CONCLUSIONS AND RECOMMENDATIONS

SECTION 5

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF THE ENVIRONMENTAL ANALYSIS

The conclusions and recommendations presented in this section are those of the FERC environmental staff. Our conclusions and recommendations are based on input from the COE, Coast Guard, DOE, and DOT as cooperating agencies in the preparation of this EIS. However, the cooperating agencies will present their own conclusions and recommendations in their respective Records of Decision and can adopt this EIS consistent with 40 CFR 1501.3 if, after an independent review of the document, they conclude that their requirements have been satisfied. Otherwise, they may elect to conduct their own supplemental environmental analyses.

We conclude that construction and operation of the Cameron Liquefaction Project would result in mostly temporary and short-term environmental impacts. However, the Project would result in permanent impacts on wetlands, forests, pine plantations, agricultural lands, migratory birds, and EFH, and long-term environmental impacts on some species. In addition, there would be short-term impacts on traffic on LA-27 in the vicinity of the Terminal Expansion site during construction. As part of our analysis, we developed specific mitigation measures that we believe are practical, appropriate, and reasonable for the construction and operation of the Project. We are, therefore, recommending that these mitigation measures be attached as conditions to any authorization issued by the Commission. We believe that implementation of the mitigation proposed by Cameron and our recommended mitigation would ensure that impacts in the Project area would be avoided or minimized and would not be significant. A summary of the Project impacts and our conclusions are presented below by resource.

5.1.1 Geologic Resources

Construction and operation of the Project would not materially alter the geologic conditions of the Project area, and the Project would not affect mining of resources during construction or operation. The Pipeline Expansion would not cross any significant geologic hazards, including areas of seismic activity or subsidence. Cameron Interstate committed to conducting geotechnical studies to determine general subsurface conditions, evaluating the potential for settlement at the Holbrook Compressor Station site, and developing engineering designs to avoid or minimize any geotechnical hazards, such as settlement, at the site. Additional information is required on the geology and seismology of the proposed Terminal Expansion site to adequately design the Terminal Expansion facilities. Therefore, we are recommending that Cameron LNG file Terminal Expansion design and construction details stamped and sealed by the professional engineer of record. Blasting is not anticipated during construction of either the Pipeline Expansion or the Terminal Expansion. Based on Cameron's proposal, including implementation of the FERC and Cameron Interstate Plans and Procedures and our recommended mitigation measures, we believe impacts on geological resources would be adequately minimized and would not be significant, and that the potential for impacts on the Project from geologic hazards would also be minimal.

5.1.2 Soils

Construction of the Project facilities would disturb soils, resulting in increased potential for erosion, compaction, mixing of topsoil, and the introduction of rock into the topsoil. Soils

within the general Project area are moderately susceptible to water and wind erosion. Most soils have low to moderate revegetation potential, although some prime farmland soil with high revegetation potential would be affected by the Pipeline Expansion. The erosion potential of the soils is reduced by the generally level topography of the area.

There are no prime farmland soils on the site of the Terminal Expansion. Most impacts on prime farmland soils from construction of the Pipeline Expansion would be short-term and would not affect the potential use of prime farmland for future agricultural purposes. The Holbrook Compressor Station would impact 14.8 acres of prime farmland, but would not result in a significant reduction of usable prime farmland soils in the area.

Cameron did not encounter contaminated soil during construction of the existing LNG Terminal and the associated pipeline facilities. Cameron would implement its Unanticipated Hazardous Waste Discovery Plans if unanticipated contaminated soil is discovered during construction. The potential impacts from soil erosion would be minimized through the use of erosion control and revegetation measures described in the FERC and Cameron Interstate Plans.

5.1.3 Water Resources

The Project is underlain by the upper portion of the Coastal Lowlands Aquifer System (known as the Chicot Aquifer), an EPA-designated sole-source aquifer; however, we do not anticipate any long-term or significant impacts on the aquifer due to construction or operation of the Project. Standard construction procedures could affect groundwater resources by altering overland water flow and infiltration rates. Because the recharge areas are much larger than the footprint of the Project, changes in groundwater recharge as a result of Project construction are not expected to be significant. There are no active public water supply wells, wellhead protection areas, or springs within 150 feet of any of the proposed Project facilities.

Cameron LNG would withdraw water for hydrostatic testing and dust control at the Terminal Expansion facilities from an onsite well. The estimated overall volume is a small percentage of the total daily volume removed from the aquifer for domestic and industrial uses and the aquifer would recharge quickly. Implementation of the FERC Procedures would minimize adverse impacts on surface water quality. In addition, Cameron LNG must obtain an LDEQ discharge permit.

During dredging of the work dock area, Cameron LNG would use a hydraulic cutterhead dredge and, if appropriate, would install turbidity curtains to reduce impacts on water quality in the Calcasieu Ship Channel. Construction of the Terminal Expansion facilities would eliminate one of two man-made freshwater pond basins. Cameron LNG would use the remaining pond as a stormwater retention basin during construction and may fill it during operation. We conclude that the potential impacts on groundwater and surface water quality during construction and operation of the Terminal Expansion would be minimized through implementation of the FERC Plan and Procedures, and no significant impacts on water resources would occur due to construction and operation of the proposed Terminal Expansion.

The Pipeline Expansion would cross 27 streams (with one stream crossed twice) and one pond. Cameron Interstate would cross all perennial waterbodies using the HDD method, and use the open-cut and dry-ditch crossing methods on other waterbodies. Cameron Interstate would

cross all waterbodies in accordance with federal and state regulations and permit requirements and minimize impacts by following the measures identified in its Procedures. Installation of the pipeline would have only temporary impacts on waterbodies when open-cut or dry-ditch crossing methods are employed and avoid impacts when using the HDD method. We believe that the potential impacts on groundwater and surface water quality during construction and operation of the Pipeline Expansion would be minimized through implementation of the Cameron Interstate Plan and Procedures.

Construction of the Pipeline Expansion would require the use of surface water sources for hydrostatic testing of the pipeline segments. We believe adherence to the Cameron Interstate Procedures would minimize impacts on water resources related to water withdrawal and discharge. In addition, Cameron Interstate would follow the requirements of the LDEQ discharge permit for hydrostatic test water withdrawal and discharge.

5.1.4 Wetlands

Construction and operation of the Terminal Expansion would affect a total of about 213.7 acres of wetland. All wetlands affected during construction of the Terminal Expansion would be permanently filled, but impacts on 99.2 acres of jurisdictional wetlands would be offset by Cameron LNG's mitigation measures, including creation of 129 acres of offsite tidal fresh/brackish marsh wetland habitat. To further minimize impacts on wetlands, Cameron LNG would comply with all conditions of its joint Section 404 permit and CUP issued by the LDNR, Office of Coastal Management and the COE.

