Inability to meet permit conditions poses a significant risk to core programmatic activities that depend on permitted facilities. LANL's strategy for addressing this uncertainty and reducing the associated risk, as described in the NPDES Permit Compliance and Outfall Reduction Strategy (LA-UR-07-8312), is to eliminate as many permitted outfalls as possible.

The drivers for expanding the SERF capability are the Department of Energy (DOE) Strategic goals described in the DOE October 2006 Strategic Plan and the National Nuclear Security Administration (NNSA) Strategic Plan dated November 2004.

Department of Energy Strategic Goals
The Department of Energy's Overarching mission is to advance the national, economic, and energy security of the United States; to promote scientific and technological innovation in support of that mission. DOE stands at the forefront of helping the Nation meet our energy, scientific, environmental, and national security goals. These include developing and deploying new energy technologies, reducing our dependence on foreign energy sources, protecting our nuclear weapons stockpile, and ensuring that America remains competitive in the global marketplace. (Reference: DOE October 2006 Strategic Plan)

National Nuclear Security (NNSA) Goals
As NNSA continues to draw-down the nuclear weapons stockpile to the lowest levels since the 1950s, we must consider the long-term effects of aging and the implications of successive warhead refurbishments which take us further away from the tested designs of the Cold War stockpile. The current nuclear weapons complex is not sufficiently responsive to fix technical problems in the stockpile or to react to potential adverse geopolitical change. Therefore, the nuclear weapons stockpile and the supporting infrastructure must be transformed. The Department is working closely with its customers to transform the nuclear deterrent to ensure that it can meet the changing technical, geopolitical, and military needs of the future. A second challenge deals with the ever increasing threat of terrorism. The mere acquisition by terrorists or rogue regimes of nuclear and radiological materials which could be used in weapons of mass destruction or in a "dirty bomb" represents a threat to the United States and to international peace and security. (Reference: DOE October 2006 Strategic Plan)

NNSA Goal 1. NUCLEAR WEAPONS STEWARDSHIP: Ensure that our nuclear weapons continue to serve their essential deterrence role by maintaining and enhancing the safety, security, and reliability of the U.S. nuclear weapons stockpile. (Reference: NNSA November 2004 Strategic Plan)

Strategies to Reach this Goal: The NNSA conducts an effective and integrated program to restore, revitalize, and rebuild the nuclear weapons complex infrastructure. Two complementary programs, Readiness in Technical Base and Facilities (RTBF) and the Facilities and Infrastructure Recapitalization Program (FIRP), are essential to the operations, maintenance, and renewal of the physical infrastructure. RTBF provides the funding needed to operate and maintain the facilities required for annual assessments of the stockpile and warhead certification, thus ensuring the vitality of the nuclear weapons complex and meeting its goal of a consistent readiness level. FIRP is a capital renewal and sustainability program that was established principally to reduce the large backlog of deferred maintenance that had developed during the 1990's to an appropriate level consistent with industry best practices. FIRP also develops corporate facility management practices required to maintain the complex into the future as well as eliminating excess real property. (Reference: NNSA November 2004 Strategic Plan).

2.0 Analysis to Support Mission Need

Since 1993, the Laboratory has reduced the total number of outfalls from 141 to the current number, 15. During 2007, the Laboratory studied these remaining outfalls and devised a strategy for their mitigation and / or elimination. This study, entitled "NPDES Permit Compliance and Outfall Reduction Strategy (LA-UR-07-8312), was submitted to LASO in December 2007. The purpose of this effort was to develop a compliance strategy to evaluate and recommend options to maximize effluent reuse and to treat, reduce, or eliminate these remaining NPDES outfalls. Four of these remaining outfalls will be eliminated, or the amount of their discharge greatly reduced, if the SERF capability is expanded. The outfall reduction strategy also evaluated reducing waste streams, reusing effluent, and conserving potable water. To support the Laboratory objective of sustainable operations and water conservation, the strategy identified reuse for industrial processes as the best use of treated effluent. This reuse of effluent reduces the amount of potable water used for the processes and reduces discharges to the environment.

The strategy document's recommended actions were selected based on how well the proposed project met the evaluation criteria. The criteria which were developed to meet the objectives of the outfall reduction strategy are:

- Compliance with effluent limits of the new NPDES permit;
- Zero discharge from Laboratory operations where feasible;
- Increased sustainability of Laboratory operations by reducing the need for potable water and electrical energy where feasible;
- Compatibility with programmatic needs and schedules;
- Acceptability to facility operations;
- Providing the appropriate level of treatment technology to achieve compliance; and
- Providing maximum flexibility to meet future regulatory requirements.

The strategy document subdivided LANL's 15 remaining outfalls into six groups based on function and geography. The intent of the Outfall Reduction Program at LANL is to implement the strategy at each of the six groups independently, i.e. each outfall group is separable and distinct from the others. LANL's Environmental Protection Division – RCRA and Water Quality Group (ENV-RCRA) prioritized these six groups based on vulnerability to Laboratory missions associated with regulatory noncompliance. The Group 1 outfalls (which are the four outfalls which will be mitigated by expansion of the SERF capability - outfalls 03A027, 03A199, 001, and 13S) were determined to present the greatest vulnerability to the ability of the Laboratory to continue operations. The SERF expansion and the related work described in this document will reduce these outfalls as close as currently feasible to the Laboratory's Environmental Management System's goal of zero liquid discharge by 2012.

As a follow-on to the development of the outfall reduction strategy NNSA/LASO requested LANL prepare and submit a Preliminary Project Execution Plan (Preliminary PEP) for each of the five Outfall Groups needing construction work to achieve NPDES compliance. Included in the Preliminary PEPs was a cost estimate for execution of the project, as well as draft Functional and Operational Requirements (F&ORs). Development of these documents included an analysis of both benefits and risks. The benefits and risks identified are as follows:

Risks associated with not meeting the NPDES Permit compliance schedule include:

- Fines and penalties ($25K/day per violation), and
- Potential shutdown of mission critical facilities due to permit non-compliance (SWWS, Power Plant, SCC and LDCC).

Benefits associated with the reduction of the four Group 1 outfalls include:

- Reduces 4 NPDES Outfalls to 2 NPDES Outfalls (1 of which will be retained for emergency use only) and improves environmental compliance;
- Reduces potable water use Lab-wide. In addition, completion of this project may achieve the water conservation goal for the NNSA complex and may greatly assist efforts in water conservation across the DOE complex;
- Reduces and/or eliminates discharges to Sandia Canyon;
- Decreases expected water costs – re-use of effluent presently discharged to the environment is expected to save approximately $270k per year; and
- Improves water quality to the SCC and LDCC cooling towers, increases the cycles of concentration, reduces maintenance costs, and prolongs life expectancy of cooling system equipment.

Additional benefits beyond NPDES permit compliance include:

- Treatment required to remove contaminants to meet the stringent requirements will produce finished water that is valuable as feed water to industrial processes including cooling tower and steam boiler makeup.
- The potential for supplying boiler make-up water from the SERF product water could result in TA-03 Power Plant operating cost savings due to a reduction in treatment chemicals from ion-exchange regeneration and energy and reject water from reverse osmosis.
- Cooling towers and power plant boilers presently served by potable water are limited in evaporative cycles of concentration by the presence of total silica and total dissolved solids. Switching to SERF product water could allow for a far greater number of cycles of concentration, resulting in less water consumption and less addition of chemicals.

To achieve these benefits, the SERF product water may need to be conditioned for industrial re-use. This conditioning may entail mixing the SERF product water with some SWWS effluent, or some other type of conditioning to be determined during the Conceptual Design Phase.

2.1 Capability Gap

The SERF was originally constructed in 2003 to supply reclaimed sanitary effluent for use at only the SCC. The facility was proven to be operable and ran for a short period of time, but several factors contributed to the facility being placed in standby mode. Lack of sufficient funding for personnel and operations, and inflexibility with process water requirements at the SCC ultimately led to the shutdown of the facility. At the present time, LANL Utilities and Infrastructure Division is conducting an effort to restart the SERF. It is expected that this restart will occur near the end of FY09 and original processing capabilities will be achieved by Spring 2010.

The SERF as originally designed does not have the capacity to treat the expected amount of effluent and will need to be expanded. The expansion of SERF will provide treatment capacity, both in terms of volumetric flow and degree of treatment, which will allow the SWWS, SCC, LDCC, and Power Plant effluent to be treated to allow reuse, thereby greatly reducing the amount of water that must be discharged to the environment, and allowing NPDES permit effluent limits to be met.

The SWWS, placed online in 1992, collects primarily domestic wastewater from Laboratory facilities. It is an extended-aeration, activated sludge wastewater treatment system. The design flow is 0.6 million gallons per day (mgd); average flow in 2006 was 0.28 mgd.

