Corpus Christi Liquefaction, LLC

Corpus Christi Liquefaction Project

Draft Resource Report 1 — General Project Description

PF12-3-000

January 20, 2012

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ACRONYMS AND ABBREVIATIONS

AAV	Ambient Air Vaporizers
AEP	American Electric Power, Inc.
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
Bscf/d	billion standard cubic feet per day
BOG	boil-off gas
BTEX	benzene, toluene, ethylbenzene, and xylene
CFR	Code of Federal Regulations
CCL	Corpus Christi Liquefaction, LLC
CCLNG	Corpus Christi LNG, LP
CCSC	Corpus Christi Ship Channel
CI	Chief Inspector
Commission	Federal Energy Regulatory Commission
CMMS	computerized maintenance management system
cy	cubic yards
EI	Environmental Inspector
ESD	Emergency Shutdown
ERDC	U.S. Army Corps of Engineers Engineering Research and Development Center
F	Fahrenheit
FERC	Federal Energy Regulatory Commission
GOM	Gulf of Mexico
HDPE	high-density polyethylene
LNG	liquefied natural gas
LNGC	LNG carrier
m^3	cubic meters
MLT	mean low tide (defined as one foot below NGVD 29)
MMscf/d	million standard cubic feet per day
NFPA	National Fire Protection Association
NGL	natural gas liquids
NGA	Natural Gas Act
NGVD	National Geodetic Vertical Datum
NPDES	National Pollution Discharge Elimination System
NSI	Naval Station Ingleside
OCIMF	Oil Companies International Marine Forum
OEP	Office of Energy Projects
OSHA	Occupational Safety and Health Administration
O&M	operations and maintenance
PCB	polychlorinated biphenyls

PERC	powered emergency release coupling
Plan	FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan*
PCCA	Port of Corpus Christi Authority
Procedures	FERC's *Wetland and Waterbody Construction and Mitigation Procedures*
Project	Corpus Christi Liquefaction Project
psf	pounds per square foot
psig	pounds per square inch gauge
RMC	Reynolds Metal Company
Royal	Royal Production Company
SCV	Submerged Combustion Vaporizers
SH	State Highway
SIGTTO	Society of International Gas Tanker and Terminal Operators
TCEQ	Texas Commission on Environmental Quality
U.S.	United States
USACE	United States Army Corps of Engineers

RESOURCE REPORT 1—GENERAL PROJECT DESCRIPTION	
Filing Requirement	**Location in Environmental Report**
1. Provide a detailed description and location map of the project facilities. (§ 380.12(c)(1)) • Include all pipeline and aboveground facilities. • Include support areas for construction or operation. • Identify facilities to be abandoned.	Section 1.4, Figure 1.4-1
2. Describe any nonjurisdictional facilities that would be built in association with the project.(§ 380.12(c)(2)) • Include auxiliary facilities (See § 2.55(a)). • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of Federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Apply the four-factor test to each facility (see § 380.12(c)(2)(ii)).	Section 1.11
3. Provide current original U.S. Geological Survey (USGS) 7.5-minute-series topographic maps with mileposts showing the project facilities. (§ 380.12(c)(3)) • Maps of equivalent detail are acceptable if legible (check with staff) • Show locations of all linear project elements, and label them. • Show locations of all significant aboveground facilities, and label them.	Section 1.4, Figure 1.4-1
4. Provide aerial images or photographs or alignment sheets based on these sources with mileposts showing the project facilities. (§ 380.12(c)(3)) • No more than 1-year old • Scale no smaller than 1:6,000	Appendix 1A
5. Provide plot/site plans of compressor stations showing the location of the nearest noise sensitive areas (NSA) within 1 mile. (§ 380.12(c)(3,4)) • Scale no smaller than 1:3,600 • Show reference to topographic maps and aerial alignments provided above.	No NSAs within 1 mile
6. Describe construction and restoration methods. (§ 380.12(c)(6)) Include this information by milepost • Make sure this is provided for offshore construction as well. For the offshore this information is needed on a mile-by-mile basis and will require completion of geophysical and other surveys before filing.	Section 1.6
7. Identify the permits required for construction across surface waters. (§ 380.12(c)(9)) • Include the status of all permits. • For construction in the Federal offshore area be sure to include consultation with the MMS. File with the MMS for rights-of-way grants at the same time or before you file with the FERC.	Section 1.9
8. Provide the names and address of all affected landowners and certify that all affected landowners will be notified as required in § 157.6(d). (§ 380.12(c)(10)) • Affected landowners are defined in § 157.6(d) • Provide an electronic copy directly to the environmental staff.	Section 1.10, Appendix 1C Electronic copy will be provided directly to the environmental staff

RESOURCE REPORT 1—GENERAL PROJECT DESCRIPTION	
Filing Requirement	**Location in Environmental Report**
Describe all authorizations required to complete the proposed action and the status of applications for such authorizations.	Section 1.9
Provide detailed typical construction right-of-way cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent right-of-way, and temporary construction right-of-way. See Resource Report 8.	Not Applicable
Summarize the total acreage of land affected by construction and operation of the project.	Section 1.5
If Resource Report 5, Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	Will be included in Resource Report 5
Send two (2) additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects (OEP).	Will be provided at time of Application filing
Identify other projects in the area that could contribute to cumulative impacts.	Section 1.12

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

Resource Report 1 provides a general project description of the project proposed by Corpus Christi Liquefaction, LLC ("Corpus Christi Liquefaction") to construct and operate a natural gas liquefaction and export plant and import facilities with regasification capabilities ("CCL Project" or "Project"), to be located at the previously authorized, but not constructed, liquefied natural gas ("LNG") import terminal in San Patricio and Nueces Counties, Texas ("CCLNG Import Terminal"). When completed, the CCL Project will be capable of processing an average of approximately 2.1 billion standard cubic feet per day ("Bscf/d") of pipeline-quality natural gas (including fuel and inerts) in the liquefaction mode and 400 million standard cubic feet per day ("MMscf/d") in the vaporization mode. Although both modes of operations vaporization and liquefaction are not expected to occur simultaneously, the facility will be physically able to do so.

The CCL Project will involve liquefying natural gas into LNG to be stored in three 160,000 m^3 full containment storage tanks. LNG will be imported or exported via LNG carriers that will arrive at the Project's marine terminal ("Terminal") via marine transit of the La Quinta Channel. The facility will have the capability to liquefy natural gas from the pipeline system for export as LNG or import LNG and regasify it to send it out into the previously approved pipeline system which will be constructed (with certain modifications required to account for the bidirectional nature of the Project) in conjunction with the CCL Project. The bidirectional capability of the Project will not result in an increase in the number of ship transits that were previously permitted for the Corpus Christi LNG, L.P. Import Terminal since the total amount of natural gas processed either by liquefying natural gas or vaporizing LNG will not exceed the originally proposed average of 2.6 Bscf/d as reflected in the underlying authorizations discussed below.

The CCL Project will be located within areas that have been evaluated and assessed in conjunction with the Federal Energy Regulatory Commission's ("FERC" or "Commission") review and approval of the CCLNG Import Terminal in Docket Nos.:

- CP04-37-000 - April 18, 2005, Corpus Christi LNG, L.P.[1] received Natural Gas Act (NGA) Section 3 authorization to site, construct and operate the Corpus Christi LNG Import Terminal on the Corpus Christi Site, for which construction has yet to commence. Given current market conditions, Corpus Christi Liquefaction is seeking authorization to site, construct and operate the CCL Project at the Corpus Christi Site in lieu of construction of the Corpus Christi LNG Import Terminal by Corpus Christi LNG.
- CP04-44-000, CP04-45-000, and CP04-46-000 - April 18, 2005 Order also authorized Cheniere Corpus Christi Pipeline Company[2] to construct and operate a 23-mile long sendout pipeline

[1] Now Corpus Christi LLC ("Corpus Christi LNG")

[2] Now Cheniere Corpus Christi Pipeline, L.P.

commencing at the Corpus Christi LNG Import Terminal and extending in a northwesterly direction along a corridor that would allow for interconnection points with approximately eight interstate and intrastate natural gas transmission pipelines in South Texas ("Corpus Christi Pipeline"). The Corpus Christi Pipeline, with certain modifications, will be constructed in conjunction with the CCL Project.

Resource Report 1 describes the facilities associated with the CCL Project, the purpose and need for the project, land requirements, construction procedures, operation procedures, project schedule, compliance with regulations and codes, and permits that will be obtained. Resource Reports 2 through 9 describe the resources at the project site, the potential impacts on those resources from construction and operation of the project, and measures proposed to mitigate those impacts. Resource Report 10 describes the "No Action" alternative as well as possible system and facility siting and configuration alternatives. Resource Report 11 describes the design, construction, operation, and maintenance measures to maximize project reliability and minimize potential hazards to the public from failure of project components as a result of accidents or natural catastrophes. Resource Report 12, pertaining to polychlorinated biphenyls ("PCB"), is not applicable, as the project does not involve the removal, replacement, or abandonment of PCB-contaminated facilities. Resource Report 13 provides a detailed description of the liquefaction and vaporization facilities, as well as detailed engineering and design information. Two versions of Resource Report 13 will be filed with the CCL Project Application, a public version and a version that contains confidential and proprietary engineering and design material that will not be available to the public.

