

### **C.3 CULTURAL RESOURCES CONSULTATION**

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(See Appendix A to EIS Appendix G for a copy of the February 10, 2012  
Phase I Cultural Resources Investigation Scope of Work)

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TEXAS HISTORICAL COMMISSION

*real places telling real stories*

February 23, 2012

Mark Lusk  
U.S. Department of Energy  
3610 Collins Ferry Road  
P.O. Box 880  
Morgantown, West Virginia 26507

Re: Project review under Section 106 of the National Historic Preservation Act of 1966  
Notification of Project and Proposed Phase I Cultural Resources Inventory Scope of Work for the  
W.A. Parish Post-Combustion Carbon Capture and Storage Project in Southeastern Texas (Fort  
Bend, Wharton, and Jackson Counties)

Dear Mr. Lusk:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed federal undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations.

The review staff, led by Jeff Durst, has examined our records. According to our maps, the proposed project area should be surveyed as recommended by URS Group, Inc. (URS). However, we recommend, in addition to the procedures outlined in the URS scope of work, that backhoe trenching be conducted in areas adjacent to waterways where there is the potential for deeply buried cultural resources. In areas where directional drilling will be utilized to pass underneath waterways backhoe trenching should take place at the location of the bore holes entrance and exit points where deep sediments are observed or suspected. In instances where deep sediments are not encountered in these areas then this should be explained in the report as the reason why backhoe trenching was not conducted.

All work on the should meet the minimum archeological survey standards posted on-line at [www.thc.state.tx.us](http://www.thc.state.tx.us). A report of investigations should be produced in conformance with the Secretary of the Interior's Guidelines for Archaeology and Historic Preservation, and submitted to this office for review.

Thank you for your cooperation in this federal and state review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Jeff Durst at 512/463-8884.**

Sincerely,

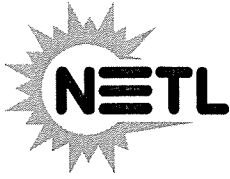


for  
Mark Wolfe, State Historic Preservation Officer

MW/jjd



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April 25, 2012

Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
1511 Colorado St.  
Austin, Texas 78701

Subject: Response to Texas Historical Commission Request for Backhoe Trenching;  
Proposed Phase I Cultural Resources Inventory Scope of Work for the W.A.  
Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project in  
Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

Dear Mr. Wolfe,

In correspondence from your office dated February 23, 2012, the Texas Historical Commission (THC) recommended that “backhoe trenching be conducted in areas adjacent to waterways where there is the potential for deeply buried cultural resources. In areas where directional drilling will be utilized to pass underneath waterways backhoe trenching should take place at the location of the bore holes entrance and exit points where deep sediments are observed or suspected.”

URS Group, Inc. (URS) conducted a soil and geomorphological review of the six horizontal directional drills (HDD) planned for waterbody crossings during construction of the proposed CO<sub>2</sub> pipeline. As shown in Attachment 1, HDDs are planned for the following six waterbody crossings: Big Creek; FM 1994 (and adjacent pond); San Bernard River; Colorado River; Jones Creek; and Lavaca River. Attachment 1 also provides detailed aerial imagery of the HDD locations and indicates the proposed limits of the pipeline construction corridor, including additional temporary workspace, approximate milepost (MP) locations, and soil types. A summary of the soil types encountered at the entry and exit points for each HDD is provided in Table 1 below.

The FM 1994 HDD would cross under a man-made pond and would be completed in Bernard-Edna Complex soil (Table 1), which is associated with an upland landform. Therefore, the U.S. Department of Energy (DOE) proposes that no deep testing would be required for the FM 1994 HDD. Additionally, the HDD exit points for the Big Creek and Lavaca River crossings are characterized by the Edna fine sandy loam and Telferner fine sandy loam, respectively (Table 1). Both of these soils are affiliated with ancient (i.e., pre-Holocene) meander ridges on the Beaumont Formation. Based on their landform characteristics and age, no additional deep testing is considered warranted for the HDD exit locations at the Big Creek and Lavaca River crossings.

The soils encountered at the remaining eight HDD entry and exit locations (i.e., the entry locations for the Big Creek and Lavaca River HDDs and the entry and exit locations for the San Bernard River, Colorado River, and Jones Creek HDDs) are associated with well-defined floodplain deposits that may contain more deeply buried cultural resources. As recommended by THC, DOE proposes that additional deep testing via backhoe trenching be conducted at these eight locations. Table 1 summarizes the recommendations for each HDD entry and exit location.

**Table 1. HDD Entry and Exit Location Soils**

HDD Name	MP	Entry Location			Exit Location		
		Soil Symbol	Soil Name	Deep Testing Proposed	Soil Symbol	Soil Name	Deep Testing Proposed
Big Creek	6.5	Kd	Kaman clay	Yes	Eb	Edna fine sandy loam	No
FM 1994	8.5	Be	Bernard-Edna complex	No	Be	Bernard-Edna complex	No
San Bernard River	20.5	As	Asa silty clay loam	Yes	Pa	Pledger clay	Yes
Colorado River	34	Cn	Clemville-Norwood complex	Yes	Me	Brazoria clay, rarely flooded	Yes
Jones Creek	35.5	Me	Brazoria clay, rarely flooded	Yes	Me	Brazoria clay, rarely flooded	Yes
Lavaca River	77.0	Ar	Aransas clay, saline, frequently flooded	Yes	TfA	Telferner fine sandy loam	No

Source: U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) soil survey data for Fort Bend, Wharton, and Jackson Counties, Texas. URL: <http://soildatamart.nrcs.usda.gov>. Accessed April 2012.

The deep testing methodology for the eight proposed testing locations would be confined to the approximate boundaries of the proposed entry/exit points. The HDD borehole size is anticipated to be approximately 20 to 24-in (51 to 61-cm) in diameter. During pipeline construction, a pit measuring approximately 10-ft by 10-ft (2.6-m by 2.6-m) in areal extent and approximately 4-ft (1.2-m) in depth would be excavated at each HDD entry and exit point to contain drilling muds. Based on this project design, DOE proposes to excavate a 10-ft-long, 4-ft-deep trench, oriented perpendicular to the pipeline corridor, within the planned entry/exit pit at each of the eight deep testing locations. Trenching would be conducted utilizing a rubber-tired or tracked backhoe, depending upon soil and weather conditions, with a smooth (i.e., clean-up) bucket measuring approximately 3-ft (0.9-m) in width. The trenches would be excavated in approximately 6-in (15-cm) intervals to allow for examination of the exposed trench soils and sidewalls. Any exposed archaeological materials and/or subsurface features would be noted and recorded during this procedure and representative soil profiles would be drawn and photographed for each exposed trench face once the maximum depth of 4-ft (1.2-m) is reached.

If the Principal Archaeologist feels that additional depth is required to adequately assess a testing location, the Principal Archaeologist would request that the backhoe excavator excavate deeper in that portion of the trench. However, for health and safety reasons, survey personnel will not enter portions of the trench that are deeper than 4-ft (1.2-m) in depth, but will visually assess the trench wall from the ground surface or an adjacent location. Once observations are completed for each trench, excavated soil would be placed back into the trench and the ground surface returned to preexisting contours. Any encountered cultural features and/or materials will be analyzed and assessed as described in the February 10, 2012, Scope of Work that was reviewed by your office. The results of the deep testing at the eight proposed HDD locations would then be summarized in the Phase I cultural resources report being prepared for the ongoing pipeline corridor investigation.

We hope that the above rationale and trenching methodology address THC's recommendation for deep soil testing. DOE and NRG Energy, Inc., plan to proceed with this work as soon as possible (i.e., beginning around May 1, 2012) and are providing this approach to your office for informational purposes. Should you have any questions regarding the proposed backhoe trenching, please contact Mr. Rob Lackowicz (URS National Historical Preservation Act consultant) at 225-935-2974 or by email at [rob.lackowicz@urs.com](mailto:rob.lackowicz@urs.com). You can also reach me for comment at the address listed on the front page, by telephone at (304) 285-4145, or by email at [mark.lusk@netl.doe.gov](mailto:mark.lusk@netl.doe.gov).

Sincerely,



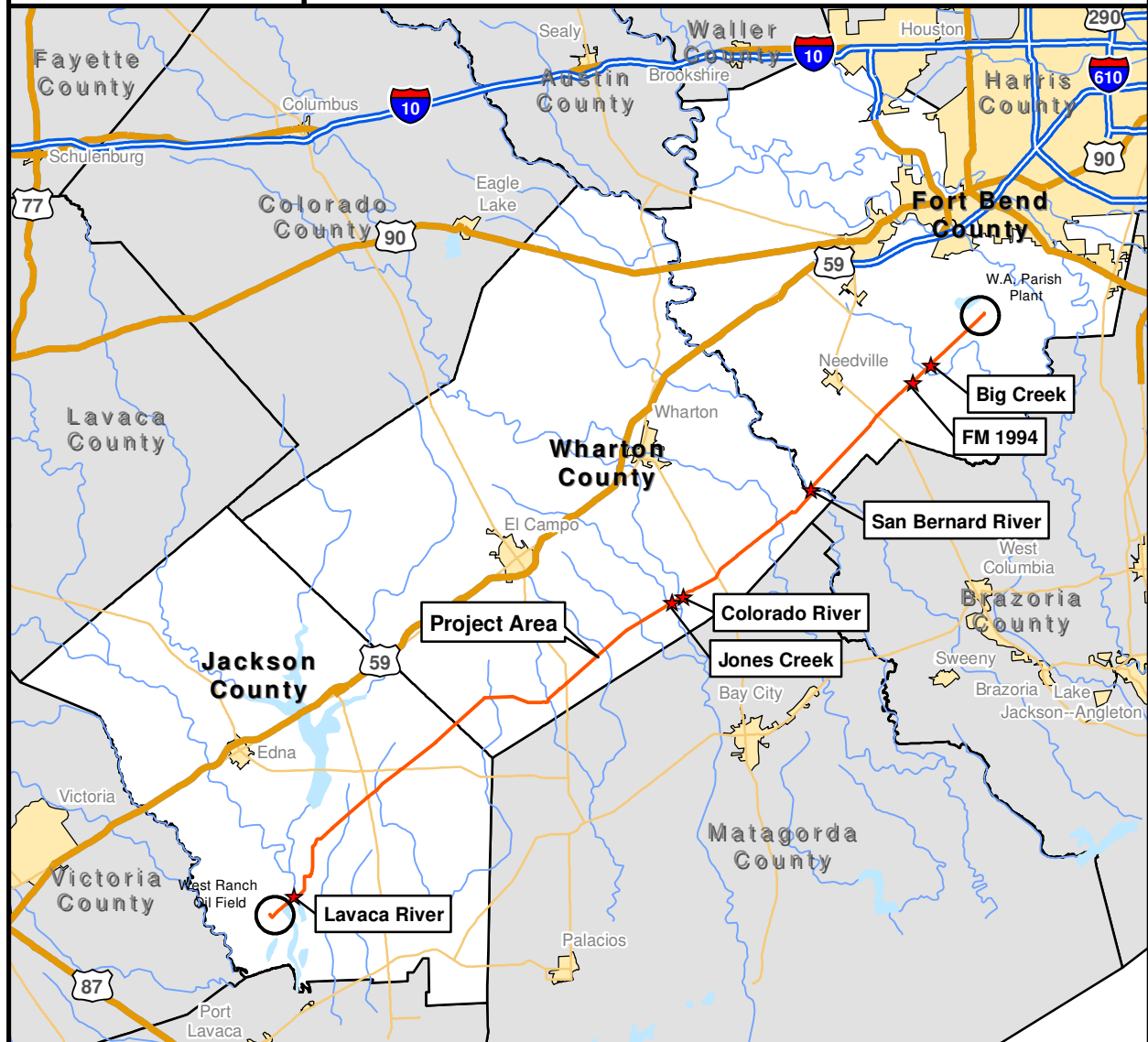
Mark W. Lusk  
NEPA Document Manager/NEPA  
Compliance Officer

Attachment

cc:

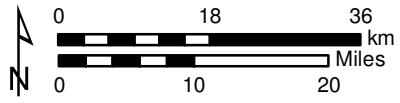
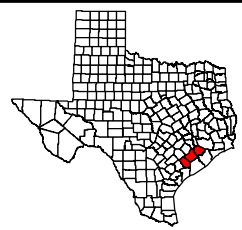
Jeff Durst - THC  
Ted McMahon - DOE  
Jon Barfield - NRG  
Anthony Armpriester - NRG  
Rob Lackowicz - URS  
Martin Handly - URS  
Pete Conwell - URS

# Proposed NRG Energy CO<sub>2</sub> Pipeline



- ★ Proposed HDD Location
- Project Area
- Major River
- Major Lake
- Interstate Highway
- Highway
- Major Road
- Urban Area
- Project County
- Surrounding County