The SWWS and Power Plant treated effluents are currently combined and discharged to the environment through Outfall 001 into Sandia Canyon. Blowdown from the SCC and LDCC cooling towers is discharged through Outfalls 03A027 and 03A199, respectively, into Sandia Canyon. However, an integrated approach to reduce or eliminate discharges to NPDES-permitted outfalls through water reuse does not exist. To achieve the integrated approach objective, treated effluent from the SWWS plant will receive additional treatment at the SERF and be used to meet the water demands for the Power Plant, SCC, and LDCC. Cooling tower blowdown from SCC and LDCC will be returned to SERF, thereby eliminating all discharges to outfalls 03A027 and 03A199. Boiler and cooling tower blowdown and other routinely-generated nonsanitary wastewaters from the Power Plant will also be returned to SERF, thereby eliminating the need to discharge these wastewaters to the environment. Discharges to Outfall 001 will be reduced to treated SWWS effluent that cannot be reused due to periodic reductions in demand and/or treated effluent that must be discharged to maintain the wetland in upper Sandia Canyon.

To meet the objective of reducing the number of outfalls in TA-03, the SERF and the water and water management systems for the Power Plant, SCC and LDCC need to be modified and/or expanded. These modifications will increase the capacity of the SERF, modify the piping systems to facilitate effluent transfer to and from the SERF, eliminate discharges from two NPDES-permitted outfalls, maintain a third outfall in the permit for emergency use (i.e., a no-discharge outfall), reduce discharges from a fourth NPDES outfall, assure that discharges from this outfall meet NPDES permit limits, and significantly reduce the amount of potable water needed to operate the Power Plant, SCC, and LDCC. The functional requirements of the project address the following primary areas:

- The ability to treat and store sufficient flows and quantities of water to eliminate discharge of non-treated SWWS effluent to the environment;
- Eliminate discharge of non-treated blowdown from the Power Plant, SCC, and LDCC to the environment and meet boiler and cooling tower make-up requirements of the Power Plant, SCC, and LDCC;
- The ability to treat wastewater to a sufficient quality to meet the NPDES effluent limits for Outfall 001 and to meet process requirements for the Power Plant, SCC, and LDCC; and
- The ability to transfer treated wastewater from SERF to the Power Plant, SCC, and LDCC for reuse and to return blowdown from the Power Plant, SCC, and LDCC to SERF.

The NPDES permit, which went into effect in August 2007, requires the Laboratory to meet more stringent effluent discharge concentration limits for metals and temperature by July 2010 and polychlorinated biphenyls (PCBs) and Whole Effluent Toxicity (WET) by July 2012. Without treatment, the present effluent discharge concentrations from Outfall 001 will exceed the more stringent metals and temperature limits that will become effective in July 2010. The estimated completion schedule for this project does not show the SERF expansion to be operational by July 2010. LANL has prepared a strategy to address this issue. Recognizing the schedule issues, LANL already has begun negotiations with EPA to obtain some relief from this requirement.

If the mission need is approved, during the Conceptual Design Phase of the SERF Expansion the Integrated Project Team will explore interim treatment options that would be outside of the SERF Expansion, which may be utilized to meet the permit requirements on a temporary basis until the SERF Expansion project is completed.

2.2 Performance Requirements and Capability Analysis

The SERF Expansion must provide treatment and storage capacity sufficient to meet the water requirements of the Power Plant, SCC, and LDCC. In addition, treated effluent must meet NPDES permit requirements should excess treated water need to be discharged through Outfall 001. The required treatment and storage capacity will depend on the SERF operating schedule but must be sized to handle the flows from the various facilities outlined below. The design phase of the project will determine capacities by balancing operating costs against capital costs for treatment throughput and storage. Longer daily hours of operation would allow lower treatment flow capacity and storage requirements for influent and/or treated water. Conversely, shorter daily hours of operation would require higher treatment flow capacity and storage requirements so that treated water can be stored to allow treated water demand to be met while the treatment system is not operating. Regardless of the operating schedule, the system should provide adequate storage capacity to allow treated water demand to be met for three days while treatment system is off line. Storage tank TA-03-336 is an existing 500,000 gal. storage tank for SWWS effluent with 100,000 gal. of this capacity dedicated for fire suppression water for SWWS. The remaining 400,000 gal. capacity can be used for this project.

Representative flows based on the outfall reduction strategy document are:

- SWWS effluent – 300,000 gal/day
- SCC cooling tower blowdown – 18,600 gal/day
- LDCC cooling tower blowdown – 10,800 gal/day
- Power Plant boiler blowdown – 43,000 gal/day
- Power Plant sump drainage – 5,000 gal/day
- Power Plant RO reject – 25,000 gal/day

Design flow rates will depend on the operating conditions of generating facilities and will be developed during the Conceptual Design Phase.

Based on the Outfall Reduction Strategy Report, representative water demands to be met with treated water through the SERF Expansion are:

- SCC cooling tower makeup –200,000 gal/day
- LDCC cooling tower makeup –40,000 gal/day
- Power Plant boiler makeup –10,000 gal/day
- Power Plant cooling tower makeup – 200,000 gal/day

Design flow rates will depend on the operating conditions of the receiving facilities and will be developed during the Conceptual Design Phase.

2.3 Alternatives Discussion

Three alternatives have been developed to address NPDES permit compliance.

Alternative 1:

No Action: Recommends that nothing be done to fix the deficiencies identified by the NPDES Permit Compliance Outfall Reduction Strategy (LA-UR-07-8312). This alternative does not address the regulatory risks that LANL faces under NPDES permit compliance and compliance with DOE O 430.2B. Non-compliance with NPDES permit conditions could result in LANL having to discontinue effluent discharges to the permitted outfalls. Without the ability to discharge effluent to these outfalls, mission-critical operations at LANL would be disrupted.

Alternative 2:

Expansion of the SERF capability and elimination of some outfalls, as described in this Mission Need Statement: Expanding the present SERF to house expanded and new sanitary effluent treatment systems, installing piping and pumping infrastructure, and eliminating two permitted outfalls by treating and recirculating water. Regulatory risks are addressed under Alternative 2. Mission critical operations will continue under Alternative 2.

Alternative 3:

Treatment of discharges at individual facility locations: Recommends treatment at each individual facility by installing treatment systems at the SWWS, LDCC, SCC, and the Power Plant. Preliminary analysis of this option indicates that the costs associated with the installation, operation, and maintenance of this equipment likely would be much greater in the long run than treatment at a consolidated facility (SERF). In addition, SWWS effluent could not be reused, and would continue to be discharged to the environment. Specifically, as long as LANL continues to discharge effluent to the environment, it is exposed to potential regulatory liability as a result of more restrictive discharge effluent limitations (both in constituent makeup and effluent concentration limits) that may be imposed in subsequent NPDES permits. Also, discharging effluent rather than reusing it does not help LANL to make progress toward compliance with the reduced potable water use requirement in DOE O 430.2B.

3.0 Importance of Mission Need and Impact if Not Approved

LANL program missions will be placed at substantially higher risk if this project is not funded. Failure to maintain compliance with regulatory requirements may result in disruption of mission-critical activities, assessment of fines, and/or civil and criminal liability.

The new NDPES permit and State of New Mexico Environment Department's (NMED) certification requirements for the permit have effluent limits that cannot be met with existing treatment facilities at the Laboratory. Even with construction of advanced treatment facilities, compliance with the permit's extremely low effluent limits is uncertain. The Laboratory recognizes the active outfalls as an environmental and mission-endangering liability and has targeted a combination of reduction and elimination of the outfalls in the 2007 Goals and Objectives of the Laboratory's Environmental Management System. In summary, if the mission need is not approved and the SERF Expansion cannot move forward, the following benefits will not be achieved:

- Outfalls 03A027 and 03A199 and their associated discharges will not be eliminated. The SCC and LDCC cooling towers will continue to release blowdown into Sandia Canyon through Outfalls 03A027 and 03A199.
- Approximately 300,000 gal. per day of effluent will continue to be discharged into Sandia Canyon through Outfall 001.. Without the SERF expansion, none of this effluent will be transported to the expanded SERF for treatment and re-use.
- Discharges from Outfall 001 may not meet new NPDES permit limits.
- The SCC and LDCC cooling towers may not experience uninterrupted operations, due to inability to provide adequate make-up water or receive blowdown. The expansion will support full operation of SCC and LDCC by providing cooling tower make-up water and reclaiming cooling tower blowdown.
- No loss of operating time for TA-03 Power Plant boiler due to inability to provide adequate make-up water or receive blowdown and other wastewaters. The expansion will support full operation of the TA-03 Power Plant using reclaimed boiler make-up water and other wastewaters.
- The Laboratory will not have the opportunity to achieve a substantial reduction in potable water usage. SWWS effluent will continue to be discharged to the environment, rather than being re-used..