1.2 PROPOSED FACILITIES

Figure 1.2-1 depicts an artist's rendering of the proposed CCL Project. A general location map and site plan are included in Section 1.4. Land requirements are discussed in Section 1.5. All Project components will be sited, constructed, operated, and maintained in accordance with applicable federal and state regulations. The Project will include the following components.

1.2.1 Liquefaction Facilities

The liquefaction portion of the CCL Project consists of three ConocoPhillips Optimized Cascade^{SM} LNG liquefaction trains, each capable of processing up to approximately 700 MMscf/d of natural gas (which includes fuel use and inerts), with average liquefaction capacity of approximately 4.5 million tonnes per annum.[3]

Each LNG liquefaction train contains the following equipment:

- Metering facilities for measurement of gas into the train;
- Facilities which remove CO_2, H_2S, and sulfur, from the feed gas;
- Facilities to remove water and mercury from the feed gas;

[3] The nameplate rating will be determined during the pre-filing process after further study of expected feed gas composition, site conditions, equipment selections, expected maintenance schedules and other factors.

Figure 1.2-1 Corpus Christi Liquefaction Project, Artist Impression

- Facilities to remove heavy hydrocarbons (such as benzene, toluene, ethylbenzene, and xylene ("BTEX")) from the feed gas to avoid freezing in the liquefaction unit;
- Six standard annular combustor aero-derivative LM2500 G4+ gas turbine-driven refrigerant compressors - each gas turbine will have water injection for emissions control, and the Propane Refrigeration Gas Turbines will have a Turbine Inlet Air Humidification System to be operated when the ambient temperature is at or above 60 °Fahrenheit ("F");
- Waste heat recovery systems for regenerating the gas driers and amine system;
- Induced draft air coolers;
- Associated fire and gas and safety systems;
- Associated control systems and electrical infrastructure;
- Utility connections and distribution systems;
- Soil improvement and paving;
- Piping, piperacks, foundations and structures within the LNG train battery limits; and

- Injection facilities for spiking ethane and/or propane (delivered via pipeline) into the feed gas to increase the calorific value of the LNG produced.

1.2.2 LNG Storage

The LNG will be stored in three, full containment storage tanks. The tanks will be designed to store a nominal volume of 160,000 m^3 (1,006,400 barrels) of LNG at a temperature of -270ºF and a maximum internal pressure of 3.5 pounds per square inch gauge (psig) (though the normal operating conditions will be -260ºF and 1.5 psig). The tank system will meet the requirements of NFPA 59A, 49 CFR Part 193, and API Standard 620 Appendix Q. A typical full containment LNG storage tank is shown in Figure 1A-5 included in Appendix 1A. The major components of the tanks will consist of:

- A 9% nickel steel open top inner container, designed to withstand the hydrostatic pressures and cryogenic temperatures of the LNG, as well as the seismic, insulation, and thermal gradient loads that it will be subjected to. The space between the inner container and the outer container will be insulated with expanded perlite to maintain the outer container at near ambient temperature. The insulation beneath the inner container will be cellular glass load-bearing insulation that will support the weight of the inner container and the LNG.
- An outer tank comprised of reinforced concrete with a domed concrete roof. The outer tank is designed for the following conditions:
    - The specified internal pressure of 3.5 psig;
    - A design wind speed of 150 mph sustained;
    - Seismic loads in accordance with NFPA 59A and the site specific seismic reports;
    - Internal pressure imposed by insulation loads; and
    - Roof and platform dead loads.
- An insulated aluminum deck over the inner container, suspended from the roof. The aluminum support deck will be insulated with fiberglass blanket so that the outer tank roof and vapor space above the suspended deck are essentially at ambient temperature. The vapor pressure from the LNG will be equalized through ports in the suspended deck and will be contained by the outer container.

The tanks will be supported on a reinforced concrete mat. Electric base heating will be installed in the concrete mat to prevent frost heave.

Tank Accessories

Five intank pump well columns will be installed in each tank. Four pump well columns will be fully installed with foot valve, electrical, supports, instrumentation, piping, etc. for a complete system. The fifth pump well column will be equipped with a foot valve only for a future spare pump. All LNG piping will enter the tank through the concrete tank roof. All piping systems will be in accordance with ASME B31.3 and NFPA 59A Chapter 6.

Each LNG Tank will also be provided with the following accessories:

- A cool down temperature detection system to monitor the inner tank bottom plate and inner tank shell continuously during cool-down procedures;
- Foundation temperature sensors located at strategic locations under the tank;
- Instrumentation to monitor the quality and level of LNG in the tank and to monitor tank contents for stratification;
- A safety-rated control system to monitor the LNG level and control the fill line shutoff valves;
- Pressure and vacuum relief systems;
- Platforms, elevators, and stairways with intermediate landings attached to the outer tank;
- Spill protection of the tank roof over the edge of the roof dome;
- Lighting and aircraft warning lights;
- Electrical grounding system;
- Electrical base heating; and
- A settlement monitoring system to measure and record inner and outer container movements during construction, hydrostatic testing, and operation.

1.2.3 LNG Vaporization

Two trains of Ambient Air Vaporizers ("AAV") and sendout pumps capable of vaporizing sufficient LNG volume for each to sendout 200 MMscf/d of natural gas will also be installed. Each AAV Train is comprised of approximately 18 to 20 AAV cells and associated piping and valves and one high-pressure LNG sendout pump. Each AAV Train will cycle the AAV cells between operation and defrost, with some cells vaporizing and some cells in defrost mode at any one time, depending on ambient conditions.

Available heat from ambient air will be used to the maximum extent possible for LNG vaporization, augmented, when necessary, with a supplementary trim heating by gas turbine waste heat recovery to achieve a natural gas sendout temperature meeting pipeline specifications.

In selecting the vaporization system, both traditional Submerged Combustion Vaporizers ("SCV") and AAVs were considered. AAVs provide the most fuel efficient method for regasifying LNG. The AAVs provide regasification of the LNG without requiring combustion resulting in no water or air emissions. The AAVs were proven in tests at Sabine Pass LNG.

1.2.4 Marine Terminal and LNG Transfer Lines

The proposed marine terminal is as previously permitted, except that only the western most LNG berth will be built. It will consist of a maneuvering area and a protected berth area. These facilities will be capable of loading or unloading approximately 200 ships per year, which is the anticipated maximum level of traffic for the facility operating at full capacity. This figure is based on current throughput

projections and could vary with the level of operations and the sizes of the vessels actually used; however, it is not expected that the level of traffic will exceed this figure.

Three dedicated tugs will be available to facilitate maneuvering of LNG carriers. When not in use, these tugs will be moored at a nearby location, yet to be determined.

The proposed docking slip will be dredged to a minimum depth of minus 45 feet mean low tide ("MLT"), plus 2 feet advanced maintenance, plus 2 feet paid allowed overdredge to ensure minimum depth is met. A 3:1 slope will form the sides of the slip, portions of which will be protected using articulated block mats or other suitable means of stabilization. A sizeable expansion of the maneuvering area also will be dredged to minus 45 feet MLT plus 2 feet paid overdredge plus 2 feet advanced maintenance, with side slopes of 3:1. Dredged materials will be used beneficially to fill a former bauxite reside storage bed that has been cleaned out (Bed 24) on the Project site, and a 30-acre portion of a former 90-acre clay borrow pit northeast of the Project site. The remainder of the dredged material will be deposited in a 385-acre area immediately to the north of the Project site known as DMPA 2 (old bauxite disposal beds) to assist in the capping of those beds. Refer to figure 1A-3 included in Appendix 1A.

Dredging activities will generally be in accordance with the work previously authorized for the Corpus Christi LNG Import Terminal with the following exceptions: (i) reduced area of dredging required (elimination of one LNG ship berth and the addition of a roll on/roll off construction dock), and the addition of a beneficial dredge disposal site - the 90 acre borrow pit. A portion of the marine terminal's berth approach area is currently being dredged by the United States Army Corps of Engineers ("USACE") as part of an extension of the La Quinta Channel (see Figure 1A-2 and 1A-4 included in Appendix 1A).

The berth will be designed to accommodate LNG carriers with capacities up to 267,000 m^3 and drafts up to 41 feet. Four breasting dolphins, consisting of reinforced concrete structures on piles, will be provided at the berth. These breasting dolphins will be equipped with fenders suitable to safely berth and moor the full range of ships being considered. The breasting dolphins will also be equipped with quick release mooring hooks for spring lines to provide the necessary mooring lines arrangement flexibility for various sizes of vessels. In addition to the four breasting dolphins, six mooring dolphins will be provided, each consisting of reinforced concrete slabs supported on piles and equipped with quick-release mooring hooks

The LNG dock will be a one-level concrete structure supported on piles. The dock will consist of a reinforced concrete beam and slab structure, approximately 90 feet wide by 116 feet long. The dock will be curbed to confine LNG spillage and its surface will be sloped to a collection point. Drainage from the collection point will be via the LNG spill-collecting trough to a spill impoundment basin.