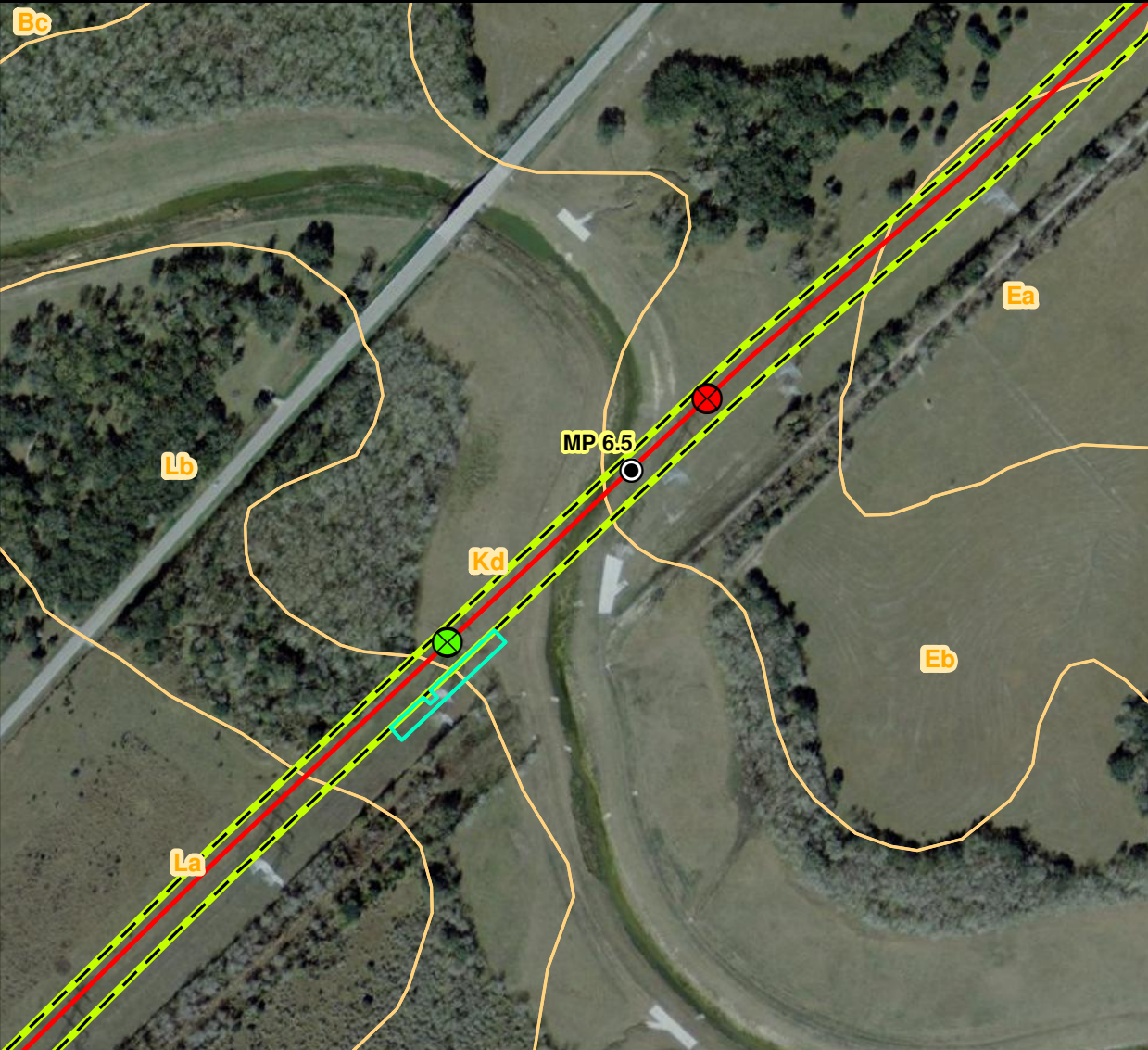
## Locator Map







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UTM Nad 83  
Zone 14

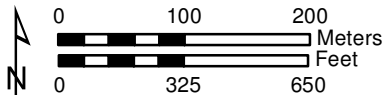
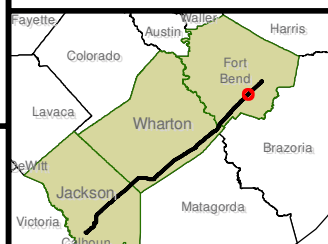
## Overview Map

# NRG W. A. Parish CO<sub>2</sub> Pipeline



-  Proposed HDD Entry
-  Proposed HDD Exit
-  Soil
-  Proposed ATWS
-  Proposed Pipeline Centerline
-  Proposed Pipeline Corridor

## Location Map

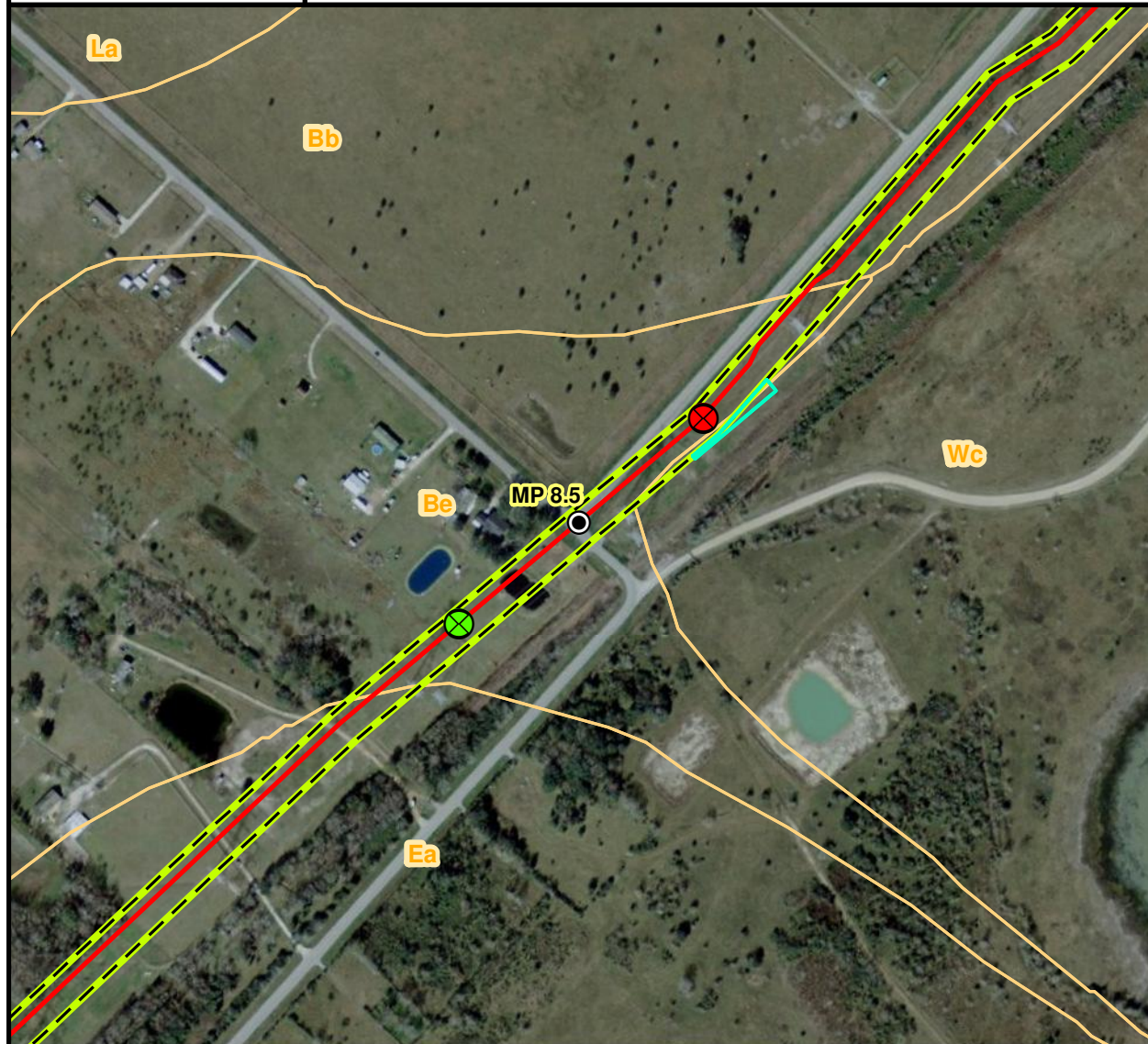






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 UTM Nad 83  
 Zone 14

## Big Creek HDD Entry/ Exit Points

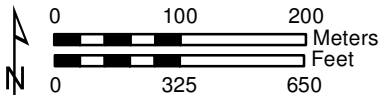
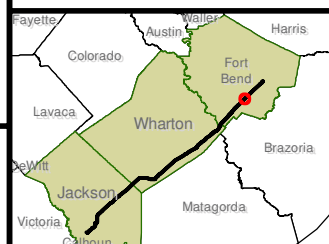


# NRG W. A. Parish CO<sub>2</sub> Pipeline



-  Proposed HDD Entry
-  Proposed HDD Exit
-  Soil
-  Proposed ATWS
-  Proposed Pipeline Centerline
-  Proposed Pipeline Corridor

## Location Map

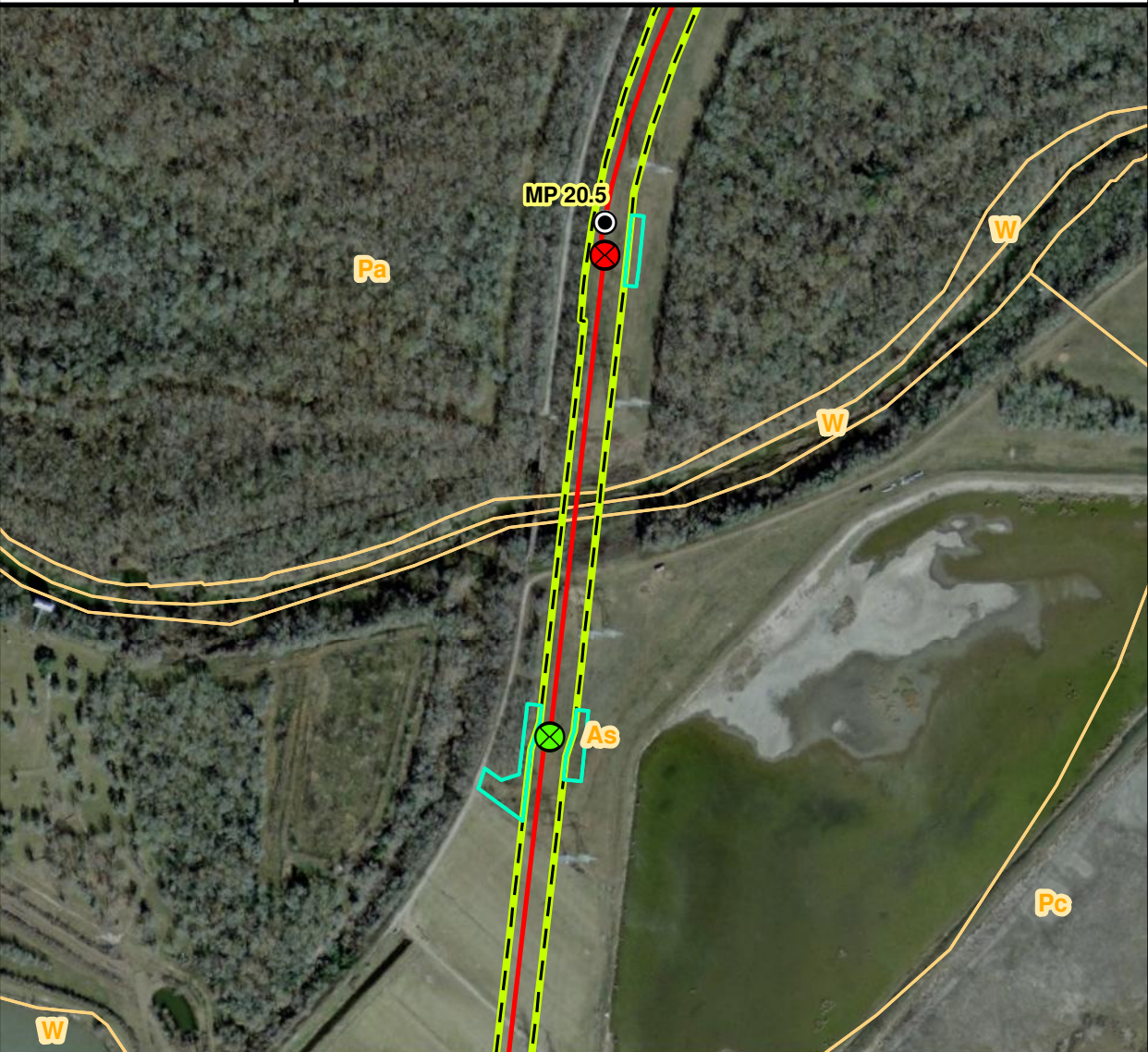





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**FM 1994  
 HDD Entry/  
 Exit Points**



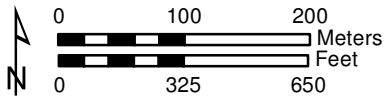
# NRG W. A. Parish CO<sub>2</sub> Pipeline



