SAND2012-3956P

Response to DOE/IG 0835 Audit Report Recommendations Closeout Status

May 15, 2012

SAND #2012-XXXX

This document has undergone the formal Review and Approval process, and its contents have been deemed unclassified/unlimited release.

Sandia National Laboratories

National Nuclear Security Administration

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1.0 Report

1.1 Introduction

Sandia National Laboratories (Sandia) provides this response to Mike Thompson's request, dated March 28, 2012, regarding the Inspector General (IG) Audit Report on Lighting (DOE/IG-0835). This document summarizes information contained in the Fiscal Year (FY) 2012 Site Sustainability Plan (SSP) and the associated Consolidated Energy Data Report (CEDR). It will assist the National Nuclear Security Administration (NNSA) in closing out the IG Audit Report recommendations by the end of the third quarter of FY 2012.

The DOE's "Opportunity for Energy Savings Through Improved Management of Facilities Lighting" audit was conducted at the Sandia National Laboratories/California (SNL/CA) location. The information provided shows that Sandia has made excellent progress in replacing inefficient lighting with new fixtures in accordance with the lighting audit recommendations. The following narrative addresses the recommendations and other NNSA required information.

1.2 Recommendations

1.2.1 Evaluate Opportunities

> **(1) Evaluate opportunities for replacing outdated lighting systems and demonstrating the practical application of lighting technologies developed in Department of Energy laboratories.**

T12 fluorescent lamps have been replaced by T8 or T5 lamps in most of the buildings at the Sandia National Laboratories/New Mexico (SNL/NM) location. Sandia is in the process of conducting energy audits to meet the Energy Independence and Security Act of 2007 (EISA 2007) requirement. This audit process has identified isolated areas at SNL/NM where T12 lamps are still in use. Sandia replaces these fixtures using Operations and Maintenance (O&M) funding.

Over the last two years, Sandia has focused on lighting replacement in buildings at SNL/CA.

Sandia's Energy program is now looking at exterior lighting, for opportunities to install LED lights at both sites.

Sandia leverages all maintenance and project funding to reduce energy and water use. Sandia's Resource Management program received $1.5 million (M) in FY 2010, $2.0M in FY 2011, and $3.0M in FY 2012 from Corporate Indirect (CI) monies to fund energy- and water-conserving projects including lighting-replacements. Sandia expects to continue funding this program in the $3M to $5M range for the next five years. The Readiness in Technical Base and Facilities (RTBF) Capability-Based Facilities and Infrastructure (CBFI) program may also contribute energy monies to fund projects in the future.

In accordance with the FY 2010 SNL SSP:

Table 1.1 Performance Status – As of December 2010

Performance Status – As of December 2010	
SNL/NM	Through the Sandia Lighting program, replaced 90 percent of T12 fluorescent lamps to more-efficient T8 and T5 lamps.
SNL/CA	Through the Sandia Lighting program, replaced 69 percent of T12 fluorescent lamps to more-efficient T8 and T5 lamps.

In accordance with the FY 2012 SNL SSP:

Table 1.2 Performance Status – As of December 2011

Performance Status – As of December 2011	
SNL/CA	Replaced T12 fluorescent lamps to more-efficient T5 lamps in Buildings C905 and C912, bringing the total T12 replacements to 79 percent at SNL/CA..

1.2.2 Develop a Plan

(2) Develop a plan to phase in more-efficient lighting technologies currently in the market.

The Sandia plan is summarized in the FY 2012 SNL SSP and CEDR. Sandia's Resource Management Team continually researches new lighting products and selectively pilots those products to evaluate their performance. Recent efforts have concentrated on exterior LED lighting and combined lighting/heating, ventilating, and air-conditioning (HVAC) controls.

In accordance with the FY 2012 SNL SSP:

Table 1.3 Performance Status – Beyond 2012

Projected Performance – Beyond FY 2012	
SNL/CA	Replace T12 fluorescent lamps with more-efficient T5 lamps in remaining SNL/CA buildings. Replace high-intensity discharge (HID) lighting with LED lights in Buildings C910, C914, C940, C941, and C942.
SNL/CA&NM	Investigate new technologies for lighting and lighting controls.

Table 1.4 Requested Quantitative Data

Requested Quantitative Data*	
Estimated Number of Buildings with Upgraded Lighting as of September 30, 2011	
SNL/CA	30 Buildings and Trailers
SNL/NM	775 Buildings and Trailers
Estimated Gross Square Feet (GSF) of Space Associated with Upgraded Lighting as of September 30, 2011	
SNL/CA	0.66M
SNL/NM	5.22M
Estimated of Site Lighting Opportunity Upgrades Remaining (GSF of Space)	
SNL/CA	0.23M
SNL/NM	0.58M

***** Estimates do not include lease space.

2.0 Lighting Improvements

Table 2.1 lists planned or identified site lighting improvements in accordance with the SNL FY 2012 SSP CEDR submission, section 3.5:

