

Chapter 1.
Purpose and Need

1 PURPOSE AND NEED

This chapter introduces the Proposed Action, describes the purpose and need for agency action, and outlines the scope of the environmental impact statement (EIS). This chapter also summarizes the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) process, project objectives, and the public scoping process undertaken for this EIS.

1.1 Introduction

The United States (U.S.) Department of Energy (DOE) proposes to provide federal financial assistance to Summit Texas Clean Energy, LLC (Summit or Proponent) for its proposed Texas Clean Energy Project (TCEP) near Odessa, Texas (Figure 1.1). DOE has prepared this EIS in accordance with NEPA (42 United States Code [U.S.C.] §§ 4321 et seq.), NEPA-implementing regulations promulgated by the Council on Environmental Quality (Title 40, Code of Federal Regulations [C.F.R.] Parts 1500–1508), and DOE’s NEPA procedures (10 C.F.R. Part 1021). This EIS describes the potential environmental impacts associated with the TCEP, as well as alternatives to and options for the TCEP, including the No Action Alternative. DOE will use this EIS to inform its decision on whether to provide financial assistance for the TCEP and, if so, whether environmental mitigation measures should be imposed.

The TCEP would comprise planning, design, construction, and operation by Summit of a coal-based electric power generation and chemicals production plant integrated with carbon dioxide (CO₂) capture and geologic sequestration through enhanced oil recovery (EOR). Summit is owned jointly by the Summit Power Group, Inc., and CW NextGen, Inc., a Clayton Williams company. The project team includes Summit; Summit Power Group, Inc.; Siemens Energy, Inc.; Linde, AG; Fluor Corporation; and Blue Source, LLC, among others.

DOE selected this project for an award of financial assistance through a competitive process under the Clean Coal Power Initiative (CCPI) Round 3 program, as announced under Funding Opportunity Announcement (FOA) DE-FOA-0000042. DOE’s financial assistance would occur through cost sharing, by applying money from the American Recovery and Reinvestment Act of 2009 (ARRA) (Public Law 111-5), as specified under the terms and conditions of a financial assistance agreement between DOE and Summit.

The TCEP would produce electricity and CO₂ for use in EOR. It would also produce urea, which is used as a fertilizer. These products of the plant would be made available for commercial use. Because the plant would produce several commodities, it is referred to as a **polygeneration** (or polygen) plant in this EIS.

DOE proposes to provide Summit with approximately \$450 million in financial assistance for this project on a cost-shared basis. The TCEP would demonstrate the full integration of CO₂ capture and geologic sequestration with a commercial, coal-based polygeneration plant (or polygen plant). DOE’s contribution of \$450 million would constitute approximately 26 percent of the estimated total development and capital costs of the project, which is estimated to be \$1.73 billion (2009 dollars).

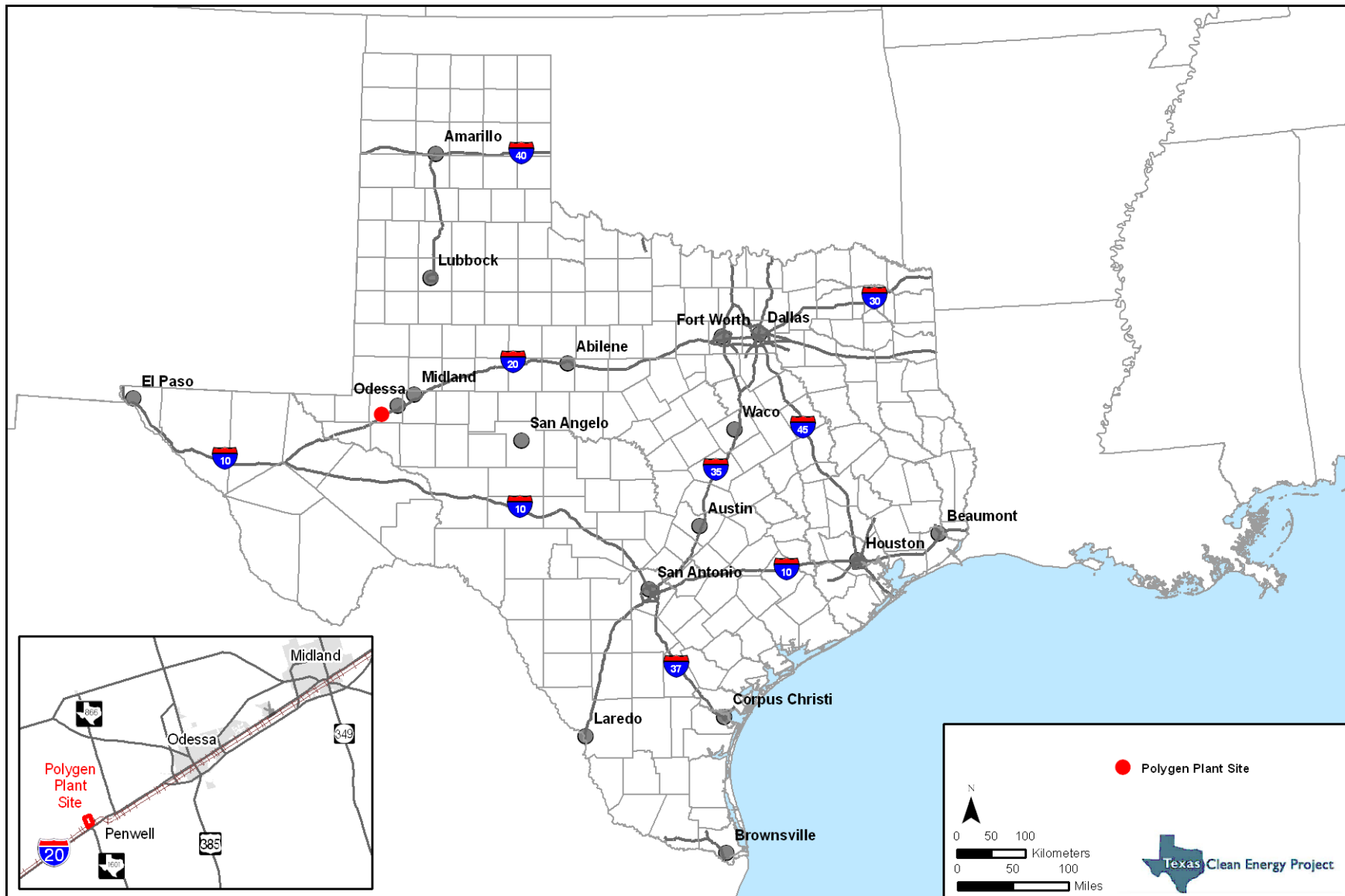


Figure 1.1. General location map.