-  Proposed HDD Entry
-  Proposed HDD Exit
-  Soil

-  Proposed ATWS
-  Proposed Pipeline Centerline
-  Proposed Pipeline Corridor

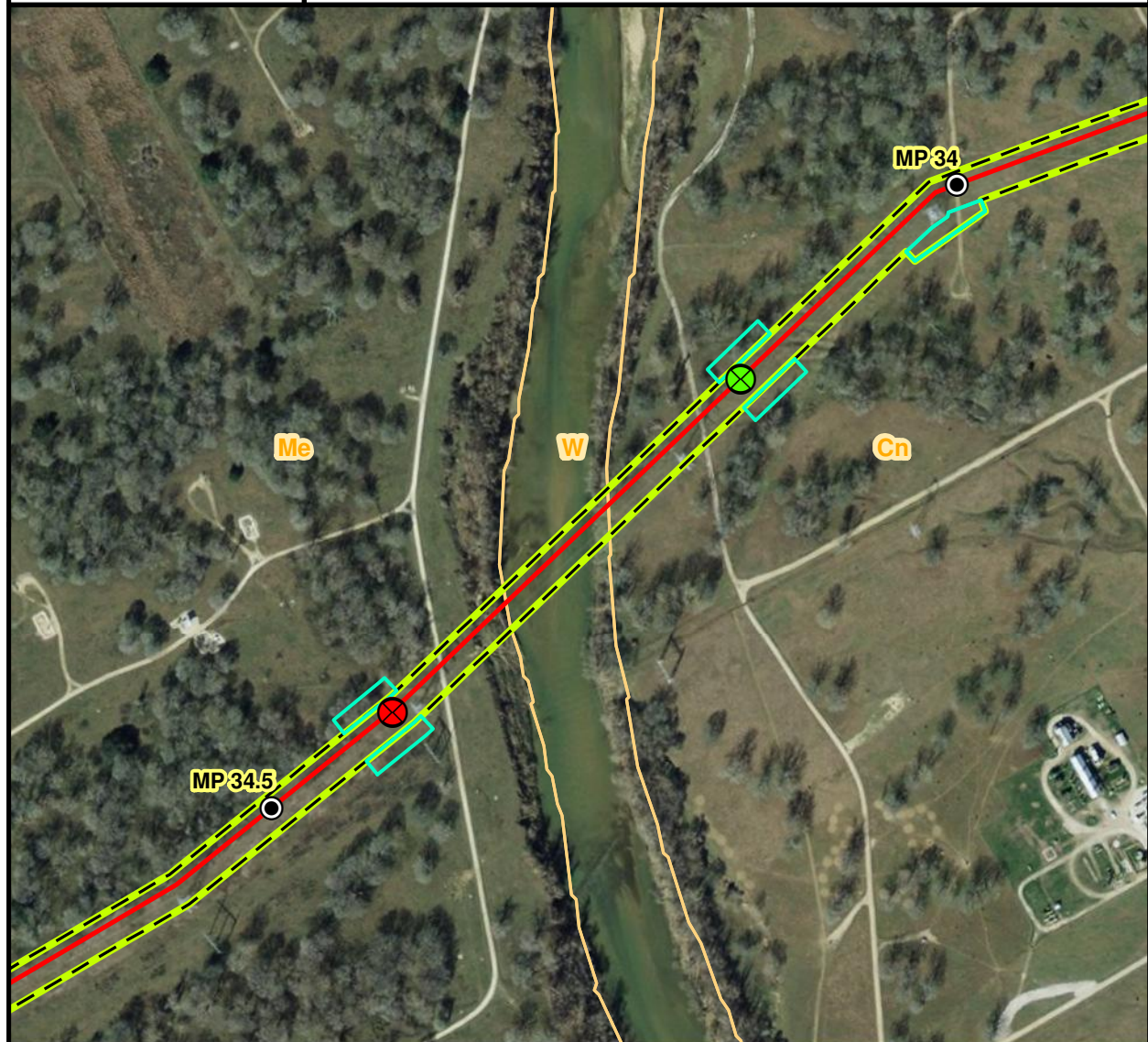
## Location Map






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UTM Nad 83  
Zone 14

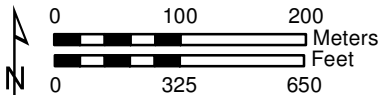
## San Bernard River HDD Entry/ Exit Points

# NRG W. A. Parish CO<sub>2</sub> Pipeline



-  Proposed HDD Entry
-  Proposed HDD Exit
-  Soil
-  Proposed ATWS
-  Proposed Pipeline Centerline
-  Proposed Pipeline Corridor

## Location Map



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 UTM Nad 83  
 Zone 14

## Colorado River HDD Entry/ Exit Points



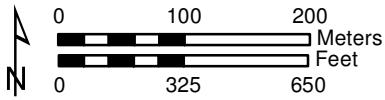
# NRG W. A. Parish CO<sub>2</sub> Pipeline



- Proposed HDD Entry
- Proposed HDD Exit
- Soil

- Proposed ATWS
- Proposed Pipeline Centerline
- Proposed Pipeline Corridor

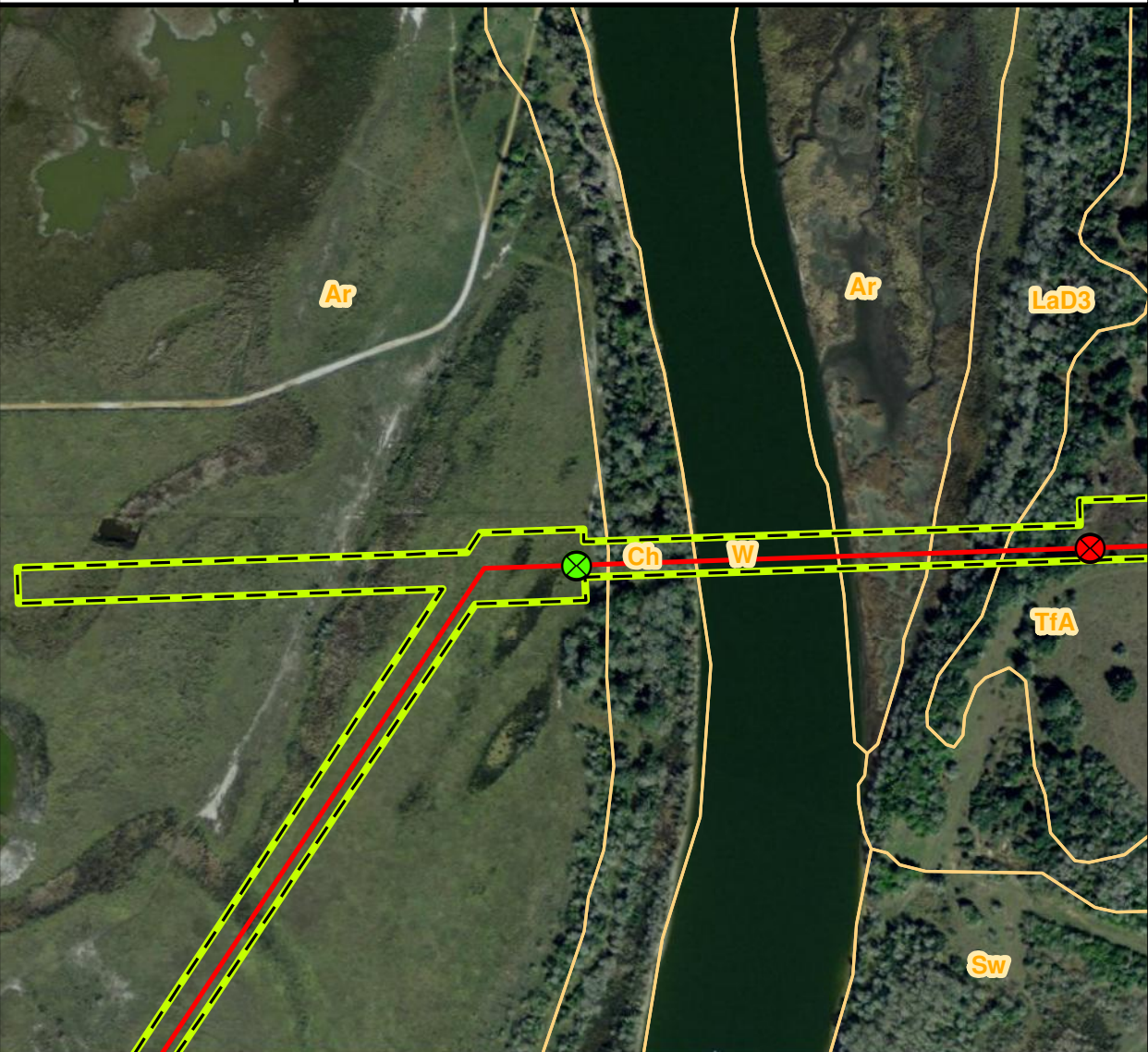
## Location Map









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 Zone 14

## Jones Creek HDD Entry/ Exit Points

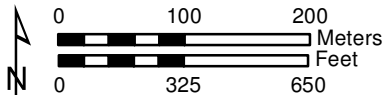
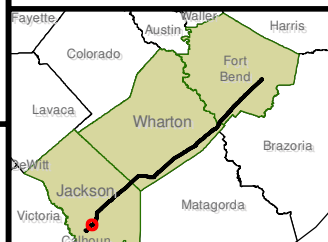
# NRG W. A. Parish CO<sub>2</sub> Pipeline



-  Proposed HDD Entry
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-  Soil

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## Location Map



1:6,000  
UTM Nad 83  
Zone 14

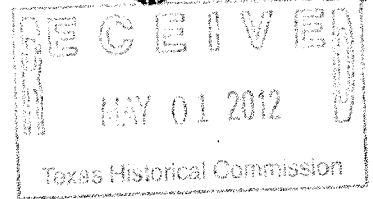
## Lavaca River HDD Entry/ Exit Points





**NATIONAL ENERGY TECHNOLOGY LABORATORY**

Albany, OR • Morgantown, WV • Pittsburgh, PA



April 25, 2012

Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
1511 Colorado St.  
Austin, Texas 78701

**Subject:** Response to Texas Historical Commission Request for Backhoe Trenching; Proposed Phase I Cultural Resources Inventory Scope of Work for the W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project in Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

Dear Mr. Wolfe,

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Sincerely,

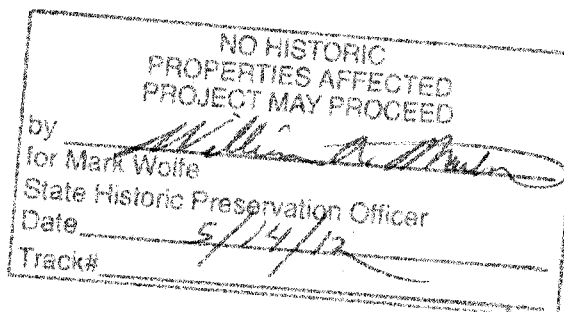


Mark W. Lusk  
NEPA Document Manager/NEPA  
Compliance Officer

Attachment

cc:

Jeff Durst - THC  
Ted McMahon - DOE  
Jon Barfield - NRG  
Anthony Armpriester - NRG  
Rob Lackowicz - URS  
Martin Handly - URS  
Pete Conwell - URS



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June 19, 2012

Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
1511 Colorado Street  
Austin, Texas 78701

Subject: Section 106 Determination for Proposed Project Activities within Previously Developed Lands at the W.A. Parish Plant (Fort Bend County) and West Ranch Oil Field (Jackson County) for the W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project

Dear Mr. Wolfe:

This letter supplements my earlier communication to your office, dated February 10, 2012, regarding the above-referenced project proposed by NRG Energy (NRG). The U.S. Department of Energy's (DOE) proposed action would provide NRG with a cost-shared award for the project. DOE is currently preparing a draft environmental impact statement (EIS) to comply with the *National Environmental Policy Act of 1969* (NEPA). DOE also intends to coordinate its obligations under Section 106 of the *National Historic Preservation Act of 1966* (NHPA) with the NEPA process.

NRG's proposed project would include the following four primary components:

1. *Carbon Dioxide (CO<sub>2</sub>) Capture Facility*

The proposed project would construct a post-combustion CO<sub>2</sub> capture system to treat a slipstream from one of the W.A. Parish Plant's existing coal-fueled units (Unit 8). A new natural gas-fired cogeneration plant, estimated to be 80-megawatts in size, would also be constructed to produce the auxiliary power needed to drive the proposed CO<sub>2</sub> capture system. These activities would occur within the existing 4,880-acre W.A. Parish Plant site.

2. *CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new, approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly sparsely developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. Currently, NRG plans to collocate the pipeline within expanded or existing mowed/maintained utility rights-of-way (ROW) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical for approximately 85 percent of the route. New ROW would be used for the remaining 15 percent.

3. *Enhanced Oil Recovery (EOR) Operations*

Up to 1.6 million tons of CO<sub>2</sub> per year would be delivered to the existing West Ranch oil field, located in Jackson County. The CO<sub>2</sub> would be injected into the 98-A, 41-A, and Greta sand units of the Frio Formation, which lie approximately 5,000 to 6,300-feet below ground surface. The oil field has operated since 1938 and the portions of the West Ranch oil field in which EOR operations would be conducted are currently owned or leased by Hilcorp Energy Company (HEC). A joint venture

between NRG and HEC, known as Texas Coastal Ventures LLC (TCV), would conduct the EOR operations. TCV would also operate the pipeline.