Shipboard LNG cargo pumps will deliver the LNG to the LNG storage tanks at a design rate of 12,000 cm/hr via two parallel LNG transfer lines for the unloading/vaporizing (import) mode. During the liquefaction (export) mode, intank pumps will deliver LNG to the ships at a design rate of 12,000 cm/hr. Three 20-inch marine cargo transfer arms will be installed for liquid delivery to/from the storage tanks,

and one 20-inch arm will provide vapor return flow between the ship and terminal (see Resource Report 13). The cargo transfer arms will be designed with swivel joints and equipped with sensors to provide the required range of movement between the ship and the shore connections. Each arm will be fitted with a powered emergency release coupling ("PERC") and associated valves to protect the arm and ship's manifold while also avoiding spillage of its liquid contents in the case of unusual movement of the ship continuing beyond the normal operating envelope. Each arm will be operated by a hydraulic system with a counterbalance weight, to reduce the weight of the arm bearing on the shipside connection and to reduce the power required to maneuver the arm into position.

The facilities have been designed to provide safe berthing for the receipt and mooring of LNG ships and to ensure the safe transfer of LNG cargoes between the ships and the onshore storage facilities. Design of the marine facilities is in accordance with applicable codes and standards, including but not limited to Oil Companies International Marine Forum ("OCIMF"), Society of International Gas Tanker and Terminal Operators ("SIGTTO"), American Petroleum Institute ("API"), and American Society of Civil Engineers ("ASCE"). Applicable codes and standards will be provided with Resource Report 13.

The design of the marine facilities was checked as part of the original LNG terminal design to ensure the following:

- Maneuvering and docking of the LNG tankers can be accomplished with no more than three Z-drive tractor tugs under most anticipated environmental conditions of weather, current, tide, etc. The berth layout was first reviewed by experienced pilots, and changes made based on their recommendations. The final berth layout was then successfully confirmed in computer simulations of the maneuvering and berthing conducted at the USACE Engineering Research and Development Center's ("ERDC") Ship and Tow Simulator located in Vicksburg, Mississippi.
- The LNG berth will be protected as much as practicable from other ship traffic, particularly in the case of a ship becoming disabled while passing the CCL Project site. The location and configuration of the berth is such that the LNG berth is at enough of an angle and recessed to avoid this, while maintaining sufficient maneuvering area in case a docked LNG ship needs to make an emergency departure. The final berth layout was confirmed to meet these criteria by simulating various combinations of environmental conditions and equipment failure scenarios that could result in the incursion of disabled ships into the terminal area. This simulation was also carried out at the ERDC facility.
- LNG carriers ("LNGCs") will load/off-load LNG cargoes at the berth. To or from the bidirectional cargo transfer arms at the berth, LNG will flow via the stainless steel insulated LNG transfer lines for delivery to the LNG storage tanks or to the LNGC. During berth idle periods when no cargo transfer operations are being conducted, the contents of the LNG transfer lines will be recirculated from one LNG storage tank to the jetty and back to another LNG tank, to keep the LNG lines cold.

NFPA 59A requires that LNG transfer line areas be drained or graded in order to safely contain accidental spills and leaks. Resource Report 13 will address the LNG transfer lines and the spill containment drainage troughs. The troughs lead to impoundment basins capable of containing a 10-minute design spill.

1.2.5 Other Infrastructure

In addition to the facilities listed above, the CCL Project will require the following facilities and infrastructure:

- Administration Building;
- Control Building;
- Miscellaneous buildings and other structures to accommodate equipment, utilities and support services infrastructure;
- Warehouse to store spare parts and consumables for the liquefaction, regasification and utility facilities;
- Storage building for chemicals, lubricants, and hazardous substances;
- Operation and Maintenance (O&M) building for lockers, canteen, offices, etc.;
- Remote I/O buildings and substations;
- Storage tanks for propane and ethylene refrigerants;
- Storage tanks for amine make up;
- Storage tanks for heavy hydrocarbons removed from the feed gas;
- Spill containment facilities;
- Propane Treating Facilities;
- Emergency Shutdown (ESD) Systems;
- Firewater System, including diesel driven pumps and storage tank;
- Wet and dry flares for the liquefaction facilities;
- Marine flare for emergency venting of LNG carriers;
- Instrument air compressor packages;
- Security and perimeter control systems;
- Telecoms, IT, CCTV and other systems;
- Storage tanks for condensate, liquid nitrogen, diesel, and gasoline (if required);
- Potable water, service water, and demineralized water systems;
- Pipeline interconnect for the receipt of natural gas from and export to Cheniere's new pipeline, including metering station and filter separator; and
- Electric generation non-jurisdictional facilities, including gas-turbine generators, transformers, and other electrical accessories.

1.2.6 Previously Authorized Facilities

Some of the facilities listed above that will make up the CCL Project were part of the Corpus Christi LNG Import Terminal project that received NGA Section 3 authorization on April 18, 2005. Table 1.2-1 lists facilities or Project components that were previously authorized in the underlying proceeding, and how these facilities will be modified as a result of the CCL Project.

TABLE 1.2-1

Previously Authorized Facilities Included in the CCL Project

Previously Authorized Facility	Summary of Modification
Three single-containment LNG storage tanks	Moved to western edge of site, revised to three full containment LNG storage tanks instead of single containment tanks.
Two marine berth	Two full LNG ship berths reduced to single LNG ship berth and a small construction dock.
Vaporizers	Changed from Submerged Combustion Vaporizers (SCV) to Ambient Air Vaporizers (AAV) to minimize environmental impacts and with a smaller throughput capacity.
Piperack from facility to berth	One piperack now proposed from single berth. Reduced from two piperacks.

1.3 PURPOSE AND NEED

The CCL Project has been proposed due to the improved outlook for domestic natural gas production, owing to drilling productivity gains that have enabled rapid growth in supplies from unconventional, and particularly shale, gas-bearing formations in the United States ("U.S."). Improvements in drilling and extraction technologies have coincided with a rapid diffusion of knowledge in the natural gas industry of the unconventional resource base and best practices in drilling and resource development. These changes have rendered obsolete once prominent fears of declining future domestic natural gas production. The export of natural gas as LNG would provide a market solution to allow the further deliberate development of these emerging sources of domestic natural gas, natural gas liquids and oil, in particular the Eagle Ford Shale, which is located approximately 70 miles to the northwest of the CCL Project, and would result in the following benefits, all of which are consistent with the public interest:

- Stimulate the Texas state, regional and national economies through job creation, increased economic activity and tax revenues;
- Further the President's National Export Initiative,[4] by improving U.S. balance of payments through the exportation of approximately 2.1 Bscf/d of natural gas;

[4] *See* Executive Order No. 13,534, 75 Federal Register 12,433 (March 16, 2010), *available at* http://www.whitehouse.gov/the-press-office/executive-order-national-export-initiative ("A critical component of stimulating economic growth in the U.S. is ensuring that U.S. businesses can actively participate in international markets by increasing their exports of goods, services, and agricultural products. Improved export performance will, in turn, create good high-paying jobs.").

- Raise domestic natural gas productive capacity and promote stability in domestic natural gas and associated liquids pricing;
- Promote liberalization of global natural gas trade through fostering of a global LNG market;
- Advance national security and the security of U.S. allies through diversification of global natural gas supplies; and
- Increase economic trade and ties with foreign nations including neighboring countries in the Americas and displacing environmentally damaging fuels in those countries.

Moreover, the bi-directional nature of the Project will enable LNG to be imported, vaporized and sent out for delivery to U.S. consumers should current market dynamics shift dramatically in the future.

1.4 LOCATION AND DESCRIPTION OF PROJECT

The proposed CCL Project is located on property at the Port of Corpus Christi on the northern shore of Corpus Christi Bay, at the north end of the La Quinta Channel, north and east of the City of Corpus Christi, in San Patricio and Nueces, Counties, Texas ("CCL Project Site"). Corpus Christi Liquefaction has acquired the CCL Project Site, which is located in an industrial area, through purchase. The CCL Project Site is the site of the previously reviewed and approved CCLNG Import Terminal.

The general location of the proposed Project is shown in Figure 1.4-1, and a site plan drawing is shown in Figure 1.4-2. The Project location shown on an aerial photo is included in Appendix 1A.

