[6450-01-P]

DEPARTMENT OF ENERGY

Record of Decision and Floodplain Statement of Findings for the Lake Charles Carbon Capture and Sequestration Project

AGENCY: Department of Energy

ACTION: Record of Decision

SUMMARY: The U.S. Department of Energy (DOE) announces its decision to provide cost-shared funding to Leucadia Energy, LLC (Leucadia) for its Lake Charles Carbon Capture and Sequestration project (Lake Charles CCS project) under DOE's Industrial Carbon Capture Sequestration (ICCS) Program. DOE prepared an environmental impact statement (EIS) to evaluate the potential environmental impacts associated with DOE's proposed action of providing financial assistance to the Lake Charles CCS project. The EIS evaluated the impacts associated with construction and operation of the proposed project and Leucadia's Gasification Plant, which is a connected action. DOE's proposed action is to provide financial assistance through a cooperative agreement with Leucadia to capture carbon dioxide (CO_2) from the Gasification Plant and transport the CO_2 via pipelines to the West Hastings oil field, for use in existing, commercial enhanced oil recovery (EOR). The West Hastings research monitoring, verification, and accounting

(MVA) program will provide an accurate accounting of approximately 1 million tons of stored CO_2.

ADDRESSES: The EIS and this Record of Decision (ROD) are available on DOE's web sites (www.energy.gov/nepa/ or **Error! Hyperlink reference not valid.**www.netl.doe.gov/publications/others/nepa/index.html). Copies of these documents may also be obtained by contacting Ms. Pierina Fayish, M/S 922-342C, U.S. Department of Energy, National Energy Technology Laboratory, P.O. Box 10940, Pittsburgh, PA, 15236; telephone: 412–386–5428; or e-mail: pierina.fayish@netl.doe.gov.

FOR FURTHER INFORMATION CONTACT: To obtain additional information about the project or the EIS, contact Ms. Pierina Fayish at the address provided above. For general information on DOE's NEPA process, contact Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance (GC-54), U.S. Department of Energy, 1000 Independence Avenue, SW., Washington DC 20585; telephone: 202-586-4600; or toll free at 1-800-472-2756.

SUPPLEMENTARY INFORMATION: DOE prepared this ROD pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321 et seq.), and in compliance with the Council on Environmental Quality (CEQ) implementing regulations for NEPA (40 Code of Federal Regulations [CFR] 1500 through 1508), DOE's NEPA implementing procedures (10 CFR 1021) and DOE's Compliance with Floodplain and Wetland Environmental Review regulations (10 CFR Part 1022). This ROD is based on DOE's EIS for the Lake Charles CCS Project (DOE/EIS-0464, November 2013) and other program considerations.

Purpose and Need for Agency Action

The purpose and need for DOE action is to advance the ICCS program by providing financial assistance to projects that have the best chance of achieving the program's objectives as established by Congress: demonstrating the next generation of technologies that will capture CO_2 from industrial sources and either sequester or beneficially use it. The proposed project was selected under the ICCS program as one of a portfolio of projects that DOE determined were the most appropriate ones to achieve programmatic objectives and meet legislative requirements.

This proposed project would help the ICCS Program meet its congressionally mandated mission of large-scale testing of CO_2 sequestration systems. The project would demonstrate the use of advanced technologies to capture CO_2 from an industrial source and sequester it as part of an EOR operation. The project would also provide information on the cost and feasibility of deploying sequestration technologies. A successful demonstration of the Rectisol®-based carbon-capture technology with beneficial use of the CO_2 at an existing oil field would also generate technical, environmental, and financial data regarding the design, construction, and operation of a CO_2 capture facility, pipeline, and CO_2 monitoring at the oil field. These data would be used to evaluate whether these technologies could be effectively implemented at a commercial scale.

DOE's Proposed Action

DOE's proposed action is to provide $261.4 million in cost-shared funding through a cooperative agreement with Leucadia for its proposed project. DOE has already provided

$13.9 million to Leucadia for preliminary design and related activities. The estimated total cost of the Lake Charles CCS project is $435.6 million.

Project Description and Location

The Lake Charles CCS project would result in the construction and operation of a Rectisol®-based facility to capture at least 75 percent of the CO_2 from the treated stream which would otherwise be released to the atmosphere from the Gasification Plant. The CCS project includes:

(1) *CO_2 Capture and Compression* - Two Lurgi Rectisol® Acid Gas Removal (AGR) units and two compressors would pressurize the CO_2 to 2,250 pounds per square inch gauge (psig) for transport and geologic sequestration. The project would be designed to capture approximately 89 percent of the CO_2 produced from the Gasification Plant. Over the 30-year expected life, approximately 4.6 million tons of CO_2 per year would be captured, on average.

(2) *CO_2 Pipeline* - A new pipeline, approximately 16 inches in diameter, would carry the captured CO_2 approximately 11.9 miles and connect to the existing Green Pipeline, which extends across Louisiana into Texas.

(3) *Research Monitoring Program* - Denbury Onshore, LLC (Denbury) and the Texas Bureau of Economic Geology (BEG) would jointly implement the West Hastings research monitoring, verification, and accounting (MVA) program aimed at providing an accurate accounting of approximately 1 million tons of stored CO_2, and a high level of confidence that the CO_2 injected in the oilfield during existing EOR operations will remain permanently sequestered. The West Hastings

research MVA activities would supplement Denbury's ongoing commercial monitoring activities and regulatory requirements performed for commercial CO_2 EOR and would provide additional information regarding the underground movement and confinement of CO_2.

