

Appendix B

NEPA

1.1 INTRODUCTION

The U.S. Department of Energy (DOE) is proposing to provide financial assistance to Hydrogen Energy California LLC (HECA) for project definition; design and construction; and demonstration of the HECA Project (Project). This provision of financial assistance is herein referred to as the Proposed Action. DOE has selected the Project through a competitive process under the Clean Coal Power Initiative Round 3 (CCPI) program. The National Environmental Policy Act (NEPA) process is initiated when a need to take a federal action has been identified. Because the Project is receiving funding from a federal agency, it is subject to the NEPA. The NEPA process consists of an evaluation of relevant environmental effects of a federal project or action undertaking, including reasonable alternatives.

This Application for Certification (AFC) Amendment is intended to provide information to the California Energy Commission (CEC) and DOE for their use in preparing a joint California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) document.

Appendix B provides the NEPA-required information that may not typically be addressed under CEQA for a CEC project, including the following:

- Purpose and Need
- Irreversible or Irrecoverable Commitments of Resources
- The Relationship between Short-term Uses of the Environment and Long-term Productivity

The Environmental Justice evaluation required for NEPA compliance is provided in the AFC Amendment Section 5.8, Socioeconomics. The Alternatives Analysis for NEPA compliance is provided in AFC Amendment Section 6.0, Alternatives.

1.2 PURPOSE AND NEED

This section introduces the Proposed Action and describes the purpose and need for agency actions. This section also summarizes the NEPA process, the scope of the Environmental Impact Statement (EIS), and the public scoping process for the EIS. The complete description of the HECA Project is provided in the AFC Amendment Section 2.0, Project Description.

The purpose and need for DOE action—providing limited financial assistance to HECA’s project—are to advance the CCPI program by funding projects that have the best chance of achieving the program’s objectives as established by Congress: The commercialization of clean coal technologies that advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies that are currently in commercial service. DOE’s purpose and need, as well as the range of reasonable alternatives, may differ from those of the CEC.

As detailed in the Project Description, the HECA Project would gasify a 75 percent coal and 25 percent petroleum coke (petcoke) fuel blend to produce synthesis gas (syngas). Syngas produced via gasification would be purified to hydrogen-rich gas and used to generate low-carbon electricity in a Combined Cycle Power Block, and to produce low-carbon nitrogen-based

APPENDIX B

NEPA INFORMATION

products in an integrated Manufacturing Complex. The products and power produced by the Project are expected to have a lower carbon footprint than similar products produced from conventional fossil-fuel based technology. The low-carbon footprint is accomplished by capturing more than 90 percent of the carbon dioxide (CO₂) in the syngas and transporting it for use in enhanced oil recovery (EOR), which results in permanent sequestration (storage) of the CO₂. The high purity CO₂ would be compressed and transported approximately 3 miles by pipeline to the adjacent Elk Hills Oil Field (EHOF), owned and operated by Occidental of Elk Hills, Inc. (OEHI), for injection into deep underground hydrocarbon reservoirs for CO₂ EOR.

This joint document will inform DOE's decision on whether to provide financial assistance to partially fund the approximately \$4.0 billion (estimated total cost) Project under DOE's CCPI program. DOE's financial assistance (or "cost share") would be limited to \$408 million, which is approximately 10 percent of the HECA Project's total cost.

Under NEPA, a federal, state, tribal, or local agency having special expertise with respect to an environmental issue or jurisdiction by law may be a cooperating agency in the NEPA process. For this Project, CEC is a cooperating agency because of its responsibility in fulfilling the requirements of the CEQA. The CEC and DOE will prepare a joint document that complies with CEQA as well as the NEPA as amended (42 United States Code [USC] 4321 *et seq.*), the Council on Environmental Quality's (CEQ) NEPA regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the DOE's NEPA regulations (10 CFR Part 1021) to assess the potential environmental impacts of providing financial assistance for the construction and operation of the Project. The joint documents will be referred to as a Preliminary Staff Assessment/Draft EIS and Final Staff Assessment/Final EIS.

Clean Coal Power Initiative Program

Public Law (PL) 107-63, enacted in November 2001, initiated and funded the initial phases of the CCPI, as a government and private-sector partnership to increase investment in clean coal technology. Through cooperative agreements with private sector partners, the program advances clean coal technologies to commercialization; these technologies often involve combustion improvements, control systems advances, gasifier design, pollution reduction (including greenhouse gas [GHG] reduction), sequestration or beneficial use of CO₂, efficiency increases, fuel processing, and others.

Congress established criteria for projects receiving financial assistance under this program in Title IV of the Energy Policy Act of 2005 (EPA, 2005: PL 109-58). Under this statute, CCPI projects must "advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies that are in commercial service." (PL 109-58, Section [§] 402(a). In February 2009, the American Recovery and Reinvestment Act of 2009 (PL 111-5, 123 Statute 115 [February 17, 2009]) appropriated \$3.4 billion to DOE for "Fossil Energy Research and Development." DOE intends to use a significant portion of these funds to provide financial assistance to CCPI projects.

The CCPI program selects projects for its government-private sector partnerships through an open and competitive process. Potential private sector partners may include developers of technologies, utilities and other energy producers, service corporations, research and

development firms, software developers, academia, and others. DOE issues funding opportunity announcements that specify the types of projects it is seeking and invites submission of applications. Applications are reviewed according to the criteria specified in each funding opportunity announcement; these criteria include technical, financial, environmental, and other programmatic considerations. DOE selects the projects that demonstrate the most promise when evaluated against these criteria and enters into a cooperative agreement with the applicant. These agreements set out the project's objectives, the obligations of the parties, and other features of the partnership. Applicants must agree to provide at least 50 percent of their project cost. For most CCPI projects, the applicant's cost share is much greater than 50 percent.

To date, the CCPI has conducted three rounds of solicitations and project selections. Round 1 sought projects that would demonstrate advanced technologies for power generation and improvements in plant efficiency, economics, and environmental performance. Round 2 requested applications for projects that would demonstrate improved mercury controls and gasification technology. Round 3 (which DOE conducted in two phases) sought projects that would demonstrate advanced coal-based electricity-generating technologies that capture and sequester (or put to beneficial use) CO₂ emissions. DOE's overarching goal for Round 3 projects was to demonstrate commercial-scale technologies that would (1) operate at more than 90 percent capture efficiency for CO₂; (2) make progress towards capture and sequestration at less than a 10 percent increase in the cost of electricity for gasification systems and a less than 35 percent increase for combustion and oxy-combustion systems; and (3) make progress toward capture and sequestration of 50 percent of the facility-generated CO₂ at a scale sufficient to evaluate the full impacts of carbon capture technology on operations, economics, and performance of a generating facility. This Project was one of two selected in the first phase of Round 3. DOE entered into a Cooperative Agreement with HECA on September 30, 2009. On September 2, 2011, SCS Energy California LLC (SCS Energy) acquired 100 percent ownership of Hydrogen Energy California LLC, from BP Alternative Energy North America Inc., and Rio Tinto Hydrogen Energy LLC. SCS Energy is a private power plant development company headquartered in Concord, Massachusetts.