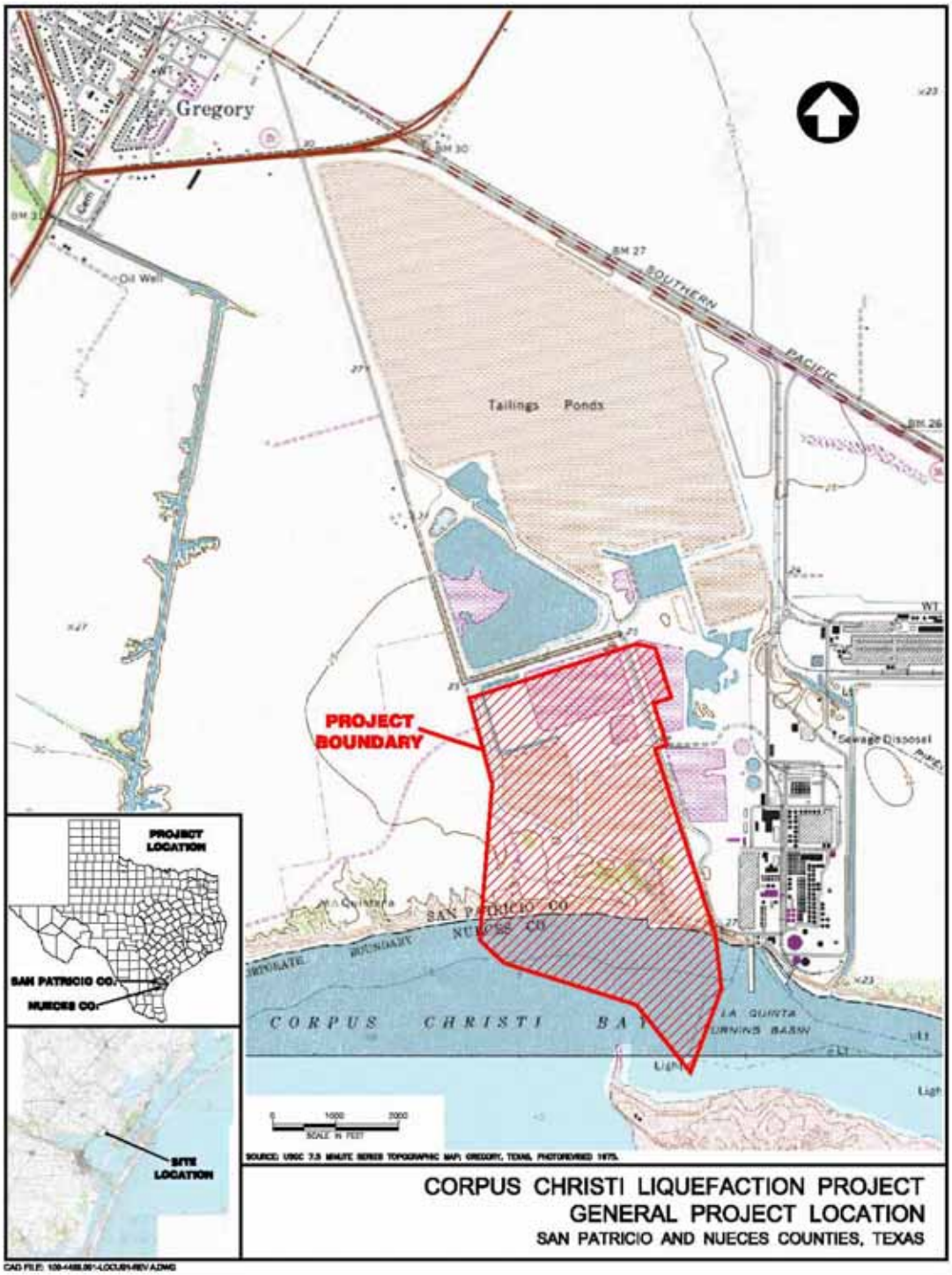

Figure 1.4-1 General Location Map

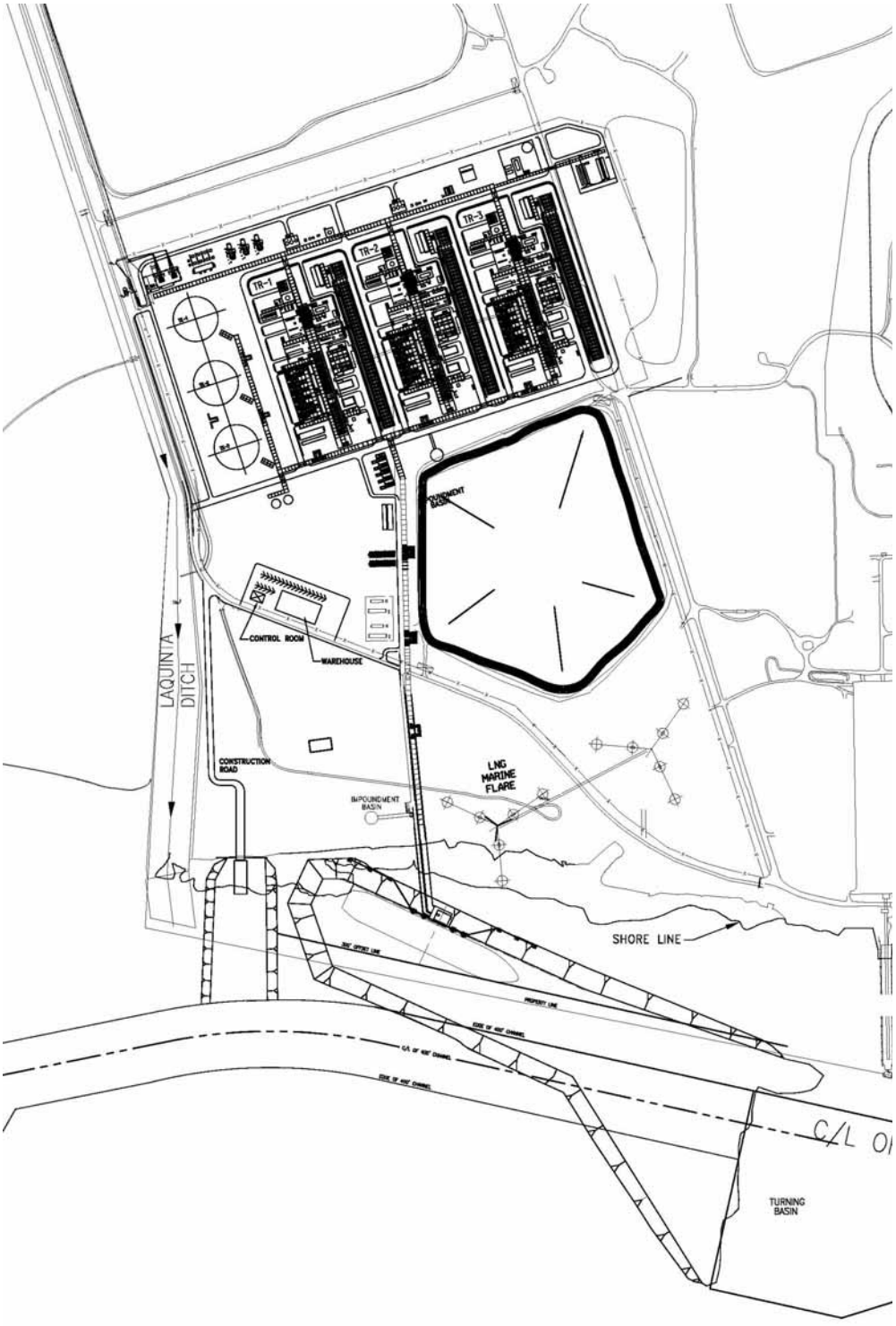

Figure 1.4-2 Site Plan

1.5 LAND REQUIREMENTS

Approximately 841 acres will be affected by construction of the CCL Project, of which 326 acres will be permanently converted for operation of the Project. Table 1.5-1 lists the land requirements for the CCL Project. The majority of the land at the Project site is previously disturbed, including areas that were used for stockpiling of bauxite. Additional information on current land use of the site will be included in Resource Report 8.

TABLE 1.5-1

Land Requirements for the CCL Project

Facility	Land Impacted by Construction[1] (acres)	Land Impacted During Operation[2] (acres)
Liquefaction Project Site[3,4]	256	256
Marine Basin and Berth	70	70
Dredged Material Placement	415	0
Temporary Staging Areas[5]	100	0
Exclusion Zone	0	To be determined after modeling. Little if any extension of current exclusion zones is expected
Total	841	326

1 Area includes entire construction footprint, including all temporary and permanent construction areas.
2 Operational area includes the permanent Project facility.
3 Acreage excludes Bauxite Disposal Bed 22 (51 acres), which is within Project property boundary but will not be disturbed by construction or operation.
4 Bed 24 acreage is included in Liquefaction Project Site and is excluded from Dredged Material Placement (area will be filled with dredged material, but will become part of the operating area).
5 Temporary staging areas outside of the CCL Project Site.

1.6 CONSTRUCTION SCHEDULE, WORKFORCE, AND PROCEDURES

1.6.1 Project Schedule

Corpus Christi Liquefaction will request that FERC authorization to site, construct, and operate the CCL Project be issued no later than September 2013, and anticipates requesting authorization to commence construction in October 2013. Assuming limited delays, the optimum overall Project duration from starting engineering design, permitting, commercial activities, and start up is approximately 50 months. Information regarding anticipated construction workforce can be found in Resource Report 5.