#### 4. *CO<sub>2</sub> Monitoring Program*

TCV would implement a program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the West Ranch oil field EOR area. The CO<sub>2</sub> monitoring program may consist of a variety of monitoring and modeling activities.

The proposed pipeline route listed above as Project Component 2 is currently being assessed through a Phase I cultural resource field investigation. DOE expects the results of that survey to be reported to you in the near future for separate comment. The results will also be summarized in the draft EIS.

Project Components 1, 3 and 4, as listed above, are described further in the enclosed document to afford the Texas Historical Commission a reasonable opportunity to comment before the draft EIS is issued. Given the level of existing land disturbance and the types of activities to be conducted as part of these project components, it is the opinion of DOE that the activities proposed to occur within these two project areas (i.e., the W.A. Parish Plant and the West Ranch oil field) will not impact historic properties meeting the criteria of significance for listing on the National Register of Historic Places. Please reply whether your office concurs with this determination of No Historic Properties Present or Affected. Again, please refer to the attached enclosure for more details regarding the background and proposed activities at these two locations.

Should you have any technical questions regarding the enclosed letter report, please contact Mr. Martin Handly (NHPA consultant-URS Group, Inc.) at (225) 276-4826 or by email at martin.handly@urs.com. You can also reach me for comment by email at mark.lusk@netl.doe.gov, by telephone at (304) 285-4145, or at the address listed on the front page.

Sincerely,



Mark W Lusk  
NEPA Document Manager/NEPA Compliance  
Officer

Enclosure

cc: J. Barfield - NRG  
A. Armpriester - NRG  
T. McMahon - DOE  
M. Handly - URS  
Rob Lackowicz - URS  
Pete Conwell - URS



June 18, 2012

Mark W. Lusk  
NEPA Document Manager  
3610 Collins Ferry Road  
P.O. Box 880  
Morgantown, West Virginia 26507

**Re: NRG Energy W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project;  
W.A. Parish Plant (Fort Bend County) and West Ranch Oil Field (Jackson County) -  
Assessment of Project Activities Impacting Historic Properties.**

Dear Mr. Lusk:

The purpose of this letter is to communicate the results of an evaluation of the W.A. Parish Plant in Fort Bend County and the West Ranch oil field in Jackson County (Figure 1) for their potential to contain and impact significant cultural resources, defined as historic properties under Section 106 of the National Historic Preservation Act (NHPA) and the National Register of Historic Places (NRHP) criteria for evaluation (36 CFR Part 800 and 36 CFR 60.4). Section 106 of the NHPA, as amended, requires the lead federal agency with jurisdiction over an undertaking to consider impacts to historic properties before the undertaking occurs. In this case, the undertaking is the U.S. Department of Energy's (DOE's) proposed financial assistance grant to NRG for the W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project (project), under the American Recovery and Reinvestment Act of 2009.

### **Project Introduction**

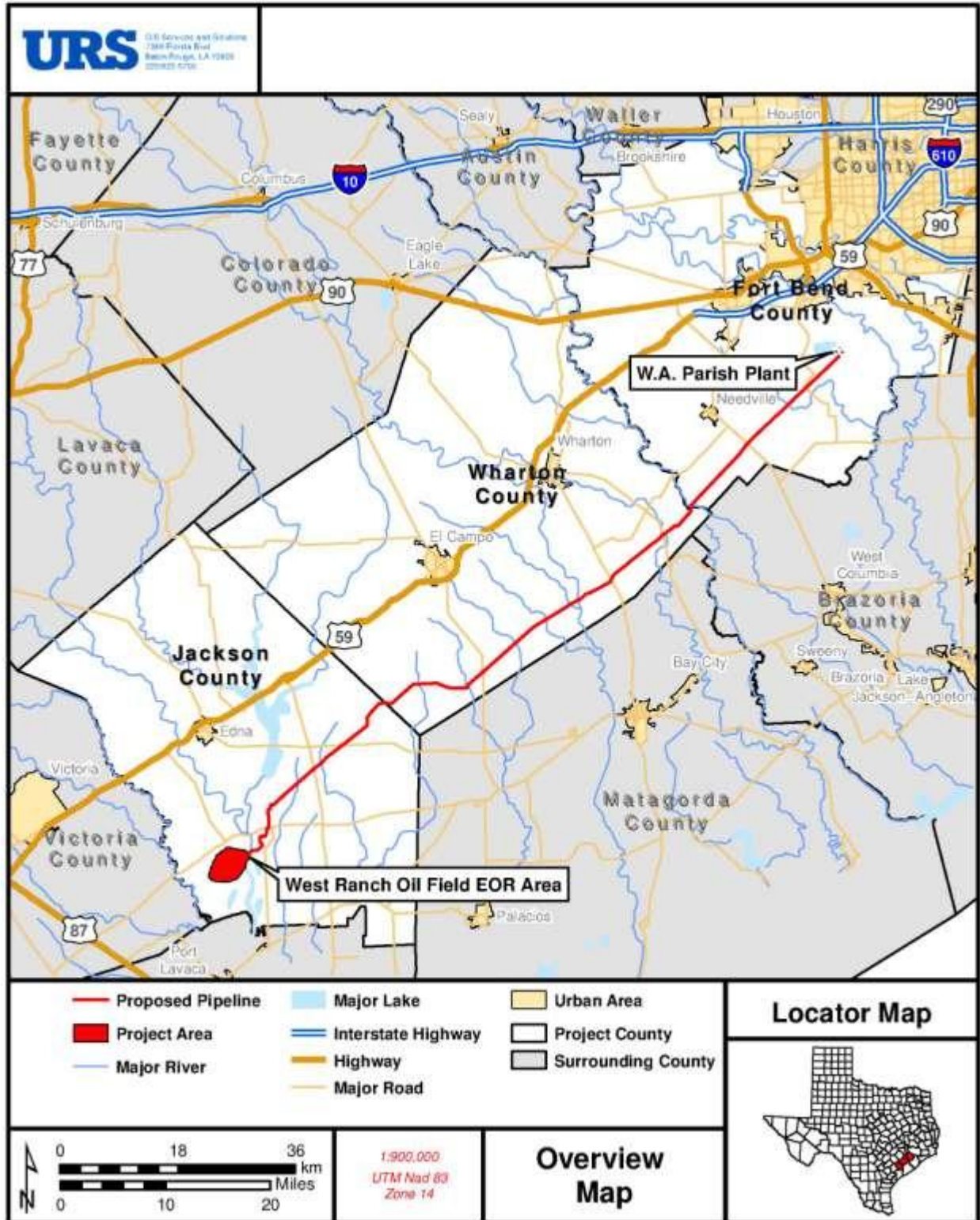
Under the American Recovery and Reinvestment Act of 2009, the DOE has made funding available for certain large-scale carbon dioxide (CO<sub>2</sub>) capture and storage projects. With DOE's cost-shared support, NRG Energy (NRG) proposes to capture CO<sub>2</sub> at NRG's existing W.A. Parish Plant in Fort Bend County, Texas. The captured CO<sub>2</sub> would be delivered via an approximately 80-mile pipeline to the West Ranch oil field in Jackson County, Texas where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. NRG's proposed project would demonstrate an integrated commercial-scale deployment of post-combustion CO<sub>2</sub> capture technology for use in EOR operations and long-term geologic storage.

The project would use an advanced amine-based absorption technology to capture approximately 90 percent of CO<sub>2</sub> annually (i.e., approximately 1.6 million tons of CO<sub>2</sub> per year) from a 250-megawatt equivalent (MWe) flue gas slip stream taken from the 650 megawatt (MW) Unit 8 at the W.A. Parish Plant. Up to 5,475 tons per day of captured CO<sub>2</sub> would be dried, compressed, and transported via pipeline to the West Ranch oil field where it would be used in EOR operations. The primary components of the project include the following:

#### *1. CO<sub>2</sub> Capture Facility*

The proposed project would retrofit one of the W.A. Parish Plant's existing coal-fueled units (Unit 8) with a post-combustion CO<sub>2</sub> capture system that would be constructed within the existing 4,880-acre W.A. Parish Plant. A new natural gas-fired cogeneration plant, estimated to be 80 MW in size, would be constructed to produce the auxiliary power needed to drive the proposed CO<sub>2</sub> capture system.

**Figure 1. Overview Map of NRG Energy W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project**



## 2. *CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new, approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly rural and sparsely-developed agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. NRG plans to use existing mowed/maintained utility rights-of-way (ROWs) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical.

## 3. *EOR Operations*

The proposed project would deliver up to 1.6 million tons of CO<sub>2</sub> per year to the existing West Ranch oil field, located in Jackson County, where the CO<sub>2</sub> would be injected through injection wells into the 98-A, 41-A, and Greta sand units of the Frio Formation, which lie approximately 5,000 to 6,300 feet below ground surface (bgs). The oil field has operated since 1938 and the portions of the West Ranch oil field in which EOR operations would be conducted are currently owned or leased by Hilcorp Energy Company (HEC). A joint venture between NRG and HEC, known as Texas Coastal Ventures LLC (TCV), would conduct the EOR operations. TCV would also operate the pipeline.

## 4. *CO<sub>2</sub> Monitoring Program*

TCV would implement a CO<sub>2</sub> monitoring program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the West Ranch oil field EOR area. The CO<sub>2</sub> monitoring program may consist of a variety of monitoring and modeling activities.

The pipeline portion of this project, listed above as Project Component 2, was referred to the THC for evaluation on February 10, 2012 and is currently being assessed by URS Group (URS) through a Phase I cultural resource field investigation. The results of that survey will be reported to the DOE, THC and applicable Native American Tribes upon its completion. This letter report examines project activities anticipated within the W.A. Parish Plant (i.e., Project Component 1) and West Ranch oil field (i.e., Project Components 3 and 4).

### **Description of Project Areas**

#### **CO<sub>2</sub> Capture Facility, W.A. Parish Plant, Fort Bend County**

The W.A. Parish Plant is located in Thompsons, Texas along the southeast shore of Smithers Lake, a 2,430-acre man-made water body used for plant cooling water. The CO<sub>2</sub> capture facility includes the following nine project components, totaling approximately 29 acres in extent, all of which lie within the boundaries of the existing W.A. Parish Plant (Figures 2 and 3): North Laydown Area (8.8 acres); South Laydown Area (13 acres); CO<sub>2</sub> Capture Area (3.3 acres); Warehouse (1.6 acres); Road Relocation (0.83 acres); 138kV Switchyard (0.23 acres); CO<sub>2</sub> Compressor (0.20 acres); Combustion Turbine/Heat Recovery Steam Generator (CT/HRSG) (0.44 acres); Pipe Rack (0.07 acres); Rail Unloading Area (0.26 acres); and Flue Tank and Dump (0.01 acres). The Area of Potential Effect (APE) associated with the CO<sub>2</sub> capture facility is defined as the 29 acres within these proposed project areas. All of the above listed project components are situated within lands that have been disturbed by ongoing power generating operations, including leveling, road construction, and building construction.