1.2.1 Proposed Action

1.2.1.1 DOE Proposed Action

The DOE Proposed Action is to provide limited financial assistance for the development, construction and demonstration of the HECA Project. Provision of financial assistance is considered a major federal action; therefore, the DOE will coordinate with the CEC to prepare the joint CEQA/NEPA document to evaluate the potential impacts of DOE's Proposed Action, the proposed Project, and reasonable alternatives to DOE's Proposed Action. The DOE and CEC will consider information prepared by HECA and OEHI, as well as additional sources available from government agencies and other entities.

The objective of the Project is to produce hydrogen for low-carbon power generation and low-carbon nitrogen-based products. The Project would demonstrate carbon capture and sequestration on a commercial scale.

Under the cooperative agreement between DOE and HECA LLC, DOE would share the costs of the gasifier, syngas cleanup systems, a combustion turbine, a heat recovery steam generator, a

APPENDIX B

NEPA INFORMATION

steam turbine, supporting facilities and infrastructure, and a demonstration phase in which the HECA Project would use at least 75 percent coal (calculated on a fuel thermal input basis) to generate low-carbon electricity and low-carbon nitrogen-based products and would capture CO₂ for EOR and sequestration.¹ The Proposed Action applies to the following components of the HECA Project:

- HECA Project Site (including the integrated gasification combined-cycle electrical generation facilities, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes, except for the air separation unit which is a Connected Action)
- Potable water linear
- Transmission linear
- Process water linear
- Natural gas linear
- Railroad spur

1.2.1.2 DOE Connected Action

DOE would not share in the cost of the air separation unit, OEHI CO₂ pipeline, OEHI CO₂ EOR and sequestration facilities, or certain other facilities. These components that will not be part of the cost-sharing effort are referred to as Connected Actions. However, the potential impacts of Connected Actions would be evaluated in addition to those of the Proposed Action.

1.2.1.3 CEC Process

As discussed in AFC Amendment Section 2.0, Project Description, the CEC is responsible for reviewing and approving the Project under the Warren-Alquist Act, Cal. Pub. Res. Code § 25500 *et seq.*, and has the role of lead agency under the CEQA for the environmental review of the whole of the Project, including the OEHI CO₂ EOR, and facilities related thereto. The CEC conducts this review in accordance with the administrative adjudication provisions of the Administrative Procedure Act, Cal. Gov't Code § 11400 *et seq.* and with its own regulations governing site certification proceedings, 20 Cal. Code Regs. § 1701, *et seq.* These provisions require the CEC staff to conduct an independent analysis of applications for certification, and to prepare an independent assessment of a project's potential environmental impacts, feasible mitigation measures, and alternatives as part of this process. In preparing this analysis, the staff consults with interested local, regional, state, and federal agencies, and Native American tribes.

In addition to the CEC power plant licensing process and DOE federal funding, Project permitting will also involve the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR).

¹ The HECA Project would continue sequestering carbon dioxide (CO₂) throughout the operational life of the facility.

1.2.2 Purpose and Need Statement

The Purpose and Need for DOE's Proposed Action are to advance the CCPI program by funding projects that have the best chance of achieving the program's objective as established by Congress—the commercialization of clean coal technologies that advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies that are currently in commercial service. The proposed HECA Project was selected under the CCPI program as one in a portfolio of projects that would represent the most appropriate mix to achieve programmatic objectives and meet legislative requirements.

1.2.3 National Environmental Policy Act of 1969

DOE does not have regulatory jurisdiction over the Project. Its decisions are limited to whether and under what circumstances it would provide limited financial assistance to the Project. There are a number of federal and state agencies that do have regulatory authority over the Project, as described below.

In compliance with the NEPA, the EIS will inform DOE's decision on whether to provide financial assistance under its CCPI program. The document will evaluate the potential impacts of the DOE Proposed Action (provision of financial assistance), the Project proposed by HECA and any Connected Actions, and reasonable alternatives to the DOE Proposed Action. The extent of actions taken by DOE with regard to any proposal, including project selection or award, is limited prior to completion of the NEPA process.

DOE is coordinating this joint NEPA/CEQA review of the Proposed Action with the environmental review of the Project conducted by the CEC as lead state agency under the CEQA. DOE is working closely with the CEC throughout its regulatory processes in order to integrate the NEPA and CEQA processes in an efficient and expeditious manner. This AFC Amendment is intended to provide information to CEC and DOE for their use in preparing a joint CEQA/NEPA document.

DOE understands that, pursuant to California law and a grant of primacy from the U.S. Environmental Protection Agency (USEPA) regarding Class II wells under Section 1425 of the Safe Drinking Water Act, the DOGGR would have responsibility for permitting EOR injection and extraction wells, and would impose permit conditions on these aspects of the Project.²

1.2.4 Scope of the Environmental Impact Statement

This section of the EIS contains descriptions of the NEPA scoping process and coordination with federal and state agencies.

² The DOE anticipates that, pursuant to California Public Resources Code (PRC) Section (§) 21000 *et seq.*, California agencies will impose mitigation measures to address potential impacts and project design elements to verify the sequestration of CO₂ injected for EOR.

APPENDIX B

NEPA INFORMATION

1.2.4.1 Federal NEPA Scoping Process

Notice of Intent

A Notice of Intent (NOI) to prepare an EIS and hold a public scoping meeting was published by DOE in the *Federal Register* (FR) on April 6, 2010 (75 FR, No. 65, Page 17397). Publication of the NOI initiated the 30-day public scoping period. The NOI invited comments and suggestions on the proposed scope of the EIS, including environmental issues and alternatives, and invited participation in the NEPA process. Display advertisements were placed in the *Bakersfield Californian* newspaper on March 31, 2010 and April 3, 2010. The advertisements briefly described the Project and the need for the open house/public meeting. They provided the meeting time and place, and also stated that the scoping period end date was May 24, 2010. Publication of the NOI initiated the EIS process with a public scoping period for soliciting public input to ensure that (1) significant issues are identified early and appropriately addressed, (2) issues of little significance do not consume time and effort, and (3) delays occasioned by an inadequate EIS are avoided (40 CFR Part 1501.7).

