



DOE/EA-1440-S-II

**FINAL SUPPLEMENT-II TO
FINAL SITE-WIDE ENVIRONMENTAL ASSESSMENT OF THE
NATIONAL RENEWABLE ENERGY LABORATORY'S SOUTH TABLE
MOUNTAIN COMPLEX**

Proposed Construction and Operation of:

- Energy Systems Integration Facility*
 - Infrastructure Improvements (Phase 2)*
 - A New Second Full Service Access Road*
 - Expansion of the Waste Handling Facility*
 - Expansion of the Visitors Center*
-

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ACRONYMS AND ABBREVIATIONS

AC	alternating current
ADT	average daily trip
BMP	best management practice
Btu	British thermal unit
CCR	Code of Colorado Regulations
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
dBA	A-weighted decibel
DC	direct current
DOE	U.S. Department of Energy
DWOP	Denver West Office Park
DWP/DWMB	Denver West Parkway-Denver West Marriott Boulevard (intersection)
EA	environmental assessment
EERE	Office of Energy Efficiency and Renewable Energy (DOE)
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
ESIF	Energy Systems Integration Facility
FONSI	Finding of No Significant Impact
FTLB	Field Test Laboratory Building
g/hp-hr	grams per horsepower-hour
H ₂	hydrogen
H ₂ S	hydrogen sulfide
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
hp	horsepower
HPL	Hydrogen Production Laboratory
HSL	Hydrogen Systems Laboratory
HVAC	heating, ventilation, and air conditioning
I-70	Interstate 70
JCOS	Jefferson County Open Space
kg	kilogram
kW	kilowatt
LEED	Leadership in Energy and Environmental Design
LOS	level of service
MW	megawatt
MCSC	Materials and Computational Sciences Center
mJ	millijoules
MJ	megajoules
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act

NHPA	National Historic Preservation Act
NIOSH	National Institute of Health and Human Services
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
O ₃	ozone
OSHA	Occupational Safety and Health Act
Pb	lead
PM	particulate matter
ppm	parts per million
psi	pounds per square inch
psig	pounds per square inch gauge
PV	photovoltaic
RFP	Request for Proposal
ROW	right-of-way
RSF	Research Support Facilities
S&TF	Science and Technology Facility
SERF	Solar Energy Research Facility
SHPO	State Historic Preservation Officer
SIP	state implementation plan
SO ₂	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
STM	South Table Mountain
SVOC	semi-volatile organic compound
SWEA	site-wide environmental assessment
SWEA/S-I	first supplement to the SWEA
SWEA/S-II	second supplement to the SWEA
TDM	traffic demand management
TNT	trinitrotoluene
TPY	tons per year
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WHF	Waste Handling Facility
WPA	Works Progress Administration

SUMMARY

Introduction

The U.S. Department of Energy (DOE) is proposing an action (the Proposed Action) consisting of the construction and operation of the following five site development projects at the National Renewable Energy Laboratory's (NREL) South Table Mountain (STM) site at Golden, Colorado:

- The Energy Systems Integration Facility (ESIF), a new research facility;
- Phase 2 of planned site infrastructure improvements (Phase 2 of Full Site Development);
- A new second full service access road;
- Expansion of the Waste Handling Facility (WHF); and
- Expansion of the Visitors Center.

In accordance with DOE and National Environmental Policy Act (NEPA) implementing regulations, DOE is required to evaluate the potential environmental impacts of DOE facilities, operations, and related funding decisions. The decision to use federal funds for this Proposed Action requires that DOE address NEPA requirements and related environmental documentation and permitting requirements.

In July 2003, DOE issued the *Final Site-Wide Environmental Assessment of the National Renewable Energy Laboratory's South Table Mountain Complex* (the SWEA) and a Finding of No Significant Impact (FONSI) for proposed site development activities (DOE/EA-1440) (DOE 2003). The SWEA evaluated the impacts that would be associated with long-term buildout of the STM site in broad terms and identified areas of the site suitable for future development. It also identified areas to be set aside and preserved as natural areas not subject to future buildout. As project-specific funding has become available to implement the STM site buildout vision, additional project-specific NEPA analyses have been generated.

In July 2007, DOE issued the *Final Environmental Assessment of Three Site Development Projects at the National Renewable Energy Laboratory South Table Mountain Site* (DOE/EA-1573) (DOE 2007). That environmental assessment (EA) tiered off the SWEA and, for some resource areas, provided updated descriptions of the existing environment at the STM site and impacts expected from the three proposed projects. The July 2007 EA and its associated FONSI are incorporated by reference in their entirety into this NEPA document.