1.6.2 Construction Procedures

All Project components will be sited, constructed, operated, and maintained in accordance with all applicable federal and state regulations. Corpus Christi Liquefaction will implement and adhere to the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan") and the *Wetland and*

Waterbody Construction and Mitigation Procedures ("Procedures")[5]. Wetland areas that will be temporarily or permanently impacted during construction and operation of the Project will be mitigated as agreed upon with the state and federal resource and regulatory agencies. Wetland impacts and mitigation will be addressed in a Project wetland mitigation plan. Corpus Christi Liquefaction has continued to work with the USACE to finalize the wetlands mitigation plan developed for the Corpus Christi LNG Project and is currently in the process of beginning design for planned mitigation at Shamrock Island. The mitigation fieldwork at Shamrock Island is planned for late 2012. Additional information will be provided in Resource Report 2.

Corpus Christi Liquefaction will employ a tracking system to ensure that relevant clearances and permits are received prior to requesting approval to begin construction from the FERC. For purposes of quality assurance and compliance with mitigation measures, other applicable regulatory requirements, and Project specifications, Corpus Christi Liquefaction will be represented on site by a Chief Inspector ("CI"). One or more craft inspectors and one or more Environmental Inspectors ("EIs") will assist the CI. All Corpus Christi Liquefaction inspectors will have access to the relevant compliance specifications and other documents contained in the construction contracts. The EI's duties will be fully consistent with those contained in paragraph III.B (Responsibilities of the Environmental Inspector) of the Plan to ensure that the environmental conditions associated with other permits or authorizations are satisfied. The EI(s) will have authority to stop work or require other corrective action(s) to achieve environmental compliance. In addition to monitoring compliance, the EI's duties will include training Project personnel about environmental requirements and reporting compliance status to the contractors, Corpus Christi Liquefaction, the FERC, and other agencies, as required.

Corpus Christi Liquefaction will develop an environmental training program tailored to the construction of the CCL Project. The program will be designed to ensure that:

- Qualified environmental training personnel provide thorough and well-focused training sessions regarding the environmental requirements applicable to the trainees' activities;
- All individuals receive environmental training before they begin work;
- Adequate training records are kept; and
- Refresher training is provided as needed to maintain high awareness of environmental requirements.

1.6.3 Temporary Construction Facilities

The main construction offices will be located either on-site or adjacent to the site. To maintain control of the site, this area will be used to provide common office areas for all contractors and parking areas outside the boundaries of the process and construction areas. All contractor personnel will be required to access the Project through a turnstile area and swipe an electronic card key. The main construction

[5] Available on the FERC website at: http://www.ferc.gov/industries/gas/enviro/guidelines.asp.

offices and temporary facilities in this area can be mobilized without significant preparation work. Support / satellite offices, warehousing, lunchrooms, temporary access roads, parking lots, and material laydown storage will be erected as necessary to support craft labor.

Additional temporary facilities, primarily laydown areas and support / satellite areas, will be located on site or adjacent to the site. The permanent site grading for drainage will be directed to an outfall on the western perimeter of the site and will be completed to assure proper drainage during construction and operation. A water run-off plan to control sediment and silt will be implemented during construction. Site preparation will involve temporary use of an area of approximately 100 acres adjacent to the Project site, and will include the installation of required construction power, communications and water.

Because major equipment will be delivered primarily by barge, the USACE permit for the marine facilities will be revised to allow a new roll-on / roll-off area for unloading equipment from barges. This location will be sited to the west of the LNG berth.

1.6.4 Liquefaction Facilities (LNG Trains)

Activities during the site-works phase of construction will include: (1) cutting necessary drainage ditches in laydown areas to allow proper surface water run off, (2) placement of gravel surfaces for temporary construction facilities such as parking lots, office areas, and lay-down areas, (3) installation of temporary construction fencing, and (4) construction of any roads within the Project site boundaries.

The site-works portion of the Project, as discussed above, need not be completed prior to commencement of subsequent activities. There are two critical paths for this project; the erection of the Phillips Optimized Cascade^{SM} LNG Trains and/or the construction of the full containment tanks. Therefore, the execution strategy will be structured to prevent slowing construction in these areas.

The foundations for equipment, buildings, and pipe racks will be installed on spread footings, as the site soil conditions are such that equipment piling is not necessary for onshore facilities. Pipe installation on the pipe racks will be implemented from multiple directions after installation of the pipe racks. Pipe spool fabrication will be done in a covered area on or off-site. Structural steel members will be prefabricated off-site and erected upon arrival.

The majority of the straight run pipe will be field fabricated prior to placement on the pipe racks. Pipe expansion loops will be pre-fabricated in a shop, transported to position, and then erected with the straight run piping. Pipe will also be painted to the maximum extent at the shops, after shop welds have been tested in accordance with the applicable codes. Pipe spool size will be as large as can be practically trucked to site to minimize site work and the number of deliveries.

Wherever practical, large equipment will arrive at site in preassembled packages that will facilitate final hook-up and testing. All equipment will be designed, fabricated, and tested by highly qualified specialist suppliers at their respective facilities, and shipped to site only after the necessary inspections and testing

have taken place and the equipment is released. The larger equipment, such as the cold boxes, acid gas absorber, and the refrigerant compressors, will be offloaded at the roll on/roll off construction dock on multi-wheel transport crawlers, and transported to their foundations. Other material and equipment will be shipped to site by truck.

Installation of the equipment will proceed at the same time as the installation of the pipe on the pipe rack. The target is to have all equipment installed prior to the erection progress of the pipe rack arriving at the main process areas. This will allow a seamless tie in at this location. The shop, warehouse, and control building erection will progress as the pipe-rack installation is occurring.

When construction is approximately 70% complete, the focus will shift from construction by area to completion by systems. The civil and structural work will be substantially complete, the equipment set, and most of the large bore piping installed. The Project schedule will be driven by the mechanical completion and pre-commissioning requirements. The system completion and turnover packages will be defined and scoped by engineering, and assembled by the construction team. A turnover coordinator will prepare the systems completion and turnover packages which will include the following documentation:

- Marked-up drawings to show the limit of the system and the location of blinds;
- Line list by system with pressure testing documentation;
- List of equipment including motors with data sheets and inspection reports;
- Marked-up Single Line Diagrams with inspection/test reports for electrical equipment;
- Cable reports;
- Instrument Index with data sheets and calibration sheets;
- Loop Diagrams;
- Any applicable vendor documentation/drawings;
- Turnover Exception Lists; and
- Detailed Punchlist.

As the piping installation, hydrotesting, pneumatic testing, and equipment erection work is completed and the density of craft personnel and construction equipment is reduced within each of the areas, the balance of the painting and insulation work will be completed. The pipe racks will be completed first followed by the process and utility areas. After the installation of the equipment and piping has been completed, the final road paving, site grading, landscaping and cleanup will be done. The temporary construction facilities will be demobilized on a progressive basis when they are no longer needed.

Construction of other necessary facilities and other buildings, as well as foundations and major utility equipment will commence once construction of the LNG Trains has begun. Emphasis will be placed on coordinating the arrival of the major equipment with the completion and curing of the respective foundation so that the equipment can be placed on its foundation when it arrives. This will avoid double handling and intermediate storage on site.

The buildings are independent sites and will be constructed simultaneously with the liquefaction facilities, so that electrical and instrument contractors can install their equipment according to their respective schedules.

1.6.5 LNG Storage

Construction of the LNG storage tanks will follow the sequence shown in Figure 1A-6 included in Appendix 1A.

1.6.6 LNG Vaporization and Natural Gas Sendout

Construction of the LNG vaporization and natural gas sendout facilities will be constructed as described above for the LNG Liquefaction Facilities.

1.6.7 Marine Terminal and LNG Transfer Lines

The LNG berth will be dredged to a depth of minus 45 feet MLT plus 2 feet advanced maintenance, plus 2 feet paid allowed overdredge to ensure minimum depth is met, and 3V:1H side slopes. The limits of dredging are shown on Figure 1A-2 included in Appendix 1A. The geotechnical properties of the berth sediment and soils have been evaluated and will be provided in Resource Report 7. Hydraulically dredged material will be put to beneficial use to fill a former bauxite residue storage bed that has been cleaned out (Bed 24) and a 30-acre portion of a former 90 acre clay borrow pit owned by Reynolds Metal Company (RMC), and to facilitate the capping of 385 acres of bauxite residue beds owned by RMC have laid open since 1968 (DMPA 2). The following sections provide an overview of the construction procedures and design measures that will be used for individual components of the marine terminal.

The primary materials used in the berth construction are steel-pipe pilings, concrete, and reinforcing steel for concrete. It is expected that the steel-pipe piles will be fabricated offsite and shipped by barge to the site. The reinforcing steel will most likely be fabricated off site and trucked to the site or delivered by barge to the construction dock. The concrete will either be produced in a batch project located at the main CCL Project site or purchased from a local supplier (depending upon economics).

Four breasting and six mooring structures will be constructed to provide flexibility in berthing the full range of design vessels.