In the context of NEPA, connected actions are actions dependent on the proposed action, as set forth in 40 CFR 1508.25. The Lake Charles CCS project cannot operate without the Gasification Plant, thus construction and operation of the Gasification Plant is a connected action and evaluated in the EIS. The Gasification Plant would convert petroleum coke into syngas, which would be further processed to produce methanol, hydrogen gas, and sulfuric acid, as well as CO_2. The Gasification Plant would provide raw syngas containing CO_2 to the Lake Charles CCS project, where the CO_2 would be separated from the syngas. The Gasification Plant and Lake Charles CCS capture and compression facilities would be located on an approximately 70-acre parcel of land leased from the Lake Charles Harbor and Terminal District (Port of Lake Charles), on the west bank of the Calcasieu River adjacent to Bulk Terminal No. 1, in southern Calcasieu Parish, Louisiana. The Gasification Plant would require new utility linears and pipelines for delivery of materials and transport of products as described in the EIS.

Site preparation activities for the Gasification Plant, including clearing and grading, began in January 2010. Site preparation work to add approximately 12 feet of fill to raise the site elevations above the local 100-year and 500-year base flood elevations also began in November 2010. These activities were authorized under permits issued by the U.S. Army Corps of Engineers (USACE) (Lake Charles Harbor & Terminal District Consent No.

DACW29-9-08 [May 30, 2008] and MVN-1998-03311-WY [August 18, 2008]). Construction of the Gasification Plant is expected to begin in the first quarter of 2014 and take approximately 36 months to complete. Peak construction is expected in month 18 and will involve approximately 2,500 workers, of which 900 would be at the Gasification Plant site.

For the purposes of the EIS, DOE assumed that the CO_2 capture system would continue to operate for 30 years. Petroleum coke from local refineries is already stored at the Port of Lake Charles and shipped to buyers overseas. The approximately 0.5 million tons per year of petroleum coke needed for the Gasification Plant will come from the port. Another approximately 2.1 million tons per year would come from other ports in the Gulf of Mexico region. During operation of the Gasification Plant, process-related chemicals would be transported to and from the facility by truck, rail, barge or ship.

The Lake Charles CCS Project does not include the commercial operation of the Green Pipeline or the existing EOR operations at the West Hastings oil field. These activities are not connected actions as defined by 40 CFR 1508.25.

Alternatives

Congress directed DOE to pursue the ICCS program by providing federal financial assistance to projects owned and controlled by non-federal sponsors. This statutory requirement places DOE in a much more limited role than if it were the owner and operator of these projects. Here, the purpose and need for DOE action is defined by the ICCS program (and its enabling legislation, Public Laws 110-140 and 111-5). As such, the reasonable alternatives available to DOE prior to the selection of this project under

the ICCS program were the other projects that met the eligibility requirements of a competitive solicitation. Other applications (and their potential environmental, safety, and health impacts) were considered during the selection process. Pursuant to 10 CFR 1021.216, a publicly-available synopsis of the environmental review and critique developed for the selection process was included in the EIS.

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, and the no action alternative.

No Action Alternative

Under the no action alternative, DOE would not provide cost-shared funding for the proposed Lake Charles CCS project. In the absence of DOE cost-shared funding, Leucadia could reasonably pursue several options. Leucadia could build both the Gasification Plant and the CCS project with funding from other sources and these facilities would include the same features, attributes, and impacts of the proposed project and connected action. Alternatively, Leucadia could choose not to build all or parts of the Gasification Plant and CCS project. For the purpose of making a meaningful comparison between the impacts of DOE providing and withholding financial assistance, DOE assumed that all or part of the Gasification Plant and CCS project would not be completed without DOE funding. Therefore, the following alternatives were identified and analyzed in the EIS:

1. Neither the Gasification Plant nor the Lake Charles CCS project would be built; or

2. The Gasification Plant would be built, but the captured CO_2 would be vented to the atmosphere rather than sequestered in an ongoing EOR operation.

The ongoing commercial CO_2 EOR operations and the West Hastings research MVA program would continue under each of these no action alternatives. Under these alternatives, the opportunity to capture an average of 4.6 million tons of anthropogenic CO_2 per year over the 30 year life of the Gasification Plant for use in EOR would not be realized. These alternatives would not contribute to DOE's goal of advancing the next generation of technologies that capture CO_2 from industrial sources for sequestration or beneficial reuse. While the no action alternatives would not satisfy the purpose and need for DOE action, these alternatives were analyzed to allow for comparisons to the impacts of the proposed project as required by 40 CFR 15012.14. The no action alternatives reflect the baseline conditions and serve as benchmarks against which the impacts of the proposed action can be evaluated.

Leucadia has begun preparing the site for construction of the Gasification Plant without DOE funding for other purposes not related to the Lake Charles CCS project. The construction of the Gasification Plant will receive no DOE funding.

NEPA Process

DOE published a Notice of Intent (NOI) for this proposed action in the *Federal Register* (FR) on April 29, 2011 (FR Doc. 2011-10448). DOE held public scoping meetings on May 16, 2011, in Pearland, Texas, and May 17, 2011, in Westlake, Louisiana. The public scoping period ended on May 29, 2011, after a 30-day comment period.