Construction and operation of the Pipeline Expansion would affect a total of about 61.6 acres of land classified as wetlands. Of the total affected acres, Cameron Interstate would permanently impact 17.0 acres, including conversion of 1.3 acres from forested to emergent wetlands. Cameron Interstate would mitigate the permanent loss of forested wetlands by purchasing mitigation credits from a COE-approved mitigation bank servicing the area, and would further minimize impacts on wetlands through collocation of its pipeline, reduction of right-of-way width, and implementation of measures presented in its Procedures. Cameron Interstate will continue working with the COE to determine the appropriate mitigation bank. We are also recommending that Cameron Interstate complete all wetlands surveys and conduct alternative assessments for construction approaches at specific wetlands containing bottomland hardwood species, which are of higher quality than silviculture wetlands.

Based on Cameron's proposal, including implementation of wetland mitigation, the FERC and Cameron Interstate Plans and Procedures, and our recommended mitigation measures, we believe impacts on wetland resources would be adequately minimized and mitigated and would not be significant. We also believe Cameron Interstate's impacts on herbaceous and scrub-shrub wetlands would generally be temporary or short-term, while impacts on forested wetlands would result in long-term to permanent impacts. However, we believe that implementation of Cameron's compensatory mitigation would ensure that impacts on filled and forested wetlands would be offset by sufficient mitigation.

5.1.5 Vegetation

No vegetative communities of special concern have been identified within the area affected by the Project. About 93 percent of the Terminal Expansion site was previously disturbed through use as a COE disposal site for dredged material from maintenance of the Calcasieu Ship Channel, and portions of these areas were also disturbed during construction of the existing Cameron LNG Terminal. Much of the property is comprised of vegetation indicative of disturbed sites. As a result, we conclude that the loss of vegetation from the Terminal Expansion would be minor but permanent. Cameron LNG would implement compensatory mitigation for wetland vegetation impacts as mentioned above.

Impacts of the Pipeline Expansion on vegetation would range from short-term to permanent, including impacts on upland forest, pine plantation, open land, agricultural land, and wetlands. To minimize vegetation impacts (including wetlands), Cameron Interstate would collocate and overlap existing rights-of-way to the extent practicable, comply with the requirements in its Section 404 permit issued by the COE, employ the spill prevention measures in its Environmental Plan, adhere to the mitigation measures provided in its Plan and Procedures, and consult the local USDA NRCS regarding re-seeding specifications and appropriate guidelines. Cameron Interstate would allow most of the construction right-of-way to revert to vegetation types present prior to construction, although upland woody vegetation would not be allowed within the permanent right-of-way. About 20.6 acres of upland forest and pine plantation would be permanently affected along the route.

Access road improvements would have a minor impact on existing vegetation. The one contractor yard required for the Pipeline Expansion would primarily affect open vegetation types which we expect to quickly return to pre-construction conditions after completion of the Project.

The Chinese tallow tree is the only noxious species of concern along the pipeline route, and Cameron Interstate would control growth of this species using the methods described in its Environmental Plan. In addition, Cameron Interstate's Plan and Procedures include measures to minimize the introduction of noxious weeds from areas outside of the right-of-way during construction. As stated in these documents, Cameron Interstate would develop Project-specific procedures in coordination with the NRCS to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

We anticipate that impacts on herbaceous vegetation generally would be temporary or short-term and would not be significant, and that impacts on forested tracts would result in long-term and limited permanent impacts. Further, Cameron Interstate would parallel and overlap existing rights-of-way to the extent practicable and be parallel and adjacent to existing rights-of-way for the remainder of the route, thereby substantially reducing impacts on forested areas.

5.1.6 Wildlife and Aquatic Resources

Construction and operation of the Terminal Expansion would result in the removal of all habitats at the site and conversion of the site to industrial land. This would have a permanent effect on wildlife and wildlife habitats of the site; however, much of the Terminal Expansion site was previously disturbed, as described above, resulting in degraded wildlife habitat and a reduction in habitat diversity and the number of species on the site. Cameron LNG would

mitigate wetland habitat impacts through the creation of tidal freshwater/intermediate marsh, which would provide additional habitat.

During construction and operation of the Terminal Expansion, temporary and minor impacts on aquatic resources would also occur due to the initial and periodic dredging of the work dock area. NMFS and the GMFMC identified the Calcasieu Ship Channel and adjacent coastal marsh as EFH. The EFH within the proposed Terminal Expansion site boundary includes estuarine water bottoms and estuarine water column. To minimize impacts from dredging on EFH and EFH species, Cameron LNG would use a hydraulic cutterhead dredge. Cameron LNG would beneficially use dredged materials at existing disposal sites and in Cameron LNG's marsh mitigation area to create tidal freshwater/intermediate marsh, providing additional habitat for EFH species. We believe that through implementation of the FERC Procedures and Cameron LNG's proposed mitigation measures, effects on EFH and EFH species in and near the terminal construction area would be localized, minor, and temporary.

Vegetation types providing wildlife habitat in land affected by the Pipeline Expansion include upland forest, agriculture, wetlands, pine plantation, and open land. The impacts of construction and operation would range from temporary to permanent, with the impact dependent on the resource requirements of each species and the existing habitat present. Clearing of the temporary construction right-of-way would reduce cover, nesting, and foraging habitat for some species. However, species that use early successional shrub or forest communities may benefit from the clearing and revegetation process. We are recommending that Cameron Interstate complete surveys for birds of conservation concern, such as rookeries and/or nesting colonies, and file the results of its consultation with the FWS, including measures to avoid or minimize impacts on birds of conservation concern and their habitats.

Because Cameron Interstate would collocate the pipeline as much as possible with other rights-of-way and would adhere to its Plan and Procedures, including revegetation requirements, we believe construction and operation of the Pipeline Expansion would not significantly affect local wildlife populations and do not expect additional habitat fragmentation.

All waterbodies that would be affected by the Project could support warm, freshwater fisheries. No sensitive fish species, fisheries of concern, or EFH have been identified within the waterbodies the Pipeline Expansion would cross. While construction could result in several impacts on fisheries resources, these impacts would be minor due to the relatively small area of the waterbody affected, the use of HDDs at perennial stream crossings, and implementation of the Cameron Interstate Procedures.

Based on Cameron Interstate's proposal, including implementation of its Plan and Procedures, we believe impacts on wildlife and aquatic resources would be adequately minimized and not significant.

5.1.7 Threatened, Endangered, and Other Special Status Species

Based on consultations with the FWS and Cameron's species-specific surveys, four federally listed species potentially occur in the general Project area. We anticipate that construction and operation of the proposed Project would not likely adversely affect the Kemp's ridley sea turtle, West Indian manatee, and piping plover at the Terminal Expansion, and the red-

cockaded woodpecker at the Pipeline Expansion. We are recommending that Cameron Interstate conduct updated surveys for the red-cockaded woodpecker within 1 year prior to construction. We are requesting that the FWS and NMFS consider this EIS as the BA for the proposed Project as part of our ESA Section 7 consultation process and are recommending that Cameron not begin construction until all necessary consultation is completed with the FWS and NMFS.