In accordance with Section 216 of the DOE NEPA regulations, DOE prepared an “environmental critique” that assessed the environmental impacts and issues relating to each of the proposals that the DOE selecting official considered for selection in this round of the CCPI program.

DOE will publish an amended NOI after the filing of the AFC Amendment to reflect Project changes subsequent to the April 2010 publication.

List of Issues to be Analyzed

The following environmental issues were tentatively identified for analysis in the EIS. This list (which was developed from the DOE environmental critique of the Project, from permit applications that HECA filed and comments by regulatory agencies on those applications, and from information from similar projects) is neither an inclusive nor a predetermined set of potential impacts. This preliminary list is presented to facilitate public comment on the planned scope of the EIS. The preliminary list of potential environmental issues includes:

1. **Atmospheric Resources:** Potential air quality impacts resulting from emissions during construction and operation of the Project and Connected Actions (e.g., effects of ground-level concentrations of criteria pollutants and trace metals—including mercury—on surrounding areas, including those of special concern, such as Prevention of Significant Deterioration Class I areas). Potential cumulative effects of GHG emissions.
2. **Water Resources:** Potential effects of groundwater withdrawals and water use by the Project, including potential impacts resulting from construction and operation of the Project, such as linear facilities and any Connected Actions.
3. **Infrastructure and Land Use:** Potential effects on existing infrastructure and land uses resulting from the construction and operation of the Project. For example, potential traffic effects resulting from the Project and potential land use impacts of committing farm land to the Project.
4. **Solid Waste:** Pollution prevention and waste management issues, including potential impacts from the generation, treatment, transport, storage, and management of wastes.

5. **Visual:** Potential aesthetic impacts of new stacks, mechanical-draft cooling towers, flares, and other structures of the Project; linear facilities; and Connected Actions.
6. **Floodplain:** Potential impacts (e.g., impeding floodwaters, redirecting floodwaters, possible property damage) of siting structures on a floodplain.
7. **Wetlands:** Potential effects on wetlands due to construction and operation of the Project (including the Manufacturing Complex), linear facilities, and Connected Actions.
8. **Ecological:** Potential on-site and off-site impacts to vegetation, terrestrial and aquatic wildlife, threatened and endangered species, and ecologically sensitive habitats due to the construction and operation of the Project (including the Manufacturing Complex), linear facilities, and Connected Actions.
9. **Safety and Health:** Construction and operation-related safety, process safety, and management of process chemicals and materials.
10. **Construction:** Potential impacts associated with noise, traffic patterns, and construction-related emissions.
11. **Community Impacts:** Potential congestion and other impacts on local traffic patterns, socioeconomic impacts on public services and infrastructure (e.g., police protection, schools, and utilities), noise associated with Project operation, and environmental justice issues with respect to nearby communities.
12. **Cultural and Archaeological Resources:** Potential impacts on such resources from construction of the Project.
13. **Cumulative Effects:** Incremental impacts of the Project (e.g., incremental air emissions affecting ambient air quality) that, when added to other past, present, and reasonably foreseeable future actions, including Connected Actions, may have potentially significant impacts on the environment. This analysis would include potential impacts on climate.

The level of analysis of issues in the EIS is in accordance with their level of importance. The most detailed analyses focus on potential impacts on air, water, and ecological resources.

As discussed above, the list of issues presented in the NOI was not intended to be all-inclusive nor was it intended to imply a predetermined set of potential environmental issues. During scoping, focus was drawn to certain specific issues of concern (see the subsection entitled Comments Received During the Scoping Process, below).

NEPA Public Scoping Meeting

A NEPA public scoping meeting was held at the Bakersfield Marriott at the Convention Center on Wednesday, April 14, 2010, from 5:00 PM to 9:00 PM. The format of the meeting was set up as a combination informal poster session and presentation. There were informational boards and maps explaining the NEPA and CEC processes and showing the Project Site and linear facilities. There were 14 attendees who signed in; 8 of them provided oral comments during the public comment session.

DOE received five sets of written comments during the scoping meeting and four sets of written comments and questions after the meeting. The responses assisted in establishing additional

APPENDIX B

NEPA INFORMATION

issues to be analyzed in the EIS. Issues raised during public scoping are identified in the subsection entitled Comments Received During the Scoping Process.

DOE plans to hold a second scoping meeting for the Project in Spring/Summer 2012 after publication of the Amended NOI in the Federal Register.

Comments Received During the Scoping Process

During the scoping process, comments that were received from the public included those requesting that the EIS include a discussion of the positive benefits of the Project and those requesting further analysis of potential impacts and consideration of additional mitigation measures.

The potential effects and issues that the public commented on included the following:

1. Socioeconomic effects and environmental justice issues, both positive and negative, including an increased tax base, jobs, and domestic energy security.
2. Air quality and mitigation measures.
3. GHG emissions and climate change.
4. Benefits of CO₂ sequestration and concerns about its effectiveness, safety, monitoring, enforcement, and potential impacts.
5. Water use and impacts on local water quality.
6. Impacts on farmland and suggested mitigation measures.
7. Biological impacts and suggested mitigation measures.
8. Cumulative impacts.

DOE considered input obtained during the scoping process for addition to the list of issues to be analyzed and to provide additional focus to the analysis of previously identified issues (presented above under List of Issues to be analyzed). There were no resources identified that were not included in the NOI. Issues are analyzed and discussed in this document in accordance with their level of importance, and based on the expressed concerns of the public.

1.2.4.2 Coordination with Federal and State Agencies

In compliance with CEQ and DOE regulations for implementing the NEPA, DOE contacted appropriate federal and state (California) resource agencies with special expertise or jurisdiction in the Project area to participate in the NEPA Process. Contacts were made with USEPA, the U.S. Fish and Wildlife Service, the CEC, the State Historic Preservation Officer, and DOGGR. On June 3, 2010, the CEC accepted the DOE's invitation to become a cooperating agency for the EIS. Subsequently, the CEC and DOE agreed to produce a joint CEQA/NEPA document for the Project. This AFC Amendment is intended to provide information to the CEC and DOE for their use in preparing the joint document.

1.2.4.3 Coordination with Native American Tribes

DOE will consult with Native American Tribes with historic interests in Kern County on DOE's proposed action and the proposed Project, and will continue consultation through the NEPA process.

1.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

For the purposes of this document, a commitment of resources is irreversible when the primary (direct) or secondary (indirect) impacts from the use limit the future options for that resource. Irreversible commitments of resources refer to the use or consumption of a resource that cannot be reversed except over a very long time period (e.g., minerals). An irretrievable commitment of resources refers to the use or consumption of resources that is neither renewable nor recoverable for use by future generations and that cannot be restored. This commitment can refer to the use of non-renewable resources such as cultural resources, and the expenditure of labor or funds that, when used, would not be available for future use.