1.2 Project Background

This section describes DOE's CCPI program and provides a brief overview of Summit's proposed project.

1.2.1 Clean Coal Power Initiative

The CCPI is a cost-shared collaboration between the federal government and industry to increase investment in advanced, low-emissions coal technologies, consistent with the Energy Policy Act (EPACT) of 2005 (Public Law 109-58).

The CCPI's goal is to accelerate the readiness of new coal-based technologies for commercial deployment, thus enabling future access to clean, reliable, and affordable power for the U.S. By commercially demonstrating selected advanced technologies, the CCPI encourages the emergence of new electricity and hydrogen gas (H₂) production technologies from the core research and development activities, contributes to proving the feasibility of integrating CO₂ management with power production, and facilitates widespread commercial deployment of coal technologies that can benefit our society. CCPI directly supports the Climate Change Technology Program to reduce emissions of CO₂, a greenhouse gas (GHG).

The CCPI is closely linked with research and development activities driving toward ultra-clean, fossil fuel-based energy complexes in the twenty-first 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 and attain near-zero emissions, including management of CO₂ emissions. CCPI technologies offering CO₂ capture and storage, or beneficial reuse, will significantly reduce the emissions of CO₂ from fossil-based power generation. This commitment to low-CO₂ emissions, coal-based electric power will effectively respond to the national challenge of meeting the dynamic national electricity supply requirements while simultaneously decreasing emissions of CO₂ from coal-based electric power generation. More specifically, the CCPI addresses this challenge through a focus on demonstrations, at commercial scale and in commercial settings, of advanced and innovative low-CO₂ emissions coal-based technologies and on opportunities for timely deployment of those technologies by the power industry.

Public Law 107-63, enacted in November 2001, initiated and funded the initial phases of the CCPI. Later, with Title IV of EPACT 2005, the U.S. Congress established additional criteria for projects receiving financial assistance under this program. Under these criteria, CCPI projects must "advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies that are in commercial service" (EPACT 2005, § 402(a)). In February 2009, the ARRA 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.

DOE conducts its CCPI financial assistance through a series of FOAs or "rounds," which industry can respond to by preparing and submitting applications requesting federal financial assistance for proposed demonstrations. DOE issued the first CCPI FOA (Round 1) in March 2002. A second FOA (Round 2) was issued in February 2004. A third FOA (Round 3) was issued in August 2008 with a new requirement for technologies that capture and sequester, or put to beneficial reuse, CO₂ emissions. As part of DOE's ARRA implementation, CCPI Round 3 was reopened in June 2009.

CCPI Round 3 allowed DOE financial assistance for coal-based power technologies that would produce heat, fuels, chemicals, H₂, or other useful products in any combination with production of electricity. Applications for demonstrations under the CCPI Round 3 were evaluated against specific programmatic criteria, summarized as follows:

- Technical Merit, Technical Plan, and Site Suitability:
- Ability of the technology and technical plan to achieve project goals
- Identification of potential risk elements, quality and adequacy of the approach to assessing and managing risk, conformance of risk management approach with industry standards
- Ability of the proposed technology to meet the priority objectives of the FOA and to achieve progress toward the performance targets of EPACT—specifically, to support the ability of the project to achieve the minimum CO₂ capture efficiency of 50 percent and make progress toward the target of 90 percent CO₂ capture efficiency—and specifically to support the ability of the project to capture and sequester, or put to beneficial use, a minimum of 300,000 tons (tn) (272,155 metric tonnes [t]) per year of CO₂
- Adequacy of economic metrics including tons of CO₂ sequestered per dollar of carbon capture and sequestration capital cost and per dollar of carbon capture and sequestration operating cost; adequacy of the proposed approach to sequestration or beneficial use
- Quality and adequacy of the proposed site for supporting the proposed project
- Strength of the commitment(s) for use and availability of the host site
- Adequacy of the integration of the key physical or logistical (external) elements with the project necessary for a successful demonstration
- Reasonableness and appropriateness of the proposed schedule
- Project Organization and Project Management Plan:
- Completeness of the proposed project team and ability of the proposed team to successfully provide the skills and resources needed to implement the project as proposed
- Adequacy of corporate background and experience to support successful performance
- Clarity and logic of proposed organizational structure with respect to responsibilities and authorities
- Soundness and completeness of the project management plan for establishing the baseline scope, schedule, and cost of the project, including the work breakdown structure and statement of project objectives, project schedule, baseline cost plan, project management controls, communication protocols, risk management, and environmental management
- Commercialization Potential:
- Completeness of the commercialization plan
- Economic viability
- Potential for proposed technologies and sequestration approaches to meet DOE's priority objectives to achieve widespread commercial deployment
- Potential for spin-off products
- Funding Plan and Financial Business Plan:

- Financial condition and capacity of proposed funding sources to provide their portion of project costs, including development costs
- Completeness and reasonableness of the financial business plan, including financial projections and models and degree of financial commitment to the project
- Adequacy of the Budget Information and Financial Management System
- Environmental:
- Applicant's awareness of project-related requirements, including environmental risks and impacts
- Ability to meet compliance requirements

The industry participants are responsible for project definition as well as design, construction, and operation of the facilities. DOE is responsible for 1) ensuring that the industry participants execute projects pursuant to the terms and conditions established in the cooperative agreements, 2) monitoring project activities relative to cooperative agreement requirements, 3) reviewing project performance and documentation, 4) providing technical advice to ensure that critical programmatic issues are addressed, and 5) ensuring that project costs shared by DOE are allowable and can be allocated.

Summit submitted its CCPI application on August 24, 2009, and was one of three projects initially selected for further consideration under the reopening of Round 3. As detailed in the application, the TCEP would be a first-of-its-kind polygen plant located in the West Texas Permian Basin, an area with substantial energy resource development and CO₂ beneficial reuse/storage activity. The TCEP would integrate, for the first time, proven gasification and CO₂ capture technologies in a commercial project to achieve an overall CO₂ capture rate of approximately 90 percent on a plant-wide basis. The TCEP would annually capture approximately 3 million tn (2.7 million t) of CO₂, which would be purchased by others for EOR operations that ultimately lead to geologic sequestration of the CO₂. In addition to electric power and captured CO₂ for EOR, the TCEP would produce urea, a fertilizer. Products of the gasification process such as argon and sulfuric acid (H₂SO₄) would be made available for commercial purchase. Slag, an inert product of the gasification process, would be sold for beneficial reuse such as in the manufacture of cement and roofing tiles or for use as a road base, asphalt filler, or sandblasting agent.