The jetty platform is a single level, pile supported concrete platform having a proposed design elevation of +37.0 ft. The surface of the jetty platform will slope landward in order to drain away rainwater and potential LNG discharges. Curbs shall be provided to separate the LNG areas from the remainder of the jetty surfaces. Curbs will also be provided where necessary to meet Occupational Safety and Health Administration (“OSHA”) requirements at the perimeter of the jetty platform.

The platform will support fixed equipment as follows:

- Jetty substation building;
- Marine liquid cargo transfer and vapor return arms;
- Gangway tower/crane;
- LNG and utility piping;
- Fire suppression equipment;
- Elevated access platforms;
- Elevated firewater monitors; and
- Jetty Control Building.

The approach and pipe trestles will serve as the connecting link between the shore and the rear of the jetty platforms. Four-foot wide catwalks will provide walking access to mooring and breasting dolphins and to shore.

Three dedicated tugs will be available to facilitate LNG carrier traffic. When not in use, these tugs will be moored at a nearby location, to be determined. Two line-boats will also serve the facility.

Work on the berth platform, approach and pipe trestles will begin first to allow installation of equipment and piping. All steel pilings will be coated with coal tar epoxy from a point 15 feet below the mudline or groundline, to the soffit of the pile cap. Concrete filled high-density polyethylene ("HDPE") pipe sleeves are required for all piling under the pipe trestle, to provided splash zone corrosion resistance.

1.6.8 Site Access and Traffic

Construction traffic will access the site via U.S. Highway 181. Once at the site, construction traffic will utilize La Quinta Road, which parallels the western boundary of the property. Material deliveries to the site will be via truck using the same access point as construction traffic. Heavy material delivery will occur via barge to the on-site construction dock. Additional information on construction traffic and material deliveries will be provided in Resource Report 5.

1.6.9 Drainage of the Finished Site

To facilitate stormwater drainage, a system of drainage ditches will be constructed within the CCL Project site. These ditches will connect to a larger, existing drainage ditch that runs along the western edge of the Project site (the La Quinta Ditch) and flows into Corpus Christi Bay.

1.6.10 Sewer Collection and Disposal

Sanitary sewage from each building containing toilets will be collected and treated in a central sanitary treatment. Lift stations will be installed to carry the waste to the central treatment unit. The treated sewage will be discharged with the facility stormwater in accordance with the regulations in the National Pollution Discharge Elimination System ("NPDES") issued by the Texas Commission on Environmental

Quality ("TCEQ"). The permit application will state the volume of the discharge, identify the receiving body of water and provide for analytical results as required by state law.

1.7 OPERATIONS AND MAINTENANCE

The CCL Project will employ approximately 175 full-time plant staff. All permanent personnel will be trained in LNG safety, cryogenic operations, and the proper operation of all equipment. Operators will meet all the training requirements of the U.S. Department of Transportation minimum federal safety standards specified in Title 49 of the Code of Federal Regulations ("CFR"), Parts 192 and 193. Safety procedures are discussed further in Resource Report 11.

1.7.1 Operations

The CCL Project will be a bi-directional facility, capable of loading and unloading LNG cargoes, liquefying natural gas from the pipeline to produce LNG, and vaporizing stored LNG and sending the resultant natural gas into the pipeline. Whether the facility is in liquefaction or vaporization mode will be determined by nominations from Corpus Christi Liquefaction's customers. The plant will also be capable of certain simultaneous operations normally associated with regasification or liquefaction, including:

- Unloading an LNG ship while liquefying natural gas.
- Loading an LNG ship while vaporizing LNG.

Operating procedures will be developed for the facilities, and extensive training will be provided for operational personnel to ensure that they are familiar with and understand the importance of adherence to safe procedures. These procedures will provide functional requirements for the control and safeguarding systems, to include addressing safe start-up, normal shutdowns, emergency shutdowns, fire, gas and spills, etc., as well as routine operation and monitoring.

The LNG ships will enter Corpus Christi Bay from the Gulf of Mexico ("GOM") and transit between the terminal and the GOM under the command of the ship's master with a local pilot to provide specialized navigational-related advice. Together, they will decide whether the existing and anticipated environmental conditions allow safe entry and transit between the GOM and Terminal via the Aransas Pass Channel, Corpus Christi Channel, and La Quinta Channel. The pilot will be assigned by the ship's master to direct the maneuvering of the LNG ship in the harbor with the accompanying assistance of the Project's dedicated tugboats. The pilot will continue to advise the ship's master during the berthing and securing of the ship's mooring lines until the ship is securely moored at the Terminal's berth.

The cargo transfer arms will be coupled to the ship's manifold by the Terminal's personnel. A communications and 'linked emergency shutdown' ("ESD") system umbilical cable deployed between ship and Terminal will connect these critical functions between the ship and Terminal cargo control systems during the period that the cargo transfer arms remain connected. The emergency shutdown system will be tested from both the ship's and Terminal's control rooms before cargo transfer operations can begin.

The ship's and Terminal's operators will prepare and align their respective side's cargo systems and valves after performing the required safety checks and procedures so that LNG cargo transfer between ship and Terminal can then commence. During all cargo transfer operations, the ship's manifold is continuously visually monitored by ship's duty personnel and also remotely by two video cameras mounted on the jetty platform which transmit real-time video to display monitors located in both the jetty and main control rooms.

A security guardhouse will be located at the facility entrance and continuously staffed 24-hours a day, seven days a week.

1.7.2 Maintenance

Facility maintenance will be conducted in accordance with 49 CFR 193 Subpart G. The full-time plant maintenance staff will conduct routine maintenance and minor overhauls. Major overhauls and other major maintenance will be handled by soliciting the services of trained contract personnel to perform the maintenance. All scheduled and unscheduled maintenance will be entered into a computerized maintenance management system ("CMMS"). All personnel, operations, maintenance, and others will be trained on the use of CMMS. The CMMS will print out work orders every morning. These work orders will be distributed to the maintenance personnel during morning meetings.

Scheduled maintenance, such as preventive and predictive maintenance of equipment, will be input into the system to automatically print out work orders either on a time basis or on hours of operation, depending on the requirement. Scheduled maintenance will be performed on safety and environmental equipment, instrumentation, and any other equipment that requires maintenance on a routine basis. When a problem is detected that requires unscheduled maintenance attention, the person that detects the problem will enter it into the CMMS. If a problem requires immediate attention, the appropriate person will be notified.

The normal flow of maintenance orders will be as follows:

- Scheduled preventative and predictive maintenance will be input to the CMMS upon installation of each piece of equipment and once placed in-service;
- Unscheduled maintenance will be input to the CMMS when the person that detects the problem detects a problem;
- CMMS will print out work orders every morning;
- The work orders will be distributed to the appropriate maintenance personnel in their morning meetings; and
- The person that completes the maintenance work will close out the work order on the CMMS.

1.8 FUTURE PLANS AND ABANDONMENT

1.8.1 Future Plans

Corpus Christi Liquefaction presently has no plans for further expansion. To the extent that consideration for expansion of the facilities becomes warranted in response to additional demand for liquefaction or vaporization services, any new facilities would be designed to be compatible with the proposed facilities and Corpus Christi Liquefaction would obtain all necessary permits and approvals for those facilities.

1.8.2 Abandonment of Facilities

No facilities are proposed for abandonment or removal at this time.

1.9 PERMITS AND APPROVALS

Corpus Christi Liquefaction will obtain all necessary permits, clearances, and licenses relating to the construction and operation of the CCL Project. Table 1.9-1 provides a list of permits that Corpus Christi Liquefaction will obtain for the CCL Project. Copies of approvals and correspondence with regulatory agencies and others are included in Appendix 1B. Corpus Christi Liquefaction will file any additional correspondence and approvals with the FERC upon receipt.

TABLE 1.9-1

Permits and Consultations for the CCL Project

Agency and Agency Contact	Permit/Approval/Consultation	Anticipated Submittal	Anticipated Receipt
U.S. Fish & Wildlife Service	Section 7 Endangered Species Act Consultation/Clearance; Migratory bird consultation; Fish and Wildlife Coordination Act	Initiate 1st Quarter 2012	3rd Quarter 2012
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit; Rivers and Harbors Act Section 10 Permit	August 2012	1st Quarter 2013
NOAA Fisheries	Essential Fish Habitat; Endangered Species Act Aquatic Threatened and Endangered Species; Marine Mammal Protection Act; Fish and Wildlife Coordination Act	Initiate 1st Quarter 2012	3rd Quarter 2012
U.S. Coast Guard	Waterway Suitability Assessment	Initiated 4th Quarter 2011	3rd Quarter 2012
U.S. Environmental Protection Agency	Greenhouse Gas; Air Permit (Title V & PSD)	August 2012	3rd Quarter 2013
U.S. Environmental Protection Agency	NPDES Stormwater Construction Permit	Notification Prior to Construction	Notification only
U.S. Department of Energy	Authorization to Export LNG	August 2012	4th Quarter 2012 for FTA nations; 2nd Quarter 2013 for non-FTA nations