The No Action Alternative would not directly require the commitment of human or fiscal resources. However, this alternative fails to achieve all of the Project objectives related to production of energy, advancement of technology, and enhancement of energy security. In the long run, this alternative would not provide environmental benefits with regard to greenhouse gases, and would not help California meet its obligations under AB 32, SB 1368, and AB 1925.

The Action Alternatives would each involve irreversible or irretrievable commitment of resources, including the materials, energy, labor, and funds required during construction and operation. Implementation of mitigation measures, as identified in Section 5.0, Environmental Information, of the AFC Amendment, will minimize these commitments.

Non-renewable and irretrievable fossil fuels and construction materials (e.g., petroleum) would be required for both construction and operation. Use of raw building materials would be an irretrievable commitment of resources from which these materials were produced. Consumption or use of widely available materials such as gasoline and cement would not be anticipated to result in shortages.

Resources that would be irreversibly used during the construction of the Project include land and raw materials. Areas needed for construction of the Project and the associated linear facilities would be modified (e.g., cleared, graded, filled) to meet Project design requirements. The land resources needed would be physically altered, and the alteration of these land resources would constitute a permanent commitment of land for the life of the Project to a developed use and would decrease the amount of open/agricultural land available for other uses. Access to lands in the Project Site would also be limited to authorized personnel, thus limiting the use of those lands for other uses.

Construction would also result in an irreversible loss of biological resources, including loss of individual plants and animals. Individuals could be destroyed or displaced during construction and operation activities. Cultural and paleontological resources are non-renewable, and any disturbance of these resources from the action alternatives would constitute an irreversible and irretrievable commitment.

APPENDIX B

NEPA INFORMATION

Construction and operation of the Project would result in an irretrievable commitment of resources such as non-renewable fuels to generate power and operate equipment and vehicles. Resources consumed during operation would include diesel oil, fuel oil, and gasoline.

An irretrievable expenditure of labor would occur during both construction and operation for all action alternatives. Funding would also be committed as part of any of the action alternatives, would not be available for other uses, and would therefore be irretrievable. Labor would also irreversibly and irretrievably be committed during preparation and creation of the construction materials.

Although the implementation of the action alternatives would result in the commitment of resources as described above, the alternatives would allow for the addition of a nominal 300 megawatts of baseload low-carbon power to the grid, provide environmental benefits with regard to greenhouse gases (among others), and help California meet its obligations under AB 32, SB 1368, and AB 1925.

1.4 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

This section addresses the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity.

The No Action Alternative would not result in short-term uses of the environment. However, this alternative fails to achieve all of the Project objectives related to production of energy, advancement of technology, and enhancement of energy security. In the long run, this alternative would not provide environmental benefits with regard to greenhouse gases, nor help California meet its obligations under AB 32, SB 1368, and AB 1925.

Regardless of the Action Alternative, short-term uses of the environment would occur as a result of construction activities, as described in Section 5.0, Environmental Information, of the AFC Amendment. These uses include impacts on air, noise, soils, water, and transportation resources. These short-term impacts would be minimized through the use of Best Management Practices and through the implementation of mitigation measures described in Section 5.0, Environmental Information, of the AFC Amendment. In addition, these short-term uses would allow for long-term productivity of several resources, as discussed below.

Some greenhouse gases would be emitted during construction and operation of the Project. However, as discussed in Section 5.1, Air Quality, of the AFC Amendment, implementation of the Project would result in long-term greenhouse gas benefits by dramatically reducing average annual greenhouse gas emissions relative to those emitted from a conventional power plant nitrogen-based-product manufacturing facility by capturing and sequestering CO₂ emissions.

Short-term use of the construction labor force would result in substantial long-term productivity in the economic environment, given the short- and long-term benefits to local and regional employment and tax revenue, which are discussed in Section 5.8, Socioeconomics, of the AFC Amendment.

Short-term commitment of non-renewable and irretrievable fossil fuels and energy would be required for both construction and operation, as discussed above. However, implementation of the Project would conserve domestic energy supplies and enhance energy security by using coal and a byproduct from the oil-refining process (petcoke) to generate electricity and by enhancing production of domestic petroleum reserves that are otherwise unrecoverable.

In the long term, implementation would support the Project's objective to produce hydrogen for low-carbon baseload power generation and nitrogen-based products, and demonstrate carbon capture and sequestration on a commercial scale. The Project would support the DOE's Clean Coal Power Initiative, to further the commercialization of clean coal technologies that advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies that are currently in commercial service. The proposed Project would contribute an approximately 300-megawatt output of low-carbon baseload electricity to the grid during operations, and thus feed major load sources while providing environmental benefits regarding greenhouse gases (among others) and helping California to meet its obligations under California AB-32 and AB-1925, California SB-1368, and California Executive Orders S-7-04 and S-3-05. If other older coal-fueled power plants were replaced with newer plants similar to the Project's, the total domestic and international emissions of pollutants could be reduced, and there will be an increase in the efficient use of non-renewable resources.

If implemented, the Project would contribute to long-term positive impacts through the reduction of CO₂ emissions per megawatt generation. In addition, the integrated production of nitrogen-based products would enhance the production and availability of nitrogen-based products by producing approximately 1 million tons per year of low-carbon nitrogen-based products (including Urea, Urea Ammonium Nitrate, and anhydrous ammonia) for regional markets, which will result in long-term productivity increases.

ENVIRONMENTAL SYNOPSIS
CCPI Round 3
DE-PS26-08NT43181
DE-FOA-0000042

October 2010

National Energy Technology Laboratory
U.S. Department of Energy

INTENTIONALLY LEFT BLANK

CONTENTS

INTRODUCTION	1
BACKGROUND	1
PURPOSE AND NEED	3
ALTERNATIVES	3
ENVIRONMENTAL REVIEW	4
Applications in Response to the Initial FOA	5
Applications in Response to the Reopened FOA.....	7
CONCLUSION	9

INTENTIONALLY LEFT BLANK

INTRODUCTION

The U.S. Department of Energy (DOE or the Department) prepared this Environmental Synopsis pursuant to the Department's responsibilities under section 1021.216 of DOE's National Environmental Policy Act (NEPA) Implementing Procedures set forth in 10 CFR Part 1021. This synopsis summarizes the consideration given to environmental factors and records that the relevant environmental consequences of reasonable alternatives were evaluated in the process of selecting projects seeking financial assistance under Round 3 of the Clean Coal Power Initiative (CCPI). DOE selected five applicants seeking financial assistance under CCPI Round 3 during its merit review process. In addition to financial and technical elements, DOE considered relevant environmental factors and consequences of the projects proposed to DOE in response to the funding opportunity announcements. As required by section 1021.216, this synopsis does not contain business, confidential, trade secret or other information that statutes or regulations would prohibit DOE from disclosing. It also does not contain data or other information that may in any way reveal the identity of the offerors.¹