DOE prepared a draft EIS identifying and analyzing the potential impacts of the proposed action and no action alternatives. Although DOE funds would only go to the CCS project, DOE determined that the Gasification Plant is a connected action in accordance with 40 CFR 1508.25 (a), and its impacts are analyzed in the EIS, as well as DOE's no action alternatives. DOE announced the availability of the draft EIS in a Notice of Availability (NOA) published in the Federal Register (FR) by the U.S. Environmental Protection Agency (EPA) on May 10, 2013 (78 FR 28205). DOE published a separate NOA to announce its plans for two public hearings, held in Westlake, Calcasieu Parish, Louisiana, on June 4, 2013, and in Pearland, Brazoria County, Texas on June 5, 2013.

DOE received oral comments on the draft EIS at the public hearings and listened to questions and concerns during informal sessions before the hearings. During the 45-day public comment period, which ended June 25, 2013, DOE received comment letters from several organizations and agencies. Comments included concerns about: (1) the economic benefit of the project and the use of federal funds; (2) the amount of CO_2 that would be emitted and captured, and the monitoring of the CO_2 throughout the process; (3) the amount and types of wastes generated; (4) the process for selecting projects for DOE funding; (5) the impacts on the ozone non-attainment status of Calcasieu Parish; (6) mitigation measures for construction-related emissions; (7) the loss of forests and impacts on threatened and endangered species, ; (8) adequacy of the environmental justice analysis; (9) impacts to water resources and wetlands; and (10) safety of chemical use and storage.

DOE considered these comments in preparing the final EIS. DOE distributed the final EIS on November 14, 2013, and EPA published a NOA in the FR on November 22, 2013 (78 FR 70041). DOE received no comments on the final EIS.

Decision

DOE has decided to provide Leucadia with $261.4 million in cost-shared funding for its proposed project through a cooperative agreement under DOE's ICCS program.

Basis of DOE's Decision

DOE based its decision on the importance of achieving the objectives of the ICCS program and a careful review of the potential environmental impacts presented in the EIS. The proposed project would help DOE meet its congressionally mandated mission of supporting demonstration of the next generation of technologies that capture CO_2 from industrial sources for sequestration or beneficial use. The proposed action would also generate technical, environmental, and financial data regarding the design, construction, and operation of a CO_2 capture facility, pipeline, and monitoring facilities. The data would contribute to DOE's evaluation of the effective and economic implementation of these technologies at a commercial scale.

This decision incorporates all practicable means to avoid or minimize environmental harm. DOE plans to verify the environmental impacts predicted in the EIS and the implementation of appropriate avoidance and mitigation measures.

Mitigation

DOE's decision incorporates measures to avoid and minimize adverse environmental impacts during the design, construction and operation of the project. DOE requires that recipients of financial assistance comply with all applicable federal, state, and local environmental laws, orders, and regulations. During project planning, Leucadia incorporated various minimization measures and anticipated permit requirements into its project. The analyses completed for the EIS assumed that such measures would be implemented. These measures are identified in Chapter 4 of the EIS and hereby incorporated into this ROD as conditions for DOE's financial assistance under the cooperative agreement between DOE and Leucadia. Additional mitigation measures or measures specific to certain impacts or comments received are further discussed below in the section entitled *Potential Environmental Impacts and Mitigation Measures.*

Mitigation measures beyond those typically specified in permit conditions will be addressed in a Mitigation Action Plan (MAP). DOE will prepare the MAP, consistent with 10 CFR 1021.331, to establish how the mitigation measures will be planned, implemented, and monitored. The MAP is an adaptive management tool; therefore mitigation conditions in it would be removed if equivalent conditions are otherwise established by permit, license, or law. Compliance with permit, license or regulatory requirements is not considered mitigation subject to DOE control and therefore are not included in a MAP.

DOE will ensure that requirements in the MAP are met through management of its cooperative agreement with Leucadia, which requires that Leucadia fulfill the monitoring and mitigation measures specified in this ROD. DOE will make copies of the MAP

available for inspection online and in appropriate locations for a reasonable time. Copies of the MAP and any annual reports required under it will also be available upon written request.

Potential Environmental Impacts and Mitigation Measures

In making its decision, DOE considered the environmental impacts of Leucadia's proposed project, DOE's proposed action, and the no action alternative on potentially affected environmental resource areas. These included: climate and air quality, including greenhouse gas emissions; geology and soils; surface water, wetlands, and floodplains; groundwater; biological resources; cultural resources; land use; socioeconomics and environmental justice; traffic and transportation; noise; waste management; materials; and human health and safety. The EIS also considered the impacts of the project in combination with those from other past, present, and reasonably foreseeable future actions. The following sections summarize the potential impacts to the resource areas with mitigation requirements. Detailed information for all resource areas is in the EIS.

Air Quality

Construction of the Gasification Plant and the CCS project's CO_2 capture and compression facilities would result in short-term, localized increased fugitive dust and vehicle and construction equipment emissions. In response to EPA's comments on the draft EIS, Leucadia will implement additional best management practices (BMPs) and mitigation measures. To control fugitive dust, Leucadia must avoid open storage of dry material, install wind fencing as needed, use water trucks to stabilize surfaces, prevent spillage when hauling material and operating equipment, to the extent possible, and limit

the speed of vehicles on site to 15 miles per hour (mph) and earth-moving equipment to 10 mph. To control mobile and stationary source emissions, Leucadia must use remote parking with bus transport to the worksite, maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering with engines, and use new equipment where practicable. Leucadia also must limit idling of heavy equipment; EPA recommends limiting idling to less than 5 minutes.