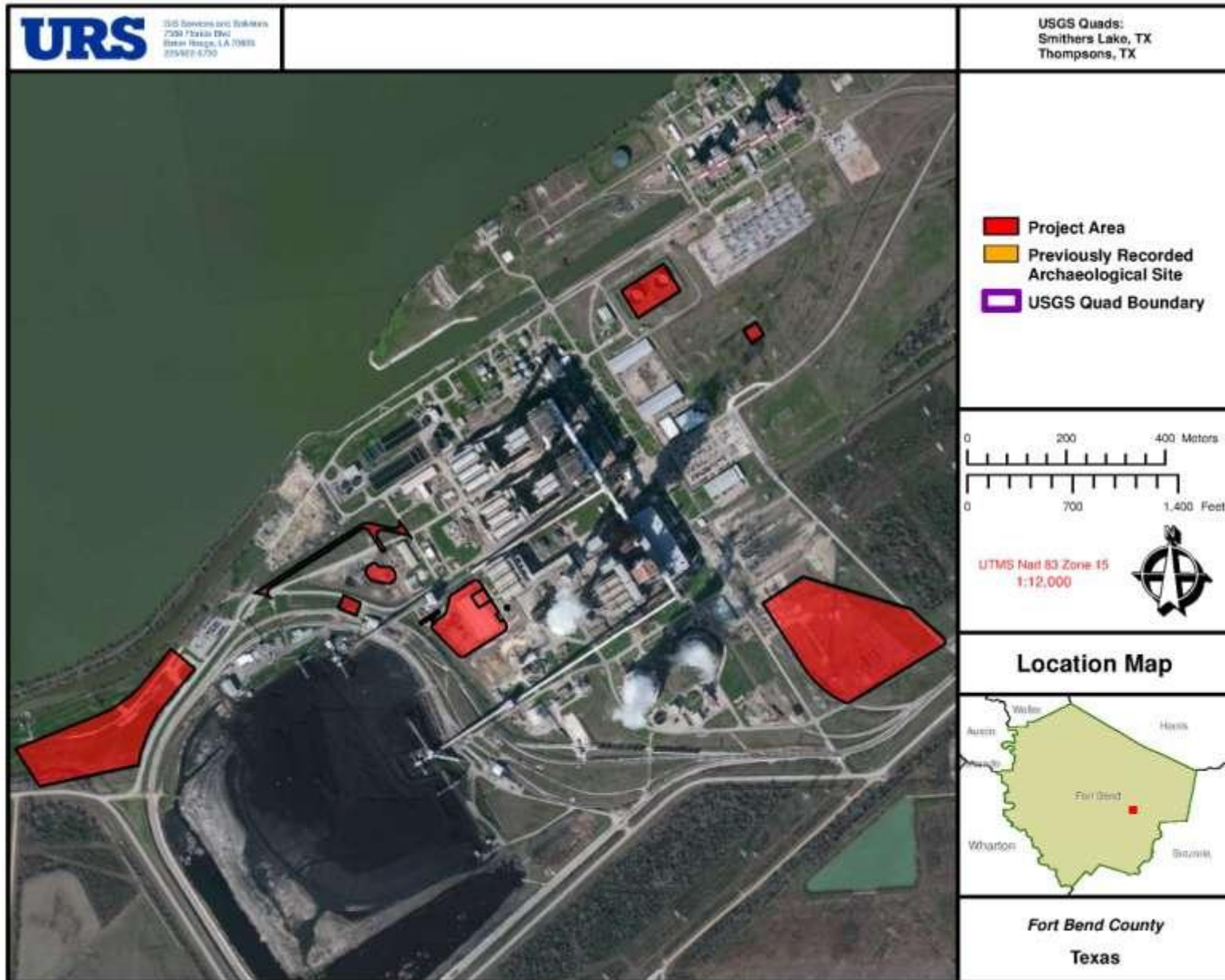
A review was conducted by URS on May 17, 2012 of data on file at the THC via the online Texas Archeological Sites Atlas, along with the online records of the NRHP. This research was undertaken to identify previously completed cultural resources surveys and cultural resources recorded within one mile (1.6 km) of the proposed project activities. According to these sources, no State Archeological Landmarks, Texas Historic Landmarks, National Register historic buildings or historic structures have been identified within one mile (1.6 km) of the W.A. Parish Plant.

**Figure 2. Topographic Map – Proposed W.A. Parish Plant Project Areas**

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CONFIDENTIAL INFORMATION



Figure 3. Aerial Overview – Proposed W.A. Parish Plant Project Areas



Three prehistoric lithic artifact scatters (Sites 41FB225, 41FB226, and 41FB227) are situated within one mile (1.6 km) of the W.A. Parish Plant (Figure 3). They were recorded between 1994 and 1995 by the Fort Bend Archaeological Society and these sites are positioned along the southern shore of Smithers Lake (Site 41FB225) and Dry Creek/Rabbs Bayou (Sites 41FB226 and 41FB227). However, none of these sites was considered eligible for listing in the NRHP.

#### EOR Operations and CO<sub>2</sub> Monitoring Program, West Ranch Oil Field, Jackson County

The West Ranch oil field is located roughly 3.2 miles south of the community of Vanderbilt, between Venado Creek (west) and the Lavaca River (east), within Jackson County (Figures 4a to 4d and 5a to 5d). HEC currently operates the West Ranch oil field, which was first developed in 1938. The oil field covers approximately 11,500 acres, but only 5,500 acres are currently targeted for EOR operations, as shown in Figures 4 and 5. The CO<sub>2</sub> generated by the proposed project would be injected by TCV within the West Ranch oil field. The project will involve a CO<sub>2</sub> monitoring program, which will be carried out by TCV.

The currently defined locations of any active, inactive, temporarily abandoned, and/or plugged and abandoned wells are shown for the West Ranch oil field in Figure 5. Numerous unused wells are available for conversion and use as part of EOR or CO<sub>2</sub> monitoring operations. Existing wells that are unable to accommodate the pressure increase from the CO<sub>2</sub> injection will be remediated by TCV prior to initiating CO<sub>2</sub> injection.

At this time, all of the CO<sub>2</sub> monitoring program activities are expected to be limited to existing drilled well sites and therefore minimal to no new land impacts are expected for this phase of the NRG project. Also, approximately 130 existing injection wells and 130 existing production wells may be utilized, with approximately 10 to 13 monitoring wells being utilized in the CO<sub>2</sub> monitoring program (i.e., one monitoring well for every 10 to 15 injection wells). In general, existing wells would be utilized (i.e., refurbished or deepened as needed) to the extent practicable, so that few new injection, production, or monitoring wells would be needed. New wells, if required, would be installed on existing well pads to the extent practicable. Existing roads would be used to the extent practical to access EOR and CO<sub>2</sub> monitoring areas within the West Ranch Oil Field; therefore, no new road construction is currently anticipated. Finally, any new CO<sub>2</sub> distribution piping would be installed, to the extent practicable, along the existing piping corridors. The APE associated with the West Ranch oil field is defined as the proposed 5,500-acre EOR area shown on Figures 4 and 5.

A review of the online Texas Archeological Sites Atlas and NRHP was performed by URS on May 17, 2012. This research was undertaken to identify previously completed surveys and cultural resources in proximity to the proposed project activities. According to these sources, no State Archeological Landmarks, Texas Historic Landmarks, National Register historic buildings or historic structures have been identified within one mile (1.6 km) of the West Ranch oil field.

A total of 14 archaeological sites have been identified within one mile (1.6 km) of the West Ranch oil field (i.e., Sites 41JK2, 41JK35, 41JK38, 41JK39, 41JK61 to 41JK63, 41JK114, 41JK115, 41JK126, 41JK127, 41JK129, 41JK138, and 41JK139), as shown in Figure 5. The majority of these sites appear to be prehistoric lithic and ceramics scatters situated along the Lavaca River Bluff (eight sites), Venado Creek (three sites), Menefee Lake (two sites), and Redfish Lake (one site). Four of these sites were considered Not Eligible for listing in the NRHP (i.e., sites 41JK115, 41JK126, 41JK127, and 41JK139) and an additional four sites did not provide any information concerning their eligibility (i.e., 41JK2, 41JK35, 41JK38, and 41JK39). The remaining six sites (i.e., 16JK61, 16JK62, 16JK63, 16JK114, 16JK129, and 16JK138) were recommended for additional testing to determine their eligibility status by the previous researchers.



**Figure 4a. Topographic Map – Proposed West Ranch Oil Field EOR Area**

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**Figure 4b. Topographic Map – Proposed West Ranch Oil Field EOR Area**

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**Figure 4c. Topographic Map – Proposed West Ranch Oil Field EOR Area**

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**Figure 4d. Topographic Map – Proposed West Ranch Oil Field EOR Area**

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**Figure 5a. Aerial Overview – Proposed West Ranch Oil Field EOR Area**

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**Figure 5b. Aerial Overview – Proposed West Ranch Oil Field EOR Area**

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**Figure 5c. Aerial Overview – Proposed West Ranch Oil Field EOR Area**

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**Figure 5d. Aerial Overview – Proposed West Ranch Oil Field EOR Area**

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In addition, a further nine archaeological sites have been identified within the boundary of the West Ranch oil field (i.e., Sites 41JK128 and 41JK130 to 41JK137), as shown in Figure 5. Most of these sites (i.e., eight sites) are located along the boundaries of Venado Creek, with a single site associated with Menefee Bayou (i.e., Site 16JK128). All of these sites are identified as prehistoric lithic scatters, except for Site 16JK128, which also contained prehistoric ceramics. None of the site forms provided information on their eligibility for listing in the NRHP.


### **Findings and Recommendation**

URS has conducted an office review of the potential for the proposed project areas at the W.A. Parish Plant in Fort Bend County and the West Ranch oil field located in Jackson County, Texas to contain and impact historic properties as defined under Section 106 of the NHPA. A records review found that no historic properties are currently plotted within the project areas.

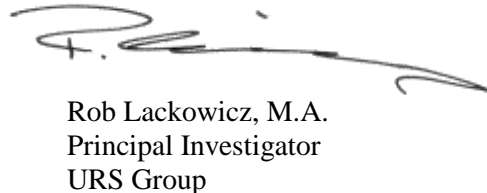
Based on a review of the proposed project activities and their locations, it is our opinion that a very low likelihood exists of unrecorded historic properties being situated within the Areas of Potential Effect associated with these two proposed project areas. This opinion for the W.A. Parish Plant is based on the level of existing ground disturbance within this operating facility, which includes extensive grading as well as facility, road, and building construction. For the West Ranch oil field, our opinion is based on project plans that anticipate re-using existing well sites for the proposed monitoring program; therefore, little to no new land impacts are expected. To the extent practicable, any proposed new wells would be installed on existing well pads, existing built roads would be used to access EOR and CO<sub>2</sub> monitoring areas, and any new CO<sub>2</sub> distribution piping would be installed along the pre-existing piping corridors. We therefore recommend that no further archaeological or architectural studies are warranted for these project components as currently defined. If additional rights-of-way for new well pads, access roads, or CO<sub>2</sub> distribution piping are required within the West Ranch oil field for this undertaking, beyond what has already been disturbed, TCV would initiate consultation with the THC to determine whether any further cultural resources investigations would be necessary.

If you have any questions or concerns regarding this study, please do not hesitate to contact Mr. Martin Handly at 225-276-4826 or by email at martin.handly@urs.com.

Sincerely,

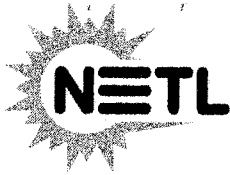


Martin Handly, M.A.  
Principal Investigator  
URS Group

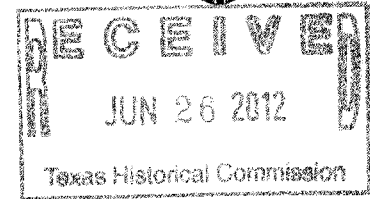


Rob Lackowicz, M.A.  
Principal Investigator  
URS Group

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June 19, 2012



Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
1511 Colorado Street  
Austin, Texas 78701

Subject: Section 106 Determination for Proposed Project Activities within Previously Developed Lands at the W.A. Parish Plant (Fort Bend County) and West Ranch Oil Field (Jackson County) for the W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project

Dear Mr. Wolfe:

This letter supplements my earlier communication to your office, dated February 10, 2012, regarding the above-referenced project proposed by NRG Energy (NRG). The U.S. Department of Energy's (DOE) proposed action would provide NRG with a cost-shared award for the project. DOE is currently preparing a draft environmental impact statement (EIS) to comply with the *National Environmental Policy Act of 1969* (NEPA). DOE also intends to coordinate its obligations under Section 106 of the *National Historic Preservation Act of 1966* (NHPA) with the NEPA process.

NRG's proposed project would include the following four primary components:

1. *Carbon Dioxide (CO<sub>2</sub>) Capture Facility*

The proposed project would construct a post-combustion CO<sub>2</sub> capture system to treat a slipstream from one of the W.A. Parish Plant's existing coal-fueled units (Unit 8). A new natural gas-fired cogeneration plant, estimated to be 80-megawatts in size, would also be constructed to produce the auxiliary power needed to drive the proposed CO<sub>2</sub> capture system. These activities would occur within the existing 4,880-acre W.A. Parish Plant site.

2. *CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new, approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly sparsely developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. Currently, NRG plans to collocate the pipeline within expanded or existing mowed/maintained utility rights-of-way (ROW) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical for approximately 85 percent of the route. New ROW would be used for the remaining 15 percent.

3. *Enhanced Oil Recovery (EOR) Operations*

Up to 1.6 million tons of CO<sub>2</sub> per year would be delivered to the existing West Ranch oil field, located in Jackson County. The CO<sub>2</sub> would be injected into the 98-A, 41-A, and Greta sand units of the Frio Formation, which lie approximately 5,000 to 6,300-feet below ground surface. The oil field has operated since 1938 and the portions of the West Ranch oil field in which EOR operations would be conducted are currently owned or leased by Hilcorp Energy Company (HEC). A joint venture

between NRG and HEC, known as Texas Coastal Ventures LLC (TCV), would conduct the EOR operations. TCV would also operate the pipeline.

#### 4. CO<sub>2</sub> Monitoring Program

TCV would implement a program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the West Ranch oil field EOR area. The CO<sub>2</sub> monitoring program may consist of a variety of monitoring and modeling activities.

The proposed pipeline route listed above as Project Component 2 is currently being assessed through a Phase I cultural resource field investigation. DOE expects the results of that survey to be reported to you in the near future for separate comment. The results will also be summarized in the draft EIS.

Project Components 1, 3 and 4, as listed above, are described further in the enclosed document to afford the Texas Historical Commission a reasonable opportunity to comment before the draft EIS is issued. Given the level of existing land disturbance and the types of activities to be conducted as part of these project components, it is the opinion of DOE that the activities proposed to occur within these two project areas (i.e., the W.A. Parish Plant and the West Ranch oil field) will not impact historic properties meeting the criteria of significance for listing on the National Register of Historic Places. Please reply whether your office concurs with this determination of No Historic Properties Present or Affected. Again, please refer to the attached enclosure for more details regarding the background and proposed activities at these two locations.