Two state-listed species and five other species of concern were identified by agencies and stakeholders as potentially occurring within the vicinity of the Project. We are recommending that Cameron Interstate file the Site-Specific Construction Management Plan it developed to minimize impacts on areas with western acidic and western saline longleaf pine savannahs, which also includes measures to minimize impacts on the state listed dotted gay-feather and silveus dropseed. Based on the presence of potential habitat and our recommendation, we conclude that Cameron Interstate's collocation with existing pipeline corridors and overlapping the construction workspace with these existing disturbed areas would avoid or minimize potential impacts on state-listed species by reducing the overall extent of new clearing and land disturbance.

In summary, we believe that implementation of Cameron's mitigation measures, our recommendations, and use of the FERC and Cameron Interstate Plans and Procedures during construction and operation of the Project would adequately minimize impacts on federally and state-listed species along with other species of concern.

5.1.8 Land Use, Recreation, and Visual Resources

Construction of the Terminal Expansion would be within and adjacent to the existing Cameron LNG Terminal and would result in permanent impacts on about 502.2 acres of open land, industrial/commercial land, forested and non-forested wetlands, and open water. All of the affected area would be permanently converted to industrial land. A portion of the Terminal Expansion site is within the designated coastal zone, which is managed by the LDNR, Office of Coastal Management. The LDNR is reviewing coastal zone consistency concurrently with the conditional use permit. We are recommending that Cameron provide documentation that it has obtained coastal zone consistency from LDNR.

Cameron has not requested any changes in the number or route of LNG carriers currently authorized to call on the terminal. Although barge traffic in the Gulf Intracoastal Waterway and in the Calcasieu Ship Channel would increase during construction, we anticipate that the overall impact on recreational boating and fishing would be minor. Views of the Terminal Expansion would generally be similar to those of the adjacent existing Cameron LNG Terminal, except for the proposed vapor fence that would be installed along the western boundary of the site. We are recommending that Cameron Interstate install vegetative screening between the vapor fence and LA-27 (Creole Nature Trail) to minimize the visual impact of the vapor fence. Based on those considerations, we conclude that the visual impact of the Terminal Expansion would be minor although permanent.

Construction and operation of the Pipeline Expansion would include both temporary and permanent impacts on a variety of land uses: forested wetlands, scrub-shrub and emergent wetlands, upland forest and planted pine forest, open space, open water, residential land, industrial land, and agricultural land. The entire pipeline right-of-way would overlap with or be

adjacent to existing rights-of-way, with about 15.5 miles of the right-of-way collocated with the existing Cameron Interstate Pipeline right-of-way. Except for a permanent access road constructed for the Holbrook Compressor Station, Cameron Interstate would use public roadways and existing access roads. Most of the affected area would be available for pre-construction use after the pipeline is installed. Overall, Cameron Interstate would permanently impact about 88.1 acres of land.

Cameron Interstate would impact visual resources along the pipeline route by clearing of the right-of-way and construction of the Holbrook Compressor Station. Visual impacts associated with the pipeline would be greatest where the pipeline route parallels or crosses roads, trails, or prominent off-site observation points, and other places where the rights-of-way may be seen by passing motorists or recreationists. The presence of construction personnel and equipment would result in short-term impacts on the viewshed of those areas. Although clearing of forested land would result in minor long-term and permanent impacts on the viewshed, we believe that the visual character would not change substantially from existing conditions at these observation points because the pipeline would be constructed within or directly adjacent to existing pipeline or utility corridors. The area surrounding the Holbrook Compressor Station is mainly forested and would provide a visual screen resulting in temporary and minor impacts on the viewshed of that area.

Cameron Interstate would implement mitigation measures proposed in its site-specific construction plans to minimize potential impacts on the four houses within 135 feet of the construction right-of-way.

Cameron Interstate would construct the pipeline near or across several recreation areas including a scenic highway, two Louisiana Natural and Scenic Rivers, Sam Houston Jones State Park, Holbrook Park, and a private hunting area. Given the current hunting management practices, we do not believe construction or operation of the Pipeline Expansion would adversely affect hunting activities. Cameron Interstate would bore under the scenic highway and use the HDD method to cross the scenic rivers to avoid or minimize impacts on these areas. The two parks in the vicinity of the project are more than 1.5 miles from the right-of-way and we do not anticipate direct construction-related impacts.

5.1.9 Socioeconomics

Construction of the Project would increase the population within Cameron, Calcasieu, and Beauregard Parishes for the 4.5-year construction period of the Terminal Expansion. Although the peak construction workforce for the Terminal Expansion would be about 3,500 workers, with some of the workers from the local area, the workforce would be housed throughout the three-parish area where there is a large amount of transient housing, and the impact on housing would be minor to moderate. We anticipate that the impact of the combined workforce of the Terminal Expansion and the Pipeline Expansion on public services would be minor.

Construction and operation of the Project would increase local and state tax revenues from sales taxes, payroll taxes, and property taxes, and would likely increase local employment. The Pipeline Expansion would result in minor, long-term, and permanent impacts on local

forestry economics, as construction would result in the loss of about 20.6 acres of pine plantation for the life of the Project.

Cameron Interstate would collocate the majority of the Pipeline Expansion with existing linear and facility infrastructure, with the remaining portion of the pipeline route parallel and adjacent to other existing linear facilities. The Project would not significantly impact urban or residential areas, and no disproportionately high and adverse human health or environmental effects on minority, low-income communities, or Native American tribes have been identified.

Cameron LNG has proposed mitigation to reduce the impact on LA-27 traffic in the vicinity of the Terminal Expansion site during commuting periods for the workforce. We are recommending Cameron LNG develop a Traffic Management Plan with additional mitigation to further reduce the impact. With incorporation of the additional mitigation, we believe that the impact of traffic on LA-27 due to construction of the Terminal Expansion would not be significant.

Barges would deliver equipment and materials to the work dock and to an existing dock on the Gulf Intracoastal Waterway. The impact of barge traffic on the waterway and the Calcasieu Ship Channel would be moderate during the initial stages of construction and would decline to a minor impact after about the first year of construction when barge traffic decreases.

Cameron LNG has not requested to increase the number of LNG carriers calling on the terminal above the number currently authorized.

5.1.10 Cultural Resources

Cultural resource surveys were conducted for the Project, including surveys of the Terminal Expansion site, the pipeline right-of-way, the Holbrook Compressor Station, contractor yard, access roads, and the new and modified pipeline interconnections. No archaeological or historic architectural resources were identified within the survey areas, and the SHPO and FERC staff agree that no historic properties would be affected. The review process under Section 106 of the National Historic Preservation Act is complete for the Project.