In assessing potential impacts during operations, DOE evaluated the Lake Charles CCS project and the Gasification Plant as a single facility, because together they make a single source for purposes of air emissions. Leucadia completed air dispersion modeling in support of the initial permit application for criteria pollutants and toxic air pollutants. For all criteria pollutants, maximum modeled concentrations in ambient air due to the proposed facility emissions would not violate federal or Louisiana standards.

A General Conformity analysis is not required for the operations phase as the Gasification Plant, which includes the Lake Charles CCS project CO_2 capture and compression facilities, requires a permit under the Prevention of Significant Deterioration program. Under the General Conformity rule, DOE evaluated the impact of construction emissions because Calcasieu Parish has a maintenance plan effective through 2014 for the 8-hour National Ambient Air Quality ozone standard. Total NO_x emissions would increase 1.9 percent and total VOC emissions would increase 0.5 percent above the projected 2014 emission values in Calcasieu Parish. These increases in emissions from construction would not obstruct Calcasieu Parish's efforts to maintain attainment with the ozone standard.

Construction and operation of the CO_2 pipeline, and operation of the West Hastings research MVA program would result in short-term, localized increased fugitive dust and vehicle emissions. Denbury has indicated that it will implement BMPs including suppression techniques to minimize dust and operate and maintain vehicles in accordance with manufacturers' recommendations.

Climate

Construction of the Gasification Plant and Lake Charles CCS project would generate up to approximately 31,300 tons per year (tpy) of CO_2 emissions over the construction period. Operation of the Gasification Plant would result in approximately 5.8 million tpy of new CO_2 emissions. According to the terms of the cooperative agreement, Leucadia must design and construct the Lake Charles CCS project with the goal of capturing at least 75 percent of the CO_2 from the treated stream, comprising at least 10 percent of CO_2 by volume, which would otherwise be emitted to the atmosphere. However, the proposed project is designed to capture approximately 89 percent of the CO_2 produced, or approximately 4.6 million tpy, when averaged over 30 years. Additionally, DOE compared the life cycle analysis (LCA) for the proposed project and connected action against the greenhouse gas (GHG) LCA for conventional production methods of the same quantities of methanol (steam reformation of natural gas), hydrogen (pressure swing absorption), and sulfuric acid (combustion of elemental sulfur and catalysis reactions) that would be produced by Leucadia with these facilities. The CCS project captures CO_2 and prevents long-distance exportation of petroleum coke, making the Gasification Plant life cycle GHG emissions 56 percent lower than conventional production methods generating the same quantities of methanol.

Geology and Soils

Construction and operation of the Gasification Plant and Lake Charles CCS capture and compression facilities would result in negligible impacts to geologic resources. The risk of seismic events is minimal because the area is within the lowest seismic hazard category (Seismic Zone 0). Potential minor impacts to soils during construction of the project pipelines would include disturbance of soils and the potential for increased soil erosion from both wind and water. Construction of the CO_2 pipeline would temporarily affect approximately 107 acres of prime farmland. Construction of the water supply and hydrogen pipelines would temporarily affect approximately 111 acres of prime farmland. As the pipelines would be located below the surface, impacts on prime farmland would be minor and temporary. Leucadia must restore surface conditions to their original state and use following construction of the water supply and hydrogen pipelines. Potential soil impacts in all construction areas would be avoided or mitigated as described in a project-specific storm water pollution prevention plan (SWPPP). Operational activities would have negligible impacts on soil, primarily due to disturbance of soils from vehicle traffic and minor spills or leaks from vehicles used during inspection and maintenance activities.

The West Hastings research MVA program would occur in a seismically stable area (Seismic Zone 0). None of the proposed MVA activities would produce vibrations or forces that would result in seismic destabilization, and no geologic hazards exist that would impact the project or that would become more hazardous or be aggravated as a result of those activities. Potential impacts on geologic resources could result from seismic events or subsidence related to CO_2 injection; CO_2 migration through a permeable zone in the confining unit or through improperly plugged and abandoned wells or

unknown wells; or CO_2 migration through an existing injection, production, or monitoring well. Denbury has indicated that a well integrity testing program would be conducted and any deficiencies would be corrected prior to use of such wells. CO_2 migration from the target geologic units is unlikely, and ongoing monitoring and modeling would provide an accurate accounting of the approximately 1 million tons per year of CO_2 stored through the commercial EOR process. Therefore, DOE expects adverse impacts on geologic resources at the West Hastings oil field from the West Hastings research MVA program to be unlikely and negligible to minor due to the nature of the site and the activities being conducted. Furthermore, the research MVA program could have the positive impact of helping to ensure the long-term economic and financial viability of CO_2 capture by confirming storage of CO_2 injected during commercial EOR operations.

Surface Water, Wetlands, and Floodplains

The quantity of water needed for construction and operation of the Gasification Plant and Lake Charles CCS capture and compression facilities would have negligible impacts on water availability and local water use.

Approximately 26.2 acres of wetlands were permanently impacted during the site preparation for the Gasification Plant and were addressed through off-site mitigation banking. Construction does not conflict with applicable flood management plans or ordinances and would not increase the potential for flooding. Potential surface water and wetland impacts from the construction of the water supply and hydrogen pipelines would occur during crossing of Bayou d'Inde, the Sabine River Canal, and two additional water bodies. Construction of the water supply and hydrogen pipelines could potentially impact 7.1 acres of wetlands, but the final wetland delineation and permitting will be conducted by the U.S. Army Corps of Engineers (USACE). If a water

body, wetland, or floodplain is crossed by the water supply and hydrogen pipelines and determined to be a jurisdictional water of the United States and the construction impacts on wetlands exceed applicable thresholds, Leucadia must obtain the necessary USACE permits. If compensatory wetland mitigation becomes necessary under any USACE permit, Leucadia must implement additional mitigation as required and described in the permit(s). Leucadia must use horizontal directional drilling (HDD) where appropriate to minimize the environmental impacts of crossing surface waters.