TABLE 1.9-1

Permits and Consultations for the CCL Project

Agency and Agency Contact	Permit/Approval/Consultation	Anticipated Submittal	Anticipated Receipt
Texas Commission on Environmental Quality	Water Quality Certification under Section 401; Stormwater Discharge Permit	August 2012	1st Quarter 2013
Texas Commission on Environmental Quality	Air Permit (Title V & PSD)	August 2012	3rd Quarter 2013
Texas Parks and Wildlife Department	State threatened and endangered species review	Initiate 1st Quarter 2012	3rd Quarter 2012
Texas Historical Commission	Section 106 National Historic Preservation Act Consultation, Clearance	Initiate 1st Quarter 2012	3rd Quarter 2012
Railroad Commission of Texas	Hydrostatic Test Water Discharge Permit; Application for License; Application for Tentative Approval	1st Quarter 2012	3rd Quarter 2012
Texas Coastal Coordination Council (Texas General Land Office)	Coastal Zone Consistency Determination	August 2012	1st Quarter 2013

Corpus Christi Liquefaction will include copies of all relevant environmental permits and approvals in the construction bid packages and contracts. Construction contractor(s) employed by Corpus Christi Liquefaction will be required to be familiar with all permits and licenses obtained by Corpus Christi Liquefaction and comply with all federal, state, and local laws, ordinances, and regulations that apply to construction of the facility and to restoration of any areas temporarily disturbed during construction. Should other safety, design, and construction codes and regulations be enacted or adopted by governmental agencies having jurisdiction over the locations where the work is to be performed, the contractor(s) will be required to observe and abide by all provisions that are applicable.

1.10 AFFECTED LANDOWNERS

There are three landowners adjacent to, and within 0.5 mile of, the proposed CCL Project site: Port of Corpus Christi Authority, Sherwin Alumina, and Alcoa. Names and addresses of these landowners are provided in Appendix 1C, as required in 18 CFR. §157.6(d) of the FERC's regulations. Further, in accordance with 18 CFR 157.21(f)(3) and 18 CFR §157.6(d)(2), Corpus Christi Liquefaction has contacted each of these entities and individuals regarding the CCL Project

1.11 NONJURISDICTIONAL FACILITIES

1.11.1 Identified Nonjurisdictional Facilities

Several nonjurisdictional facilities will be required to support the CCL Project, as described below.

Ethane Pipeline

A connection to an existing or new ethane pipeline will be required for delivery of ethane should CCL decide to increase the heating value of its LNG product though ethane injection or a combination of propane and ethane injection. Details will be provided as soon as a viable solution is developed.

Propane Pipeline

A connection to an existing Propane pipeline will be required for delivery of propane should CCL decide to increase the heating value of its LNG product though propane injection or a combination of propane and ethane injection. Details will be provided as soon as a viable solution is developed.

Power Line

Power line connections and a substation will be required for construction power and back-up power supply during operation. An overhead power line will be extended from the junction of SH 35 and SH 361 to a new substation adjacent to the La Quinta Road (a distance of about 1.1 mile). The substation will be designed, built, owned and operated by American Electric Power, Inc. ("AEP"), the local power transmission provider. The CCL Project will design, build, own and operate an overhead power line that will run from the AEP substation to the CCL Project substations on the CCL Project site (a distance of about 0.5 mile).

Water Pipeline

The CCL Project will require a connection to a potable water system for site personnel and will also require a large quantity of either potable or raw water for the following processes:

- Feed source to the demineralized water system for injection into the gas turbines for nitrogen dioxide control, and for make up of the amine unit;
- Humidification equipment at the inlet to the gas turbine drivers; and
- Potable water for the additional operation and maintenance activities.

Corpus Christi Liquefaction is studying the various options available to acquire water supply and will provide additional details when developed.

Existing Natural Gas Pipelines

At the time of the Corpus Christi LNG filing with the FERC there were three existing nonjurisdictional natural gas pipelines (Gulf South, Crosstex, and Royal Pipeline) that were to be abandoned in place, removed, and/or relocated to allow for construction of the marine basin. Work required to abandon, remove, or relocate these facilities has already been completed as a result of the La Quinta Channel extension project. Therefore, this activity is not required for development of the CCL Project.

1.11.2 Determination of the Need for FERC to Conduct an Environmental Review

Under certain circumstances, nonjurisdictional facilities may be subject to FERC's environmental review. In making this determination, the FERC requires applicants to address four factors that indicate the need for FERC to do an environmental review of project-related nonjurisdictional facilities. These factors include:

(1) Whether or not the regulated activity comprises "merely a link" in a corridor type project (such as a transportation or utility transmission project);

(2) Whether there are aspects of the nonjurisdictional facility in the immediate vicinity of the regulated activity which affect the location and configuration of the regulated activity;

(3) The extent to which the entire project will be within the FERC's jurisdiction; and

(4) The extent of cumulative federal control and responsibility.

The application of this procedure to the nonjurisdictional facilities follows:

- With respect to factor (1), the regulated activity is not a corridor-type project or a link in a corridor type project. Therefore, this factor does not support a review of the nonjurisdictional facilities.
- With respect to factor (2), there are no aspects of the nonjurisdictional facilities that affect the location and configuration of the proposed CCL Project. Therefore, this factor does not support a review of the nonjurisdictional facilities.
- With respect to factor (3), the nonjurisdictional facilities are entirely outside of FERC's jurisdiction as the construction of these facilities is under the jurisdiction of the State of Texas regulatory agencies and the USACE as applicable. This factor weighs against inclusion of the nonjurisdictional facility in a review by the FERC.
- With respect to factor (4), the cumulative level of federal control and responsibility over the project, federal control is determined by the amount of federal financing, assistance, direction, regulation, or approval inherent in a project. The nonjurisdictional facilities will be developed by either the local utilities or Corpus Christi Liquefaction, and no federal financing or guarantees will be granted for construction of these facilities. Corpus Christi Liquefaction is an independent company and the non-jurisdictional facilities will be constructed by private companies under state and local regulatory jurisdiction. Some federal permits may be involved, but no federal lands are involved. Therefore, cumulative federal control is minimal and this factor does not support FERC environmental review.

1.12 Cumulative Effects

1.12.1 Other Projects Potentially Contributing to Cumulative Effects

Corpus Christi Liquefaction identified other projects in the area of the CCL Project which, if constructed along with the proposed CCL Project, could result in cumulative impacts. Following relevant guidance (CEQ, 1997; EPA, 1999) Corpus Christi Liquefaction looked for commonalities of impacts from other projects and applied the following three criteria in identifying other potential projects to include in the cumulative impact analysis:

- impact a resource area potentially affected by the Project;
- cause this impact within all, or part of, the Project area; and
- cause this impact within all, or part of, the time span for the potential impact from the Project.

For the purposes of this analysis we considered the Project area to be the northern shore of Corpus Christi Bay and adjoining Bay waters, including the La Quinta Channel and access to the Channel from the Gulf of Mexico via the Corpus Christi Ship Channel at Port Aransas. Only projects with either ongoing impacts or that are "reasonably foreseeable" future actions were considered. Table 1.12-1 below contains a summary of these actions.

TABLE 1.12-1

Other Projects Potentially Contributing to Cumulative Impacts

Project	Description	Estimated Construction Date	Location Relative to CCL Project
USACE La Quinta Channel Extension	Extend the La Quinta Channel 1.5 miles to serve the POCCA proposed La Quinta Container Terminal.	Fall 2011 - May 2013	La Quinta Channel extension crosses the CCL Project turning basin
La Quinta Container Terminal	3800' long, 3-berth ship dock with 9 ship-to-shore cranes, 180-acre container/cargo storage yard, intermodal rail yard, over 400 acres for on-site distribution and warehouses	Project in development stage	Northern shore of Corpus Christi Bay adjacent to (west) of CCL Project
Naval Station Ingleside Redevelopment	483 acres former naval base + 433 undeveloped acres adjacent to base for redevelopment	Base closed April 2010; September 2011 redevelop-ment on hold until developer is found to purchase site	Northern shore of Corpus Christi Bay east of CCL Project site
Copano Pipelines/South Texas Oil Pipeline	4.5-mile-long, 16-inch petroleum products pipeline under CCSC and across Nueces Bay	Comment period on USACOE permit SWG-2011-00563 ended 12/30/11	Nueces Bay, west of CCL Project site
Revolution Energy Harbor Wind Project	6 wind turbines	2012	Offshore north side of the Port of Corpus Christi harbor
Offshore Wind Power Systems of Texas LLC Foundation Test Site	"Titan 200" foundation test site	Permitted 2011	10 miles offshore, east-southeast of Ingleside Navy Base
TPCO America Corporation Minimill	Seamless steel pipe manufacturing facility	2015	Gregory, TX, north of CCL Project site

The identified existing or proposed projects within the Project area include the following:

USACE La Quinta Channel Extension

The USACE, Galveston District, awarded a contract on September 22, 2011 in the amount of $33,537,027.20 to King Fisher Marine Service LP for dredging of the Corpus Christi Ship Channel's La Quinta extension in Nueces County, Texas. Work will include deepening 1.4 miles of the La Quinta Channel extension to a depth of minus 39 feet MLT (plus 2 feet paid overdredge plus 2 feet advanced maintenance) using a pipeline dredge beginning in December 2011, with a scheduled completion of May 2013 (DVIDS website, 2012).