5.1.11 Air Quality and Noise

Construction of the Project would result in temporary impacts on air quality due to emissions from fossil-fueled construction equipment and fugitive dust. Cameron would incorporate dust control measures during construction to minimize fugitive dust, and we conclude the impact of construction on air quality would be minor. We would not expect construction equipment emissions to cause or significantly contribute to a violation of an applicable air quality standard. There would be long-term impacts on air quality during operation of the proposed Terminal Expansion facilities and the Holbrook Compressor Station. However, Cameron LNG would minimize operational emissions from the expanded terminal in the vicinity of the Terminal Expansion by using purchased electrical power from a new non-jurisdictional Entergy transmission line. Operation of the Terminal Expansion and Holbrook Compressor Station would comply with the requirements of applicable federal and state regulations, and BACT would be installed as described in Cameron LNG's Title V Permit

application modification for the terminal and in Cameron Interstate's Title V Permit application for the compressor station.

Construction activities and the associated noise would vary depending on the phase of construction in progress at any one time. While individuals in the immediate vicinity of construction activities could experience an increase in noise, this effect would be temporary and localized. HDD crossings associated with the pipeline construction represent the greatest potential for prolonged noise impacts during construction. Based on noise assessments completed for the HDD sites, Cameron Interstate committed to implementing mitigation measures to reduce noise levels as needed. This would include methods such as installation of partial noise barriers around the hydraulic power units, the use of silencers or mufflers on engines, and gear box noise blankets. During initial drilling of the four HDD entry points nearest to the NSAs, Cameron Interstate would collect noise measurements to confirm that noise levels at the nearest NSAs are acceptable. If HDD operation with implementation of Cameron Interstate's mitigation measures results in noise levels unacceptable to residents, Cameron Interstate would reimburse landowners who may elect to use temporary housing at a local hotel or motel during HDD-related construction activities. We are recommending that Cameron Interstate file noise measurements at the start of drilling operations and state any mitigation measures that it has implemented if HDD noise is above an L_{dn} of 55 dBA. We believe that Cameron Interstate's commitments would lessen impacts on residents to the extent practicable.

Based on the distance to the NSA nearest the Terminal Expansion site, sound levels from construction would not be expected to result in adverse impacts on the NSA. Operation of the expanded terminal would generate sound levels that would occur throughout the life of the proposed Project, but the increase in noise levels would be just above the "barely detectable" noise level increase of 3 dBA and would result in minor impacts on the nearest NSA. In addition, the noise level would be below the FERC limit of 55 dBA. Therefore, we believe that operational noise from the expanded terminal would result in minor impacts on the nearest NSA.

The modeling analyses for the proposed Holbrook Compressor Station and the Terminal Expansion facilities resulted in calculated noise levels below an L_{dn} of 55 dBA at the nearest NSAs. To ensure that noise levels would be below an L_{dn} of 55 dBA, we are recommending that Cameron LNG and Cameron Interstate file noise surveys during full load. As a result, we believe that the impact on noise levels during operation would be minor.

5.1.12 Safety

We evaluated the safety of the proposed LNG facilities associated with the Terminal Expansion, including a review of the cryogenic design of the facilities proposed for liquefaction, related facilities, and safety systems. Our assessments addressed hazards, preliminary engineering design, siting requirements, siting analysis, emergency response, and facility security. In accordance with the working arrangements allowed by the 1985 Memorandum of Understanding between the FERC and the DOT, the DOT reviewed our analysis of Cameron LNG's compliance with the requirements in 49 CFR 193, as well as our recommended mitigation measures, and has no objections at this time. In accordance with 33 CFR 127, the Coast Guard reviewed the proposed liquefaction facilities and stated that a Letter of Intent or a revision to the Water Suitability Assessment would not be required for the Terminal Expansion because the proposed modifications clearly lie outside the Marine Transfer Area. We identify

specific recommendations to be addressed by Cameron LNG prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, and prior to commencement of service.

Cameron Interstate would design, construct, operate and maintain its pipeline and aboveground facilities to meet or exceed the DOT Minimum Federal Safety Standards in 49 CFR 192 and other applicable federal and state regulations. We noted during our review that the vapor fence would bisect the truck loading area; therefore, we are recommending that Cameron LNG revise the location of the vapor fence accordingly. By designing and operating the proposed Project in accordance with the applicable standards, the Project would represent only a slight increase in risk to the nearby public.

5.1.13 Cumulative Impacts

We considered the contributions of the proposed Project in specific cumulative impact areas for the resources affected by the Project. As a part of that assessment, we identified existing projects, projects under construction, projects that are proposed or planned, and reasonably foreseeable projects, including agriculture and silviculture, existing LNG terminals and future LNG liquefaction projects, currently operating and future oil and gas projects, land transportation projects, and other types of projects, including commercial developments and dredging projects. Our assessment considered the impacts of the proposed Project combined with the impacts of the other projects on resources within all or part of the same area and time.

We conclude that for most resources the Project's contribution to cumulative impacts on resources affected by the Project would not result in significant impacts. Construction traffic associated with the Terminal Expansion could contribute significantly to traffic congestion on LA-27 in the vicinity of the Terminal Expansion site, particularly when shifts begin and end during the period when the workforce peaks. That construction traffic during commuting time may coincide with construction traffic of other projects in general area, if those projects are approved and constructed. We believe that with incorporation of the mitigation measure proposed by Cameron LNG and mitigation measures we are recommending, the cumulative impact on traffic along LA-27 would be reduced. However, if all of the projects are under construction at the same time, the impact on traffic along LA-27 south of Sulphur due to construction worker traffic may result in periods of congestion and delay on portions of the highway.

Similarly, because several projects in the Lake Charles area could be under construction at the same time as Cameron's Project, there may be increased congestion on surface streets between Sulfur and Lake Charles, and perhaps along I-10, particularly during commuting periods, and possibly in the area east of Lake Charles. Impacts would be greatest in the vicinity of the major projects, and mitigation measures may be implemented by the proponents of those projects to reduce the impacts.

Simultaneous construction of the Cameron Liquefaction Project and the projects in the Lake Charles area would require a large number of workers from the local labor pool and import of construction workers. To find adequate housing, it is likely that workers may have to reside in adjacent parishes. The cumulative effect would benefit the transient housing market but would adversely affect those seeking transient housing.

The combined construction workforces of projects under simultaneous construction would increase the need for some public services, such as police, medical services, and schools. The need for those services would generally be spread throughout the parishes that house the workforce, but because the majority of construction would take place in Cameron and Calcasieu Parishes, there may be an increased need for medical and emergency services at or near the sites of the projects. Because the construction periods of the proposed Project and many of the projects identified in table 4.13.1-1 could overlap, in some cases over a period of several years, there is a potential for a significant cumulative impact on such services in Calcasieu Parish. However, Cameron LNG and the other LNG projects in the Project area would develop emergency response plans to lessen the impacts on emergency services.