Activities during the operations period would not result in additional structures in the floodplain, filling of wetlands, or alteration of infiltration rates that would increase volumes downstream.

During construction of the CO_2 pipeline potential impacts to surface water quality include increased sediment load, alteration of flow rates and accidental spills of chemicals or lubricants. Denbury has proposed HDD to minimize the environmental impacts of crossing surface waters. In addition, USACE permits must be obtained to cross waters of the United States, including associated wetlands. Approximately 550,100 gallons of water for hydrostatic testing would be obtained from local water bodies or purchased from municipal supplies. No changes in the availability of surface water for current or future uses are anticipated as a result of pipeline construction. Construction of the CO_2 pipeline could permanently impact 14.98 acres and temporarily impact 13.23 acres of 100-year floodplain. Due to the narrow width of the permanent right-of-way (ROW), no alteration of infiltration rates are expected and there would be no substantial decrease in the volume of surface water flowing downstream. Normal operation of the CO_2 pipeline

would not affect surface waters. No impacts on wetlands or floodplains are anticipated from operation of the CO_2 pipeline.

The West Hastings Research MVA program would not involve the removal or injection of any materials that would result in changes in surface water availability or runoff or result in significant effluent releases. Recompletion of proposed wells would be outside wetland areas, and Denbury has proposed BMPs to prevent runoff from entering wetlands outside of construction areas. MVA activities would not increase the potential for floods, alter a floodway or floodplain, or otherwise impede or redirect flows.

Biological Resources

Construction and operations activities at the Gasification Plant and Lake Charles CCS Capture and Compression facilities are expected to have negligible to moderate impacts on biological resources, which include wildlife, habitat, plant life, threatened and endangered species, and migratory birds. The loss of 70 acres within the 1,740 acres of forested habitat represents 4 percent of the total area. Clearing and filling of the equipment laydown area could remove up to 40 acres of potential adjacent forested emergent wetland habitat. A loss of 40 acres of forest in the equipment laydown and methanol/sulfuric acid storage area represents a 14.5 percent loss within the local 275-acre forested wetland area and 2.3 percent loss within the 1,740-acre forested area of the Bayou ecosystem, which is a part of the Calcasieu estuary. The Port of Lake Charles consulted with the Louisiana Department of Wildlife and Fisheries (LDWF) and Louisiana Natural Heritage Program, regarding construction of the equipment laydown area. The Louisiana Natural Heritage Program indicated that no impacts on rare, threatened, or endangered species or critical habitats are

anticipated. Approximately 76 percent of the water supply pipeline route and 99 percent of the hydrogen pipeline route follow existing ROWs. The water supply pipeline and hydrogen pipeline corridor would impact 18.47 and 62.74 acres, respectively, of forest habitat potentially used by the red cockaded woodpecker. The USFWS's Louisiana Ecological Services concurred that the proposed project is not likely to adversely affect resources under the jurisdiction of Endangered Species Act. Prior to construction of the pipelines, Leucadia must contact LDWF to request another database review to identify any new occurrences of nesting areas for migratory birds or colonial water birds. Leucadia must perform site-specific surveys within 2 weeks of project startup, in accordance with LDWF requirements, to determine whether migratory birds or colonial water bird nesting areas are present and the extent of any colonies. Leucadia must further consult with LDWF if active nesting colonies are found within 400 meters of the project site. Operations activities are expected to have negligible impacts to biological resources.

The CO_2 pipeline would be located along or within existing utility ROWs to the extent practicable and construction would result in minor impacts to biological resources. Pipeline construction would affect 10.21 acres of forest, 17.65 acres of scrub-shrub, and 2.1 acres of herbaceous grassland habitats. Denbury has indicated that it will obtain necessary federal and state permits, and associated site-specific surveys and mitigation, if necessary, prior to construction. The LDWF recommended that surveys of suitable nesting areas be conducted no more than two weeks before construction begins to determine whether breeding colonies are present. In addition, the USFWS recommended informing on-site personnel of the need to identify colonial wading birds and their nests, and to avoid affecting them during the

breeding season. Operations activities are expected to have negligible impacts to biological resources.

Negligible impacts on aquatic ecology, terrestrial vegetation, or wildlife, including threatened and endangered species, are expected as a result of the West Hastings research MVA activities. Affected habitats at these locations have been disturbed by past and ongoing industrial and oil production activities. Operations activities are expected to have negligible impacts to biological resources.

Cultural Resources

Construction of the Gasification Plant and Lake Charles CCS Capture and Compression facilities would disturb a portion of one cultural resource site located within the areas of potential effects (APEs). The Louisiana Site Historic Preservation Officer (SHPO) concurred with the determination that the site was not eligible for listing on the National Register of Historic Places (NRHP) and that no further investigations were necessary. Operation of the plant and facilities would have no impacts on cultural resources or historic properties. DOE initiated consultation with 13 federally recognized Native American tribes in Louisiana, Texas, and other states in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. The Choctaw Nation of Oklahoma was the only tribe to respond to the consultation letter for the proposed action. It concurred with the finding of no historic properties affected at this time and agreed that the project should move ahead as planned. Leucadia must include a provision in its construction plans for its contractors that require them to immediately notify LCCE if identifiable tribal artifacts or remains are found during construction. If notified of any such discoveries, Leucadia must inform the SHPO and the Choctaw Nation to ensure the artifacts or remains are handled appropriately.