Should you have any technical questions regarding the enclosed letter report, please contact Mr. Martin Handly (NHPA consultant-URS Group, Inc.) at (225) 276-4826 or by email at martin.handly@urs.com. You can also reach me for comment by email at mark.lusk@netl.doe.gov, by telephone at (304) 285-4145, or at the address listed on the front page.

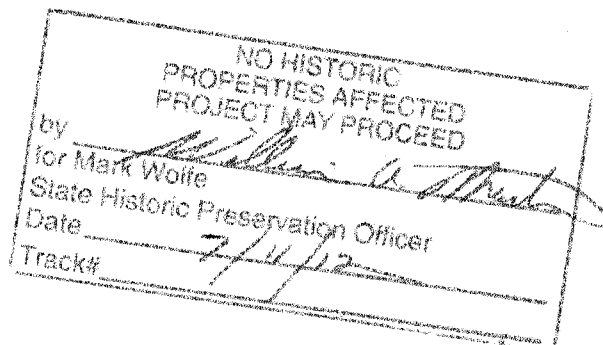
Sincerely,



Mark W Lusk  
NEPA Document Manager/NEPA Compliance  
Officer

Enclosure

cc: J. Barfield - NRG  
A. Armpricster - NRG  
T. McMahon - DOE  
M. Handly - URS  
Rob Lackowicz - URS  
Pete Conwell - URS





August 2, 2012

Mr. Mark Wolfe  
State Historic Preservation Officer  
Texas Historical Commission  
1511 Colorado St.  
Austin, Texas, 78701

Re: Section 106 Determination for Proposed CO<sub>2</sub> Pipeline in Fort Bend, Wharton, and Jackson Counties for the W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project and Submittal of the Draft Phase I Cultural Resources Investigation Report

Dear Mr. Wolfe:

This letter supplements my earlier communication to your office dated June 19, 2012, regarding the above-referenced project proposed by NRG Energy, Inc. (NRG). The U. S. Department of Energy's (DOE) proposed action would provide NRG with a cost-shared award for the project. DOE is currently preparing a draft environmental impact statement (EIS) to comply with the *National Environmental Policy Act of 1969* (NEPA). DOE also intends to coordinate its obligations under Section 106 of the *National Historic Preservation Act of 1966* (NHPA) with the NEPA process.

NRG's proposed project would include the following four primary components:

*1. Carbon Dioxide (CO<sub>2</sub>) Capture Facility*

The proposed project would construct a post-combustion CO<sub>2</sub> capture system to treat a slipstream from one of the W.A. Parish Plant's existing coal-fueled electric generation units (Unit 8). A new natural gas-fired cogeneration plant, estimated to be 80-megawatts in size, would also be constructed to produce the auxiliary electricity and steam needed for the proposed CO<sub>2</sub> capture system. These activities would occur within previously developed areas of the existing 4,880-acre W.A. Parish Plant site in Fort Bend County.

*2. CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new, approximately 80-mile-long pipeline from the W. A. Parish Plant to the West Ranch oil field in Jackson County. The anticipated pipeline route would mostly cross sparsely developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties. Currently, NRG plans to collocate approximately 85 percent of the pipeline within expanded or existing mowed/maintained utility rights-of-way (ROW) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical. New ROW would be used for the remaining 15 percent of the route. A joint venture between NRG and Hilcorp Energy Company (HEC), known as Texas Coastal Ventures LLC (TCV), would operate the pipeline.

*3. Enhanced Oil Recovery (EOR) Operations*

Up to 1.6 million tons of CO<sub>2</sub> per year would be delivered to the existing West Ranch oil field. The CO<sub>2</sub> would be injected into the 98-A, 41-A, Glasscock, and Greta sand units of the Frio Formation, which lie approximately 5,000 to 6,300-feet below ground surface. The oil field has operated since 1938 and the portions of the West Ranch oil field in which EOR operations would be conducted are currently owned or leased by TCV. HEC has been contracted to conduct the EOR operations.

#### 4. CO<sub>2</sub> Monitoring Program

TCV would implement a program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the West Ranch oil field EOR area. The CO<sub>2</sub> monitoring program may consist of a variety of monitoring and modeling activities.

DOE's review of NRG project components 1, 3, and 4 (i.e., activities limited to the W.A. Parish Plant and the West Ranch oil field) were sent to you in my letter on June 19, 2012. On July 11, 2012, your office concurred with the determination of no historic properties affected for these project components and approved proposed project activities to proceed at the W.A. Parish Plant and the West Ranch oil field. The proposed pipeline route, listed as project component 2 above, was assessed through a Phase I cultural resource field investigation that is reported in the attached draft cultural resources investigation report. Results of the report will be summarized in the draft EIS and the full report will be included as an appendix, along with all correspondence with your office.

The backhoe trenching requested by your office in previous correspondence will be conducted within the next month according to the work plan submitted to you on April 25, 2012. Your office approved the work plan on May 14, 2012. DOE will submit the results of that investigation to you as an addendum to the attached report for your review and concurrence once the backhoe trenching activities have been completed.

Given the results of the Phase I cultural resource investigation activities completed to date, it is the opinion of DOE that the activities proposed in project component 2 (i.e., the proposed CO<sub>2</sub> pipeline construction ROW, additional temporary workspace areas, and access roads) would not impact historic properties meeting the criteria of significance for listing on the National Register of Historic Places. Please reply within 30 days whether your office concurs with this determination of No Historic Properties Affected for the surveyed areas.

Should you have any technical questions regarding the enclosed report, please contact Mr. Martin Handly (NHPA consultant-URS Group, Inc.) at (225) 276-4826 or by email at martin.handly@urs.com. You can also reach me for comment by email at mark.lusk@netl.doe.gov, by telephone at (304) 285-4145, or at the address listed on the front page.

Sincerely,



Mark W. Lusk  
NEPA Document Manager/NEPA Compliance  
Officer

Enclosure

#### DISTRIBUTION:

J. Barfield – NRG  
A. Armpriester – NRG  
T. McMahon – NETL/DOE  
M. Handly – URS  
R. Lackowicz – URS  
P. Conwell – URS

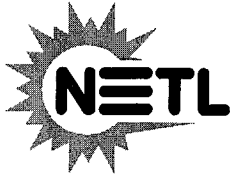
(See EIS Appendix G for a copy of the July 2012  
Phase I Cultural Resources Investigation Draft Report)

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## **C.4 OTHER CONSULTATION**

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February 10, 2012

Rhonda M. Smith  
U.S. Environmental Protection Agency, Region 6  
Chief, Office of Planning and Coordination (6EN-XP)  
1445 Ross Avenue, Suite 1200  
Dallas, Texas 75202

Re: Request for Consultation for the Proposed W.A. Parish Post-Combustion Carbon Capture and Storage Project in Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

To Ms. Smith:

The U.S. Department of Energy (DOE) proposes to provide funding to NRG Energy, Inc. (NRG) and its subsidiary, Petra Nova, LLC, for a project that would capture carbon dioxide (CO<sub>2</sub>) at NRG's W.A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas. The CO<sub>2</sub> would be delivered in a new approximately 80-mile-long pipeline to the West Ranch oil field located near the city of Vanderbilt in Jackson County, Texas, where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. This proposed project, known as the W.A. Parish Post-Combustion Carbon Capture and Storage Project (Project), would demonstrate an integrated commercial-scale deployment of post-combustion CO<sub>2</sub> capture technology for use in EOR operations and long-term geologic storage.

DOE proposes to provide NRG with approximately \$167 million of cost-shared funding, which includes *American Recovery and Reinvestment Act of 2009* (ARRA) funds, to implement the Project. DOE selected the Project for a financial assistance award through a competitive process under the Clean Coal Power Initiative (CCPI) Program. The estimated total project cost is \$845 million.

DOE is preparing an environmental impact statement (EIS) to assess the potential environmental impacts associated with the proposed Project. As part of the *National Environmental Policy Act of 1969* (NEPA) process, DOE will consult with interested federal, state, regional, and local agencies; as well as Native American tribes. As a result, DOE requests consultation with the U.S. Environmental Protection Agency (USEPA) regarding potential environmental impacts or other considerations in the vicinity of the Project.

### **Project Details**

NRG proposes to design, construct, and operate a commercial-scale CO<sub>2</sub> capture facility at its Parish Plant and deliver the CO<sub>2</sub> via an approximately 80-mile-long, 12.75-inch (outside diameter) pipeline to the West Ranch oil field in Jackson County, Texas. The enclosed maps (Attachment 1) illustrate the proposed project areas.

The Project would use an advanced amine-based absorption technology to capture 90 percent (approximately 1.6 million tons) of CO<sub>2</sub> annually from a 240-megawatt (MW) equivalent flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Up to 5,475 tons per day of

captured CO<sub>2</sub> would be dried, compressed, and transported via a new pipeline to the West Ranch oil field where it would be used in EOR operations.

The primary components of the Project include the following:

*1. Carbon Capture Facility*

The proposed Project would retrofit one of the Parish Plant's existing coal-fueled units (Unit 8) with a post-combustion CO<sub>2</sub> capture system that would be constructed within the existing 4,880-acre Parish Plant. A new natural gas-fired combined-cycle power plant, estimated to be 80-MW in size, would be constructed to produce the auxiliary power needed to drive the proposed carbon capture system.

*2. CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly sparsely-developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. The majority (approximately 95 percent) of the planned pipeline route will utilize existing mowed/maintained utility rights-of-ways (ROWs) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical. Although the proposed pipeline will be located within existing ROWs for the majority of its length, NRG may need to review existing landowner agreements along the route to negotiate for widening of the ROW for construction of the pipeline in some areas.

*3. EOR and CO<sub>2</sub> Sequestration*

The proposed Project would deliver up to 1.6 million tons of CO<sub>2</sub> per year to the existing West Ranch oil field, located in Jackson County. The oil field has been in operation since 1938, and Texas Coastal Ventures, LLC, a joint venture between NRG and Hilcorp Energy Company, would conduct the EOR operations.

*4. CO<sub>2</sub> Monitoring, Verification, and Accounting Program*

NRG would implement a monitoring, verification, and accounting (MVA) program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the EOR site. The MVA program must meet specific regulatory and CCPI Program requirements, and may consist of a variety of monitoring and modeling activities.

## **Project Schedule**

NRG plans to start construction of the Project in November 2012 and begin commercial operations (demonstration phase) by 2015. The schedule is contingent on NRG receiving the necessary permits and regulatory approvals, as well as financial closing on all the necessary funding sources, including DOE's financial assistance.

Maps showing the expected footprint for the proposed carbon capture site, the proposed pipeline route, and the existing oil field area are provided in Attachment 1. Biological and cultural

resource surveys along the proposed pipeline route are scheduled between January and March 2012. DOE and NRG have contracted with URS Group, Inc., to provide environmental and cultural resources services to support development of the EIS and other regulatory compliance requirements for the Project.

DOE respectfully requests that the USEPA provide any opinions or site-specific information concerning natural resources or other environmental considerations within the vicinity of the proposed Project in Fort Bend, Wharton, and Jackson Counties. Information provided by the USEPA will assist DOE in the preparation of an EIS and with fulfillment of its regulatory responsibilities under NEPA. DOE also intends to provide your office with a copy of the draft EIS for the Project for review and comment. All correspondence with your office will be included in an appendix to the EIS. We would appreciate your participation and request a response as soon as practical to help us more quickly identify potential issues. You can reach me by email at [mark.lusk@netl.doe.gov](mailto:mark.lusk@netl.doe.gov), by telephone at (304) 285-4145, or at the address listed on the front page with any questions or comments.