4.0 Constraints and Assumptions

Project constraints and assumptions will be identified through the LANL Permit Requirements Identification System (PR-ID) as well as through Integrated Project Team collaborative efforts. Constraints and assumptions will encompass elements that apply, but are not limited to: execution; operation; environmental aspects; geography; safety; and organizational coordination.

4.1 Tailoring

DOE Order 413.3A allows the Federal Project Director to identify those areas that a project plans to "tailor" during each Critical Decision phase, and to explain/discuss each tailored area.. Tailoring of requirements must be appropriate relative to project risk, complexity, visibility, cost, safety, security, and schedule. Tailoring may involve consolidation of critical decisions, substitution of equivalent documents, concurrency of processes, and/or adjusting the scope of Independent Project Reviews and External Independent Reviews to match the size, risk, and complexity of the project. The Federal Project Director, with the support of the Integrated Project Team, has identified several aspects of the Order for consideration of tailoring. During the course of the conceptual design phase and the development of the Preliminary Project Execution Plan these requirements will be explored further and a "Tailoring Strategy" will be developed for submittal by the Federal Project Director for the Acquisition Executive's approval.

This "Tailoring Strategy" will address several aspects of the 413.3A requirements. The requirements which will be examined are: 1) the combination of two critical decisions - CD–2 and CD–3. The project supports the utilization of a Design-Build contractor which would require NNSA to approve Critical Decisions 2 and 3 at one time; and 2) using the design-build process to meet the requirements of a Value Engineering study. One of the advantages to the design-build process is the concept that companies involved in a specific field understand means and methods by which costs can be minimized without sacrificing quality. Following is a justification supporting the use of "tailoring".

- The SERF Expansion is technically a low risk project. The technology used in this facility is proven "off the shelf" components. The processes in the expanded portion of the facility are essentially duplicates of processes already installed and operating.
- Schedule compression is needed in order to comply with the current NPDES Outfall Permit. These compliance requirements carry with them an aggressive completion date. Even though these dates may not be achievable due to Congressional budget cycles, the Laboratory benefits from demonstration of an aggressive schedule during negotiations with the EPA.
- The marketplace contains companies with the expertise to design and construct facilities such as the SERF. These companies are familiar with the technology and methods that can be utilized to meet the Laboratory's requirements.
- The project team's preliminary risk analysis indicates minimal risk associated with the execution phase of the project.

Further details of the tailoring strategy will be developed during the conceptual design phase and included in the Preliminary Project Execution Plan.

4.2 Operational and Execution Limitations

The SERF expansion must provide treatment and storage capacity sufficient to meet the water requirements of the Power Plant, SCC, and LDCC. In addition, treated effluent must meet schedule and concentration requirements in the NPDES permit. The required treatment and storage capacity will depend on the SERF operating schedule but must be sized to handle the

flows from the various facilities outlined below. The design phase of the project will determine capacities by balancing operating costs against capital costs for treatment throughput and storage. General operational and execution limitations are listed below.

- Discharge from Outfall 001 may need to be continued to maintain the wetlands in upper Sandia Canyon. The amount of discharge needed to maintain the wetlands will be determined based on a Biological Assessment and consultation with the U.S. Fish and Wildlife Service.
- SCC and LDCC cooling towers' operating conditions can be increased.
- Space is not available in the existing SERF for installation of all treatment equipment needed to treat additional flow. The footprint of the facility will need to be expanded.
- NPDES permit metals concentration and temperature limits effluent requirements must be met by July 2010.
- The expanded SERF must be operational by July 2010 or interim treatment options may need to be implemented.
- Treatment may need to be added to SERF to meet the new NPDES permit effluent limit for PCBs for Outfall 001 by 2012.
- Installation of new piping in the vicinity of the Power Plant will involve extensive potholing due to the presence of numerous existing underground utilities, which could potentially increase cost and schedule beyond those assumed in this document.
- Controlled access to portions of the Power Plant, SERF, SCC, and LDCC will be necessary, which could potentially increase cost and schedule beyond those assumed in this document.
- A plan for SWWS operation during the SERF Expansion execution phase will need to be developed to identify constraints, if any, related to expanding SERF without adversely affecting SWWS operations.
- A plan to install new piping to transport make-up water provided by SERF must be developed and coordinated with interfacing facilities to identify constraints.

4.3 Organizational, Geographic, or Environmental

The ability to expand the footprint of the SERF will be constrained by the presence of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) associated with the former TA-03 wastewater treatment plant. Preliminary consultation with LANL's Environmental Programs (EP) Directorate, which is responsible for disposition of SWMUs and AOCs under LANL's Consent Order with NMED, has indicated that the SERF expansion can be coordinated with investigation and remediation of SWMUs and AOCs. The success depends on timely coordination with EP. It is assumed that EP's required activities under the Consent Order can be coordinated with the SERF Expansion so that the schedule will not be negatively impacted and future investigation or remediation activities will not negatively affect the expanded SERF facility.

4.4 Standards and Requirements

The SERF Expansion will be designed and constructed in accordance with the LANL *Engineering Standards Manual,* PD 342..

4.5 Environmental, Safety, and Health Requirements

The LANL Permit Requirements Identification system (PR-ID) is utilized to ensure the appropriate reviews regarding environmental, safety, and health (ES&H) compliance are conducted. A PR-ID has been created and subject matter experts' comments have been received. There are no indications of any issues which will impact or affect the potential

SERF Expansion at this stage of development. If issues arise, they will be resolved with the subject matter experts, and additional requirements, if any, will be incorporated.

4.5.1 Environmental Concerns

NEPA
LANL's Environmental Protection Division's Risk Reduction Office (ENV-RRO) will prepare a National Environmental Policy Act (NEPA) review document requesting a determination of the required level of NEPA documentation. It is likely that an Environmental Assessment may need to be prepared. The NEPA documentation determination will be made by DOE/NNSA`s NEPA Compliance Officer.

Air Emissions
Notification to NMED regarding air emissions or a permit for the SERF evaporator may be needed. Necessary information will be provided to LANL environmental compliance oversight staff about the chemical make-up of RO reject that will be treated in the evaporator and the fuel type and consumption rate if the evaporator is not electrical. With this information, the staff will determine if notification to NMED is required.

Prior to performing any demolition or major facility modification, a notification is required if encountering asbestos is anticipated. Once the start of construction approaches, the work will be closely coordinated with the environmental staff to determine if advance notification to NMED is required, and to ensure that any asbestos-containing material is properly mitigated.

Waste Management
LANL environmental compliance oversight staff must verify compliance with LANL's Hazardous Waste Facility Permit before activities that could generate waste regulated under the permit could be conducted, or must verify compliance with Hazardous and Solid Waste Management regulations and internal Laboratory procedures. LANL environmental compliance subject matter experts (SMEs) will be engaged in early planning and subsequent reviews to provide guidance for compliance with regulatory requirements.

Storm Water Pollution Prevention
Storm water pollution prevention is required under a NDPES Construction General Permit for Storm Water Discharge and an associated Storm Water Pollution Prevention (SWPP) Plan. The SWPP will be certified and implemented before a Notice of Intent is submitted to EPA, triggering a mandatory 7-day waiting period before field work can begin. SWPP Plan development will be coordinated with a LANL environmental compliance oversight staff representative.

Industrial and Sanitary Wastewater Discharges
LANL subject matter experts have determined that expanding the SERF capability may result in modifications to existing NPDES-permitted treatment processes, which would require a Notification of Changed Conditions submittal to EPA prior to construction. The notice will include schematic drawings, and will be submitted as soon as the design/build specification package is completed. LANL environmental compliance oversight staff will be notified prior to starting any construction that may modify an existing outfall, and at least 180 days prior to installing any new industrial discharge to the environment.

The Utilities & Infrastructure Facility Operations Division office will be notified of any impacts to the SWWS system (i.e., new connections and disconnects). Waste Profile

Forms will be completed and submitted for new waste stream connections to SWWS that are not considered sanitary wastewater per Waste Management guideline/ definitions. Any new source of liquid waste must meet the Waste Acceptance Criteria requirements for the facilities involved.

NPDES
The current and foreseeable regulatory environment at LANL creates uncertainty over the ability to meet increasingly stringent permit conditions with existing technology. Inability to meet permit conditions poses a significant risk to core programmatic activities that depend on permitted facilities. LANL's strategy for addressing this uncertainty and reducing the associated risk, as described in the NPDES Permit Compliance and Outfall Reduction Strategy (LA-UR-07-8312), is to eliminate as many permitted outfalls as possible. NMED is planning to propose new water quality standards for the upcoming Triennial Review in early 2009. The Laboratory will review and comment on new more stringent water quality standards and participate in the Triennial Review and Public Hearing processes. Potential impacts from the proposed water quality standards will be communicated to DOE and LANS management.