Construction of the CCS CO_2 pipeline would destroy one archaeological site. However, the SHPO reviewed the results of the Phase I cultural resources survey within the APE and concluded that the site was not eligible for the NRHP. Construction of the CO_2 pipeline also has the potential to result in direct, permanent, negative impacts on the Hardey Family Cemetery. Denbury proposes to avoid the direct impacts by directionally drilling beneath the cemetery to avoid physical disturbance. Cemetery owners have indicated no objection to construction of the proposed pipeline if there are no surface operations and the HDD method is employed to a depth of at least 25 feet below the surface of the cemetery.

Construction and operation of the CO_2 pipeline would have minor impacts on cultural resources. Operation of the West Hastings research MVA program would have no impacts on cultural resources because none were identified within the MVA area.

Leucadia, in coordination with DOE, must continue consultation with the SHPO for areas not previously surveyed for cultural resources. This may occur if the currently proposed pipeline route needs to be altered or for other unforeseen areas of ground disturbance not analyzed in the EIS. Leucadia must complete any additional surveys prior to construction in such areas.

Land Use

Construction and operation of the Gasification Plant and CO_2 Capture and Compression facilities would not conflict with current and future land use plans and/or zoning ordinances of Calcasieu Parish. Impacts on residences would be negligible due to the distance between residential areas and the construction site. Construction of the raw water pipeline would impact a total of 122 acres of land, including 24 acres of permanent

ROW and 98 acres of temporary ROW. Construction of the hydrogen pipeline would impact a total of 77 acres of land, including 51 acres of permanent ROW and approximately 26 acres of temporary ROW. To reduce impacts on surrounding land and properties, approximately 76 percent of the water supply pipeline route and 99 percent of the hydrogen pipeline route would follow existing ROWs. Temporary visual impacts would result due to construction and ground disturbance. Impacts on cropland would be temporary, and active cropland would revert to preconstruction use for the full width of the ROWs. Construction would not impact special land uses such as recreation areas, public lands, historic sites, and protected water bodies. Leucadia must use BMPs including dust suppression techniques to control the dust generated by construction. Leucadia must revegetate the pipeline ROWs and adjacent properties to pre-construction conditions and vegetate and maintain new ROW areas. Operation of the Gasification Plant and Lake Charles CCS CO_2 Capture and Compression facilities would be compatible with the surrounding industrial properties and would have no or negligible impacts on surrounding land uses. Occasional maintenance of the water supply and hydrogen pipelines may require access to buried portions of the lines. Leucadia would coordinate with property owners to minimize potential disturbances. The ROWs and adjacent properties would be restored to pre-construction conditions and maintained.

Construction of the CCS CO_2 pipeline would cause short term impacts om 50.62 acres of temporary ROW and long term impacts to 56.34 acres of permanent ROW. Construction activities would include use of a 12.4 acre site for a warehouse yard and a 6.9-acre site at the pipe storage yard. Construction of the CO_2 pipeline would result in the permanent conversion of 8.27 acres of forested land, including 2.98 acres of forested wetland. Small

areas of other vegetation (i.e., scrub/shrub, pasture, and grassland) within the construction ROW could be permanently impacted. Following construction, approximately 50.62 acres of land within the temporary ROW would be restored to previous conditions and uses. Active cropland would be allowed to revert to preconstruction use in the full width of the ROW. No special land uses such as recreation areas, public lands, historical sites, or protected water bodies would be impacted by construction activities. Denbury would avoid or minimize adverse impacts on land use by locating the proposed CO_2 pipeline within or adjacent to existing utility ROWs with compatible land uses to the extent practicable. Denbury has indicated that it would use BMPs to supplement applicable regulatory requirements in order to minimize impacts on land use during construction. Operation of the CO_2 pipeline would require that landowners not construct or place any structures within the permanent ROW. Occasional maintenance may require access to buried portions of the pipeline. Denbury would use BMPs during maintenance to avoid or minimize impacts on adjacent land uses and residences. Operation of the pipeline would have temporary and negligible impacts on surrounding land uses during maintenance. The West Hastings Research MVA activities are consistent with the existing commercial EOR operations and would have negligible impacts on land uses in the immediate and surrounding areas.

Traffic and Transportation

A temporary increase in traffic during construction of the Gasification Plant and Lake Charles CCS Capture and Compression facilities is expected from approximately 900 workers accessing the off-site construction parking area and approximately 150 off-site construction vehicles entering the LCCE Gasification site daily during peak construction. No major short or long-term impacts to interstate, multi-lane highway or two lane highway transportation resources are expected to occur, although certain segments of local roadways currently are in degraded conditions. Based on the estimated existing and projected future level of service (LOS) of Ruth Street, the use of this street during peak construction would degrade its LOS. For the offsite construction parking area, Leucadia must operate shuttle buses to reduce traffic congestion on local roadways and may be required to obtain a temporary construction access permit from the Louisiana Department of Transportation and Development (DOTD). To the extent practicable, Leucadia must schedule heavy equipment deliveries during off peak hours, start work shifts at non-peak hours, stagger arrival times at the off-site construction parking area, request that personnel use roadways with LOS of A, B, or C, and coordinate traffic congestion with Louisiana DOT District 7. Construction of the water supply and hydrogen pipelines may cause short-term, minor traffic delays from large, slow-moving heavy equipment and delivery trucks. Leucadia must ensure adequate notice to landowners and drivers to maintain access to public roads.