1.2.2 Summit's Proposed Project: TCEP Overview

As proposed by Summit, the TCEP would consist of a polygen plant and associated linear facilities that would be constructed and operated to serve the plant. The TCEP would employ integrated gasification combined-cycle (IGCC) technology. Gasification is the process of converting coal into a gaseous fuel called synthesis gas (syngas). A combined-cycle electric power plant is one that uses both a **gas turbine**-generator and a steam turbine-generator (which uses steam produced by exhaust heat from the **gas turbine**-generator) at one location to produce electricity. Combining (integrating) the gasification process with the combined-cycle power plant is known as IGCC.

The polygen plant would be located on approximately 600 acres [ac] (243 hectares [ha]) and would include CO₂ capture and compression to transport the CO₂ for off-site geologic sequestration through EOR. Specifically, the polygen plant would consist of an air separation unit, a coal gasification island (with two gasifiers), a syngas cleanup system, mercury (Hg) removal, acid gas removal (for sulfur species and CO₂), a CO₂ compressor system, a H₂SO₄ plant, a **gas turbine**-

generator, a heat recovery steam generator (HRSG), a steam turbine-generator, and a urea production plant. The proposed linear facilities would consist of an electric transmission line, one or more water pipelines, a natural gas pipeline, a CO₂ pipeline connector, two access roads that would connect the plant to existing roadways, and a rail line connector.

Summit's TCEP would generate **up to** approximately 400 megawatts (MW) (gross) (**130–213 MW** net) and be expected to generate **up to approximately** 1.7 billion net kilowatt-hours of electricity per year, which would be delivered to the electric grid system to help meet future demand. In addition, the plant would be designed to capture, as CO₂, 90 percent or more of the total carbon in the fossil fuel used as feedstocks and fuels for the plant under typical operating conditions. Summit proposes to capture **up to** approximately 3 million tn (2.7 million t) of CO₂ annually. **Approximately 2.5–3.0 million tn (2.3–2.7 million t) of the** captured CO₂ would be sold under binding commercial contracts and subsequently injected into geologic formations for EOR. In addition, the plant would be designed to produce urea for sale as fertilizer. Products (argon, H₂SO₄, and inert slag) from the gasification process would also be sold on the commercial market.

Summit has applied for a grant under DOE's CCPI Round 3 program and an Internal Revenue Service Code Section 48A Qualifying Advanced Coal Project investment tax credit. However, most of the TCEP would be conventionally financed. Most of TCEP's funds would consist of owner-invested equity and debt obtained in private capital markets. No federal loan guarantee is currently envisioned, and no new CO₂ sequestration grants are assumed.

1.3 Purpose and Need for Action

This section describes DOE's purpose and need for agency action as well as Summit's reasons for pursuing the project.

1.3.1 DOE's Purpose and Need

DOE's purpose for its Proposed Action in the context of the CCPI Round 3 program is to advance the program by providing financial assistance to projects that have the best chance of achieving the program's objectives as established by the U.S. Congress. These objectives are the commercialization of clean coal technologies that advance efficiency, environmental performance, and cost competitiveness well beyond the level of technologies that are currently in service. Specifically, DOE's purpose and need for selecting TCEP for an award is to demonstrate the commercial-readiness of CO₂ capture and geologic sequestration (through EOR), fully integrated with a polygen plant. The technical, environmental, and financial data generated from the design, construction, and operation of the polygen plant would result in a commercial reference plant for the technology. Programmatically, the proposed 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.

1.3.2 Summit's Purpose and Need

Summit's primary business is the development of low- and zero-carbon power projects, including gasification/CO₂ capture and storage projects, wind projects, solar power projects, and combined-cycle gas-fueled power projects. In addition to continuing and expanding this business strategy, the purpose of the TCEP is to add low CO₂ emissions base-load power to the nation's electricity generation mix, to provide supply stability to offset the irregular nature of West Texas wind

generation, and to store captured CO₂ geologically, in this case by using it to boost production of oil wells in the Permian Basin. The sale of granulated urea produced at the plant would support the farming industry and reduce annual imports of foreign-produced urea by approximately 10 percent. Product sales of argon and H₂SO₄ would support the chemical industry; and sales of inert, nonleachable slag would support general cement, concrete, and roofing tile manufacture, as well as road construction.

Summit is responding to a regional need for a firm (nonfluctuating) supply of electric power, including peaking capacity during summer months. The Electric Reliability Council of Texas (ERCOT) manages the flow of electric power to 22 million Texas customers, which represents 85 percent of the state's electric load and 75 percent of the Texas land area. A 2010 ERCOT capacity, demand, and reserve report estimates that peak demand (including a 13.5 percent reserve margin) in the ERCOT market area will increase from approximately 70,000 MW in 2010 to approximately 96,000 MW in 2030. To address this demand, ERCOT forecasts a need for new generation from approximately 6,400 and 33,000 MW in 2015 to approximately 50,000 and 70,000 MW in 2030 to account for retiring power plants more than 30 years old.

There are ERCOT interconnect studies currently underway for approximately 18,500 MW of new power resources, of which approximately 7,200 MW would be for wind-powered generation projects (ERCOT 2010a). However, less than 1,000 MW of new wind power projects went into service in 2009 and approximately 350 MW of new wind power projects were expected in 2010. Summit, as a wind power producer itself, believes that the wind power market in Texas will be weak for the foreseeable future for a variety of reasons, including the lack of national renewable portfolio standards (RPS), the dearth of available bilateral power sale contracts for wind power **alternatives** with Texas utilities (many of which are reaching their limits in terms of ability to integrate wind into their resource mix and still meet their firm loads), and the seasonally depressed power prices available for wind generation. In the current ERCOT market, it is almost impossible to finance a wind power project because it is very difficult to obtain a long-term power sales contract with a utility, given the nonfirm nature of wind power and financial and transmission constraints.

The amount of solar-generated capacity in the ERCOT market area is very small. Statewide, renewable energy projects including solar-generated capacity account for approximately 1 percent of total generating capacity. ERCOT studies are underway for approximately 90 MW of solar power. Summit is actively pursuing photovoltaic solar power projects in Texas (including West Texas). However, for a variety of cost and market reasons, commercial opportunities to develop new solar projects in Texas remain limited. It is currently very difficult to find utility buyers in Texas for any large amount of solar power, although Summit hopes that situation will improve in future years.