Biological and Cultural Resources
Biological Resources
Sandia Canyon is core habitat for the Mexican Spotted Owl. Under the requirements in LANL P 405, *National Environmental Policy Act, Cultural Resources, and Biological Resources Reviews*, reducing or eliminating effluent flow into Sandia Canyon requires a Biological Assessment and consultation with the U.S. Fish and Wildlife Service. The expansion of the SERF also may require a Biological Assessment.

Cultural Resources
LANL reviewer comments indicate that no cultural resources will be affected by this Project.

Potential Release Sites/Solid Waste Management Units
Potential release sites are located the area for potential SERF Expansion. See description in Section 4.2.

4.5.2 Safety and Health Concerns

Integrated Safety Management (ISM) will be implemented by tailored actions.

4.6 Safeguards and Security Considerations

The SERF expansion work is located in non-secure areas in TA-03. In accordance with a graded Safeguards and Security approach, and the DOE design basis threat guidance, and based on SME comments in the PR-ID, expanding SERF capability needs to comply with DOE Orders, manuals, and standards, including compliance with Implementation Support Documents, procedures, and engineering standards. All LANL access control protocols will be followed.

4.7 Interfaces with Existing and Planned Acquisitions

The SERF expanded capability is needed to address four of the most significant outfalls described in the Outfall Reduction Strategy document (LA-UR-07-8312) which need to be mitigated in order to maintain LANL compliance with the new NPDES permit. The

laboratory's plan for wastewater going into the future is accounted for in sizing the scope of the SERF expansion.

The remaining outfalls (Groups 2 through 6) will be addressed by the Laboratory through institutional and/or programmatic funding.

4.8 Affordability

Expanding SERF capability presents many opportunities for cost reductions over existing wastewater treatment. The expanded facility will be designed with criteria for ease of construction and maintenance to reduce life-cycle costs. Value engineering principles will be employed throughout to ensure the government is receiving the most economical and cost effective product.

4.9 Operations Costs Goals

The need for expanded SERF capability is regulatory compliance. LANL expects overall operations and maintenance costs for cooling towers to decrease if SERF capability is expanded. Makeup potable water for the Power Plant and the SCC and LDCC cooling towers will be minimized. This will result in water purchase cost savings.

4.10 Legal and Regulatory Constraints and Requirements

The Laboratory's NPDES Permit No. NM0028355 requires that Laboratory effluents comply with the new metals and temperature limits by July 2010. The Laboratory's Environmental Protection Division updates the EPA on a regular basis. They have notified EPA that the SERF Expansion requires Line Item funding. Due to Congressional budget cycles this funding is planned to be available in FY11. As a result, current construction projections will not meet the existing compliance schedule in the NPDES Permit. The facilities involved (SWWS, LDCC, SCC, and the Power Plant) must develop operational strategies to achieve compliance in the interim. The Laboratory will discuss this issue with EPA and NMED to negotiate a solution. At this time however, the Laboratory could face fines and penalties for failure to meet permit compliance milestones and for other non-compliance issues.

4.11 Stakeholder Considerations

The SERF Expansion will integrate work with Federal, State, and local stakeholders.

5.0 Applicable Conditions and Interfaces

5.1 Significant Conditions Affecting Project

The LANL Permit Requirements Identification system (PR-ID) is used to ensure projects receive the appropriate reviews regarding compliance to Federal, State, local, and Laboratory requirements and standards. A PR-ID has been created to expand SERF capability and subject matter experts' comments have been received. There are no indications of any issues which will impact or affect the ability to expand SERF capability.

5.2 Compatibility with Existing and Future Systems

The NPDES Permit Compliance and Outfall Reduction Strategy document (LA-UR-07-8312) evaluated the current and future needs of the SERF expansion to ensure that it will continue to enable the Laboratory to comply with regulatory requirements.

5.3 Functional Concept and Operations

The proposed expansion will provide treatment systems with the flexibility and capacity to meet new treatment requirements.

5.4 Key Interfaces with Other Programs and Projects

The SERF Expansion project will have key interfaces with the following facilities:

- SWWS – The SERF will provide additional treatment for SWWS effluent in order to meet NPDES permit requirements and to allow use of the SWWS effluent to provide make-up water for the SCC, LDCC, and Power Plant. SWWS operations will need to coordinate with SERF if there are any changes to the flow rates or characteristics of wastewaters from SWWS.
- SCC and LDCC – The expanded SERF will be used to treat blowdown from the SCC and LDCC and will also be used to supply make-up water to these facilities. The project may require changes to the operating conditions at these facilities to accommodate operational constraints at SERF. For example, cooling towers may need to increase cycles of concentration or switch to continuous blowdown from batch blowdown.
- Power Plant – The expanded SERF will be used to treat blowdown and other wastewaters from the Power Plant and will also be used to supply make-up water to this facility. Any maintenance, operational down time, or other changes that affect wastewater flow or characteristics will need to be coordinated with SERF.

The SERF expanded capability will require coordination with the Environmental Programs (EP) Directorate concerning discharges to Sandia Canyon through Outfall 001. Discharges to Sandia Canyon from Outfall 001 affect the potential for mobilization and transport of legacy contamination in the canyon system. Actions required by EP Directorate under the Consent Order with NMED may affect the amount of water that can be discharged to Sandia Canyon.

6.0 Resource Requirements and Schedule

6.1 Preliminary Schedule for Key Milestones

Project schedule information is provided on a summary level in Table 1 below. A detailed schedule is provided in Attachment B.

Table 1. Preliminary Schedule for Key Milestones

Date	Milestone Title
Sept. 5, 2008	Submit Critical Decision - 0 Package for Review
3rd QFY09	Receive Critical Decision - 0, Approval of Mission Need
3rd QFY09	Begin Conceptual Design Report
4th QFY09	Complete Conceptual Design Report
1st QFY10	Submit Critical Decision - 1 Package
2nd QFY10	Receive Critical Decision - 1
3nd QFY10	Submit RFQ/RFP for Design Build Contract
4th QFY10	Submit Critical Decision 2/3 Package
1st QFY11	Receive Critical Decision-2/3
1st QFY11	Award Design Build Contract
FY112	Complete Commissioning and Turnover
FY12	Submit CD - 4 Package

6.2 Total Cost

The Rough Order of Magnitude Total Estimated Cost (TEC) for the SERF Expansion Project ranges from $9.8M to $14.7M. Operating expense (OPC) funds are available to support project definition, commissioning, and closeout. The cost estimate summary is provided in Attachment C.

6.3 Funding Profile

Table 2 summarizes the funding profile for this project.

Table 2: SERF Funding Profile
($M)

Cost Type	FY2009	FY2010	FY2011	FY2012
OPC	.85	1.58		0.81
TEC			6.17	
Contingency	0.25	0.31	2.24	0.19
TPC	1.10	1.89	8.41	0.99

This funding profile does not reflect $0.18M in OPC funding expended in FY2008 for preparation of CD - 0 Submittal Package. Additionally, the NEPA work (and budget) originally scheduled for the execution phase has been moved up into the Conceptual Design Phase.

6.4 Success Measures

This project will be considered a success if it meets the performance measurement criteria in Sections 2.2 and 4.2.

7.0 Development Plan

7.1 Planning Activities to Date

The following planning activities have been completed:

- Preparation of the NPDES Permit Compliance and Outfall Reduction Strategy (LA-UR-07-8312);
- Preparation, submittal, and receipt of comments for the PR-ID review have been addressed and will continue to be updated as the project progresses through the Conceptual, Definitive Design, and Execution phases;
- As part of preconceptual planning, a Preliminary Project Execution Plan (PEP) was prepared at the request of the NNSA/LASO. This preconceptual document will be updated as the project proceeds through the Conceptual and Definitive Design phases;
- A Program Requirements Document has been prepared; and
- As part of the preconceptual planning, a Preliminary Functional and Operational Requirements (F&ORs) have been prepared and were submitted to NNSA/LASO with LANS' April 30, 2008 NPDES Permit Compliance and Outfall Reduction Project Group 1 Outfalls Preliminary Project Execution Plan (LA-CP-08-0495). F&ORs will be updated as the project proceeds through the Conceptual and Definitive Design phases.