The project for navigation and ecosystem restoration, is part of the Corpus Christi Ship Channel - Channel Improvement Project authorized by Section 1001(40) of the Water Resources Development Act of 2007. Funding for the construction contracts was approved on May 17, 2011 by the USACE as part of its 2011 work plan for the Army Civil Works program. The Projects include the following navigation and ecosystem restoration elements:

- Extend the La Quinta Ship Channel approximately 1.4 miles at a depth of -39' MLT;
- Construct an ecosystem restoration feature; and
- Create a beneficial use site.

Extending the La Quinta Ship Channel will provide deep channel access to the Port's proposed multipurpose/container facility located just to the west of the proposed CCL Project, as well as the TPCO American Corporation Steel Pipe mill in Gregory (Citybizlist Houston website, 2011a).

La Quinta Container Terminal

The La Quinta Trade Gateway Terminal is a major component of the Port of Corpus Christi Authority's ("PCCA") long-term development plan. Located on a 1,100-acre site on the north side of Corpus Christi Bay, when completed, this fully permitted project will provide a state-of-the-art multi-purpose dock and container facility. Project features consist of the extension of the La Quinta Channel (see above), construction of a 3,800–foot-long, three (3) berth ship dock with nine ship-to-shore cranes, 180 acres of container/cargo storage yard, an intermodal rail yard, and over 400 acres for on-site distribution and warehouse centers. The facility will have the capacity to handle approximately 1 million twenty-foot equivalent units ("TEU") annually. The Project is sited adjacent to US 181/IH 37 and immediately to the west of the proposed CCL Project site (Citybizlist Houston website, 2011b).

Key to moving forward with the construction of the project was the recent Federal authorization to construct the extension of the La Quinta Ship Channel. With the authorization and initial appropriation to construct the channel extension, the Port was able to sign a Project Partnership Agreement ("PPA") with the USACE in October 2009 to construct the extension. The USACE has already initiated work by constructing a 126-acre dredge material placement area in 2010 and beginning the dredging of the La

Quinta Channel extension in December 2011. The La Quinta Channel extension is anticipated to be complete and ready to serve the project by 2013.

The conceptual plans for the berth and landside improvements have been complete for several years, awaiting channel authorization to proceed. Upon execution of the PPA with the USACE, the Port Commission also approved moving forward with the final design and construction of the initial phase of the Project consisting of a single berth ship dock and required backland improvements. The PCCA has completed the Preliminary Engineering Reports for both the landside and waterfront facilities. In coordination with the Federal funding for the channel extension, final designs are anticipated to be complete in 2012, with construction contracts awarded enabling Gulf Compress, the PCCA, and others, to begin shipping cotton and other products by 2013 (Port Corpus Christi website, 2009).

Naval Station Ingleside Redevelopment

Naval Station Ingleside (NSI) was designated for closure under the Base Realignment and Closure Act of 2005 resulting in the departure of the Navy by April 30, 2010. On that date, ownership of the base reverted to the PCCA.

NSI encompasses 483 acres with more than 70 state-of-the-art buildings, including: warehouse facilities, office and administrative offices, barracks, fitness and recreation facilities, a capital-class pier and wharf area, and much more. PCCA has also included 433 acres of green field property bordering the base to be incorporated in the development project. PCCA continues to seek a purchaser of this property for development.

Copano Pipelines/South Texas Oil Pipeline

Copano Pipelines proposes to install a 4.5-mile-long, 16-inch petroleum products pipeline under the Corpus Christi Ship Channel ("CCSC") and across Nueces Bay, beginning from a tie-in to an existing pipeline located north of the Nueces Bay north shoreline approximately 5 miles west of Portland, in San Patricio County, and ending on the south side of the CCSC at a refinery near Cantwell Lane, in Corpus Christi, Nueces County, Texas. The pipeline would be installed with a combination of horizontal directional drilling, ditching through uplands and wetlands, and jetting. Horizontal directional drilling will occur under the CCSC (one 16-inch and two 12-inch lines), and at the south and north Nueces Bay shorelines (one 16-inch only). Approximately 1,069 linear feet of pipeline will be buried in wetlands located adjacent to Nueces Bay between the CCSC and Nueces Bay, and is to be restored to pre-project contours upon completion. Approximately 1.94 miles of pipeline will be installed by jetting through Nueces Bay (one 16-inch only).

No mitigation for project impacts is proposed. Copano Pipelines has stated that they have avoided and minimized the environmental impacts by relying on an oyster and seagrass survey which they recently had conducted. To avoid and minimize impacts, Copano Pipeline proposes to horizontally directionally drill portions of the pipeline under the Nueces Bay shorelines, and has relocated the alignment to avoid all seagrasses and oysters and maintain a minimum of 500-foot buffer from the near edges of these resources.

Turbidity curtains are to be deployed for work sites in Nueces Bay; however, specific details have not been provided at this time (USACE, 2011).

Revolution Energy Offshore Wind Farm

Revolution Energy is developing the Harbor Sunrise wind farm on the north side of the Inner Harbor along Nueces Bay. The feasibility study results indicated that a wind power project located within the inner harbor is viable. Under a lease agreement, additional scoping studies were conducted to determine the exact number and size of the wind turbines (Port of Corpus Christi website, 2012b).

The project began in the fall of 2011. The wind project will consist of six, 1.5-megawatt offshore wind turbines that will supply 30 million kilowatt-hours a year to the local grid sufficient to power about 2,500 homes. The turbines are being installed along the perimeter of the port, out of the way of cargo operation areas (Corpus Christi Caller Times, 2011c).

Offshore Wind Power Systems of Texas LLC Foundation Test Site

Offshore Wind Power Systems of Texas LLC, a privately owned Texas corporation, has developed an offshore platform for specific use by wind turbines. In September 2011 the company solicited turbine manufacturers/suppliers to adopt their turbines to the "Titan 200" foundation at the fully permitted test site offshore of the former Naval Station Ingleside site (Offshore Wind Power Systems of Texas website, 2011 and 2012).

TPCO America Corporation Minimill

TPCO America Corporation broke ground in August 2011 for its Texas Mill Project in Gregory, Texas. The Texas Mill Project will be a seamless steel pipe manufacturing facility on a 253-acre site, which will be located between State Highway 35 and State Highway 361, north of the proposed CCL Project site. The project received its air permit from the TCEQ in April, 2010. Construction of all planned facilities is estimated to require 34 months. The 1.6 million square-foot facility will produce 500,000 metric tons per year of seamless steel pipe principally for use in the energy industry, both here and abroad using an electric arc furnace to convert recycled scrap steel and pig iron. When completed, the TPCO America facility will be the largest single investment by a Chinese company (Tianjin Pipe [Group] Corporation) in a U.S. manufacturing facility (TPCO America Corporation website, 2012).

1.12.2 Potential Cumulative Effects

Table 1.12-2 presents a summary of the expected cumulative impacts of the CCL Project and other identified past, present or reasonably foreseeable future projects in the Project area.

TABLE 1.12-2

Cumulative Impacts of the CCL Project and Other Projects in the Project Area

Project	Land Disturbance	Coastal Marine Disturbance	Marine Transporta-tion	Air Quality	Wetlands/ Surface Water-bodies
CCL Project	Yes	Yes	Yes	Yes	Yes
USACE Corpus Christi Ship Channel Improvement Project	No	Yes	Yes	IU	No
La Quinta Container Terminal	Yes	Yes	Yes	Yes	IU
Naval Station Ingleside Redevelopment	Yes	Yes	Yes	IU	Yes
Copano Pipelines/South Texas Oil Pipeline	Yes	Yes	Yes	IU	Yes
Revolution Energy Harbor Wind Project	Yes	Yes	Yes	IU	No
Offshore Wind Power Systems of Texas LLC Foundation Test Site	IU	Yes	Yes	IU	IU
TPCO America Corporation Minimill	Yes	No	IU	Yes	IU

Note:
IU = Information Unavailable

Of the identified projects, only the La Quinta Container Terminal and the TPCO America Corporation Minimill could be constructed during the same time as the CCL Project. The majority of the impacts of the proposed CCL Project and those of other projects in the area would be temporary, occurring primarily during the construction phase. Because the construction time periods and physical impact areas for most of these projects are not expected to overlap, cumulative impacts to environmental resources during construction of the projects would be insignificant. Due to the implementation of specialized construction techniques and carefully developed resource protection and mitigation plans designed to minimize and control environmental impacts from the CCL Project, only minimal cumulative effects to some resources are anticipated when the impacts of the CCL Project are added to those of the other identified projects. Each project would also be required to secure applicable permits each of which may impose conditions designed to further minimize or avoid impacts.

It is expected that the CCL Project, together with the other projects in the area, would cumulatively benefit the local and regional economy through job creation and wages, purchases of goods and services, and increased tax revenues.

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