In 1999, Texas enacted an RPS to promote the use of renewable energy sources. The standard mandated that electricity providers (competitive retailers, municipal electric utilities, and electric cooperatives) collectively generate 2,000 MW of additional renewable energy by 2009. The 2005 Texas Legislature increased the state's total renewable-energy mandate to 5,880 MW by 2015 with a target of 10,000 MW in 2025.

Currently, wind power represents the bulk of renewable energy development occurring under the Texas RPS. In an effort to diversify the state's renewable generation portfolio, legislation passed in 2005 included a requirement that the state meet 500 MW of the 2025 target with nonwind renewable generation. The Public Utility Commission of Texas is also considering a rule to require retail electric providers to purchase at least 500 MW of nonwind renewable energy in the ERCOT

market by 2015. Despite these requirements for renewable energy sources, such sources would not be sufficient to meet the projected deficit of between approximately 6,400 and 33,000 MW in 2015.

Further, unlike most renewable energy projects, the proposed TCEP would produce base-load electric power. Summit believes that the operation of the proposed TCEP would allow intermittent, renewable energy projects to be more viable by providing a firm, stabilizing power source to help anchor electrical power generation in West Texas.

1.4 Regulatory Framework

This section describes the NEPA requirements that DOE must meet to inform its decision on whether to partially fund the TCEP, and the state requirements that Summit must meet to construct and operate the polygen plant.

1.4.1 National Environmental Policy Act

For every recommendation or report on proposed major federal actions significantly affecting the quality of the human environment, NEPA requires all federal agencies to prepare an EIS that addresses 1) the environmental impact of the proposed action; 2) any adverse environmental effects that cannot be avoided should the proposed action be implemented; 3) alternatives to the proposed action; 4) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and 5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented. NEPA also requires consultations with federal agencies that have jurisdiction by law or special expertise with respect to any environmental impact involved. The EIS, along with the comments and views of consulted governmental agencies, must be made available to the public.

DOE determined that providing financial assistance for the construction and operation of the TCEP would constitute a major federal action that could significantly affect the quality of the natural and human environment. Therefore, DOE has prepared this EIS in compliance with requirements for implementing NEPA as established by the Council on Environmental Quality regulations (40 C.F.R. Parts 1500–1508) and DOE procedures for implementing NEPA (10 C.F.R. Part 1021).

Preparation of the EIS for the TCEP began in June 2010 with the publication of DOE's Notice of Intent (NOI) to prepare **an** EIS. Following the 45-day public comment period on **the** draft EIS, DOE considered all substantive comments received within the comment period and **is** issuing **this** final EIS. The NEPA process will conclude with the publication of DOE's Record of Decision **and if needed, a mitigation action plan**. DOE plans to complete its NEPA process in the summer of 2011.

1.4.2 State Requirements

1.4.2.1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

The U.S. Environmental Protection Agency (EPA) has delegated its authority to enforce various federal environmental laws to the Texas Commission on Environmental Quality (TCEQ). Thus, TCEQ would be responsible for the issuance of permits required under the Clean Water Act (40 C.F.R. Parts 104–140), the Clean Air Act (40 C.F.R. Parts 50–96), the Resource Conservation and Recovery Act (40 C.F.R. Parts 239–299), and the Oil Pollution Prevention Act (40 C.F.R. Part 112). TCEQ is also

responsible for enforcement of Texas state environmental laws regarding air and water quality, treatment and storage of hazardous wastes, and on-site sewage facilities.

1.4.2.2 TEXAS PARKS AND WILDLIFE DEPARTMENT

Texas Parks and Wildlife Department (TPWD) regulations prohibit the taking, possession, transportation, or sale without a permit of any animal species designated by state law as endangered or threatened. State laws and regulations prohibit commerce in threatened and endangered plants as well as the collection of listed plants from public land without a permit issued by the department.

1.4.2.3 TEXAS DEPARTMENT OF TRANSPORTATION

A permit from the Texas Department of Transportation (TxDOT) would be required for the placement of utilities within a state road right-of-way (ROW).

1.4.2.4 PUBLIC UTILITY COMMISSION OF TEXAS

Power-generation plants operating in Texas must register with the Public Utility Commission of Texas pursuant to Public Utility Commission Substantive Rule Section 25.109. As an exempt wholesale generator, the TCEP would not be required to obtain a Certificate of Convenience and Necessity from the Public Utility Commission for the transmission line that would be constructed from the plant to an interconnection with an existing transmission grid.

1.5 DOE Scoping Process

This section describes the activities DOE has undertaken to determine the actions, alternatives, and impacts addressed in this EIS and reports on the public and agency involvement process used to solicit comments on the scope of the document. The scoping report includes a copy of the NOI, the informational display boards used at the public scoping meeting, the presentations given by DOE and Summit at the scoping meeting, and a list of the meeting attendees (National Energy Technology Laboratory [NETL] 2010).

1.5.1 Notice of Intent

DOE published an NOI to prepare the EIS in the *Federal Register* on June 2, 2010 (75 *Federal Register* 30800). Publication of the NOI initiated a 30-day formal public and agency scoping period, during which DOE solicited comments regarding the proposed project, its potential impacts, and possible project alternatives.

1.5.2 Public Scoping Meeting

A scoping meeting was held on June 17, 2010, to provide information on project planning activities to date and to give federal, state, and local government agencies and members of the public the opportunity to ask questions of DOE and Summit. Meeting attendees were also invited to provide comments on the issues and alternatives that should be included in the draft EIS.

An open house was held from 4:00 to 7:00 p.m., during which informational display boards were arranged in stations around the meeting rooms for review. The formal component of the scoping

meeting began at 7:00 p.m., with DOE representatives providing information on DOE's NEPA process and DOE's CCPI program. A Summit representative provided an overview of the TCEP.

Following these presentations, elected officials and members of the public were provided an opportunity to make verbal comments regarding the scope of the EIS. A court reporter was present to record and provide a transcript of all spoken comments (NETL 2011). Approximately 75 persons attended the public scoping meeting.

1.5.3 Issues Identified during Scoping

In total, 218 comments were received from 23 commenters during the public scoping comment period from June 3, 2010 through July 2, 2010. Of the 23 commenters, 10 represented local, state, and federal government agencies and municipalities; two represented organizations; two represented businesses; and nine individuals represented themselves. A number of commenters stated their general support for or opposition to the proposed project, made rhetorical statements, asked questions, or provided statements of opinion. All comment submissions were reviewed to determine specific issues, concerns, and questions to ensure the consideration of all substantive concerns.