During operations, additional traffic from 187 personnel and approximately 127 material deliveries would be negligible compared to the current traffic. The estimated total ship

traffic for the Gasification Plant is 12 trips per year or approximately 1.2 percent of the current vessel traffic at the Port of Lake Charles.

A temporary minor increase in traffic during construction of the CO_2 pipeline is expected from an average of approximately 100 personnel and 10 trucks accessing the route daily. Denbury has indicated that it would minimize impacts through various measures that ensure adequate notice to landowners and drivers to maintain access to public roads. Periodic maintenance of the ROW would include slow-moving mowers and occasional maintenance vehicles. Impacts on local traffic related to 14 new personnel hired by Denbury to perform the MVA activities, as well as personnel that would conduct temporary site visits, would be negligible.

Noise

Sound levels for general construction of the Gasification Plant and Lake Charles CCS Capture and Compression facilities at the closest noise-sensitive, residential receptor are expected to be 58 average-weighted decibels [dBA], which exceeds the 55dBA EPA guideline. However, a noise study indicated that the current background noise level at the nearest receptor (60 dBA) also exceeds the EPA guideline. As a temporary daytime occurrence, construction noise of this magnitude would likely be imperceptible, and impacts would be negligible. Increased truck traffic during daytime hours would cause a temporary increase in noise at a limited number of residences and the impacts are expected to be negligible. Residences within 500 to 1,000 feet of construction of the water supply and hydrogen pipelines would experience a short-term increase in ambient noise and vibrations from construction activity. Receptors near HDD locations could experience elevated

temporary ambient noise levels as high as 78 dBA. Noise minimization measures would be used to reduce levels by approximately 10 dBA. Leucadia must minimize noise levels by limiting construction activities to daylight hours, as practicable, requiring contractors to minimize construction noise and maintain equipment in good working order, and utilizing temporary sound barriers. If necessary, Leucadia must obtain a variance from Calcasieu Parish for operating HDD equipment during evening and weekend hours. Typical sound levels for the equipment to be used during operation of the LCCE Gasification plant and CO_2 capture and compression facilities can exceed 120 dBA. Leucadia must implement engineering design and noise minimization measures to limit the levels such that the combination of noise from the plant and existing ambient noise would not exceed 58 dBA at the nearest noise-sensitive receptor during operation.

During the CCS CO_2 pipeline construction, noise levels may exceed the EPA guideline of 55 dBA at some residences. HDD activities may need to be conducted in the evening or weekends within 165 feet of a residence or noise sensitive area, which is prohibited by Calcasieu and Cameron Parishes without a variance. Noise minimization measures would be implemented to achieve up to a 10 dBA reduction. As a temporary daytime occurrence, noise from construction of the CO_2 pipeline would have short-term, minor impacts on noise receptors. The impacts from traffic noise during construction would be negligible because a majority of the pipeline route traverses rural areas. No noise above ambient levels would be generated by operation of the CO_2 pipeline. Noise impacts from equipment and vehicles used during inspection and maintenance activities would be negligible.

Noise produced by equipment during conversion and reworking of wells for the West Hastings Research MVA Program is not expected to exceed the EPA guideline more than

1,000 feet from the equipment. Construction noise of this magnitude would likely be imperceptible, given the industrial setting, and the on-going commercial EOR operations. Therefore, the potential noise from the research MVA well reworking would result in negligible impacts. Traffic noise may increase for additional periodic sampling and monitoring activities, but the increase would not be distinguishable from ambient noise levels and would be negligible.

Waste Management

Approximately 2,640 cubic yards of nonhazardous waste and small quantities of hazardous waste would be generated annually during the 3-year construction period of the Gasification Plant and Lake Charles CCS Capture and Compression facilities, or less than 0.0002 percent of the available landfill capacity in Calcasieu Parish. Leucadia must require construction contractors to develop a Waste Management Plan that includes specifications for handling, containment, and disposal of all wastes generated during construction of the Gasification Plant and CCS Capture and Compression facilities. Approximately 65,000 tons (75,000 cubic yards) of nonhazardous waste generated annually during operation represents 0.6 percent of the total landfill capacity in Calcasieu Parish. Approximately 1,500 cubic yards of potentially hazardous waste would be generated annually during operation, or less than 0.03 percent of the capacity of the hazardous waste landfills in Calcasieu Parish. Leucadia must implement a program to reduce, reuse, and recycle waste materials to the extent practicable.

Portions of the CCS CO_2 pipeline would be constructed using HDD and a bentonite slurry that would be recycled, spread in upland areas as a soil supplement, if permitted, or removed

and disposed of at a local permitted solid waste landfill. Construction and operation would not create hazardous wastes in quantities that would require a RCRA permit. Disposal of nonhazardous and potentially hazardous wastes generated by construction and operation of the proposed CO_2 pipeline would have a negligible impact on the capacity or management of hazardous or solid waste services and landfills in the area.