5.2 ALTERNATIVES

As alternatives to the proposed action, we evaluated the No-Action Alternative, system alternatives for the Terminal Expansion and the Pipeline Expansion, alternative Terminal Expansion sites, alternative terminal configurations and designs, alternative Pipeline Expansion aboveground facility sites, and alternative compressor station design. While the No Action Alternative would avoid the environmental impacts identified in this EIS, the objectives of the Project would not be met. However, the purpose of and need for the Project would likely be met by other LNG export projects developed elsewhere, would result in similar or greater impacts at other locations, and potential end users would make other arrangements to obtain natural gas service, or use alternative fossil fuel energy sources, other traditional long-term fuel source alternatives, and/or renewable energy sources to compensate for the reduced availability of natural gas that would otherwise be supplied by the proposed Project.

We evaluated twelve Terminal Expansion system alternatives including five existing LNG import terminals with planned, proposed, or authorized liquefaction projects, and seven stand-alone LNG export terminals. To meet all or part of Cameron LNG's contractual agreements, each of these projects would require substantial construction beyond what is currently planned and would not offer significant environmental advantages over the proposed Terminal Expansion. As a result, we eliminated them from further consideration.

We evaluated alternative Terminal Expansion sites near the western and southern borders of the existing Cameron LNG Terminal. We conclude that use of those areas would result in substantially greater impacts on open water, marsh, fish, wildlife, and active oil and gas activities than those associated with development of the proposed site. In addition, the selected location of each of the components within the Terminal Expansion site was based on the relevant regulations, codes, and guidelines, and we did not find any alternative configurations that would meet the regulations, codes, and guidelines, while avoiding or reducing impacts in comparison to those of the proposed terminal configuration. As a result, we conclude that development of the expanded terminal on the alternative sites or with alternate configurations would not be environmentally preferable.

We evaluated three existing pipeline systems as system alternatives to the proposed Pipeline Expansion and determined that those system alternatives would not have sufficient capacity to meet the natural gas requirements of the Terminal Expansion without substantial expansion. We believe that the construction impacts of expanding those pipeline systems would be similar to or greater than those of the proposed pipeline. Consequently, we conclude that

none of the pipeline system alternatives would be environmentally preferable to the proposed Pipeline Expansion.

Cameron LNG originally proposed to install and operate gas turbine-driven generators, while purchased power alternatives could be more fully explored and analyzed. Cameron LNG completed its evaluation and eliminated on-site power turbine generators in favor of purchased power for the proposed Terminal Expansion, to be supplied by the new non-jurisdictional Entergy electric transmission line. The use of on-site power generation is now considered a design alternative. During operation, most emissions and the noise levels of the turbine generators would be greater than those of purchased power in the vicinity of the Terminal Expansion site. For both options, dispersion modeling results showed no exceedances of SILs with the exception of NO_2, which showed no contribution of exceedance of NAAQS in refined analyses. Although it is not possible to determine the difference of the emissions of NO_x and CO_2 between the two design options, if any, the total increase in emissions from the power generation plants that would provide electricity to the transmission line would generally be comparable to those of the gas-driven on-site generators.

The noise levels during operation of the expanded terminal using the on-site power generation alternative would be slightly greater than those using purchased power, with both options being below the FERC noise level criterion of an L_{dn} of 55 dBA at the nearest NSA. Therefore, we believe noise at the nearest NSA from the expanded terminal would not be significant.

We evaluated four site alternatives to the proposed Holbrook Compressor Station site. Cameron Interstate could not acquire the land for two of the alternative sites. Although the potential impacts associated with emissions, access road construction, and construction of an electrical distribution line would be greater at the proposed Holbrook Compressor Station than the two remaining alternative sites, we believe those differences would be minor. In addition, the proposed site would have less impact on forest land, wetlands, and NSAs than the remaining two alternative sites. Therefore, we conclude that the alternative sites would not provide a significant environmental advantage to the proposed site. No alternative sites were identified that would be environmentally preferable to the other proposed aboveground facilities associated with the Pipeline Expansion.

We also evaluated the use of electric-powered compressors and purchased power as an alternative to the proposed natural gas-fired compressors at the Holbrook Compressor Station. Use of purchased power would require construction of a 3.5-mile-long non-jurisdictional, 230-kV electric distribution line from LA-27 to the proposed Holbrook Compressor Station site and a switch yard in or near the site. That distribution line, which would be in addition to the distribution line required for electric power for other equipment at the site, would require clearing a new right-of-way adjacent to the proposed Cameron Interstate pipeline right-of-way from LA-27 to the Holbrook Compressor Station site. Based on the additional environmental impacts that would result from construction of the distribution line, operational considerations of the compressor station, and emissions data for the two power options, we conclude that the use of purchased power for operating the Holbrook Compressor Station does not offer a significant environmental advantage over the proposed on-site power generation.

We reviewed Cameron Interstate's alternatives to the proposed design of the Holbrook Compressor Station, including fewer, larger, more efficient turbines, use of selective catalytic reduction to reduce nitrogen oxide emissions, and use of an oxidation catalyst to reduce carbon monoxide emissions. These alternatives would require substantially more fuel than the proposed design or are not feasible due to economic and/or environmental impacts, as described in Cameron Interstate's BACT analysis as part of its air permit application submitted to the LDEQ. We conclude that these alternatives would not provide a significant environmental advantage to the proposed Project.

5.3 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission authorizes the Project, we are recommending that the following measures be included as specific conditions in the Commission's Order. We believe that these measures would further mitigate the environmental impacts associated with the construction and operation of the proposed Project.

1. Cameron LNG and Cameron Interstate shall follow the construction procedures and mitigation measures described in their applications, supplemental filings (including responses to staff data requests), and as identified in the EIS, unless modified by the Order. Cameron LNG and Cameron Interstate must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of OEP **before using that modification**.

2. For LNG facilities, the Director of OEP has delegated authority to take all steps necessary to ensure the protection of life, health, property, and the environment during construction and operation of the Terminal Expansion Project. This authority shall include:

    a. stop-work authority and authority to cease operation; and

    b. the design and implementation of any additional measures deemed necessary to assure continued compliance with the intent of the conditions of the Order.

3. For pipeline facilities, the Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Pipeline Expansion Project. This authority shall allow:

    a. the modification of conditions of the Order; and

    b. the design and implementation of any additional measures deemed necessary (including stop-work authority) to assure continued compliance with the intent of

the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from Pipeline Expansion Project construction and operation.