The following sections summarize the relevant issues and concerns related to the TCEP that were identified through the public scoping process and that are addressed in this EIS.

1.5.3.1 PROCESS ISSUES

Comments related to the NEPA process included requests for copies of the draft EIS and scoping meeting information, questions about the comment submittal process, and requests to be added to the distribution list. Commenters also inquired about the length of the NEPA process and recommended contacting specific federal agencies for information.

1.5.3.2 PURPOSE AND NEED

Commenters recommended examining the need for the TCEP considering current and future energy demands, regulations, and the availability of alternative energy generation sources such as solar, wind, nuclear, and conventional coal-based power plants.

1.5.3.3 PROPOSED ACTION

Commenters recommended incorporating project details such as process information, CO₂ monitoring systems for EOR, labor uses, and utility and resource requirements into the EIS. Other comments addressed rail and access road alignments, transmission corridors, contaminants, and various other site features.

1.5.3.4 ALTERNATIVE TECHNOLOGIES ISSUES

Commenters requested examination of alternative technologies to various chemical processes, including ammonia (NH₃) production and Hg removal as well as technologies that reduce particulate matter (PM) emissions.

1.5.3.5 RESOURCE AND ANALYSIS ISSUES

Numerous comments were received regarding potential impacts to natural and human environmental resources. In general, commenters requested a comprehensive evaluation of the direct, indirect, and cumulative effects of process inputs, oil and gas operations, and by-products. Most comments focused on air quality, climate change, water resources, and petroleum issues. A brief summary of comments received on particular resource issues is provided below.

- Air quality comments called for air emissions modeling to determine impacts on air quality, nearby national parks, and neighboring states that fail to meet federal air quality standards. Climate change comments questioned whether the net benefits of CO₂ sequestration through EOR efforts would be offset by full life-cycle CO₂ impacts associated with the recovered oil.
- Commenters requested information on petroleum issues including the EOR process and CO₂ monitoring methods as well as clarification on the liability and guarantees associated with the CO₂ monitoring system.
- Commenters raised concerns about potential impacts to water quality, surface water (including Monahans Draw), and ground water resources, and they recommended alternative water sources (i.e., brackish water) instead of fresh water to meet TCEP's needs for process water.
- Biological resources comments were focused on potential impacts to ecological resources; wildlife habitat; migratory birds; game species; and rare, threatened, and endangered species.
- The public raised issues regarding the effects of the project on the local community, including land use impacts to the rural character of the area, cultural impacts to historic structures and prehistoric resources, and impacts to recreational hunting and mineral rights ownership. Potential noise and visual impacts to Monahans Sandhills State Park and other sensitive receptors were also noted.
- Commenters inquired about the socioeconomic and environmental justice impacts resulting from the project, and they questioned whether associated by-products would overwhelm various economic markets.
- Utility systems inquiries focused on whether the project would affect transmission lines intended for wind and solar projects, and commenters requested analysis of available electric transmission capacity. In addition, commenters expressed concerns about the increase in rail traffic affecting vehicular traffic and the rate of traffic accidents.
- The public raised issues regarding materials and waste management, including whether facilities regulated by EPA are located near the project area and whether activities would affect homes with lead-based paint.
- Human health issues were directed toward safety and the potential for accidents at the plant site and during the CO₂ injection process for EOR purposes.

1.5.3.6 OUT-OF-SCOPE COMMENTS

DOE addressed all substantive scoping comments in this EIS. However, there were several issues raised by the public that are beyond the scope of the EIS or were not substantive. This section provides a brief summary of comments that were determined to be out-of-scope or nonsubstantive.

Commenters recommended that DOE consider alternative energy sources such as solar, wind, nuclear, and conventional coal-fired power plants. However, DOE's purpose and need is to demonstrate an advanced power plant based on fossil fuels in general and coal in particular. These suggested alternatives would not fulfill DOE's purpose and need, and for that reason, are not reasonable alternatives and were not analyzed in this EIS.

Commenters requested that DOE analyze the full life-cycle impacts of mining and transporting coal to West Texas. Although the EIS does address the transportation of coal to the TCEP, the effects of commercial coal mining are generally well known and well described and are not within the scope of this EIS. The operation of the TCEP would not change mining techniques and, for the proposed project, DOE has no decisions that would affect coal mining techniques or the choice of coal mines. It is assumed that the coal intended for the TCEP would be used as a feedstock or fuel in another facility in the event that the TCEP is not constructed.

Commenters requested that DOE analyze potential impacts to federally listed species whose critical habitat would be traversed by the proposed Fort Stockton Holdings, LLC (FSH) waterline. Although DOE has evaluated all federally listed and state-protected species that could be affected by the TCEP, the FSH waterline is a separate action that is not dependent on whether the TCEP is constructed and operated. Because this action is independent of the TCEP, the evaluation of impacts to federally listed and state-protected species that could be affected by the FSH waterline is outside the scope of this EIS. However, the proposed connecting pipeline between the proposed FSH main pipeline and the polygen plant site is evaluated in this EIS.

Commenters questioned whether the TCEP EIS would be similar to the *FutureGen Project Final Environmental Impact Statement* (FutureGen EIS) (DOE 2007), which was prepared for DOE's proposal to provide financial assistance to the FutureGen Alliance (FG Alliance) for the FutureGen project, a coal-based electric power and H₂ production plant integrated with CO₂ capture and geologic sequestration. Although the FutureGen EIS considered the site that is now proposed for the TCEP, the FG Alliance and DOE eventually decided to construct the proposed FutureGen plant in Illinois (that project has since been modified). Thus, the TCEP is not the same as the FutureGen project; it is a different project and DOE is evaluating it as such. Because the location is the same, however, relevant information from the FutureGen EIS has been used to the extent appropriate in this TCEP EIS.

1.6 Comments on the Draft Environmental Impact Statement

1.6.1 Public Hearing and Opportunities to Comment

DOE distributed the draft EIS on March 10, 2011 to the elected officials, agencies, Native American tribes, organizations, and members of the public identified in the TCEP distribution list (Chapter 9). DOE filed the draft EIS with EPA on March 10, 2011, and EPA's Notice of Availability was published in the Federal Register on March 18, 2011 (76 Federal Register 14968). EPA's notice started the 45-day comment period on the draft EIS, which ran from March 18 to May 2, 2011.