BACKGROUND

Coal is an abundant and indigenous energy resource and supplies almost 50 percent of the United States' electric power. Demand for electricity is projected to increase by more than 30 percent by 2030. Based on analyses conducted by the EIA, it is projected that this power increase can only be achieved if coal use is also increased. Furthermore, nearly half of the nation's electric power generating infrastructure is more than 30 years old, with a significant portion in service for twice as long. These aging facilities are - or soon will be - in need of substantial refurbishment or replacement. Additional capacity must also be put in service to keep pace with the nation's ever-growing demand for electricity. Therefore, DOE expects that nearly half of the nation's electricity needs will continue to be served by coal for at least the next several decades. Given heightened awareness of environmental stewardship, while at the same time meeting the demand for a reliable and cost-effective electric power supply, it is clearly in the public interest for the nation's energy infrastructure to be upgraded with the latest and most advanced commercially viable technologies to achieve greater efficiencies, environmental performance, and cost-competitiveness. However, to realize acceptance and replication of these advanced technologies into the electric power generation sector, the technologies must first be demonstrated (i.e., designed and constructed to industrial standards and operated at significant scale under industrial conditions).

Public Law 107-63, enacted in November 2001, first provided funding for the Clean Coal Power Initiative, or CCPI. The CCPI is a multi-year federal program tasked with accelerating the commercial readiness of advanced multi-pollutant emissions control, combustion, gasification, and efficiency improvement technologies to retrofit or repower existing coal-based power plants and for deployment in new coal-based generating facilities. The CCPI encompasses a broad spectrum of commercial-scale demonstrations that target environmental challenges, including reducing greenhouse gas (GHG) emissions, by boosting the efficiency at which coal is converted to electricity or other energy forms. The CCPI is closely linked with DOE's research and development activities directed toward creating ultra-clean, fossil fuel-based energy complexes in the 21st century. When integrated with other DOE initiatives, the CCPI will help the nation successfully commercialize advanced power systems that will produce electricity at greater efficiencies, produce almost no emissions, and create clean fuels. Improving power plant efficiency is a potentially significant way to reduce carbon dioxide (CO₂) emissions in the near- and midterm. In the longer term, the most recent future funding opportunity announcements targeted CCPI technologies employing CO₂ capture and storage, or beneficial reuse. Accelerating

¹ The five projects selected for awards are identified in this synopsis and information on these projects is available on the DOE National Energy Technology Laboratory web site at <http://www.netl.doe.gov/technologies/coalpower/cctc/ccpi/index.html>.

commercialization of clean coal technologies also positions the United States to supply these technologies to a rapidly expanding world market.

Congress provided for competitively awarded federal cost-shared funding for CCPI demonstration projects. In contrast to other federally funded activities, CCPI projects are not federal projects seeking private investment; instead, they are private projects seeking federal financial assistance. Under the CCPI funding opportunities, industry proposes projects that meet its needs and those of its customers while furthering the national goals and objectives of DOE's CCPI. Demonstration projects selected by the CCPI program become private-public partnerships that satisfy a wide set of industry and government needs. Through the CCPI program, industry may satisfy its short-term need to retrofit or repower a facility, develop new power generating capacity, or obtain critical economic or technical evaluation of emerging commercial-scale technologies, all for the benefit of its customers. By providing financial incentives to the energy sector that reduce risks associated with project financing and technical challenges for emerging clean coal technologies, the government: (a) supports the verification of commercial readiness leading toward the long-term objective of transitioning the nation's existing fleet of electric power plants to more efficient, environmentally sound, and cost-competitive facilities; and (b) facilitates the adoption of technologies that can meet more stringent environmental regulation through more efficient power generation, advanced environmental controls, and production of environmentally attractive energy carriers and byproduct utilization.

DOE selects projects for CCPI funding in a series of rounds, each of which starts with a Funding Opportunity Announcement (FOA) that asks project proponents to submit applications for federal cost-sharing for their demonstration projects. DOE issued the first CCPI FOA (Round 1) in March 2002 and a second FOA (Round 2) in February 2004. These funding opportunities focused on projects involving advanced coal-based power generation, including gasification, efficiency improvements, optimization through neural networking, environmental and economic improvements, and mercury control. For Round 3, DOE issued a Financial Assistance FOA on August 11, 2008 (DE-PS26-08NT43181) to solicit applications and subsequently issued Amendment 005 (as DE-FOA-0000042) on June 9, 2009, to reopen the FOA and provide a second closing date (August 24, 2009) for additional applications. Projects receiving awards under the amended FOA could be funded, in whole or in part, with funds appropriated by the American Recovery and Reinvestment Act of 2009, Public Law 111-5.

Applications for demonstrations under CCPI Round 3 were evaluated against specific programmatic criteria:

- Technology merit, technical plan, and site suitability;
- Project organization and project management plan;
- Commercialization potential;
- Funding plan;
- Financial business plan.

Evaluations against these criteria represented the total evaluation scoring. However, the selection official also considered the results of the environmental evaluation and the applicant's budget information and financial management system, as well as program policy factors, in making final selections.

As a Federal agency, DOE must comply with NEPA (42 U.S.C. §§ 4321 et seq.) by considering potential environmental issues associated with its actions prior to deciding whether to undertake these actions. The environmental review of applications received in response to the CCPI Round 3 FOA was conducted pursuant to Council on Environmental Quality Regulations (40 Code of Federal Regulations (CFR) Parts 1500 - 1508) and DOE's NEPA Implementing Procedures (10 CFR Part 1021), which provide directions specific to procurement actions that DOE may undertake or fund before completing the NEPA process.

PURPOSE AND NEED

The purpose and need for DOE's selections of projects under the CCPI Program are to satisfy the responsibility Congress imposed on the Department to demonstrate advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States.

The specific objectives of the Round 3 FOAs were:

- The CO₂ capture process must operate at a CO₂ capture efficiency of at least 90 percent;
- Progress is made toward carbon capture and sequestration (CCS) at less than a 10 percent increase in the cost of electricity for gasification systems and less than 35 percent increase for combustion and oxy-combustion systems;
- Progress is made toward CCS of 50 percent of plant CO₂ output at a scale sufficient to evaluate the full impact of the carbon capture technology on plant operations, economics, and performance; and
- At least 300,000 tons per year of CO₂ emissions from the demonstration plant must be captured and sequestered or put to beneficial use.