Table 2.1 Planned or Identified Site Lighting Improvements

Conservation Measure/Project	Estimated Implementation Cost ($000)	Estimated Annual Energy Savings (10^9BTU/Yr)	Funding Source/Type (Actual, Potential, or Identified)	Measure Completion Year (Anticipated or Actual)	Notes
(1)	(2)	(3)	(4)	(5)	
Building 887 Hybrid Solar Lighting System	$37,000	0.000	M&R Indirect	2008	Pilot project; no energy savings.
Building 800 PV Parking Lot Lighting	$50,000	0.011	M&R Indirect	2008	
Credit Union PV Parking Lot Retrofit	$25,000	0.004	M&R Indirect	2008	
Building 848 PV Parking Lot Lighting	$30,000	0.006	M&R Indirect	2008	
Building 861 PV Pedestrian Lighting	$25,000	0.001	M&R Indirect	2008	
Building 956 PV Pedestrain Lighting	$5,000	0.003	M&R Indirect	2008	
Building 848 Additional PV Parking Lot Light	$5,000	0.001	Other	2008	
Building 848 Additional PV Parking Lot Light	$5,000	0.001	Other	2008	
Building 755 PV Parking Lot Lighting	$5,000	0.001	Other	2009	
Building 755 PV Parking Lot Lighting	$5,000	0.001	Other	2009	
Building 9981/T-33 PV Parking Lights	$50,000	0.006	M&R Indirect	2009	
Building 970/983 Replace Existing Lighting with Higher-Efficiency Fixtures	$550,000	1.245	M&R Indirect	2010	
SNL/CA Campus Install LED Street Lights	$85,000	0.372	M&R Indirect	2010	
Building C912 First floor T12 Relamping & Ballast with T5	$143,000	0.327	M&R Indirect	2010	All ceiling-mounted lights were converted to T5 lights.
Building C912 Equipment Room 12 Relamping & Ballast with T5	$19,775	0.033	M&R Indirect	2010	All ceiling-mounted lights were converted to T5 lights.
Building C912 Second-Floor T12 Relamping & Ballast with T5	$173,719	0.334	M&R Indirect	2010	All ceiling-mounted lights were converted to T5 lights.

Conservation Measure/Project	Estimated Implementation Cost ($000)	Estimated Annual Energy Savings (10^9BTU/Yr)	Funding Source/Type (Actual, Potential, or Identified)	Measure Completion Year (Anticipated or Actual)	Notes
(1)	(2)	(3)	(4)	(5)	
Building C941 Loft T12 Relamping and Ballast with T5	$56,000	0.099	M&R Indirect	2010	
Building C942 Loft T12 Relamping & Ballast with T5	$52,000	0.069	M&R Indirect	2010	
Building C942 T12 Relamping & Ballast with T5	$68,000	0.146	M&R Indirect	2010	
Building C941 T12 Relamping & Ballast with T5	$87,000	0.357	M&R Indirect	2010	
Building C905 Relamping & Ballast from T-12 T-5	$220,000	0.158	M&R Indirect	2011	Estimated saving using 12 hours/day, 5 days/week, 51 weeks/year.
SNL/NM VP Suite 802 Lighting	$25,000	0.002	M&R Indirect	2011	
SNL-CA C912 Relamping & Ballast from T12 to T5 (wall lights)	$123,000	0.050	M&R Indirect	2011	
Building 957 PV Parking Lot Lighting	$50,000	0.007	M&R Indirect	2011	
Building 810 Bollard Lighting System	$36,000	0.001	M&R Indirect	2011	
SNL/CA LED Lighting, C910, C914, C940, C941, C942	$61,000	0.192	M&R Indirect	2012	Added for 2012
SNL/CA MANTL Lighting	$5,000	0.014	M&R Indirect	2012	Added for 2012
SNL/NM Design for Efficient Security Lighting	$50,000	0.000	M&R Indirect	2012	Design only in 2012; added to 2012; no energy savings.
SNL/CA C912 Computer Basement Relamping & Ballast from T12 to T5	$125,000	0.184	M&R Indirect	2012	FY changed.
SNL/NM LED Lighting in 887 Parking Lot	TBD	0.000	M&R Indirect	2012	New installation; no energy savings.
SNL/CA Solar LED Lighting Parking Lot West of C911	$30,000	0.008	M&R Indirect	2012	Replace existing HID (metal halide).
SNL - CA C906 Relamping & Ballast from T12 to T5	$180,000	0.211	M&R Indirect	2013	Estimated saving using 12 hours/day, 5 days/week, 51 weeks/year.
C968 Relamping & Ballast from T-12 to T-5 (approx. 500 lamps)	$100,000	0.170	M&R Indirect	2013	Estimated saving using 12 hours/day, 5 days/week, 51 weeks/year.

Conservation Measure/Project	Estimated Implementation Cost ($000)	Estimated Annual Energy Savings (10^9BTU/Yr)	Funding Source/Type (Actual, Potential, or Identified)	Measure Completion Year (Anticipated or Actual)	Notes
(1)	(2)	(3)	(4)	(5)	
Building C943 T12Relamping & Ballast to T5	$600	0.002	M&R Indirect	2013	
SNL/CA C907 LED Lighting Upgrade	$22,000	0.056	M&R Indirect	2013	Added for 2012
SNL/CA Solar LED Lighting at C966	$30,000	0.017	M&R Indirect	2014	Replace existing HID (metal halide).
Building 518 Remove Light Fixtures in Corridor to Reduce Lighting Level & Install Occupancy Sensors in Corridors & Chases	$5,000	0.034	M&R Indirect	2014	
SNL/CA Solar LED Lighting in Thunderbird Parking Lot	$235,000	0.043	M&R Indirect	2014	Replace existing HID (metal halide).
SN/-CA Solar LED Lighting between C960 & C940	$200,000	0.000	M&R Indirect	2016	New installation; no energy savings. FY changed.
SNL/CA Solar LED Lighting for C905 Pathway	$5,000	0.000	M&R Indirect	2016	Replace existing HID (metal halide). FY changed.
SNL/CA Campus Install LED Path Lights	$100,000	0.000	M&R Indirect	2016	New installation; no energy savings.

Notes:

1. **Projects completed before 2008 are not listed.**
2. **List does not include identified lighting-controls projects.**