On March 22, DOE published its own notice of the availability of the draft EIS and announced the date and location of a public hearing on the draft EIS (76 Federal Register 15968). The public hearing was held on April 5, 2011, in the city of Odessa, Ector County, Texas. The hearing location was selected based on proximity to the project, venue size, and venue availability.

DOE published advertisements for the draft EIS public hearing and comment period in several local newspapers in both English and Spanish. The English version was published in the Odessa American and the Midland Reporter Telegram on March 21, 2011, April 3, 2011, and April 4, 2011 (DOE 2011). The Spanish version was published on March 24, 2011, and March 31, 2011, in El Editor, a weekly bilingual newspaper with distribution in the Odessa–Midland area (DOE 2011). Both versions of the advertisement provided the following information:

- *Hearing time, date, location, and agenda*
- *Brief project description*
- *Internet location where interested parties could view or download an electronic copy of the draft EIS*
- *Physical location in Odessa where interested parties could view a hard copy of the draft EIS*
- *Process for registering to submit verbal comments during the hearing*
- *Alternative methods of comment submittal (e.g., toll-free telephone number, fax, email, U.S. Postal Service mail)*
- *Instructions for requesting assistance with the comment process (such as translation services)*
- *Comment deadline*

The April 5th public hearing began with an informal open house from 4:00 to 7:00 p.m., during which time attendees were given information packages about the project and were able to view project-related posters. DOE personnel and support staff were on hand to greet attendees; outline the meeting agenda; answer questions about the draft EIS, NEPA process, project status; and invite all attendees to provide comments, either written or verbal, on the proposed project. Summit personnel were also available at displays illustrating various features of the proposed project.

Those attendees wishing to speak during the formal hearing portion of the meeting were given an opportunity to register. Anyone who wished to provide comments in writing was invited to do so by completing a comment form and giving it to a DOE team member at the public hearing or mailing it in at a later date. The comment form provided information about all alternative methods of submitting comments as well as the comment deadline. Individuals were also given an opportunity to receive a copy of the draft EIS at the public hearing or request a copy of the draft EIS and/or the final EIS (either a hard copy of the entire EIS or a hard copy of the Summary plus a compact disk containing the entire EIS).

The informal open house was followed by presentations and the formal public hearing, which were held from 7:00 to 9:00 p.m. DOE led the presentation and presided over the hearing. The presentation included an overview of the DOE CCPI Program, Summit's proposed project, and the NEPA process. DOE presented information about alternative methods of submitting comments and the comment deadline. A court reporter was present during the formal public hearing portion of the meeting to record all verbal comments. A total of five individuals presented verbal comments at the hearing.

Collectively, 27 individuals attended the public hearing, including members of the public and representatives from state agencies, media, and Summit Energy and its associated business entities.

1.6.2 Responding to Comments on the Draft Environmental Impact Statement

During preparation of the final EIS, DOE considered all comments received on the draft EIS individually and collectively. An identification number was assigned to each originator of comments (i.e., per commenter), including those at the public hearing and recorded by the court reporter. A total of 11 individuals, organizations, and agencies provided comments on the draft EIS (some more than once), as follows:

- *Three representatives of federal agencies (EPA, U.S. Department of the Interior, and U.S. Army Corps of Engineers)*
- *Three representatives of state agencies (TxDOT, TCEQ, and TPWD)*
- *One representative of the general public (supplying both verbal testimony and two sets of written comments)*
- *Four representatives of local ranching and farming businesses (one person supplying both verbal and written comments)*

After reviewing the comments received, a list of issues was developed (Table 1.1).

Volume II (Responses to Comments) of the final EIS provides DOE's methodology for responding to public comments, copies of the transcript from the public hearing and original comment documents in their entirety, and DOE's response to each comment.

Table 1.1. General Comments Received During the Draft EIS Public Comment Period.

Issues	
<i>Economy, Employment, and Income</i>	<i>Commenters expressed concern regarding the market for CO₂.</i>
<i>DOE's Proposed Action</i>	<i>Commenters requested consideration of other energy sources in the EIS beyond fossil fuels.</i>
<i>Summit's Proposed Project and Project Options</i>	<i>Commenters expressed concern with the use of wet cooling technology and requested consideration of an alternative using only dry cooling technology. Commenters also provided suggestions regarding other alternative sources of water that should be analyzed in the final EIS: Pecos Alluvium Aquifer, Capitan Reef Complex Aquifer, construction of pipelines from East Texas, and use of produced water from oil fields. Commenters expressed a preference for the zero liquid discharge system technology option. Commenters questioned the rationale for the elimination of other locations for the TCEP from detailed analysis in the draft EIS.</i>
<i>DOE's Purpose and Need</i>	<i>Commenters expressed concerns about practicality of producing and using synthesis gas when natural gas is already available already in the area. Commenters expressed concern about the likely success of the reported DOE programmatic goal of a net decrease in GHG emissions that could be triggered if the proposed technologies are successfully and widely deployed by industry.</i>

Table 1.1. General Comments Received During the Draft EIS Public Comment Period.

Issues	
Summit's Purpose and Need	<i>Commenters expressed concerns about a market for the energy to be produced by the project and the economic viability of the project.</i>
Air Quality	<i>Commenters expressed concern about impacts from coal dust from trains.</i>
CO₂ Sequestration	<i>Concerns were expressed regarding the sequestration of CO₂, specifically the manner in which CO₂ stays underground, and the overall net decrease in CO₂ emissions through use in EOR.</i>
Waters of the U.S.	<i>Commenters requested clarification regarding impacts on waters of the U.S.</i>
Water Use/Utilities	<i>Commenters expressed concern regarding the impact of the project on water supply and demand, particularly the potential use of potable water to meet process water needs. Commenters expressed concern about the availability of some of the process water options, due to over-commitment of water rights, potential for litigation, or other issues.</i>
Ground Water	<i>Commenters expressed concern regarding impacts to ground water, including</i> <ul style="list-style-type: none"> • <i>depletion of aquifers and ground water supplies,</i> • <i>increased salinity from discharge of waste water and its impact on local wells, and</i> • <i>impacts to aquifer recharge from reallocation of water from current uses to accommodate the TCEP.</i>
Surface Water	<i>Commenters expressed concern regarding impacts to surface waters. Concerns included</i> <ul style="list-style-type: none"> • <i>impacts from runoff from the polygen plant site;</i> • <i>increased flooding due to project-related discharges to local surface waters;</i> • <i>impacts from the discharge of saline waters into local surface waters;</i> • <i>impacts from the potential dewatering of local surface waters;</i> • <i>changes in surface water quality;</i> • <i>impacts to jurisdictional waters of U.S.; and</i> • <i>impacts to playas from proposed waste water discharges and from direct surface disturbance.</i>
Traffic	<i>Commenters expressed concern regarding the proposed increase in railroad traffic.</i>
Vegetation	<i>Commenters expressed concern regarding impacts to riparian vegetation and wetlands from effluent discharge and/or direct surface disturbance. Commenters suggested the use of reclamation measures and best management practices to prevent growth of noxious weeds.</i>
Terrestrial Wildlife	<i>Commenters expressed concern regarding impacts to migratory birds, as well as impacts to wildlife from placement of certain linear facility options near playas. Commenters expressed concern about impacts to wildlife habitat as a result of changes in surface water quality.</i>
Cumulative Effects	<i>Commenters requested an update of reasonably foreseeable projects that would occur near the polygen plant site to include proposed TxDOT projects. Commenters expressed concern about impacts of climate change on future water availability, and consideration of those impacts in DOE project and funding plans. Commenters expressed concern about the likely success of the reported DOE programmatic goal of a net decrease in GHG emissions that could be triggered if the proposed technologies are successfully and widely deployed by industry.</i>
Coordination and Consultation	<i>Commenters requested that the EIS include all consultation request letters.</i>