ALTERNATIVES

DOE received eleven (11) applications in response to the initial FOA (issued August 11, 2008) for CCPI-3, all of which were determined to have met the mandatory eligibility requirements listed in the FOA. The applications covered a wide geographic range, including sites in fourteen different states representing nearly every region of the country. In response to the reopened FOA (issued June 9, 2009), DOE received thirty eight (38) applications, of which twenty five (25) were determined to have met the mandatory eligibility requirements listed in the FOA. The requirements for the reopened FOA were the same as for the initial. The twenty five applications offered projects involving sites in nineteen different states representing nearly all geographic regions of the country. Several applicants in the initial FOA also resubmitted modified applications in response to the reopened FOA. The applications were evaluated against technical, financial and environmental factors. The criteria for evaluating applications received under CCPI-3 were published in the FOA. The technical and financial evaluations resulted in separate numerical scores; the environmental evaluation, while not scored, was considered in making selections. Each applicant was required to complete and submit a standard environmental questionnaire for each site proposed in its application.

The evaluations focused on the technical description of the proposed project, financial plans and budgets, potential environmental impacts, and other information that the applicants submitted. Following reviews by technical, environmental and financial panels and a comprehensive assessment by a merit review board, a DOE official selected those projects that best met the CCPI program's purpose and need. By broadly soliciting proposals to meet the programmatic purpose and need for DOE action and by evaluating the potential environmental impacts associated with each proposal before selecting projects, DOE considered a reasonable range of alternatives for meeting the purpose and need of the CCPI Round 3 solicitation.

For the initial FOA, applications were divided into three broad categories:

- Retrofit of CCS to an existing integrated gasification combined cycle (IGCC) facility or to an IGCC facility under construction;
- Retrofit of CCS to an existing pulverized coal (PC)-fired facility; and
- Construction and operation of new IGCC or Fluidized Bed Combustion (FBC) facilities with integrated CCS.

DOE received no less than two applications in each of the above groupings, which provided DOE with a range of reasonable alternatives for meeting the Department’s need to demonstrate, at a commercial scale, new technologies that capture CO₂ emissions from coal-based power plants and either sequester the CO₂ or put it to beneficial reuse. The applications included demonstration of CCS integrated into new facilities using advanced technologies for power generation, as well as retrofits of CCS to existing facilities or ones already under construction, including both advanced and conventional technologies for power generation.

For the reopened FOA, DOE divided the applications into four groups, because of the larger number of submissions received:

- Retrofit of CCS to an existing plant (already permitted and operating);
- Retrofit of CCS to a planned or authorized power plant (but not yet constructed or operating);
- Construction and operation of a new power plant with CCS on an existing industrial site; and
- Construction and operation of a new power plant with CCS on an undeveloped site.

DOE received no less than four applications in each of the above groupings.

ENVIRONMENTAL REVIEW

DOE assembled environmental review teams to assess all applications that met the mandatory requirements. The review teams considered twenty (20) resource areas that could potentially be impacted by the projects proposed under CCPI-3. These resource areas consisted of:

Aesthetics	Floodplains	Soils
Air Quality	Geology	Surface Water
Biological Resources	Ground Water	Transportation and Traffic
Climate	Human Health and Safety	Utilities
Community Services	Land Use	Wastes and Materials
Cultural Resources	Noise	Wetlands
Environmental Justice	Socioeconomics	

The review teams were composed of environmental professionals with experience evaluating the impacts of power plants and energy-related projects, and with expertise in the resource areas considered by DOE. The review teams considered the information provided as part of each application, which included narrative text, worksheets, and the environmental questionnaire(s) for the site(s) proposed by the applicant. In addition, reviewers independently verified the information provided to the extent practicable using available sources commonly consulted in the preparation of NEPA documents, and conducted preliminary analyses to identify the potential range of impacts associated with each application. Reviewers identified both direct and indirect, as well as short-term impacts, which might occur during construction and start-up, and long-term impacts, which might occur over the expected operational life of the proposed project and beyond. The reviewers also considered any mitigation measures proposed by the applicant and any reasonably available mitigation measures that may not have been proposed.

Reviewers assessed the potential for environmental issues and impacts using the following characterizations:

- **Beneficial** – Expected to have a net beneficial effect on the resource in comparison to baseline conditions.

- **None (negligible)** – Immeasurable or negligible in consequence (not expected to change baseline conditions).
- **Low** – Measurable or noticeable but of minimal consequence (barely discernable change in baseline conditions).
- **Moderate** – Adverse and considerable in consequence but moderate and not expected to reach a level of significance (discernable, but not drastic, alteration of baseline conditions).
- **High** – Adverse and potentially significant in severity (anticipated substantial changes or effects on baseline conditions that might not be mitigable).

Applications in Response to the Initial FOA

Based on the technologies and sites proposed, none of the applications for the initial FOA were deemed to have a high potential for adverse impacts in nineteen of the twenty resource areas. However, four applications could have a potential for high adverse impacts to biological resources. The following impacts by resource area were considered in the selection of candidates for award:

Aesthetics – No impacts would be expected for one project at an existing power plant. Low to moderate impacts would be expected for other existing facilities or facilities to be constructed. Impacts ranged from temporary impacts during construction to new construction within the line-of-sight of public property, including nearby roads and highways.

Air Quality – Low to moderate impacts would be expected from emissions of criteria pollutants from new sources and fugitive emissions of dust. Compliance with Prevention of Significant Deterioration increments would be required for three projects; and new source reviews would be required for four projects. Increased emissions of volatile organic compounds (VOCs) and ammonia would be expected for more than half of the projects. Some increase in cooling tower drift could be expected for two projects.

Biological Resources – Four applications could potentially impact threatened or endangered species or their critical habitat, waterfowl and other migratory bird flyways or their crucial habitat, or wildlife refuges either because of new plant construction or installation of pipelines for CO₂ transport. No impacts were expected for two projects at existing plants. Low to moderate potential impacts would be expected for five applications.

Climate – No impacts would be expected for four projects at existing power plants. Low to moderate impacts would be expected for other existing facilities or facilities to be constructed. Impacts ranged from potential operational impacts from severe weather to localized increases in fogging or icing. Successful demonstration of CCS could contribute to reduced carbon footprints of fossil-fuel power plants.

Community Services – No impacts would be expected at the sites of two existing plants. Low to moderate impacts would be expected for the remaining applications. Generally, projects anticipating a larger temporary workforce during construction would be expected to place a higher demand on community services – particularly in smaller, more rural communities where currently existing community services are more limited.