In May 2008, DOE issued its first supplement to the SWEA (SWEA/S-I): *Final Supplement to Final Site-wide Environmental Assessment of the National Renewable Energy Laboratory's South Table Mountain Complex, Proposed Construction and Operation of: Research Support Facilities, Infrastructure Improvements (Phase I), Upgrades to the Thermochemical User Facility, and Addition of the Thermochemical BioRefinery Pilot Plant* (DOE/EA-1440-S-1) (DOE 2008).

The 2003 SWEA and 2008 SWEA/S-I provide a detailed framework and an analytical structure under which the potential environmental impacts of the Proposed Action assessed in this second supplement to the SWEA (hereafter referred to as SWEA/S-II) would be evaluated. In compliance with NEPA (42 U.S.C. 4321) and DOE's NEPA implementing regulations (10 CFR section 1021.314) and procedures, DOE is examining the potential environmental impacts of the Proposed Action described above. The Proposed Action would be implemented in areas that were analyzed in the SWEA and SWEA/S-I. Similar to the SWEA and SWEA/S-I, to the fullest extent possible, this supplement tiers off the descriptions of the affected environment and the potential environmental impact assessments presented in the SWEA and the SWEA/S-I.

The SWEA and the SWEA/S-I evaluated the existing and proposed STM site facilities as well as the operation of the site. Implementation of the full site buildout contemplated in the SWEA on 55 hectares (136 acres) of buildable site land would be based on the availability of funds. This SWEA/S-II evaluates the proposed activities for which funding is currently available or for which the likelihood of securing funding in the near future is high. Additional site development activities identified in the 2003 SWEA would be evaluated in future SWEA supplements or other NEPA analyses as funding for them is obtained and as project designs and schedules are further developed. Although this SWEA/S-II does not address all potential future site development projects, they have been included under the analyses of cumulative impacts (to the extent that they can be addressed at this time) in accordance with the Council on Environmental Quality (CEQ) and DOE regulations.

The July 2003 SWEA, the July 2007 EA, and the May 2008 SWEA/S-I and their associated FONSI are available at the NREL Visitors Center and at the DOE Golden Field Office Public Reading Room website at http://www.eere.energy.gov/golden/Reading_Room.aspx.

This SWEA/S-II has been prepared under DOE's regulations and guidelines for compliance with NEPA. It was distributed to interested members of the public and to federal, state, and local agencies for review and comment. DOE has responded to the comments on the draft SWEA/S-II in Appendix E of this final SWEA/S-II.

Purpose and Need

The Proposed Action supports and advances DOE's research and development mission in the area of energy efficiency and renewable energy technologies. The goal of this mission is to improve the nation's overall economic strength and competitiveness, energy security, and environmental stewardship by developing, demonstrating, and deploying clean, competitive, and reliable power technologies. The Proposed Action would contribute to achieving this mission. Specifically, the purpose and need of the Proposed Action is to (1) provide additional research and development capabilities at NREL, (2) upgrade and expand portions of the existing infrastructure, including the handling of site-generated wastes, (3) alleviate projected traffic congestion associated with future growth, (4) provide additional office space for an expanding employee population, and (5) expand the site's ability to accommodate visitors to NREL.

Proposed Action and Alternatives

Under the Proposed Action, the following five site development construction projects would be implemented.

Energy Systems Integration Facility

The ESIF would serve as a model for sustainable high-performance design for laboratories across the country. It would demonstrate the integration of high-performance building design and practices, showcase technology advances, and demonstrate to industry the applications of renewable and energy-efficient technologies for this type of facility. The ESIF would incorporate energy efficiency, environmental performance, and advanced controls using a "whole building" integrated design approach and would be required to comply with Energy Star standards.

At the ESIF, technical staff would research, engineer, design, test, and analyze components and systems for a broad range of renewable energy generation capabilities. The ESIF would house a state-of-the-art, high-performance computing and data center. It would also support improved and expanded capabilities

in the modeling and simulation of renewable energy and energy-efficient technologies and their integration into the existing energy infrastructure.

The ESIF would be a one- to five-story building with a maximum footprint of approximately 23,230 square meters (250,000 square feet), plus an additional 1,850 to 2,800 square meters (20,000 to 30,000 square feet) of outdoor research test pads and associated infrastructure requirements (access road, services drives, utilities, etc.).