1.6.3 Consultation and Coordination

1.6.3.1 COORDINATION WITH FEDERAL AND STATE AGENCIES

DOE contacted several federal and state agencies by letter to initiate consultation regarding particular environmental resources in their jurisdictions or areas of special expertise, or to invite them to become cooperating agencies under NEPA. The agencies contacted were:

- U.S. Department of the Interior, Regional Environmental Office
- EPA, Region 6, Regional Environmental Review Coordinator, Office of Planning and Coordination
- TCEQ, Region 7, Midland
- U.S. Army Corps of Engineers, Fort Worth District
- U.S. Fish and Wildlife Service (USFWS), Austin Ecological Services Field Office
- U.S. Department of Transportation, Federal Highway Administration
- TxDOT, Office of Planning and Development
- Texas State Historic Preservation Officer (SHPO), Texas Historical Commission
- TPWD, Wildlife Habitat Assessment Program

The consultation letters are contained in Appendix A to this EIS, and the agency contacts are included in the distribution list for the *final* EIS. No agency requested to participate as a cooperating agency for the EIS.

1.6.3.2 CONSULTATION WITH NATIVE AMERICAN TRIBES

DOE also sent letters to several tribes inviting them to attend and participate in the scoping meeting, and sent follow-up letters to provide information on how they could contact DOE if they had questions or concerns (see Appendix A). The tribes contacted were as follows:

- The Apache Tribe of Oklahoma
- The Comanche Tribe of Oklahoma
- The Kiowa Tribe of Oklahoma
- The Lipan Apache Tribe of Texas
- The Fort Sill Apache Tribe of Oklahoma
- The Wichita Tribe of Oklahoma
- The Ysleta Del Sur Pueblo of Texas
- The Mescalero Apache Reservation of New Mexico

The Ysleta Del Sur Pueblo of Texas requested consultation in compliance with the Native American Graves Protection and Repatriation Act (Public Law 101-601) only if human remains or artifacts were unearthed during the construction of the TCEP. No other responses were received.

1.6.3.3 SCOPE OF DOE'S ALTERNATIVES CONSIDERED

NEPA requires that agencies evaluate all reasonable alternatives to the proposed action. The purpose and need for agency action determines the range of reasonable alternatives. In this case, the purpose and need for DOE's proposed action is to advance the CCPI program by providing financial assistance to projects that have the best chance of achieving the program's objectives as established by U.S. Congress.

DOE's NEPA regulations include a process for identifying and analyzing reasonable alternatives in the context of providing financial assistance through a competitive selection of projects proposed by entities outside the federal government (10 C.F.R. § 1021.216). The range of reasonable alternatives in competitions for grants, loans, loan guarantees, and other financial support is defined initially by the range of responsive proposals received by DOE. Unlike projects undertaken by DOE itself, the department cannot mandate which entities submit proposals, where they propose to locate their projects, or how they propose to implement their projects, beyond expressing basic requirements in the FOA; these express requirements are limited to those that further the program's objectives. DOE's decision is then limited to selecting among the applications that meet the program's goals.

Recognizing that the range of reasonable alternatives in the context of financial assistance and competitive solicitations is determined by the number and nature of the proposals received, 10 C.F.R. § 1021.216 requires that DOE prepare an "environmental critique" that assesses the environmental impacts and issues relating to each of the proposals that the DOE-selecting official considers for an award. The DOE-selecting official considers these impacts and issues, along with other aspects of the proposals (such as technical merit and evidence of financial ability) and the program's objectives, in making awards. DOE prepared a critique of the proposals that were deemed suitable for selection in this round of awards for the CCPI program. Based on the critique, DOE prepared a publicly available environmental synopsis to document consideration given to environmental factors. The environmental synopsis is provided in Appendix B.

After DOE selects a project for an award, the range of reasonable alternatives becomes the project as proposed by the applicant, any alternatives still under consideration by the applicant or that are reasonable within the confines of the project as proposed (e.g., the particular location of the plant on the parcel of land proposed for the project), and a no action alternative.

In this EIS, DOE evaluates the project as proposed by Summit (with and without any mitigating conditions that DOE may identify as reasonable and appropriate), operational options that Summit is considering (e.g., water sources and transmission line interconnections), and the No Action Alternative.

As discussed in Section 1.2.1, DOE issued CCPI Round 3 in August 2008, and reopened it in June 2009 in response to the ARRA. Private sector participants submitted 38 proposals in response to the reopened solicitation. After an initial screening removed from further consideration those proposals that failed to meet all the mandatory eligibility requirements, there were 25 responsive proposals that were subjected to environmental review and consideration (during the selection process) in accordance with 10 C.F.R. § 1021.216. Accordingly, DOE met its obligations under NEPA to consider the alternatives available to the agency when DOE completed this process. As the final step, DOE chose a group of proposals, representing diverse technologies and using a variety of coals, to further the goals of the CCPI program. The TCEP was selected under the reopening of Round 3 because of the opportunity to demonstrate the specific technology proposed: an IGCC

power generation and chemicals production plant and CO₂ capture technologies in a commercial project to achieve an overall CO₂ capture rate of 90 percent. Other projects that propose to demonstrate other technologies are not alternatives to the proposed project for the purposes of this EIS, which was prepared to support a DOE decision on whether to provide partial funding for the TCEP and to inform other governmental agencies and the public about the proposed project and the potential environmental impacts.