7.2 Project Technical Approach and Scope

Expanding SERF capability, if approved, will involve installation of additional wastewater treatment equipment, storage tanks, and conveyance. Treated effluent from SWWS will continue to be discharged from Outfall 001 while the SERF is being upgraded. Some existing equipment in the SERF building will be relocated to a new structure to provide room for new water filtration equipment to be installed in the existing SERF building. New storage tanks will be installed and plumbed into the existing waste transfer piping. New piping to the LDCC and Power Plant will be installed and connected to an existing pumping station. Upon completion of the SERF expansion, if approved, treated effluent from the SWWS will be routed to the SERF and treated water from the SERF will be routed to the SCC, LDCC, and Power Plant.

7.3 Acquisitions and Contract Types

Design and construction will be accomplished through competitively-awarded contracts using fixed price and cost-reimbursable pricing methods. The design effort is relatively simple, and the construction scope is straightforward. Due to this, design-build is being considered as the execution approach at this pre-conceptual stage and the preliminary cost estimate assumes this approach. The acquisition and approach including long-lead item procurement will be specifically defined during the Conceptual Design Phase. FIRP activities will acquire capital assets using the design-build procurement process.

7.4 Management Structure and Approach

The project will be managed by a Federal Project Director, and supported by an Integrated Project Team. The composition and charter of the team will be developed after the Mission Need is approved.

7.5 Conceptual Design Plan

After approval of the Mission Need, during the development of the Critical Decision 1 Submittal Package, the IPT will prepare a Conceptual Design Report (CDR). This effort will be approached methodically to clearly and concisely describe the recommended alternative. Included in the CDR will be an Alternatives Analysis with life-cycle analysis, a conceptual design and layout of the proposed facility based on the recommended alternative together with preliminary structure locations, piping and flow schematics, and an evaluation of existing site conditions (related to topography, Potential Release Sites (PRSs), locations of existing systems, and other pertinent site conditions). It will also contain a schedule and cost range including essential resources, summary test and acceptance criteria, a preliminary Work Breakdown Structure (WBS), preliminary Safeguards and Security and Waste Management Plans, and other elements as detailed in DOE Order 413.3A.

This conceptual design will ultimately become part of the design-build procurement documents and be included in the Request for Proposals during the Critical Decision 2 phase.

7.6 Project Controls Plan

A Project Controls Plan will be developed prior to CD-1 Request in accordance with Project Management and Site Services Directorate (ADPMSS) Procedure 109 and Project Control Plan Work Instruction 109.8. This plan will ensure that the correct and appropriate tools will be implemented on the project and document the extent to which they will be used. It will address baseline development; cost, schedule, and scope control; performance measurement; reporting and forecasting; and use of Trend Notices, Variance Analysis, and Baseline Change Proposals (BCP).

8.0 References

CDM (Camp, Dresser, and McKee), December 20, 2007. "Los Alamos National Laboratory NPDES Permit Compliance and Outfall Strategy." Los Alamos National Laboratory document LA-UR-07-8312, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL) P 341, December 3, 2008. "Conduct of Engineering." Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL) P 350-2, October 31, 2008. "Project Management." Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL) P 405, October 31, 2008. "National Environmental Policy Act (NEPA), Cultural Resources, and Biological Resources (NCB) Reviews." Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL) PD 342, December 15, 2008. "Engineering Standards Manual." Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL) P 350-5, November 13, 2008. "Project Management Procedures for Capital Asset Acquisition." Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), April 30, 2008. "NPDES Permit Compliance and Outfall Reduction Project Group 1 Outfalls, Project Execution Plan, Revision 0." Los Alamos National Laboratory document LA-CP-08-0495, Los Alamos, New Mexico.

Project Management and Site Services Directorate (ADPMSS), January 27, 2009. "Procedure 109, Project Controls." Los Alamos National Laboratory, New Mexico.

The National Nuclear Security Administration (NNSA), November, 2004. DOE/NA-0010. "Strategic Plan." National Nuclear Security Administration, Washington, DC.

U.S. Department of Energy (DOE), July 28, 2006. "Program and Project Management for Acquisition of Capital Assets." U.S. Department of Energy Order 413.3A, Washington, DC.

U.S. Department of Energy (DOE), September 2006. DOE/CF-0010 "Strategic Plan." U.S. Department of Energy, Washington, DC.

U.S. Department of Energy (DOE), February 27, 2008. "Departmental Energy, Renewable Energy, and Transportation Management." U.S. Department of Energy Order 430.2B, Washington, DC.

U.S. Department of Energy (DOE), March 2008. "Integration of Safety into the Design Process." U.S. Department of Energy Standard (STD) 1189-2008. Washington, DC.

U.S. Environmental Protection Agency (EPA), 2007. Authorization to Discharge Under National Pollutant Discharge Elimination System, Permit Number NM0028355. EPA Region 6, June 8, 2007.

Attachment A: Program Requirements Document

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Facility Infrastructure Recapitalization Project
TA-46-577 505/665-9515 FAX 505/667-3989 Mail Stop J590, Drop O1U

SERF Expansion

Critical Decision-0 Request, R.1

Attachment A:

Program Requirements Documents

March 31, 2009

Originator: Jeffrey J. Schroeder
Phone Number: 665-9515
Organization: FIRP-PGIU

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

DOE	Department of Energy
EMS	Environmental Management System
EP	Environmental Programs
EPA	Environmental Protection Agency
F&OR	Functional and Operational Requirement
IBC	International Building Code
IEBC	International Existing Building Code
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
LDCC	Laboratory Data Communications Center
MNS	Mission Needs Statement
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
PC	Performance Category
PCB	Polychlorinated Biphenyl
PEP	Project Execution Plan
PRD	Program Requirements Document
RO	Reverse Osmosis
SCC	Strategic Computing Complex
SERF	Sanitary Effluent Reclamation Facility
SWWS	Sanitary Wastewater System
TA	Technical Area

1.0 Introduction

1.1 Purpose and Background

The Program Requirements Document (PRD) for the Los Alamos National Laboratory (LANL) Sanitary Effluent Reclamation Facility (SERF) Expansion addresses the tiered programmatic requirements. This document identifies the National Nuclear Security Administration (NNSA) and U.S. Department of Energy (DOE) strategic level requirements for the SERF Expansion.

The SERF Expansion is currently in the initiation phase and this PRD is a prerequisite to obtaining Critical Decision (CD)-0 Approval. The PRD and Mission Need Statement (MNS) are the primary documents that comprise a CD-0 request. The project scope is to expand the SERF to meet new National Pollutant Discharge Elimination System (NPDES) permit requirements and to allow reuse of sanitary effluent and other wastewaters for cooling tower and boiler make-up water, thereby eliminating the need to discharge the effluent and blowdown to the environment, or greatly reducing the amount of such discharges.

1.2 Approvals and Concurrence

The concurrence, endorsement, and approval of this document, by both NNSA and LANL, indicate agreement with the fundamental requirements and objectives delineated herein.

1.3 Preparation

The PRD, the MNS, and other documents, provide the programmatic basis, justification, and pre-conceptual planning information. The PRD, together with the Functional and Operational Requirement (F&OR) Document (to be finalized during the Conceptual Design Phase), establish the technical baseline for the SERF Expansion.

1.4 Changes to the PRD

The NNSA Federal Project Director has the lead responsibility to update and maintain the PRD, under formal change control after it is approved, and to ensure that the proposed project capabilities meet the documented program requirements. Any change in the PRD must be agreed upon by both NNSA and LANL. Resources, budget, schedule, and other factors will be updated in the PRD on a continual basis for the life-cycle of the project. Formal change control will be used to manage the PRD.

2.0 Mission Need Summary and Strategic Criteria

2.1 Mission Need Summary

The National Nuclear Security Administration (NNSA) is responsible for maintaining the nation's nuclear weapons stockpile in support of the United States' nuclear deterrence policy. The NNSA's national security objectives are integrated and coordinated across the nuclear weapons complex. Los Alamos National Laboratory (LANL), an NNSA laboratory, is an important element in the nation's security strategy.

During the course of performing NNSA's mission,, LANL discharges more than 175 million gallons of treated wastewater per year through 15 permitted outfalls under its NPDES permit. These outfalls support mission-critical research and development and waste management operations. In August 2007 LANL was issued a new NPDES Outfall permit by the Environmental Protection Agency (EPA) (Permit #NM0028355). Stricter effluent limitations and July 2010 and July 2012 compliance deadlines for some constituents will result in compliance issues for LANL if they are not addressed. These stricter effluent limitations cannot be met with existing treatment facilities at the Laboratory. Failure to resolve these compliance issues by compliance deadlines could disrupt Laboratory operations and possibly expose NNSA and LANS to civil and criminal liability.