To support its research, the ESIF would house state-of-the-art laboratories, offices, and shared areas to support a constant staff of approximately 250 personnel and would include dedicated spaces such as conference rooms, guest offices, and other “institutional” spaces that would facilitate collaboration between NREL/DOE’s private, academic, and public sector partners. In addition, outdoor pads would provide for testing larger equipment and systems up to a multi-megawatt scale.

Site Infrastructure Improvements (Phase 2 Buildout)

The proposed Site Infrastructure Improvements (Phase 2 Buildout) would consist of several infrastructure improvements (roadways, gathering areas, and pedestrian/bicycle paths) and utility improvements contemplated in the 2003 SWEA. These proposed improvements would service and support the proposed ESIF and other projected developments in Zones 4, 5, and 6. The North Loop Road, a new east-west roadway connecting the East Loop Road and Denver West Parkway, and utility extensions would be part of this phase. Denver West Boulevard through the campus would remain. As buildings are completed, the interconnectivity of pedestrian walkways, bicycle paths, and open space landscaping and gathering areas would also be completed. Additional improvements to the central and eastern drainage arroyos and stormwater detention basins would also be made as part of the Phase 2 buildout.

New parking areas would be added to areas adjacent to the Visitors Center and/or to the new parking lots identified in SWEA/S-I south of Denver West Parkway. Multi-level parking could be constructed over those parking lots to provide additional parking space.

Second Access Road

Consistent with the needs identified in traffic surveys conducted in 2007 and 2008 (FHU 2008) and most recently in 2009 (Baseline 2009), a new second access road providing access to the STM site would be built or existing roads upgraded to accommodate additional traffic associated with the Proposed Action. DOE and NREL are considering five corridors for the second access road. Either a single corridor (Corridor A or Corridor E) or a combination of corridors (Corridor B/C, B/D, or B/D/E) are evaluated for the final roadway alignment. The routes, access points, and lengths of the corridors are described below, assuming a driver is leaving the site:

- Corridor A would connect with the existing western entrance gate on the STM site and extend south on Quaker Street, connecting to South Golden Road, a distance of approximately 0.69 kilometer (0.43 mile).
- Corridor B/C would begin at the proposed on-site parking lots and extend south to connect with South Golden Road, a distance of approximately 0.49 kilometer (0.31 mile).
- Corridor B/D would begin in the same area as Corridor B/C. From there, it would either utilize the existing access road (with upgrades) to the current parking lot for the Pleasant View Community Park or require new construction in an area nearby to cross Lena Gulch. It would

then travel south on Kilmer Street to connect to South Golden Road. The total distance of this corridor would be approximately 0.88 kilometer (0.55 mile).

- Corridor B/D/E would be the same as the Corridor B/D option with the exception of using Isabell Street to gain access to South Golden Road. The total distance of this corridor would be approximately 1.13 kilometers (0.70 mile).
- Corridor E would begin at the Denver West Parkway near the current Visitors Center and travel south along Isabell Street to connect with South Golden Road, a distance of approximately 0.72 kilometer (0.45 mile).

For all of the proposed corridors, construction of either a new access road or widening and upgrades of existing roads would require a roadway right-of way (ROW) width of 18.3 meters (60 feet). Additionally, a roadway on Corridors B, C, or D would require new bridging or a culvert over Lena Gulch, and Corridor E could require expansion of the existing bridge. Corridors A and E would require widening to sections of Quaker Street and Isabell Street, respectively, and Corridor D would require widening of Kilmer Street.

Based on its analysis and understanding of impacts, DOE has selected Corridor B/C as the preferred corridor for a second access road to the STM site. This corridor would provide the best traffic flow for employees to access the major arteries and freeways; minimize the number of residential properties that might be affected; avoid large increases in traffic down existing residential streets; and avoid numerous historic resources and conflicts with other activities along Kilmer Street.

Expansion of the Waste Handling Facility

The current WHF would be expanded from 99 square meters (1,065 square feet) to approximately 370 square meters (4,000 square feet). This expansion would accommodate anticipated future needs. The expanded facility would be used for packaging and short-term storage of NREL's increasing volume of hazardous and universal wastes before the wastes are shipped off-site for disposal. No on-site waste treatment or disposal is proposed.

Expansion of the Visitors Center

The Visitors Center currently covers about 600 square meters (6,500 square feet). DOE is proposing to approximately double the size of the center, to 1,200 square meters (13,000 square feet). The added space would include a large conference room and additional office and exhibit space. It could also include a cafeteria for visitor and employee use.