1.6.3.4 REGION OF INFLUENCE AND AREA OF REVIEW

The scope of *the final* EIS includes potential impacts that Summit's proposed project may have on the natural and human environment in the region of influence (ROI). In this document, the ROI establishes the area of review for potential impacts. The ROI for the proposed project varies depending on the environmental resource affected. The site for Summit's proposed project (polygen plant site) and the ROWs for the linear facilities represent the narrowest ROI in which environmental resources may be affected. For some resources, such as biological and cultural resources, the ROI may extend beyond these sites into lands adjacent to the property boundaries. For other resources, such as socioeconomics and transportation, the ROI may encompass the surrounding local communities. Other resources, such as air quality and water resources, may have regions of influence that extend beyond municipal and county boundaries.

1.7 Summary of Changes in the Environmental Impact Statement

Comments received on the draft EIS are presented in Volume II (Responses to Comments). DOE responded to these comments and addressed them in the final EIS, as appropriate. A summary of the major comments and revisions in the final EIS is provided in the following sections.

1.7.1 Urea Production

Summit has modified the proposed project to include an option to increase the flexibility in the production of urea. Under this option, the TCEP could increase urea production by up to 40 percent. Net electrical output would be decreased due to the use of additional syngas for the production of NH₃, a precursor for the production of urea. Under this option, 40 percent more CO₂ could be used in the production of urea. See Sections 2.4.2 and 2.4.7 for a description of this option. This production option is considered in the impacts analysis for all resources.

1.7.2 Linear Facility Calculations

Summit has modified the proposed project to increase the construction or temporary ROW width to 200 feet (ft) (61 meters [m]) and the permanent ROW width to 150 ft (46 m) for the transmission line options in the final EIS. This is an increase from the 100-ft (30-m) temporary and 50-ft (15-m) permanent ROW widths in the draft EIS. In addition, the construction or temporary ROW widths for the waterline, natural gas pipeline, CO₂ pipeline connector, access road, and railroad options increased from 100 ft (30 m) in the draft EIS to 150 ft (46 m) in the final EIS; however, the permanent ROW width of 50 ft (15 m) remains the same for these linear facilities in the final EIS. The additional areas are considered in the impacts analysis under all resources.

1.7.3 Water Supply

Summit has modified the proposed project to include one additional waterline option (WL5) for the Gulf Coast Waste Disposal Authority (GCA) water source. The EIS now has three additional backup water supply options, one of which would include a new waterline option (WL6). Summit also clarified the potential for each source to be used as a primary and/or backup water source. See Section 2.4.5.3 for a description of these facilities. The new linear facility options are considered in the impacts analysis under all resources.

Concerns were raised about this project causing adverse cumulative effects to water supply resources. The final EIS contains revised text that more fully explains the water supply sources and the potential demand on water supply sources in the future (See Sections 2.4.5.3 and 3.7.5).

1.7.4 On-site Water Treatment

Summit has modified the proposed project to include on-site water treatment of incoming source water under all water source options. Source water, which would be delivered to the polygen plant site from the various water source options under consideration, would be treated on-site in the source water treatment system, which uses reverse osmosis membranes to remove dissolved solids and other constituents prior to use in the various plant processes. This would minimize changes to the base discharge water quality and quantity into Monahans Draw from the GCA Odessa South Facility. See Section 2.4.3.1 for a description of the source water treatment system. In addition, see Section 2.4.5.3 for a description of the primary water supply options. This new on-site water treatment option is considered in the impacts analysis for all resources.

1.7.5 Waste Disposal Systems

Because of the higher volume of reverse osmosis reject water that would be produced at the polygen plant as a result of locating the source water treatment system at the polygen plant site, Summit has modified the proposed project to include two disposal systems for the disposal of the waste water streams from the polygen plant site. These systems consist of the 1) reverse osmosis reject water disposal system (Disposal System 1), which would dispose of reject water through a combination of evaporation ponds and deep well injection; and 2) residual industrial waste water disposal system (Disposal System 2), which would dispose of all residual industrial waste water that could not be cleaned and recycled back into the plant for use as process water. Disposal System 2 would use a mechanical crystallizer and filter press system or solar evaporation ponds, with an option to deep well inject the industrial waste water, depending on its quality. There would be no surface discharge of residual industrial waste water or reject water from the polygen plant site. See Section 2.4.3.5 for a description of these waste disposal systems. These options are considered in the impacts analysis for all resources.

1.7.6 Flare Systems

There is a change from two totally enclosed ground flares (each 200 ft (61 m) high) to four flares (each approximately 200 ft (61 m) high and co-located on one structure). See Section

2.4.3.3 for a description of these facilities. This change in design is considered in the impacts analysis for all resources.

1.7.7 Carbon Dioxide Pipeline Networks

Additional information regarding the specifications of the pipelines that would be used for CO₂ transport is contained in Section 2.4.5.6.

1.7.8 Natural Gas Pipelines

Summit has modified the proposed project to include two additional options for natural gas pipeline routings (new NG2 and NG3) (see Section 2.4.5.2). These options are considered in the impacts analysis for all resources.

1.7.9 Transportation

Summit has modified the proposed project to include two new options to provide access into the polygen plant site (new AR3 and AR4) (see Section 2.4.5.7). These options are considered in the impacts analysis for all resources. Summit has also updated information regarding rail transportation needs. These new options and additional information are considered in the impacts analysis for all resources.

1.7.10 Water Resources

Concerns were raised about impacts to ground and surface waters, as well as adverse cumulative effects to water supply resources. Sections 3.6 and 3.7 of the final EIS contain revised text that more fully explains potential impacts to respective ground water and surface water resources from the project.

1.7.11 Cumulative Impacts

Revisions to the cumulative effects analysis were made to include additional reasonably foreseeable transportation projects identified during the public comment period (see Section 5.1.3).

1.7.12 Public Hearing Summary

A description of the public hearing held in April 2011 is provided in Section 1.6 and in Volume II.

1.7.13 Comments and Responses on the Draft Environmental Impact Statement

Volume II (Responses to Comments) provides a description of the public hearing, DOE's methodology for responding to public comments, a copy of the transcript from the public hearing and original comment documents in their entirety, and DOE's response to each comment.