The means the Laboratory has selected to resolve these compliance issues is to minimize and / or eliminate outfalls, including the four outfalls located in TA-03. This outfall reduction will be accomplished by treating the wastewater released from the Sanitary Wastewater System (SWWS) and reusing it at various locations throughout TA-03. Cooling towers at the Strategic Computing Complex (SCC) and Laboratory Data Communications Center (LDCC) and the existing boiler and cooling tower at the TA-03 Power Plant will receive treated effluent from the SWWS. The Sanitary Effluent Reclamation Facility (SERF) was constructed in 2003 to reclaim sanitary effluent for use at SCC and was designed to be expanded, if necessary, to provide additional capacity for wastewater reclamation. The existing SERF provides some of the capability needed to meet the new permit limits. In order to fully meet the new permit limits, the existing SERF will need to be expanded to provide increased capacity. Along with the SERF expansion, additional water conveyance capacity will be required to transport the effluent to and from the SWWS, the SCC and LDCC cooling towers, and the Power Plant.

2.2 Strategic Criteria

The SERF Expansion capability is needed to address the following strategic objectives:

- Outfall reduction to meet the new NPDES permit requirements. Absent such a reduction, NNSA's mission at LANL could be put at risk. The Laboratory has targeted elimination and reduction of the outfalls in the 2007 Goals and Objectives of the Laboratory's Environmental Management System (EMS). The goal for SERF Expansion is to reduce the outfalls in TA-03.
- DOE Order 450.1 sustainability goals require waste stream reduction, effluent reuse, and potable water conservation.
- DOE Order 430.2B requirement that DOE facilities to reduce potable water use by at least 16 percent over Fiscal Year 2007 levels by Fiscal Year 2015.

3.0 Required Functions and Capabilities

The SWWS is used to treat most of the sanitary wastewater generated at LANL. Thus, SWWS is a key component of the Laboratory's utility infrastructure and continued operation of SWWS is essential for maintaining the Laboratory's mission. The treatment capability of SWWS is insufficient to meet the effluent limitations in the new NPDES permit. Of greatest concern is the 0.00064 ug/L effluent limit for polychlorinated biphenyls (PCBs), which must be met by July 2012. Similarly, the SCC and LDCC provide essential computing capabilities that are needed to support the Laboratory's mission. Discharges of cooling tower blowdown from these facilities also may not meet the effluent limits of the new NPDES permit without additional treatment to modify pH or whole effluent toxicity. The TA-03 Power Plant is another essential component of the Laboratory's utility infrastructure. Boiler blowdown, cooling tower blowdown, reverse osmosis (RO) reject and other Power Plant wastewaters are currently discharged to an NPDES outfall, but additional treatment will be needed to meet the effluent limits of the new permit. Major compliance concerns are the effluent limits for aluminum and temperature, which must be met by July 2010, and PCBs, which must be met by July 2012. The expansion of SERF will provide treatment capacity that will allow the SWWS, SCC, LDCC, and Power Plant effluents to be treated to meet NPDES permit limits and to allow reuse, thereby greatly reducing the amount of water that must be discharged to the environment.

Four NPDES outfalls will be affected by executing the SERF Expansion project. These outfalls are:

- Outfall 001 – This outfall currently discharges blowdown and other wastewaters from the TA-03 Power Plant, as well as treated sanitary effluent from SWWS. Most of the water currently discharged from Outfall 001 will be treated at SERF for reuse and the volume to be discharged will be greatly reduced.
- Outfall 13S – This outfall currently receives treated effluent from the SWWS and is an internal outfall at the SWWS Plant located after the final treatment process. From Outfall 13S, wastewater is permitted to be pumped up to the Reuse Tank for use at the Power Plant, then through Outfall 001 to Sandia Canyon at TA-03. The Laboratory is also permitted to discharge from Outfall 13S to Cañada del Buey at TA-46, although SWWS effluent has never been discharged to Cañada del Buey. Discharges to Outfall 13S will effectively be eliminated, but Outfall 13S will be retained in the permit for emergency use for discharge into Cañada del Buey.
- Outfall 03A027 – This outfall receives cooling tower blowdown from the SCC. Discharge from this outfall will be eliminated.
- Outfall 03A199 – This outfall receives cooling tower blowdown from the LDCC. Discharge from this outfall will be eliminated.

The December 2007 document "Los Alamos National Laboratory NPDES Permit Compliance and Outfall Reduction Strategy" (LA-UR-07-8312) was prepared after the new NPDES permit was issued to develop an overall strategy for achieving compliance with the new permit, as well as accomplishing sustainability goals of reducing waste streams, reusing effluent, and conserving potable water. This document contains both volume and contaminant information needed to plan future SERF treatment capability. Many of the capacity values provided in the following sections are derived from that report.

3.1 Functions

The expanded SERF system performs four (4) key functions:

1. Collection
2. Storage
3. Treatment
4. Discharge and Distribution

These functions are described below.

3.1.1 F1 – Collection

The first step in the SERF system is collection of wastewater from the generating facilities. The four facilities that will generate wastewater to be treated by the expanded SERF are SWWS (treated sanitary effluent), SCC (cooling tower blowdown), LDCC (cooling tower blowdown), and the TA-03 Power Plant (boiler blowdown, RO reject, sump drainage, and cooling tower blowdown). Collection will be achieved through piping and appurtenances physically connecting the generating facility to the SERF. Representative flows based on the outfall reduction strategy document are:

- SWWS effluent – 300,000 gal/day
- SCC cooling tower blowdown – 18,600 gal/day
- LDCC cooling tower blowdown – 10,800 gal/day
- Power Plant boiler blowdown – 43,000 gal/day
- Power Plant sump drainage – 5,000 gal/day
- Power Plant RO reject – 25,000 gal/day

Design flow rates will depend on the operating conditions of generating facilities and will be developed during the Conceptual Design Phase.

Piping is currently in place to convey SWWS effluent to SERF, but no piping exists to convey the other wastewaters to SERF.

3.1.2 F2 – Storage

Storage capacity will be needed to balance influent flows, discharge flows, and treatment throughput. In addition, storage capacity for influent and effluent is needed to allow the SWWS, SCC, LDCC, and Power Plant to continue to operate with the SERF off line. Existing storage capacity consists of storage tank TA-03-336, a 500,000 gal. storage tank for SWWS effluent, with 100,000 gal. of this capacity currently dedicated for fire suppression water. Capacity not needed for fire suppression can be used for this project.

3.1.3 F3 – Treatment

The treated effluent from SWWS, along with cooling tower blowdown from SCC and LDCC, and boiler blowdown, cooling tower blowdown, RO reject, and sump drainage from the TA-03 Power Plant will be treated at the expanded SERF. Most of the treated water will be used as makeup for the SCC and LDCC cooling towers and Power Plant boiler and cooling tower, with some water being discharged through Outfall 001 into Sandia Canyon. The treatment process will produce water that meets NPDES permit requirements for all water that is discharged through Outfall 001. The treatment process should also produce water that can be reused at SCC, LDCC, and the Power Plant with no or minimal additional treatment at these facilities. The SERF system must also provide treatment of secondary waste streams so that they can be managed in compliance with disposal requirements.

3.1.4 F4 – Discharge and Distribution

The final step in the SERF system is conveyance of treated water to the point of reuse or discharge. The three facilities that will reuse treated water are the SCC (cooling tower makeup), LDCC (cooling tower makeup), and the TA-03 Power Plant (boiler and cooling tower makeup). Discharge will be to existing NPDES Outfall 001. Discharge and distribution will be achieved through piping and appurtenances physically connecting the receiving facility or outfall to the SERF. Representative flows based on the outfall reduction strategy document are:

- SCC cooling tower makeup –200,000 gal/day
- LDCC cooling tower makeup –40,000 gal/day

- Power Plant boiler makeup –10,000 gal/day
- Power Plant cooling tower makeup – 200,000 gal/day

Design flow rates will depend on the operating conditions of the receiving facilities and will be developed during the Conceptual Design Phase. Piping is currently in place to convey treated water from SERF to SCC and Outfall 001, but no piping exists to convey treated water to LDCC or the Power Plant.

3.2 Core Capabilities

In assessing the project needs, the expanded SERF's treatment capability has been subdivided into eleven core capability areas. Each capability fulfills a key function and/or multiple functions. As noted in Section 3.1, design flow rates will be developed during the Conceptual Design Phase.

3.2.1 C1 – Dissolved Solids Removal

Water discharged from Outfall 001 must meet the NPDES effluent limits for aluminum (0.0581 mg/L average, 0.0871 mg/L maximum). Aluminum in water discharged from Outfall 001 over the past five years has been as high as 0.125 mg/L, which exceeds the maximum effluent limit. Water used as cooling tower makeup must meet requirements for total dissolved solids and dissolved silica (to be determined based on cycles of concentration). Water used as boiler makeup must meet requirements for total dissolved solids. The expanded SERF system must be capable of reducing dissolved solids to meet the permit effluent limits. Treatment should also allow the treated water to be reused as make-up water with no or minimal additional treatment by the receiving facility. The existing SERF provides the capability to meet these dissolved solids removal requirements, but not at expected design flow rates.