No Action Alternative

Under the No Action Alternative, the five proposed projects would not be implemented and the STM site would remain in its current configuration. The No Action Alternative would not preclude future proposed development, at which time DOE would make a NEPA determination.

Scoping

The provisions of NEPA ensure that the public has an opportunity to participate in the environmental review process. In addition, NREL/DOE has taken extra measures to maximize public consultation and input during the preparation of this EA. To ensure that all matters of public interest were considered in this SWEA/S-II, on September 4, 2008, NREL/DOE distributed a scoping letter to the public and to

county, state, and federal agencies and other organizations requesting public and agency comments on the Proposed Action. The letter was also posted on the DOE Golden Field Office Public Reading Room website at http://www.eere.energy.gov/golden/Reading_Room.aspx. The scoping letter and mailing list are shown in Appendix A. A public meeting was held August 6, 2009, by NREL/DOE to discuss the status of the proposed actions and the characteristics of the five projects, and the nature of environmental issues to be addressed in this SWEA/S-II. It also provided an opportunity for public input regarding environmental concerns in the project area. A summary of the comments expressed at the scoping meeting, as well as the summaries of the comment letters, are provided in subsequent sections of this SWEA/S-II.

Environmental Consequences

This SWEA/S-II considers the following environmental resource or impact areas:

- Land use
- Traffic
- Safety and accidents
- Visual quality/aesthetics
- Water resources
- Biological resources and wetlands
- Cultural resources
- Air quality
- Geology and soils
- Waste management
- Noise
- Public services and utilities
- Environmental justice
- Intentional destructive acts
- Energy efficiency and sustainability

Because there are no species of concern, no disproportionately impacted low-income or minority populations, no agriculturally productive soils, and no high commercial or aesthetic value geologic resources, many of the site improvement projects that make up the Proposed Action would not result in adverse or beneficial impacts. The areas that would experience some impact are area traffic circulation, land use on the STM site, and the visual appearance of the STM site. The development of a second access road could impact wetlands and floodplains associated with Lena Gulch, depending on which corridor is selected.

Traffic Circulation

The traffic impact analyses demonstrate that without mitigation, the increase in staffing levels proposed for the STM site would cause the unacceptable degradation of traffic flow at the west bound exit off I-70 and at the Denver West Parkway/Denver West Marriott Boulevard intersections near the site (Baseline 2009, FHU 2008). As a result, DOE and NREL are committed to taking both near-term and longer-term mitigation measures to prevent unacceptable traffic impacts from the actions assessed in this SWEA/S-II and from planned future expansion of the STM site. In the near term, mitigation actions would include implementing traffic demand measures such as flextime, carpools and van pools, and other measures to reduce the number of project-related vehicles accessing the site.

For the long term, to adequately mitigate traffic impacts from the foreseeable staff increases at the STM site, DOE and NREL are planning for a second site entrance from South Golden Road (dependent upon funding). Multiple alternative corridors are assessed in this SWEA/S-II to meet this need.

Land Use

Under the Proposed Action analyzed in this SWEA/S-II, some currently undeveloped areas within the STM site's development zones would be converted to office and laboratory space, parking lots, and associated access ways. This development would occur within areas identified in the final SWEA as acceptable for future development. However, the Proposed Action would convert approximately 6 hectares (15 acres) of mixed grassland habitat (and its use by wildlife) to buildings and roads. Recognizing this potential for biotic impacts from site buildout, in 1999, DOE committed to setting aside 72 hectares (177 acres) of the site as a preserve for the conservation of prairie grasses and associated habitats.

For the second access road alternatives, within Corridors A and E, the existing Quaker Street or Isabell Street would have to be widened, expanding the ROW into areas of private property; however, no structures would have to be relocated. For Corridors B/C and B/D, new road construction would occur on public and private lands that are currently a combination of grasslands, streamside vegetation and a few private residences. Portions of these corridors lie within the Camp George West Historic District. For the Kilmer segment of Corridor D, road widening could require the relocation of several historic structures.

Visual Quality

The ESIF, the multi-story parking structures, and the second access road would have the greatest potential to affect the existing visual setting at the STM site. Although a conceptual design for the ESIF or multi-story parking structures does not exist, DOE and NREL are committed to building structures that are visually consistent with the existing STM facilities. Simulated images in this SWEA/S-II show that the ESIF and multi-story parking structures would be visually consistent with the existing STM buildings when viewed from off-site locations. The visual impacts analysis also demonstrates that construction of either a single-story or a multi-story ESIF building on either of two pads under consideration would not be expected to obstruct or otherwise block the view of the foothills for nearby residents, immediately south of Denver West Parkway and east of the STM site. The construction of multi-story parking structures immediately south of Denver West Parkway could partially obstruct views of the foothills for residents east of this area. If constructed, the parking structures would be designed considering height, location, color, and texture.