The West Hastings research MVA activities would involve drilling equipment to plug back, recondition, and re-complete existing wells. Research MVA activities could generate waste streams, including drilling mud and produced water during well construction. Produced water and light sediment would be pumped into trucks and hauled off-site by a licensed contractor for disposal. Excess drilling mud would be collected and stabilized in steel tanks and transported off-site to a designated local solid waste landfill. No hazardous waste would be generated as a result of the research MVA activities. Impacts related to the disposal of drill cuttings and treatment of the produced water generated during the reworking of existing wells would not require the use of unique waste disposal or treatment technologies and would result in negligible impacts on the capacity and management of landfills and disposal facilities in the area.

Potential Environmental Impacts of the No Action Alternative

Under no action sub-alternative 1, Leucadia would build neither the Gasification Plant nor the Lake Charles CCS project. The resources necessary for construction would be available for construction of other industrial projects in this area or elsewhere. The Port of Lake Charles would continue to ship pet coke worldwide for use as fuel in power plants. The use of pet coke in conventional power plants would likely emit more air emissions than its use in

the Gasification Plant because of the stringent emission requirements imposed on the plant compared to conventional power plants. Environmental conditions would not change. The impacts to the community from noise, traffic, air emissions, and disruption of land use, jobs, and economic development would not occur. The impacts on the environment from air emissions, disruption of wildlife, use of surface water, discharge of wastewater, and loss of wetlands would not occur. Denbury would continue to inject CO_2 obtained from geologic sources in its ongoing EOR operations. The Lake Charles CCS project would not fund a research MVA program at the West Hastings oil field. Sub-alternative 1 of the no action alternative would not contribute to the demonstration of the next generation of technologies to capture CO_2 from industrial sources.

Under no action sub-alternative 2, Leucadia would build the Gasification Plant and vent the CO_2 to the atmosphere. The impacts from the construction and operation of the Gasification Plant would still occur. Leucadia would still capture the CO_2 from the syngas using Rectisol®. Leucadia would route the CO_2 stream to discharge to the atmosphere under the current air permit issued by LDEQ. Approximately 5.2 million tons of CO_2 would be emitted per year from the carbon capture technology that would otherwise be captured. Emissions produced by the construction of the pipeline, and indirect emissions associated with electricity use by the CO_2 capture and compression facility, would not occur. No impacts related to construction of the CO_2 pipeline would occur. Denbury would continue to inject CO_2 obtained from geologic sources in its ongoing EOR operations. The Lake Charles CCS project would not fund a research MVA program at the West Hastings oil field. If the CCS project is not built, the opportunity to capture an average of 4.6 million tons of anthropogenic CO_2 per year over the 30 year life of the Gasification Plant for use in

EOR would be lost. Sub-alternative 2 would not contribute to DOE's goal of demonstrating the next generation of technologies that capture CO_2 emissions from industrial sources.

Environmentally Preferred Alternative

From a local perspective, no action sub-alternative 1 is the environmentally preferable alternative because it would result in no changes to existing environmental conditions. However, from a national perspective, DOE's proposed action is the environmentally preferred alternative. Successful operation of the proposed project could facilitate the deployment of advanced technology integrated with an industrial source to capture CO_2 that would otherwise be emitted to the atmosphere.

Floodplain Statement of Findings

DOE prepared this floodplain statement of findings in accordance with its regulations entitled "Compliance with Floodplain and Wetland Environmental Review Requirements" (10 CFR 1022). DOE completed the required floodplain assessment in coordination with development and preparation of the EIS, and incorporated the results and discussion in Sections 3.4, 4.4, and Appendix E of the final EIS.

Based on the FEMA Flood Insurance Map and Rita Recovery Maps, the Gasification Plant and the CO_2 Capture and Compression facilities site's Advisory Base Flood Elevation (ABFE) is 10 feet above mean sea level (MSL). The Gasification Plant and Capture and Compression site would be filled to an elevation that is above the ABFE. The 120-acre area, which would include 40 acres for equipment laydown during

construction and methanol/sulfuric acid storage during operation, is within the 100-year floodplain of the Calcasieu River. DOE assumes that the site would continue to be filled above the base flood elevation set by FEMA. Given the relative size of the 70-acre site and the 40-acre site compared to the designated floodway of 8 miles along the Calcasieu ship channel and 3,976 acres drainage area, the fill would not result in a measurable increase in the upstream base flood elevation as determined by FEMA, nor have a measurable effect on the performance of the designated floodway. The proposed water and hydrogen pipelines associated with Gasification Plant would be installed below ground within the 100-year floodplain of Bayou d'Inde and Calcasieu River.

The proposed CCS CO_2 pipeline route is located in proximity to the floodplains of Bayou d'Inde, the Houston River, and the Calcasieu River, and much of the proposed route is located within 100-year floodplains of the Calcasieu River and its tributaries. The proposed pipeline would be installed below ground, therefore no alteration of infiltration rates and no substantial decrease in the volume of surface water that flows downstream would result.

Approximately one-third of the West Hastings research MVA area, including two proposed well locations, is within the 100-year floodplain of Chigger Creek. However, research MVA activities would not increase the potential for floods, alter a floodway or floodplain, or otherwise impede or redirect flows such that human health, the environment, or personal property could be affected. Activities would be conducted on existing wells and no new construction would occur.

As a result of location requirements, i.e., being adjacent to navigable waters and existing rail, road, and pipeline infrastructure, the proposed project and connected action were found

to have no practicable siting alternatives. Based upon DOE's review and the project proponents' coordination with the local floodplain administrator and local USACE District, and adoption of minimization measures, DOE's proposed action would not result in potential harm to or within floodplains.

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