3.2.2 C2 – Polychlorinated Biphenyl (PCB) Removal

Water discharged from Outfall 001 must meet the NPDES effluent limits for PCBs (0.00064 mg/L average and maximum). The expanded SERF system must be capable of removing PCBs as required to meet the permit effluent limits. Existing data show that the SWWS and Power Plant effluents currently exceed the new PCB effluent limit and additional treatment will be needed for the effluent to meet PCB limits when the become effective in 2012. The specific treatment needed will be determined during the Conceptual Design Phase, but is assumed to be activated carbon adsorption.

3.2.3 C3 – Temperature Control

Water discharged from Outfall 001 must meet the NPDES effluent limit for temperature (24 degrees C). The expanded SERF system must be capable of reducing temperature as required to meet the NPDES permit effluent limit for temperature, which becomes effective in 2010. Existing data show the discharge from Outfall 001 does not meet this limit during parts of the year.

3.2.4 C4 – Disinfection

Water discharged from Outfall 001 must meet the NPDES effluent limits for *E coli* bacteria (126 cfu/100 mL average, 410 cfu/100 mL maximum). Disinfection of SWWS effluent currently occurs at the SWWS. The SERF treatment processes needed to meet the other effluent limits are expected to produce water that meets the E coli limit without additional disinfection at SERF.

3.2.5 C5 – pH Adjustment

Water discharged from Outfall 001 must meet the NPDES effluent limits for pH (6.6 minimum, 8.8 maximum). The expanded SERF system must be capable of raising or lowering pH as required to meet the NPDES permit effluent limits.

3.2.6 C6 – Toxicity Control

Water discharged from Outfall 001 must meet the NPDES effluent limits for whole effluent toxicity by 2012. Because the water treated at SERF will be very low in dissolved solids, it may be toxic to the organisms used in the test. The expanded SERF may require the capability to alter the chemical composition of the treated water discharged to Outfall 001 so that it is not toxic to the test organisms.

3.2.7 C7 – Potable Water Use Reduction

DOE facilities are required by DOE Order 430.2B to reduce potable water usage by 16% over Fiscal Year 2007 usage by Fiscal Year 2015. Cooling tower makeup at SCC and LDCC and boiler makeup at the Power Plant are major uses of potable water at the Laboratory. The expanded SERF will have the capability to allow these water needs to be met with treated wastewater rather than potable water. The capability will also allow the Laboratory to meet a commitment made in the Environmental Assessment for SCC that operation of the SCC would not increase potable water use.

3.2.8 C8 – Influent storage

Influent storage capacity is required to allow SWWS, SCC, LDCC, and the Power Plant to remain in operation with the expanded SERF system off line for three days. The storage capacity will also allow the expanded SERF system to balance plant processing capacity with flow variations. There is an existing 500,000 gal. storage tank for SWWS effluent, but 100,000 gal. of this capacity must currently be maintained for fire suppression purposes.

3.2.9 C9 – Effluent Storage

Effluent storage capacity is required to allow SWWS, SCC, LDCC, and the Power Plant to remain in operation with the expanded SERF system off line for three days. The storage capacity will also allow the expanded SERF system to balance plant processing capacity with flow variations.

3.2.10 C10 – Collection system

A collection system is required to convey wastewater from generator facilities to the influent storage tanks at SERF. At present, treated wastewater from SWWS is the only influent stream with piping to SERF. All other influent streams are currently piped to outfalls.

3.2.11 C11 – Distribution system

A distribution system is required to convey treated wastewater from SERF to the SCC, LDCC, and Power Plant for reuse. At present, a conveyance only exists from SERF to SCC.

4.0 Program Assumptions, Constraints, and Key Interfaces

4.1 Assumed Scope of SERF Expansion

The SERF Expansion will allow discharges from some TA-03 facilities to be treated to meet effluent permit requirements for discharge to the environment or for reuse in lieu of discharge to outfalls, thus achieving the objective of reducing/eliminating the number of outfalls as required by the new NPDES Permit. This scope of activities includes:

- Expanding the treatment capacity of the existing SERF to allow treatment of cooling tower blowdown from SCC and LDCC and boiler blowdown, cooling tower blowdown, RO reject, and sump drainage from the Power Plant.
- Expanding the footprint of the SERF facility to accommodate additional treatment equipment.
- Installing or modifying piping, lift stations, and/or other appurtenances necessary to convey cooling tower blowdown from SCC and LDCC to SERF and to convey boiler blowdown, cooling tower blowdown, sump drainage, and RO reject from the Power Plant to the SERF system for treatment.
- Installing or modifying piping, lift stations, and/or other appurtenances necessary to convey cooling tower blowdown from the Power Plant to the SERF system for treatment.
- Installing necessary influent and effluent storage tanks.

4.2 Key Constraints and Assumptions

The following are a summary of the key constraints and assumptions used to develop the PRD. More detail is provided in the MNS and companion documentation.

- Reuse of SERF effluent for cooling tower makeup at SCC and LDCC and for boiler and cooling tower makeup at the Power Plant is acceptable in order for the Laboratory to meet potable water use reductions mandated by DOE Order 430.2B.
- Cycles of concentration at the SCC, LDCC, and Power Plant cooling towers will be increased over current values to reduce blowdown volumes.
- It is assumed that the existing SERF structure will not require seismic upgrades and that any new structures constructed as part of the expansion will need to meet PC 1; however, if modified, SERF (which is currently considered a low-hazard, wastewater treatment facility) could require Performance Category (PC) 1 seismic conformance. This risk will be examined during the critical decision phase of the project.
- The ability to discharge treated effluent from Outfall 001 into Sandia Canyon must be maintained and the amount of water to be discharged will be determined by the Environmental Programs Directorate.
- The SERF Expansion must allow the operational requirements of SCC and LDCC to be met while satisfying other institutional requirements for compliance and conservation.
- The SERF Expansion must allow the operational requirements of SWWS and the Power Plant to be met while satisfying other institutional requirements for compliance and conservation.

4.3 Key Interfaces

Key interfaces are those interfaces that require close coordination and planning over the life of the project because of their potential to have a significant impact on the successful accomplishment of the project. The SERF Expansion will have key interfaces with the following facilities:

- SWWS – The SERF will provide additional treatment for SWWS effluent in order to meet NPDES permit requirements and to allow use of the SWWS effluent to provide make-up water for the

SCC, LDCC, and Power Plant. SWWS operations will need to coordinate with SERF if there are any changes to the flow rates or characteristics of wastewaters from SWWS.

- SCC and LDCC – The expanded SERF will be used to treat blowdown from the SCC and LDCC and will also be used to supply make-up water to these facilities. Changes may be required to the operating conditions at these facilities to accommodate operational constraints at SERF. For example, cooling towers may need to increase cycles of concentration or switch to continuous blowdown from batch blowdown.
- Power Plant – The expanded SERF will be used to treat blowdown and other wastewaters from the Power Plant and will also be used to supply make-up water to this facility. Any maintenance, operational down time, or other changes that affect wastewater flow or characteristics will need to be coordinated with SERF.

SERF Expansion will also require coordination with the EP Directorate concerning discharges to Sandia Canyon through Outfall 001. Discharges to Sandia Canyon from Outfall 001 affect the potential for mobilization and transport of legacy contamination in the canyon system. Actions required by EP Directorate under the Compliance Order on Consent (Consent Order) with the New Mexico Environment Department (NMED) may affect the amount of water that can be discharged to Sandia Canyon.

5.0 Program Requirements

There are four categories of co-equal program (or strategic) requirements for the SERF Expansion. These program requirements are driven by the following technical activities conducted at LANL:

- P1 – Laboratory Mission Assurance
- P2 – Public and Worker Safety
- P3 – Environmental Protection
- P4 – Regulatory Compliance

The bases for these strategic level requirements are those things deemed essential by NNSA and LANL to evaluate project success and reinforce the technical goals and benefits described in the MNS.

Implicit to all project and program requirements is adherence to all Federal, State, and local laws and regulations, as well as strict compliance with contract provisions between the LANL Management and Operations Contractor and the DOE/NNSA during all phases of project execution and subsequent operations. During the Conceptual Design Phase and prior to finalization of the project performance baseline, a specific listing of laws, regulations, codes, standards, and other design and operations guidelines will be developed detailing specific applicability to the SERF.