Wetlands and Floodplains

Because there are no jurisdictional wetlands or floodplains on the STM site, the proposed site development projects would not affect these types of resources. However, several of the corridor alternatives for a second access road have the potential to impact wetlands and floodplains south of the STM site. Specifically, a new crossing or an upgrade of an existing crossing over Lena Gulch would be required for Corridors B/C and B/D, and the existing bridge on Isabell Street may require widening under Corridor E. Depending upon the siting of a roadway, some areas of wetlands and floodplains could be impacted under these alternatives.

Committed Measures

Throughout this SWEA/S-II, DOE and NREL have identified measures that would be taken under the Proposed Action to ensure safe operations and minimize environmental impacts. Those actions are as follows:

Traffic Circulation

DOE and NREL are planning for the addition of dual eastbound right-turn lanes at the Denver West Parkway/Denver West Marriott Boulevard intersection as soon as funding is authorized and before the level of service exceeds level “D”.

DOE and NREL would actively monitor traffic conditions, volumes, and levels of service at key intersections and would modify the mitigation measures applied, as necessary, such as carpooling and vanpooling, telecommuting, flextime, off-site parking, and control of traffic exiting the STM site to mitigate the unacceptable degradation of traffic flow.

Water Quality

To address impacts from increased surface water runoff, DOE would install stormwater management measures, such as a new detention basin or a series of basins in or around the central or eastern drainage dry stream channels, or other stormwater management techniques, to minimize and manage potential impacts of off-site runoff that could occur under the Proposed Action. In addition, DOE would regrade the surrounding terrain and/or install engineered drainage systems to direct runoff from the proposed parking lots into the new stormwater management structures.

Biological Resources

NREL would conduct wildlife surveys, such as ground-nesting bird surveys, to the fullest extent possible before and during implementation of the Proposed Action and would implement best management practices (BMPs) to minimize impacts to wildlife. An example of a customized BMP may involve delaying portions of construction until identified migratory bird nests (e.g., raptor nests) are no longer being used for the season in the area.

NREL would also implement a noxious weed management plan which, among other strategies, calls for a native grassland seed mix or other sustainable landscaping/plantings to be used to restore disturbed areas after construction.

NREL would implement NREL’s Stormwater Pollution Prevention Plan in accordance with U.S. Environmental Protection Agency (EPA) permits, which, among other strategies, calls for a native grassland seed mix or other sustainable landscaping to be used in restoration areas after construction.

Cultural Resources

During construction, if any cultural or historic resources are discovered, work in that area would be immediately halted pending consultations with a qualified state or tribal archeologist or historian and, if necessary, the State Historic Preservation Officer (SHPO).

Air Quality

ESIF air-emitting activities would be reviewed when more equipment-specific information is available, and a notification/permitting determination (both for activity-specific and cumulative emissions) would be made. All proposed gensets¹ and future emission sources would be fitted with all required air pollutant control technologies to reduce criteria emissions taking into consideration cost, availability, and emission reduction potential.

Vehicles traveling to and from the STM site, including commuting workers, would cause an increase of 0.14 percent in the regional traffic. Air emissions from this small increase in traffic would not result in quantifiable health effects.

Noise

When more detailed information regarding noise-generating equipment to be operated on the outdoor test pads became available, DOE and NREL would consider manufacturers' noise level data when selecting such equipment and when determining final and favorable locations for operations. DOE and NREL would also consider the need for noise mitigation, as appropriate, to be in compliance with applicable noise regulations.

Safety Analyses

DOE and NREL would work closely with the selected design/build contractor to verify that the final ESIF design would incorporate all necessary safety features in accordance with NREL policies and procedures to allow the facility to operate at a low risk to workers and the off-site public.

¹. A genset (or engine-generator set) is the combination of an electrical generator and an engine mounted together to form a single piece of equipment, usually gasoline- or diesel-powered, and located near the end user rather than in a central location near commercial power providers. A genset can be used to augment an existing electrical grid system or to serve as an "off-grid" power source, depending upon the needs of the user. Gensets are often used by hospitals and other institutions that rely upon a steady source of power, as well as in rural areas where there is no access to commercially generated electricity.