4. **Prior to any construction,** Cameron LNG and Cameron Interstate shall file affirmative statements with the Secretary, certified by senior company officials, that all company personnel, EI's, and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

5. The authorized facility locations shall be as depicted in the EIS, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, Cameron LNG and Cameron Interstate shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Cameron Interstate's exercise of eminent domain authority granted under NGA Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Cameron Interstate's right of eminent domain granted under NGA Section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

6. Cameron LNG and Cameron Interstate shall file detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

   This requirement does not apply to extra workspaces allowed by Cameron Interstate's Plan or minor field realignments per landowner needs and requirements that do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

   b. implementation of endangered, threatened, or special concern species mitigation measures;

c. recommendations by state regulatory authorities; and

d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

7. **Within 60 days of the acceptance of the Authorization and the Certificate and before construction begins**, Cameron LNG and Cameron Interstate shall file Implementation Plans for the review and written approval by the Director of OEP. Cameron LNG and Cameron Interstate must file revisions to their plans as schedules change. The plans shall identify:

   a. how Cameron LNG and Cameron Interstate will implement the construction procedures and mitigation measures described in its respective application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;

   b. how Cameron LNG and Cameron Interstate will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;

   c. the number of EIs assigned per spread and aboveground facility sites, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

   d. company personnel, including EIs and contractors, who will receive copies of the appropriate materials;

   e. the location and dates of the environmental compliance training and instructions Cameron LNG and Cameron Interstate will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s);

   f. the company personnel (if known) and specific portion of Cameron LNG's and Cameron Interstate's organization having responsibility for compliance;

   g. the procedures (including use of contract penalties) Cameron LNG and Cameron Interstate will follow if noncompliance occurs; and

   h. for each discrete facility, a Gantt or PERT chart (or similar Project scheduling diagram), and dates for:

      1) the completion of all required surveys and reports;

      2) the environmental compliance training of onsite personnel;

      3) the start of construction; and

      4) the start and completion of restoration.

8. Cameron LNG's Implementation Plan shall also include the following documents or the anticipated completion dates for the following milestones:

   a. quality assurance and quality control procedures for construction activities;

   b. a plot plan of the final design showing all major equipment, structures, buildings, and impoundment systems;

   c. electrical area classification drawings of the final design;

   d. spill containment system drawings of the final design with dimensions and slopes of curbing, trenches, and impoundments; and

   e. results of the LNG storage tank hydrostatic test and foundation settlement results.

9. Cameron LNG shall employ at least one EI for the Terminal Expansion and Cameron Interstate shall employ at least one EI per construction spread. Each EI shall be:

   a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or authorizing documents;

   b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 7 above) and any other authorizing document;

   c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

   d. a full-time position separate from all other activity inspectors;

   e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

   f. responsible for maintaining status reports.

10. Beginning with the filing of its Implementation Plan, Cameron LNG and Cameron Interstate shall each file updated status reports on a **monthly** basis for the Terminal Expansion and a **weekly** basis for the Pipeline Expansion until all construction and restoration activities are complete. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

    a. an update on Cameron LNG's and Cameron Interstate's efforts to obtain the necessary federal authorizations;

    b. the construction status at the Terminal Expansion site and of each spread of the Pipeline Expansion, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;

c. a listing of all problems encountered and each instance of noncompliance observed by each EI during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;

e. the effectiveness of all corrective actions implemented;

f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by Cameron LNG or Cameron Interstate from other federal, state or local permitting agencies concerning instances of noncompliance, and Cameron LNG's or Cameron Interstate's response.

11. **Prior to receiving written authorization from the Director of OEP to commence construction of any Project facilities**, Cameron LNG and Cameron Interstate shall file with the Secretary documentation that each has received all applicable authorizations required under federal law (or evidence of waiver thereof).

12. Cameron LNG must receive written authorization from the Director of OEP **prior to introducing hazardous fluids into the Terminal Expansion facilities**. Instrumentation and controls, hazard detection, hazard control, and security components/systems necessary for the safe introduction of such fluids shall be installed and functional.

13. Cameron LNG must receive written authorization from the Director of OEP **before placing the Terminal Expansion facilities into service**. Such authorization will only be granted following a determination that the facilities have been constructed in accordance with FERC approval and applicable standards, can be expected to operate safely as designed, and the rehabilitation and restoration of the areas affected by the Terminal Expansion are proceeding satisfactorily.

14. Cameron Interstate must receive written authorization from the Director of OEP **before placing the Pipeline Expansion into service**. Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the Pipeline Expansion Project are proceeding satisfactorily.

15. **Within 30 days of placing the Authorized and Certificated facilities in service**, Cameron LNG and Cameron Interstate shall each file an affirmative statement with the Secretary, certified by a senior company official:

a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

b. identifying which of the authorization or Certificate conditions Cameron LNG and Cameron Interstate has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

16. Cameron LNG shall file the following Terminal Expansion design and construction details with the Secretary:

    a. LNG tank and foundation design based on the seismic design ground motions in Cameron LNG's Resource Report 13, Appendix I dated February 2013, **early in the design phase**;

    b. seismic specifications used in conjunction with the procuring equipment **prior to the issuing of requests for quotations**;

    c. quality control procedures that would be used for design and construction **early in the design phase**; and

    d. the results of the hydrostatic load tests on the LNG storage tanks, including settlement data, **prior to commissioning**.

    These details should be stamped and sealed by the professional engineer-of-record, registered in Louisiana, responsible for the design. *(section 4.1.3.2)*

17. **Prior to construction,** Cameron Interstate shall complete wetland surveys of the right-of-way from MP 2.8 to MP 4.7 and file the results of the surveys with the Secretary for review by the Director of the OEP. (*section 4.4.5)*

18. **Prior to the end of the draft EIS comment period,** Cameron Interstate shall provide an assessment of the feasibility of a reduced construction right-of-way width, expansion of nearby HDDs, or other alternative construction methods to minimize impacts on PFO wetlands containing bottomland hardwood species at MP 1.55 , MP 2.25, MP 15.98, MP 18.46, MP 18.79, MP 20.11, and MP 20.36. *(section 4.4.5.2)*

19. **Prior to construction**, Cameron Interstate shall file with the Secretary for review and written approval by the Director of OEP:

    a. the completed surveys to identify unavoidable bird of conservation concern impacts, such as impacts on rookeries and/or nesting colonies; and

    b. the results of consultation with the FWS, including measures to avoid or minimize impacts on birds of conservation concern and their habitat. *(section 4.6.1.3)*

20. **Prior to construction**, Cameron Interstate shall complete and file the results of an updated survey for the red-cockaded woodpecker between MP 13.9 and 14.5 where this species and its habitat potentially exist. Specifically, Cameron Interstate shall ensure that the FERC staff receives the updated survey report for the red-cockaded woodpecker **within 1 year** of the construction start date, as well as any comments received from the FWS regarding impacts on this species. *(section 4.7.1.2)*