Sincerely,



Mark W. Lusk  
NEPA Document Manager / NEPA Compliance  
Officer

Attachment: Project Location Maps

cc:

Jon Barfield - NRG  
Anthony Armpriester - NRG  
Ted McMahon - DOE  
Rob Lackowicz - URS  
Pete Conwell - URS



**Proposed Carbon Capture Area**

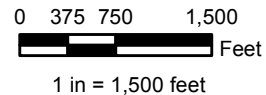
**Fort Bend County**



10550 Richmond, Suite 155  
Houston, TX 77042  
Tel: 713.914.6699  
Fax: 713.789.8404

**Legend**

Proposed Pipeline Route



**Proposed Pipeline Route Map**

**W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project**

Drawn By: AM	Date: 12-16-11	Project No.: 25014860	Figure: 5 of 8
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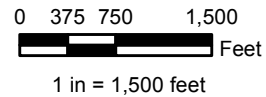
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10550 Richmond, Suite 155  
Houston, TX 77042  
Tel: 713.914.6699  
Fax: 713.789.8404

**Legend**

 Proposed Pipeline Route

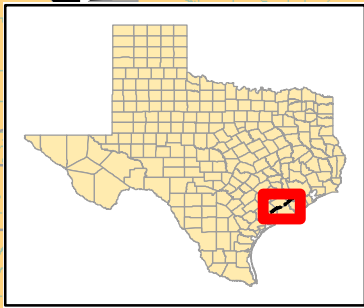


**Proposed Pipeline Route Map**

W.A. Parish Post-Combustion CO<sub>2</sub>  
Capture and Sequestration Project

Drawn By: AM	Date: 12-16-11	Project No.: 25014860	Figure: 7 of 8
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Colorado County

Fort Bend County

Lavaca County

Wharton County

Brazoria County







Jackson County

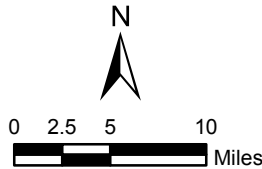
Matagorda County

Victoria County

Calhoun County

**Legend**

-  Proposed Pipeline Route
-  Major Streams / Waterways
-  Major Roads
-  County Lines
-  Streams / Waterways
-  Municipalities



**Location Map**

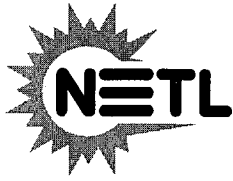
W.A. Parish Post-Combustion CO Capture and Sequestration Project

Drawn By: AM	Date: 12-16-11	Project No.: 25014860	Figure: 1
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**URS**  
10550 Richmond, Suite 155  
Houston, TX 77042  
Tel: 713.914.6699  
Fax: 713.789.8404







February 13, 2012

Johnny Ortega  
Floodplain Administrator  
Fort Bend County Engineering Department  
1124 Blume Road  
Rosenberg, TX 77471-1449

Re: Request for Consultation for Proposed W.A. Parish Post-Combustion Carbon Capture and Storage Project in Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

Dear Mr. Ortega:

The U.S. Department of Energy (DOE) proposes to provide funding to NRG Energy, Inc. (NRG) and its subsidiary, Petra Nova, LLC, for a project that would capture carbon dioxide (CO<sub>2</sub>) at NRG's W.A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas. The CO<sub>2</sub> would be delivered in a new approximately 80-mile-long pipeline to the West Ranch oil field located near the city of Vanderbilt in Jackson County, Texas, where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. This proposed project, known as the W.A. Parish Post-Combustion Carbon Capture and Storage Project (Project), would demonstrate an integrated commercial-scale deployment of post-combustion CO<sub>2</sub> capture technology and use of the CO<sub>2</sub> with EOR operations and long-term geologic storage.

DOE proposes to provide NRG with approximately \$167 million of cost-shared funding, which includes *American Recovery and Reinvestment Act of 2009* funds to help implement the Project in Fort Bend, Wharton, and Jackson Counties, Texas. DOE selected the Project for a financial assistance award through a competitive process under the Clean Coal Power Initiative (CCPI) Program. The estimated total project cost is approximately \$845 million.

DOE is preparing an environmental impact statement (EIS) to assess the potential environmental impacts associated with the proposed Project. As part of the *National Environmental Policy Act of 1969* (NEPA) process, the DOE will consult with interested federal, state, regional, and local agencies; as well as Native American tribes. As a result, NRG requests early consultation with the Fort Bend County floodplain administration regarding your opinion on potential environmental impacts or other considerations in the vicinity of the Project.

### **Project Details**

NRG proposes to design, construct, and operate a commercial-scale CO<sub>2</sub> capture facility at its Parish Plant and deliver the CO<sub>2</sub> via an approximately 80-mile-long, 12.75-inch (outside diameter) pipeline to the West Ranch oil field in Jackson County, Texas.

The Project would use an advanced amine-based absorption technology to capture 90 percent (approximately 1.6 million tons) of CO<sub>2</sub> annually from a 240-megawatt (MW) equivalent flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Up to 5,475 tons per day of captured CO<sub>2</sub> would be dried, compressed, and transported via a new pipeline to the West Ranch oil field where it would be used in EOR operations.

The primary components of the Project include the following:

1. *Carbon Capture Facility*

The proposed Project would retrofit one of the Parish Plant's existing coal-fueled units (Unit 8) with a post-combustion CO<sub>2</sub> capture system that would be constructed within the existing 4,880-acre Parish Plant. A new natural gas-fired combined-cycle power plant, estimated to be 80-MW in size, would be constructed to produce the auxiliary power needed to drive the proposed carbon capture system.

2. *CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly sparsely-developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. The majority (approximately 95 percent) of the planned pipeline route will utilize existing mowed/maintained utility rights-of-ways (ROWs) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical. Although the proposed pipeline would be located within existing ROWs for the majority of its length, NRG may need to review existing landowner agreements along the route to negotiate for widening of the ROW for construction of the pipeline in some areas.

3. *EOR and CO<sub>2</sub> Sequestration*

The proposed Project would deliver up to 1.6 million tons of CO<sub>2</sub> per year to the existing West Ranch oil field, located in Jackson County. The oil field has been in operation since 1938, and Texas Coastal Ventures, LLC, a joint venture between NRG and Hilcorp Energy Company, would conduct the EOR operations.

4. *CO<sub>2</sub> Monitoring, Verification, and Accounting Program*

NRG would implement a monitoring, verification, and accounting (MVA) program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the EOR site. The MVA program must meet specific regulatory and CCPI Program requirements, and may consist of a variety of monitoring and modeling activities.

## **Project Schedule**

NRG plans to start construction of the Project in November 2012 and begin the demonstration phase of commercial operations by 2015. The schedule is contingent on NRG receiving the necessary permits and regulatory approvals, as well as financial closing on all the necessary funding sources, including DOE's financial assistance.

Maps showing the expected footprint for the proposed carbon capture site, the proposed pipeline route, and the existing oil field area are provided in Attachment 1. Biological and cultural resource surveys along the proposed pipeline route are scheduled between January and March 2012. DOE and NRG have contracted with URS Group, Inc., to provide environmental and cultural resources services to support development of the EIS and other regulatory compliance requirements for the Project.

DOE respectfully requests that the Fort Bend County Floodplain Administration provide any opinions or site-specific information concerning the proposed Project's potential floodplain and related environmental impacts within Fort Bend County. The information provided will assist DOE in the preparation of an EIS. DOE also intends to provide a copy of the draft EIS for the Project to your office for review and comment. All correspondence with your office will be included in an appendix to the EIS.

DOE would appreciate your participation and requests a response as soon as practical to help identify potential floodplain impacts in the vicinity of the Project. You can reach me for comment by email at [mark.lusk@netl.doe.gov](mailto:mark.lusk@netl.doe.gov), by telephone at (304) 285-4145, or at the address listed on the front page.

Sincerely,



Mark W. Lusk  
NEPA Document Manager / NEPA Compliance  
Officer

Attachment: Project Location Maps

cc:

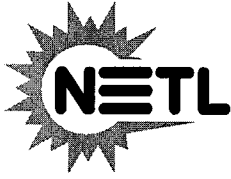
Jon Barfield - NRG

Anthony Armpriester - NRG

Ted McMahon - DOE

Pete Conwell - URS

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February 13, 2012

Floodplain Administration  
Jackson County Permit & Inspection Department  
115 West Main St. RM 104  
Edna, TX 77957

Re: Request for Consultation for Proposed Petra Nova W.A. Parish Post-Combustion Carbon Capture and Storage Project in Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

To Whom It May Concern:

The U.S. Department of Energy (DOE) proposes to provide funding to NRG Energy, Inc. (NRG) and its subsidiary, Petra Nova, LLC, for a project that would capture carbon dioxide (CO<sub>2</sub>) at NRG's W.A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas. The CO<sub>2</sub> would be delivered in a new approximately 80-mile-long pipeline to the West Ranch oil field located near the city of Vanderbilt in Jackson County, Texas, where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. This proposed project, known as the W.A. Parish Post-Combustion Carbon Capture and Storage Project (Project), would demonstrate an integrated commercial-scale deployment of post-combustion CO<sub>2</sub> capture technology and use of the CO<sub>2</sub> with EOR operations and long-term geologic storage.

DOE proposes to provide NRG with approximately \$167 million of cost-shared funding, which includes *American Recovery and Reinvestment Act of 2009* funds to help implement the Project in Fort Bend, Wharton, and Jackson Counties, Texas. DOE selected the Project for a financial assistance award through a competitive process under the Clean Coal Power Initiative (CCPI) Program. The estimated total project cost is approximately \$845 million.

DOE is preparing an environmental impact statement (EIS) to assess the potential environmental impacts associated with the proposed Project. As part of the National *Environmental Policy Act of 1969* (NEPA) process, the DOE will consult with interested federal, state, regional, and local agencies; as well as Native American tribes. As a result, NRG requests early consultation with the Fort Bend County floodplain administration regarding your opinion on potential environmental impacts or other considerations in the vicinity of the Project.

### **Project Details**

NRG proposes to design, construct, and operate a commercial-scale CO<sub>2</sub> capture facility at its Parish Plant and deliver the CO<sub>2</sub> via an approximately 80-mile-long, 12.75-inch (outside diameter) pipeline to the West Ranch oil field in Jackson County, Texas.

The Project would use an advanced amine-based absorption technology to capture 90 percent (approximately 1.6 million tons) of CO<sub>2</sub> annually from a 240-megawatt (MW) equivalent flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Up to 5,475 tons per day of captured CO<sub>2</sub> would be dried, compressed, and transported via a new pipeline to the West Ranch oil field where it would be used in EOR operations.

The primary components of the Project include the following:

*1. Carbon Capture Facility*

The proposed Project would retrofit one of the Parish Plant's existing coal-fueled units (Unit 8) with a post-combustion CO<sub>2</sub> capture system that would be constructed within the existing 4,880-acre Parish Plant. A new natural gas-fired combined-cycle power plant, estimated to be 80-MW in size, would be constructed to produce the auxiliary power needed to drive the proposed carbon capture system.

*2. CO<sub>2</sub> Transport*

Captured CO<sub>2</sub> would be transported via a new approximately 80-mile-long pipeline to the West Ranch oil field. The anticipated pipeline route includes mostly sparsely-developed rural and agricultural lands in Fort Bend, Wharton, and Jackson Counties in Texas. The majority (approximately 95 percent) of the planned pipeline route will utilize existing mowed/maintained utility rights-of-ways (ROWs) to minimize environmental impacts and avoid sensitive resources to the greatest extent practical. Although the proposed pipeline would be located within existing ROWs for the majority of its length, NRG may need to review existing landowner agreements along the route to negotiate for widening of the ROW for construction of the pipeline in some areas.

*3. EOR and CO<sub>2</sub> Sequestration*

The proposed Project would deliver up to 1.6 million tons of CO<sub>2</sub> per year to the existing West Ranch oil field, located in Jackson County. The oil field has been in operation since 1938, and Texas Coastal Ventures, LLC, a joint venture between NRG and Hilcorp Energy Company, would conduct the EOR operations.

*4. CO<sub>2</sub> Monitoring, Verification, and Accounting Program*

NRG would implement a monitoring, verification, and accounting (MVA) program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the EOR site. The MVA program must meet specific regulatory and CCPI Program requirements, and may consist of a variety of monitoring and modeling activities.

## **Project Schedule**

NRG plans to start construction of the Project in November 2012 and begin the demonstration phase of commercial operations by 2015. The schedule is contingent on NRG receiving the necessary permits and regulatory approvals, as well as financial closing on all the necessary funding sources, including DOE's financial assistance.

Maps showing the expected footprint for the proposed carbon capture site, the proposed pipeline route, and the existing oil field area are provided in Attachment 1. Biological and cultural resource surveys along the proposed pipeline route are scheduled between January and March 2012. DOE and NRG have contracted with URS Group, Inc., to provide environmental and cultural resources services to support development of the EIS and other regulatory compliance requirements for the Project.

DOE respectfully requests that the Jackson County Floodplain Administration provide any opinions or site-specific information concerning the proposed Project's potential floodplain and related environmental impacts within Jackson County. The information provided will assist the DOE in the preparation of an EIS. DOE also intends to provide a copy of the draft EIS for the Project to your office for review and comment. All correspondence with your office will be included in an appendix to the EIS.

DOE would appreciate your participation and requests a response as soon as practical to help quickly identify potential floodplain impacts in the vicinity of the Project. You can reach me for comment by email at [mark.lusk@netl.doe.gov](mailto:mark.lusk@netl.doe.gov), by telephone at (304) 285-4145, or at the address listed on the front page.

Sincerely,



Mark W. Lusk  
NEPA Document Manager / NEPA Compliance  
Officer

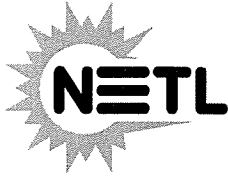
Attachment: Project Location Maps

cc:

Jon Barfield - NRG  
Anthony Armpriester - NRG  
Ted McMahon - DOE  
Pete Conwell - URS

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February 13, 2012

Monica Martin  
Wharton County Floodplain Administrator  
Permit & Inspection Department  
1017 North Alabama St.  
Wharton, TX 77488

Re: Request for Consultation for Proposed Petra Nova W.A. Parish Post-Combustion Carbon Capture and Storage Project in Southeastern Texas (Fort Bend, Wharton, and Jackson Counties)

Dear Ms. Martin;

The U.S. Department of Energy (DOE) proposes to provide funding to NRG Energy, Inc. (NRG) and its subsidiary, Petra Nova, LLC, for a project that would capture carbon dioxide (CO<sub>2</sub>) at NRG's W.A. Parish Generating Station (Parish Plant) in Fort Bend County, Texas. The CO<sub>2</sub> would be delivered in a new approximately 80-mile-long pipeline to the West Ranch oil field located near the city of Vanderbilt in Jackson County, Texas, where it would be used for enhanced oil recovery (EOR) and ultimately sequestered. This proposed project, known as the W.A. Parish Post-Combustion Carbon Capture and Storage Project (Project), would demonstrate an integrated commercial-scale deployment of post-combustion CO<sub>2</sub> capture technology and use of the CO<sub>2</sub> with EOR operations and long-term geologic storage.