Cultural Resources – No impacts would be expected at three existing facilities. Low to moderate impacts would be expected for the remaining applications. Potential impacts include tribal concerns over pipeline routes. Impacts would vary with the extent of known tribal claims and their proximity to the proposed project or pipeline route.

Environmental Justice – No impacts would be expected for five applications with no environmental justice populations present. There is a moderate potential for environmental justice issues at all but one of the remaining sites either because of environmental justice populations near the proposed site or along a

proposed pipeline route. Potential impacts at the remaining site are expected to be low because of more limited environmental justice populations in the project area.

Floodplains – No impacts would be expected for two proposed projects. Low to moderate potential impacts during construction or pipeline routing would be expected for the remaining proposed projects.

Geology – The potential for low to moderate impacts exists for all applications either from CO₂ injection into saline aquifers or use for enhanced oil recovery. Some impacts could be expected from increased demand for coal if such demand contributes to opening new coal mines or expanding existing mines.

Ground Water – No impacts would be expected for one application involving an existing facility. Low to moderate impacts could be expected for the other applications. Impacts could include displacement of saline waters in reservoirs targeted for CO₂ injection or loss of CO₂ containment should injection pressures be too high.

Human Health and Safety – Potential impacts would be low to moderate and consist mainly of hazards associated with construction. The level of risk is generally related to the size and complexity of the planned construction. There could also be risk to human health and safety from loss of containment of CO₂ during transport and injection. This risk is present for all applications and generally varies from low to moderate with distance and population density along the CO₂ transport route where shorter routes through sparsely populated areas would have a lower risk than longer routes through regions of higher population.

Land Use – No impacts were identified for applications at existing facilities where the proposed project would not increase the footprint of the existing plant. Low to moderate impacts would be expected for applications proposing new construction. The level of potential impacts would generally be higher for new facilities on land currently used for other than industrial purposes. The assessment of impacts included both the plant site, sequestration site, and required pipeline routes for CO₂ transport.

Noise – No impacts would be expected for one project at an existing power plant. Low to moderate impacts could result from increases to ambient noise during construction and operation. Impacts would generally vary with distance and population density.

Socioeconomics – Expected impacts would be low for all applications. All applications would provide some additional employment during construction and operations. Most employment opportunities would be in the local area.

Soils – No impacts would be expected for one project at an existing power plant. Low impacts related to increased erosion during construction would be expected for other existing facilities requiring new pipelines or new facilities to be constructed.

Surface Water – Low to moderate impacts, including increased demand for cooling water and discharges to surface waters, would be expected for most of the applications. Some applications offered plans to maximize on-site reuse of water. Sediment control during construction was also considered.

Transportation and Traffic – Low to moderate impacts to traffic flow would be expected for all applications. Impacts would generally be higher during construction. Impacts expected during operations vary depending on increased rail or truck traffic. Projects in more rural areas would generally have lower impacts than new or existing facilities in more urban areas, where some increases in travel time could be expected during periods of peak construction.

Utilities – Low to moderate impacts would be expected for all applications. These would include an energy penalty for CCS retrofitted to existing power plants and increased demand for natural gas, potable water and wastewater treatment and disposal. Expected impacts would be higher for new plants proposed at sites not previously serviced by public utilities.

Wastes and Materials – Low to moderate impacts would be expected for all applications. Applications for projects that would include associated construction and operation of a new power plant would generally involve more material and waste impacts than would retrofits to existing plants.

Wetlands – No wetlands are located on the preferred site for one application. The potential for low to moderate impacts could be expected to small jurisdictional wetlands located on the proposed site or near proposed pipeline routes.

Applications in Response to the Reopened FOA

Based on the technologies and sites proposed, none of the applications for the reopened FOA were deemed to have a high potential for adverse impacts in sixteen of the twenty resource areas. All applications that would involve construction and operation of a new power plant were considered to have potentially high air quality impacts based on the need for new source permitting. Four applications were determined to have high potential for adverse impacts on biological resources; three applications were determined to have high potential for adverse impacts on surface waters; and one was determined to have high potential for adverse impacts on floodplains. The following impacts by resource area were considered in the selection of candidates for award:

Aesthetics – Impacts would be negligible for six projects that would involve retrofit or new construction at existing power plants or industrial sites. Low to moderate impacts would be expected for other retrofits to existing facilities or new facilities to be constructed. Moderate adverse impacts would result in the case of four applications involving construction of new power plants that would introduce line-of-sight impacts from superstructure and exhaust stacks where similar structures do not exist.

Air Quality – Impacts would result from emissions of criteria pollutants from new sources and fugitive emissions of dust. Twelve projects would have potentially high adverse impacts relating to emissions from proposed new plants. Lowest potential impacts would result from retrofits to existing or already-planned power plants.

Biological Resources – Four applications could potentially impact threatened or endangered species or their critical habitat, waterfowl and other migratory bird flyways, crucial habitat, or wildlife refuges either because of new plant construction or installation of pipelines for CO₂ transport. Moderate potential impacts would be expected for seven applications based on the locations of pipelines and other features. Low potential impacts would be expected for fourteen applications.

Climate – All applications were considered to present net beneficial effects on climate, because successful demonstration of CCS could contribute to reduced carbon footprints for fossil-fuel power plants. Potential adverse climate effects on plant operations were considered more from the perspective of engineering and design challenges to plant construction and maintenance.

Community Services – Negligible to low impacts would be expected for twenty applications. Five applications were determined to have potential for moderate impacts based on the size of the proposed projects to be located in smaller, more rural communities where existing community services are more limited.

Cultural Resources – Low potential for impacts would be expected for seventeen applications, including most retrofit projects. Moderate impacts would be expected for eight applications that could involve construction of structures or pipelines in proximity to tribal areas or historic sites.

Environmental Justice – Negligible to low potential for impacts would be expected for twenty three applications involving locations where environmental justice populations are not present. There is a moderate potential for environmental justice issues relating to the two remaining applications because of low-income or minority populations near the proposed site or along a proposed pipeline route.

Floodplains – One application would involve construction of structures within a 100-year floodplain with high potential for adverse impacts. Four applications were determined to have moderate potential impacts

during construction of structures or pipelines. Negligible to low potential for impacts would be expected for twenty applications that do not directly involve actions in floodplains.

Geology – Negligible to low potential for impacts would be expected for twenty two applications based on CO₂ injection into saline aquifers or use for enhanced oil recovery. Three applications would have potential for moderate impacts based on limited information and uncertainties relating to target formations for proposed CO₂ injection.

Ground Water – Negligible to low potential for impacts would be expected for eighteen applications. Moderate impacts could be expected for the seven other applications relating to limited information about groundwater capacity to supply plant operations or the potential effects on groundwater sources from required dewatering operations.