21. Cameron LNG and Cameron Intestate shall not begin construction activities **until**:

    a. all outstanding biological surveys have been completed;

    b. the FERC staff completes any necessary consultations with FWS and NMFS; and

    c. each has received written notification from the Director of OEP that construction and/or use of mitigation (including implementation of conservation measures) may begin. *(section 4.7.1.5)*

22. **Prior to construction**, Cameron Interstate shall file with the Secretary, for review and written approval by the Director of OEP, the Site-Specific Construction Management Plan developed for areas where the pipeline would cross western acidic and western saline longleaf pine savannahs. *(section 4.7.2.1)*

23. **Prior to the end of the draft EIS comment period,** Cameron LNG shall file with the Secretary a plan to install and maintain vegetative screening between LA-27 and the vapor fence to disrupt views of the vapor fence and limit the visual impacts on users of LA-27 in the vicinity of the Terminal Expansion site. *(section 4.8.5.1)*

24. **Prior to construction**, Cameron LNG shall file documentation of concurrence from the LDNR that the Terminal Expansion is consistent with the Louisiana CZMP. (section 4.8.6).

25. **Prior to construction**, Cameron LNG shall file a traffic plan with the Secretary, for review and written approval by the Director of OEP that includes the following:

    a. uniformed traffic control at the access driveways of the Terminal Expansion site during construction commuting times;

    b. mass transportation to and from the Terminal Expansion site for construction workers, including the identification of locations for park-and-ride lots, and a schedule for plan implementation; and

    c. a traffic study during construction to assess the DOT's LOS. If the traffic study indicates a DOT LOS of D or worse, Cameron shall implement additional mitigation measures to reduce traffic impacts. *(section 4.9.6.1)*

26. Cameron Interstate shall file **in the weekly construction status reports** the following for the entry points of the Houston River, Indian Bayou, Beckwith Creek, and Marsh Bayou HDD sites:

    a. the noise measurements from the nearest NSA, obtained **at the start of drilling operations**;

    b. the noise mitigation that Cameron implemented at the start of drilling operations; and

c. any additional mitigation measures that Cameron would implement if the initial noise measurements exceeded an L_{dn} of 55 dBA at the nearest NSA and/or increased noise is over ambient conditions greater than 10 dB. *(section 4.11.2.2)*

27. Cameron LNG shall file a full load noise survey with the Secretary for the Terminal Expansion **no later than 60 days** after each liquefaction train is placed into service for the first and second liquefaction train. If the noise attributable to the operation of the equipment at the Terminal Expansion exceeds an L_{dn} of 55 dBA at the nearby NSA, Cameron LNG shall reduce operation of the liquefaction facilities or install additional noise controls until a noise level below an L_{dn} of 55 dBA at the nearby NSA is achieved. Cameron LNG shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls. *(section 4.11.2.3)*

28. Cameron LNG shall file a noise survey with the Secretary **no later than 60 days** after placing the Terminal Expansion into service. If a full load noise survey is not possible, Cameron LNG shall provide an interim survey at the maximum possible load and provide the full load survey **within 6 months**. If the noise attributable to the operation of all of the equipment at the Terminal Expansion under interim or full load conditions exceeds an L_{dn} of 55 dBA at the nearby NSA, Cameron LNG shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. Cameron LNG shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls. *(section 4.11.2.3)*

29. Cameron Interstate shall file a noise survey for the Holbrook Compressor Station **no later than 60 days** after placing the station into service. If a full power load condition noise survey is not possible, Cameron Interstate shall file an interim survey at the maximum possible power load **within 60 days** of placing the station into service and file the full power load survey within 6 months. If the noise attributable to operation of all equipment at the station under interim or full power load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Cameron Interstate shall:

    a. file a report with the Secretary, for review and written approval by the Director of OEP, on what changes are needed;

    b. install additional noise controls to meet that level **within 1 year** of the in-service date; and

    c. confirm compliance with this requirement by filing a second full power load noise survey with the Secretary for review and approval by the Director of OEP **no later than 60 days** after it installs the additional noise controls. *(section 4.11.2.3)*

30. **Prior to the end of the draft EIS comment period**, Cameron LNG shall file with the Secretary the revised location of the vapor fences corresponding to the most recent facility plot plan to show that the vapor fences do not obstruct the trucking route. Cameron LNG shall also revise the modeling analysis as necessary. *(section 4.12.5)*

Recommendations 31 through 69 shall apply to the Cameron LNG Terminal Expansion. Information pertaining to these specific recommendations shall be filed with the Secretary for review and written approval by the Director of OEP either: prior to initial site preparation; prior to construction of final design; **prior to commissioning; prior to introduction of hazardous fluids; or prior to commencement of service**, as indicated by each specific condition. Specific engineering, vulnerability, or detailed design information meeting the criteria specified in Order No. 683 (Docket No. RM06-24-000), including security information, shall be submitted as critical energy infrastructure information (CEII) pursuant to 18 CFR 388.112. See Critical Energy Infrastructure Information, Order No. 683, 71 Fed. Reg. 58,273 (October 3, 2006), FERC Stats. & Regs. 31,228 (2006). Information pertaining to items such as: offsite emergency response; procedures for public notification and evacuation; and construction and operating reporting requirements, will be subject to public disclosure. All information shall be filed **a minimum of 30 days** before approval to proceed is requested. *(section 4.12.3)*

31. **Prior to initial site preparation,** Cameron LNG shall files its updated ERP which includes the Terminal Expansion facilities as well as instructions to handle on-site refrigerant and NGL-related emergencies. *.(section 4.12.6)*

32. **Prior to initial site preparation,** Cameron LNG shall file an ERP which includes a Cost-Sharing Plan identifying the mechanisms for funding all Project-specific security/emergency management costs that would be imposed on state and local agencies. In addition to the funding of direct transit-related security/emergency management costs, this comprehensive plan shall include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. *(section 4.12.6)*

33. **The final design** shall include the information/revisions pertaining to Cameron LNG's response numbers 30 and 71 of its April 29, 2013 filing, which indicated features to be included or considered in the final design. *(section 4.12.3)*

34. **The final design** shall include change logs that list and explain any changes made from the Front-End Engineering Design provided in Cameron LNG's application and filings. A list of all changes with an explanation for the design alteration shall be provided and all changes shall be clearly indicated on all diagrams and drawings. *(section 4.12.3)*

35. **The final design** shall provide up-to-date Process Flow Diagrams with heat and material balances and P&IDs, which include the following information:

    a. equipment tag number, name, size, duty, capacity, and design conditions;

    b. equipment insulation type and thickness;

    c. piping with line number, piping class specification, size, and insulation type and thickness;

    d. piping specification breaks and insulation limits;

    e. all control and manual valves numbered;

f. relief valves with set points; and

g. drawing revision number and date. *(section 4.12.3)*

36. **The final design** shall provide an up-to-date complete equipment list, process and mechanical data sheets, and specifications. *(section 4.12.3)*