5.1 P1 – Laboratory Mission Assurance

5.1.1 P1.1 – SCC and LDCC Operational Requirements

The primary missions of LANL are:

- To ensure the safety and reliability of the United States' nuclear weapons stockpile;
- To develop technical means for reducing the global threat of weapons of mass destruction or terrorism (including biological, chemical, nuclear, and cyber); and
- To solve national problems in energy, environment, infrastructure, health, and security using the investment in people and facilities implied by the first two missions.

The SCC and LDCC are key facilities needed for LANL to accomplish this mission. Continued operation of these advanced computing facilities will require the ability to manage cooling tower blowdown in the face of more stringent discharge permit conditions and the ability to provide cooling make-up water in the face of diminishing supplies and increasing water conservation efforts. The SERF Expansion must allow the operational requirements of SCC and LDCC to be met while satisfying other institutional requirements for compliance and conservation.

5.1.2 P1.2 – Utility Infrastructure Requirements

Continued operation of LANL's utility infrastructure is needed to support overall Laboratory mission requirements. The SWWS and TA-03 Power Plant are key facilities in LANL's utility infrastructure. Continued operation of both SWWS and the Power Plant will require the ability to comply with increasingly stringent permit conditions for wastewater discharges. In addition, continued operation of the Power Plant will require the ability to provide make-up water while meeting water conservation requirements. The SERF Expansion must allow the operational requirements of SWWS and the Power Plant to be met while satisfying other institutional requirements for compliance and conservation.

5.2 P2 – Public and Worker Safety

5.2.1 P2.1 – Ability to Compliantly Retrofit Existing Facilities

The SERF Expansion anticipates the use of existing facilities to the extent possible. The use of existing facilities shall comply with applicable LANL engineering and industry standards such as the International Building Code (IBC), and International Existing Building Code (IEBC) (i.e., electrical distribution and ventilation).

5.3 P3 – Environmental Protection

5.3.1 P3.1 – Control of Contaminant Migration in Upper Sandia Canyon

Wastewater from SWWS, SCC, LDCC, and the Power Plant is currently discharged to Upper Sandia Canyon and has created wetlands in the upper canyon. Contamination from historic discharges to the upper canyon is present in the wetland sediments and vadose zone, and has also resulted in contamination of the regional aquifer. This contamination is being investigated by the EP Directorate as part of a Consent Order with NMED. Corrective actions required by NMED under the Consent Order may affect the quantity of water that can be discharged to Sandia Canyon. The SERF Expansion shall not impact the Laboratory's ability to implement the requirements of the Consent Order.

5.3.2 P3.2 – Reduction/Elimination of Permitted Outfalls

The Laboratory recognizes the active outfalls as an environmental and mission-endangering liability and has targeted reduction and elimination of the outfalls in the 2007 Goals and Objectives of the Laboratory's EMS. The SERF Expansion will result in elimination of the use of two outfalls, change the status of one additional outfall to emergency use only, and reduction of the amount of water discharged from the remaining outfall.

5.3.3 P3.3 – Reduction in Potable Water Usage

The Laboratory's EMS sustainability goals under DOE O 450.1 include waste stream reduction, effluent reuse, and potable water conservation. The SERF Expansion will allow the Laboratory to make substantial progress toward these goals by reusing wastewater to replace potable water used at the SCC, LDCC, and Power Plant. Further, this will allow the Laboratory to meet a commitment made in the Environmental Assessment for the SCC that operation of the SCC will not increase potable water usage.

5.4 P4 – Regulatory Compliance

5.4.1 P4.1 – NPDES Permit Compliance

The new NDPES permit and State of New Mexico certification requirements for the new permit, which became effective in July 2007, have effluent limits that cannot be met with existing treatment facilities at the Laboratory. Even with construction of advanced treatment facilities, compliance with the permit's extremely low effluent limits is uncertain. The permit contains a compliance schedule that gives the Laboratory until July 2010 to comply with limits for metals and temperature and until July 2012 to comply with limits for PCBs and whole effluent toxicity. The SERF Expansion will allow the Laboratory to comply with the new effluent limits by eliminating the need to discharge to an outfall and/or by providing additional treatment capabilities.

5.4.2 P4.2 – DOE Order 430.2B Compliance

DOE Order 430.2B requires DOE facilities to reduce potable water use by at least 16 percent over Fiscal Year 2007 levels by Fiscal Year 2015. Cooling tower makeup at SCC and LDCC and boiler and cooling

tower makeup at the Power Plant comprise a major use of potable water at the Laboratory. The SERF Expansion will allow potable water used for makeup to be replaced by reclaimed wastewater, thereby allowing the Laboratory to make substantial progress toward compliance with this DOE Order requirement.

6.0 Program Risks and Management

6.1 General and Risk Management Approach

Risks are presented in terms of:

- Technical and program risks (key technical drivers)
- Process and capacity risks (how much and what SERF will process)
- Project management and execution risks (stable funding, implementation, approvals)

A preliminary evaluation of risks for expanding SERF capability was performed during development of the PEP during preconceptual development. A formal Risk Management Plan will be developed after the mission need is approved to evaluate the potential impacts of each identified risk and to develop specific risk mitigation/management strategies. The plan will identify responsibilities for handling risks and the schedules for their disposition. The basic planning for the SERF Expansion includes contingency allowances for risks in projected requirements and capacities, as well as programmatic risks and limited programmatic redirection. More detailed contingency planning will accommodate modest changes in programmatic requirements, but does not allow for very large changes in these requirements.

6.2 Technical and Program Risks

Technical and program risks are summarized below:

- Inability to meet more stringent regulatory environment based on previous history of regulatory changes and recent NPDES permit renewal.
- Potential delay in obtaining NEPA documentation approval during the Conceptual Design phase.
- Potential change in contaminants to be treated.
- SERF (which is currently considered a low-hazard, wastewater treatment facility) could require Performance Category (PC) 1 seismic conformance.

6.3 Process and Capacity Risks

Process and Capacity risks impact the size and capability of the facility and are driven by the number of programs served and the amount of waste produced:

- Change in contaminants that must be treated
- Increase in the throughput or processing requirements
- Decrease in the throughput or processing requirements
- Increase in the number of programs or the addition of new programs that must be served by SERF
- Decrease in the number of programs that must be served by SERF

6.4 Project Management and Execution Risks

Project management and execution risk is driven primarily by the ability to accurately plan and predict, as well as the ability of the LANL and NNSA system to control project and interfacing activities so that they do not adversely impact the project. Many of these risks are similar across projects. They include:

- Extensive delay to acquire funding in a predictable and stable profile, consistent with the approved performance baseline, which affects the ability to plan activities and satisfy schedule.
- Risks involved in working in an existing facility and sequencing installation, testing, and turnover activities within budget and schedule.

- Timely decisions, approvals, and authorizations by NNSA and LANL management.
- Ability to accurately define the technical scope and prepare realistic estimates.
- Extended Startup/Operational Readiness Review Period.

7.0 References

CDM (Camp, Dresser, and McKee), December 20, 2007. "Los Alamos National Laboratory NPDES Permit Compliance and Outfall Strategy," Los Alamos National Laboratory document LA-UR-07-8312, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), April 30, 2008. "NPDES Permit Compliance and Outfall Reduction Project Group 1 Outfalls, Project Execution Plan, Revision 0," Los Alamos National Laboratory document LA-CP-08-0495, Los Alamos, New Mexico.

U.S. Department of Energy (DOE), April 1999. "Design Considerations," U.S. Department of Energy Handbook DOE-HDBK-1132-99, Washington, DC.

U.S. Department of Energy (DOE), October 23, 2001. "Conduct of Operations," U.S. Department of Energy Order 5480.19, Washington, DC.

U.S. Department of Energy (DOE), June 17, 2005. "Quality Assurance," U.S. Department of Energy Order 414.1C, Washington, DC.

U.S. Department of Energy (DOE), December 22, 2005. "Facility Safety," U.S. Department of Energy Order 420.1B, Washington, DC.

U.S. Department of Energy (DOE), July 28, 2006. "Program and Project Management for the Acquisition of Capital Assets," U.S. Department of Energy Order 413.3A, Washington, DC.

U.S. Department of Energy (DOE), January 3, 2007. "Environmental Protection Program," U.S. Department of Energy Order 450.1, Washington, DC.

U.S. Department of Energy (DOE), May 17, 2007. "Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees," U.S. Department of Energy Order 440.1B, Washington, DC.

U.S. Department of Energy (DOE), February 27, 2008. "Departmental Energy, Renewable Energy, and Transportation Management," U.S. Department of Energy Order 430.2B, Washington, DC.

U.S. Department of Energy (DOE), March 2008. "Integration of Safety into the Design Process," U.S. Department of Energy Standard DOE-STD-1189-2008, Washington, DC.