Human Health and Safety – Moderate potential for impacts would be expected for seventeen applications; low potential would be expected for eight. The level of risk is generally related to the size and complexity of the planned construction. There could also be risk to human health and safety from loss of containment of CO₂ during transport and injection. This risk is present for all applications and generally varies from low to moderate with distance and population density along the CO₂ transport route.

Land Use – Negligible to low potential for impacts would be expected for twenty applications, mainly including projects involving retrofit at existing facilities or new construction on industrial sites. Moderate potential for impacts would be expected for five applications particularly requiring new construction on land currently used for other than industrial purposes.

Noise – Negligible to low potential for impacts from increases to ambient noise during construction and operation for all applications. Moderate potential for impacts could occur in the cases of five applications if coal would be transported by truck instead of by rail.

Socioeconomics – All applications were determined to provide beneficial impacts to the respective host areas based on economic multipliers associated with project spending as well as additional employment during construction and operations.

Soils – Low potential for impacts would be expected for twenty applications, mainly including projects involving retrofit at existing facilities or new construction on industrial sites. Moderate potential for impacts would relate to increased erosion during construction of structures or pipelines for five applications.

Surface Water – Three applications could have high potential for impacts attributable to substantial planned withdrawals from surface waters for plant operations, construction of pipelines along impaired surface waters, or planned discharges to surface waters. Moderate potential for impacts would be expected for eight applications; low potential would be expected for fourteen, including most retrofit projects.

Transportation and Traffic – Negligible to low potential for impacts could result from increases in traffic during construction and operation for all applications. Moderate potential for impacts could occur in the cases of five applications if coal would be transported by truck instead of by rail.

Utilities – Low potential for impacts would be expected for twelve applications that would not require extensive new pipelines and transmission lines. Thirteen applications would have potential for moderate impacts based on the need for longer pipeline and/or transmission line construction.

Wastes and Materials – Low potential for impacts would be expected for nine applications, including most projects proposing retrofits. Sixteen applications would have potential for moderate impacts based on the development of new facilities or new processes at existing facilities that would increase demands for management of materials and wastes.

Wetlands – The potential for negligible to low impacts could be expected for nineteen applications. Six applications would have potential for moderate impacts based on the lengths and routing of utility features and the potential for encountering wetlands along corridors.

CONCLUSION

The applications received in response to the CCPI-3 FOAs provided reasonable alternatives for accomplishing the Department's purpose and need to satisfy the responsibility Congress imposed on DOE to demonstrate advanced coal-based technologies that can generate clean, reliable and affordable electricity in the United States. The alternatives available to DOE would also meet the Department's goal of accelerating the deployment of carbon capture and storage. An environmental review was part of the evaluation process of these applications. DOE prepared a critique containing information from this environmental review. That critique, summarized here, contained summary as well as project-specific environmental information. The critique was made available to, and considered by, the selection official before selections for financial assistance were made.

DOE determined that selecting two applications in response to the initial FOA, and three applications in response to the reopened FOA, would meet its purpose and need. The following provides a list of the projects selected, their locations, brief descriptions of the projects, and the anticipated level of NEPA review:

CCPI-3 initial FOA:

- Hydrogen Energy California Project (Kern County, CA). Hydrogen Energy International LLC, a joint venture owned by BP Alternative Energy and Rio Tinto, would design, construct, and operate an IGCC power plant that would take blends of coal and petroleum coke, combined with non-potable water, and convert them into hydrogen and CO₂. The CO₂ would be separated from the hydrogen using the methanol-based Rectisol process. The hydrogen gas would be used to fuel a power station, and the CO₂ would be transported by pipeline to nearby oil reservoirs where it would be injected for storage and used for enhanced oil recovery. The project, which would be located in Kern County, California, would capture more than 2,000,000 tons per year of CO₂. The anticipated level of NEPA review for this project is an EIS.
- Basin Electric Power Cooperative - Post Combustion CO₂ Capture Project - Basin Electric Power Cooperative proposed to add CO₂ capture and sequestration (CCS) to Basin Electric's existing Antelope Valley Station, located near Beulah, N.D. Negotiations are still ongoing to define the project scope and schedule.

CCPI-3 reopened FOA:

- Mountaineer Carbon Dioxide Capture and Storage Demonstration (New Haven, WV). American Electric Power (AEP) would design, construct, and operate a chilled ammonia process that is expected to effectively capture at least 90 percent of the CO₂ (1.5 million metric tons per year) in a 235 megawatt (MW) flue gas stream at the existing 1,300 MW Appalachian Power Company (APCo) Mountaineer Power Plant near New Haven, WV. The captured CO₂ would be treated, compressed, and then transported by pipeline to proposed injection sites located near the capture facility. During the operation phase, AEP proposed to permanently store the entire amount of captured CO₂ in two separate saline formations located approximately 1.5 miles below the surface. The project team includes AEP, APCo, Schlumberger Carbon Services, Battelle Memorial Institute, CONSOL Energy, Alstom, and an advisory team of geologic experts. The anticipated level of NEPA review for this project is an EIS.
- The Texas Clean Energy Project. Summit Texas Clean Energy, LLC (Bainbridge Island, WA) would integrate Siemens gasification and power generating technology with carbon capture technologies to effectively capture 90% of the carbon dioxide (2.7 million metric tons per year) at a 400 MW plant to

be built near Midland-Odessa, TX. The captured CO₂ would be treated, compressed and then transported by CO₂ pipeline to oilfields in the Permian Basin of West Texas, for use in enhanced oil recovery (EOR) operations. The Bureau of Economic Geology (BEG) at the University of Texas would design and assure compliance with a state-of-the-art CO₂ sequestration monitoring, verification, and accounting program. The anticipated level of NEPA review for this project is an EIS.

- The Parish Post-Combustion CO₂ Capture and Sequestration Project (Thompsons, Texas). NRG Energy, Inc. (NRG) would design, construct, and operate a system that would capture and store approximately 400,000 tons of carbon CO₂ per year. The system would employ Fluor's Econamine FG Plus technology to capture at least 90 percent of the CO₂ from a 60 MW flue gas stream of the 617-MW Unit 7 at the W.A. Parish Generating Station located in Thompsons, Texas. Fluor's Econamine FG Plus CO₂ capture system features advanced process design and techniques, which lower the energy consumption of existing amine-based CO₂ capture processes by more than 20 percent. The captured CO₂ would be compressed and transported by pipeline to a mature oil field for injection into geologic formations for permanent storage through an enhanced oil recovery operation. The site would be monitored to track the migration of the CO₂ underground and to establish the permanence of sequestration. DOE is in the process of evaluating the appropriate level of NEPA documentation for this project.