DOE proposes to provide NRG with approximately \$167 million of cost-shared funding, which includes *American Recovery and Reinvestment Act of 2009* funds to help implement the Project in Fort Bend, Wharton, and Jackson Counties, Texas. DOE selected the Project for a financial assistance award through a competitive process under the Clean Coal Power Initiative (CCPI) Program. The estimated total project cost is approximately \$845 million.

DOE is preparing an environmental impact statement (EIS) to assess the potential environmental impacts associated with the proposed Project. As part of the *National Environmental Policy Act of 1969* (NEPA) process, the DOE will consult with interested federal, state, regional, and local agencies; as well as Native American tribes. As a result, NRG requests early consultation with the Fort Bend County floodplain administration regarding your opinion on potential environmental impacts or other considerations in the vicinity of the Project.

### **Project Details**

NRG proposes to design, construct, and operate a commercial-scale CO<sub>2</sub> capture facility at its Parish Plant and deliver the CO<sub>2</sub> via an approximately 80-mile-long, 12.75-inch (outside diameter) pipeline to the West Ranch oil field in Jackson County, Texas.

The Project would use an advanced amine-based absorption technology to capture 90 percent (approximately 1.6 million tons) of CO<sub>2</sub> annually from a 240-megawatt (MW) equivalent flue gas slip stream taken from the 617-MW Unit 8 at the Parish Plant. Up to 5,475 tons per day of captured CO<sub>2</sub> would be dried, compressed, and transported via a new pipeline to the West Ranch oil field where it would be used in EOR operations.

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*3. EOR and CO<sub>2</sub> Sequestration*

The proposed Project would deliver up to 1.6 million tons of CO<sub>2</sub> per year to the existing West Ranch oil field, located in Jackson County. The oil field has been in operation since 1938, and Texas Coastal Ventures, LLC, a joint venture between NRG and Hilcorp Energy Company, would conduct the EOR operations.

*4. CO<sub>2</sub> Monitoring, Verification, and Accounting Program*

NRG would implement a monitoring, verification, and accounting (MVA) program to monitor the injection and migration of CO<sub>2</sub> within the geologic formations at the EOR site. The MVA program must meet specific regulatory and CCPI Program requirements, and may consist of a variety of monitoring and modeling activities.

## **Project Schedule**

NRG plans to start construction of the Project in November 2012 and begin the demonstration phase of commercial operations by 2015. The schedule is contingent on NRG receiving the necessary permits and regulatory approvals, as well as financial closing on all the necessary funding sources, including DOE's financial assistance.

Maps showing the expected footprint for the proposed carbon capture site, the proposed pipeline route, and the existing oil field area are provided in Attachment 1. Biological and cultural resource surveys along the proposed pipeline route are scheduled between January and March 2012. DOE and NRG have contracted with URS Group, Inc., to provide environmental and cultural resources services to support development of the EIS and other regulatory compliance requirements for the Project.

DOE respectfully requests that the Wharton County Floodplain Administration provide any opinions or site-specific information concerning the proposed Project's potential floodplain and related environmental impacts within Wharton County. The information provided will assist DOE in the preparation of an EIS. The DOE also intends to provide a copy of the draft EIS for the Project to your office for review and comment. All correspondence with your office will be included in an appendix to the EIS.

DOE would appreciate your participation and requests a response as soon as practical to help quickly identify potential floodplain impacts in the vicinity of the Project. You can reach me for comment by email at [mark.lusk@netl.doe.gov](mailto:mark.lusk@netl.doe.gov), by telephone at (304) 285-4145, or at the address listed on the front page.

Sincerely,



Mark W. Lusk  
NEPA Document Manager / NEPA Compliance  
Officer

Attachment: Project Location Maps

cc:

Jon Barfield - NRG  
Anthony Armpriester - NRG  
Ted McMahon - DOE  
Pete Conwell - URS

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March 22, 2012  
100809-6515 WO01

Monica Martin  
Floodplain Manager  
Permit and Inspections Department  
Wharton County  
315 E. Milam, Suite 102  
Wharton, Texas 77488

**Subject: NRG Energy W.A. Parish Post-Combustion Carbon Capture & Storage Project**

Ms. Martin:

At your request Halff Associates is responding to a letter request you received from the National Energy Technology Laboratory (NETL), a division of the U.S. Department of Energy for opinions or site-specific information concerning the proposed NRG Energy W.A. Parish Post-Combustion Carbon Capture & Storage Project pipeline that will traverse through the southerly portion of Wharton County. Specifically, the NETL requested information on potential floodplain and environmental impacts the pipeline may have within the County.

The proposed 12.75-inch diameter pipeline will carry carbon dioxide. It will enter Wharton County at the eastern boundary, approximately 2-miles north of the southerly County line. It traverses along the southerly portion of the County for approximately 40 miles, leaving the County at the western boundary, approximately 4-miles north of the southerly County line. Construction is projected to begin in November 2012 with pipeline operations starting in 2015.

Potential impacts the pipeline may have through the County are based on a letter size exhibit in the NETL letter showing the proposed pipeline route. The image was scanned and geo-referenced in GIS to the Wharton County GIS geo-database. Stream crossings where impacts to the floodplain may be possible were considered in this review. The extent of impacts the pipeline will have on floodplain and environmental features will depend on the final route of the pipeline as well as type of crossings and construction methods. At this time, there is not sufficient information to determine the type or exact number of development permits that will be required. A conservative estimate would be to assume that each stream crossing is a major creek crossing. It would be expected that wetlands and other possible environmentally sensitive features will be located within the pipeline corridor.

The following is a list of stream crossings that fall under the Drainage Ordinance, potentially requiring a development permit. There was 5 other stream crossings noted that were not within mapped floodplain and may not require a development permit. Starting at the easterly County line, moving westward, the following stream crossings were noted within Wharton County:

1. San Bernard River
2. Lower Caney Creek
3. Quinine Slough
4. Water Hole Creek
5. Colorado River



6. Jones Creek
7. Dry Creek
8. Blue Creek
9. Blue Creek Tributary
10. Tres Palacios Creek
11. Juanita Creek
12. Willow Creek
13. East Carancahua Creek
14. East Carancahua Tributary 1

Please feel free to contact me at (512) 777-4583 if you have any questions.

Sincerely,

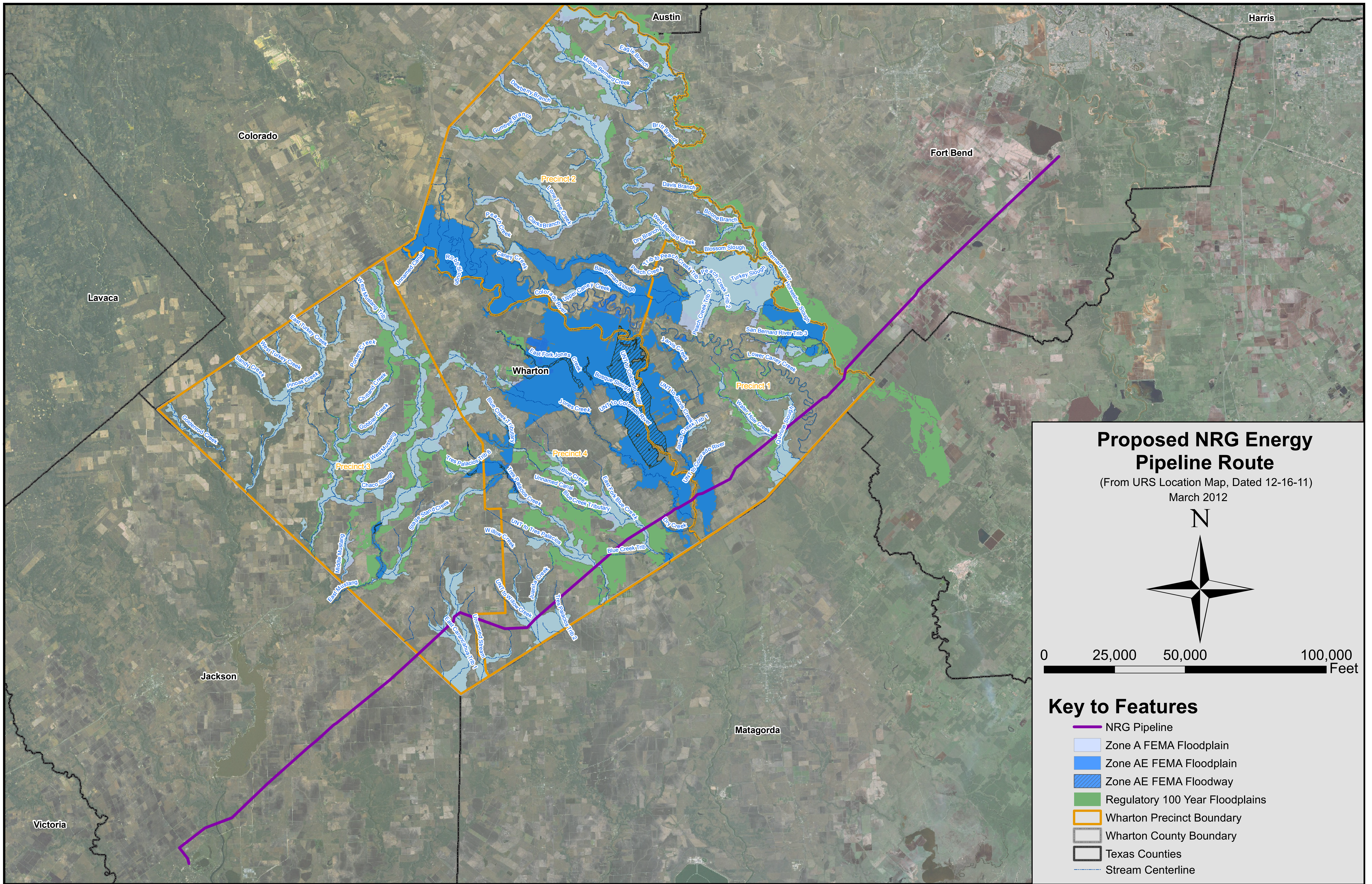
**Half Associates, Inc.**

A handwritten signature in blue ink that reads "Mark W. McGraw". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Mark W. McGraw, P.E.  
Project Manager

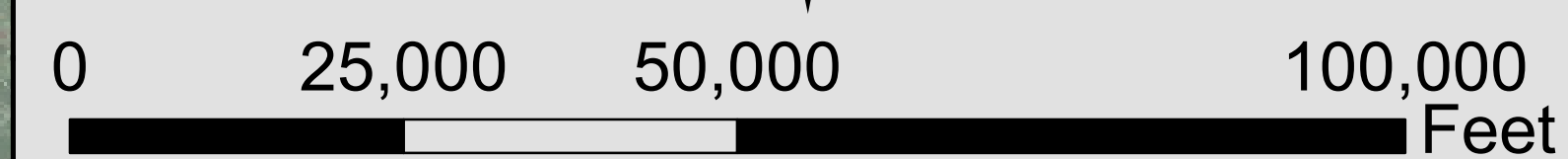
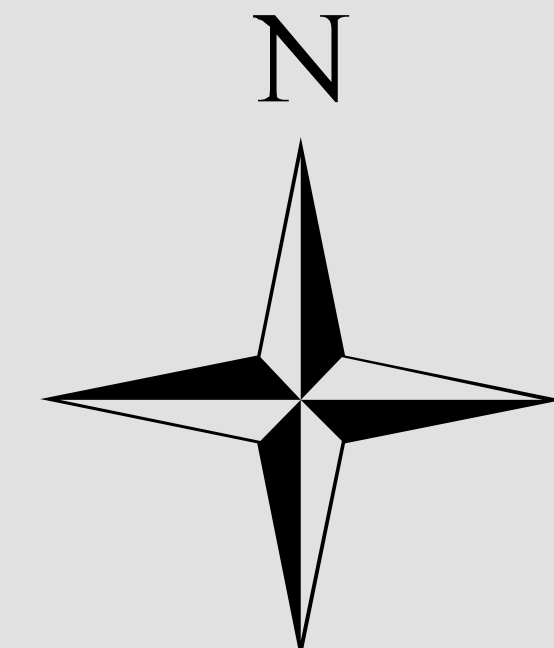
attachments: NRG Pipeline Route and Floodplain Exhibit  
NETL Consultation Request Letter





### Proposed NRG Energy Pipeline Route

(From URS Location Map, Dated 12-16-11)  
March 2012



### Key to Features

- NRG Pipeline
- Zone A FEMA Floodplain
- Zone AE FEMA Floodplain
- Zone AE FEMA Floodway
- Regulatory 100 Year Floodplains
- Wharton Precinct Boundary
- Wharton County Boundary
- Texas Counties
- Stream Centerline



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