37. **The final design** shall provide complete plan drawings and a list of the hazard detection equipment. The information shall include a list with the instrument tag number, type and location, alarm locations, and shutdown functions of the proposed hazard detection equipment. Plan drawings shall clearly show the location of all detection equipment. *(section 4.12.3)*

38. **The final design** shall provide complete plan drawings and a list of the fixed and wheeled dry-chemical, hand-held fire extinguishers, and other hazard control equipment. The list shall include the equipment tag number, type, capacity, equipment covered, and automatic and manual remote signals initiating discharge of the units. Plan drawings shall clearly show the planned location by tag number of all fixed, wheeled, and hand-held extinguishers. *(section 4.12.3)*

39. **The final design** shall provide facility plans showing the proposed location of, and area covered by, each monitor, hydrant, deluge system, hose, and sprinkler, as well as piping and instrumentation diagrams of the firewater system. *(section 4.12.3)*

40. **The final design** shall include an updated fire protection evaluation of the proposed facilities carried out in accordance with the requirements of NFPA 59A 2001, chapter 9.1.2 as required by 49 CFR Part 193. A copy of the evaluation, a list of recommendations, and actions taken on the recommendations shall be filed. *(section 4.12.3)*

41. **The final design** shall ensure that the LNG storage tank piping supports are adequately designed for the higher rated in-tank pump flow rates. *(section 4.12.3)*

42. **The final design** shall include a relief valve study to ensure the existing LNG storage tank vacuum relief valves provide adequate protection when the higher capacity in-tank pumps would be operating at full capacity. *(section 4.12.3)*

43. **The final design** shall specify that for gas, refrigerants, NGL, condensate, or LNG service, the piping, and piping nipples 2 inches or less are to be no less than Schedule 160. *(section 4.12.3)*

44. **The final design** of the electrical purge seal arrangement shall include an alternate or additional detection method to the proposed nitrogen system pressure indicators, to detect and alarm flammable vapors at the vent discharge to atmosphere in order to account for small leaks that pressure indicators may not be able to detect. *(section 4.12.3)*

45. **The final design** shall provide an air gap or acceptable means downstream of the secondary seal to prevent the migration of flammable vapors from the secondary seal to the switchgear. *(section 4.12.3)*

46. **The final design** of the hazard detectors shall account for the calibration gas when determining the LFL set points for methane, propane, and ethylene, and condensate. *(section 4.12.3)*

47. **The final design** shall include pressure relieving protection for flammable liquid piping (i.e. refrigerants, liquid hydrocarbons, condensate products) which can be isolated by valves. *(section 4.12.3)*

48. **The final design** shall specify that the pressure of the shell side of Inlet Gas Preheater, H1-1001, shall not exceed the allowable operating pressure during pressure relief conditions, and the relieving device shall discharge to a safe location. *(section 4.12.3)*

49. **The final design** shall specify that the design temperature of the coil of the Hot Oil Heat Exchanger, H1-3013, is in accordance with Note 4 on page 5 of CAM1-PRC-DTS-H0035. *(section 4.12.3)*

50. **The final design** shall specify that the C5+ Condensate Storage Tank fill connection is located above the maximum liquid level. *(section 4.12.3)*

51. **The final design** shall address the potential for reverse flow through the Molecular Sieve Driers in the event that emergency vent valve XV1-10128 opens. *(section 4.12.3)*

52. **The final design** shall include a hazard and operability review of the completed design prior to issuing the P&IDs for construction. A copy of the review, a list of recommendations, and actions taken on the recommendations, shall be filed. *(section 4.12.3)*

53. **The final design** shall include details of the shutdown logic, including cause-and-effect matrices for alarms and shutdowns, for the process instrumentation, fire and gas detection system, and emergency shutdown system. *(section 4.12.3)*

54. **The final design** shall include a pressure survey of the anticipated operating and design conditions for the wet and dry flares. The survey shall include a report showing the stream analysis, flow rates, temperatures, and operating pressures from the relief discharge to the flare inlet. *(section 4.12.3)*

55. **The final design** shall include a plan for clean-out, dry-out, purging, and tightness testing. This plan shall address the requirements of the American Gas Association's Purging Principles and Practice required by 49 CFR 193, and shall provide justification if not using an inert or non-flammable gas for cleanout, dry-out, purging, and tightness testing. *(section 4.12.3)*

56. **The final design** shall include the sizing basis and capacity for the final design of pressure and vacuum relief valves for major process equipment, vessels, storage tanks, and vent stacks. *(section 4.12.3)*

57. **The final design** shall provide the procedures for pressure/leak tests which address the requirements of ASME VIII and ASME B31.3, as required by 49 CFR 193. *(section 4.12.3)*

58. Cameron LNG shall certify that **the final design** is consistent with the information provided to DOT as described in the design spill determination letter dated November 18, 2013 (Accession Number 20131121-4000). In the event that any modifications to the design alters the candidate design spills on which the Title 49 CFR 193 siting analysis was based, Cameron LNG shall consult with DOT on any actions necessary to comply with Part 193. *(section 4.12.5)*

59. **The final design** shall include the details of the vapor fences as well as procedures to maintain and inspect the vapor barriers provided to meet the siting provisions of 49 CFR § 193.2059. *(section 4.12.5)*

60. **The final design** shall include the details of the impingement shrouds final design as well as procedures to maintain and inspect the impingement shrouds. *(section 4.12.5)*

61. **Prior to commissioning,** Cameron LNG shall file plans and detailed procedures for: testing the integrity of onsite mechanical installation; functional tests; introduction of hazardous fluids; operational tests; and placing the equipment into service. *(section 4.12.3)*

62. **Prior to commissioning**, Cameron LNG shall provide a detailed schedule for commissioning through equipment startup. The schedule shall include milestones for all procedures and tests to be completed: prior to introduction of hazardous fluids; and during commissioning and startup. Cameron LNG shall file documentation certifying that each of these milestones has been completed before authorization to commence the next phase of commissioning and startup will be issued. *(section 4.12.3)*

63. **Prior to commissioning**, Cameron LNG shall tag all instrumentation and valves in the field, including drain valves, vent valves, main valves, and car-sealed or locked valves. *(section 4.12.3)*

64. **Prior to commissioning**, Cameron LNG shall file a tabulated list and drawings of the proposed hand-held fire extinguishers. The list shall include the equipment tag number, extinguishing agent type, capacity, number, and location. The drawings shall show the extinguishing agent type, capacity, and tag number of all hand-held fire extinguishers. *(section 4.12.3)*

65. **Prior to commissioning**, Cameron LNG shall file updates addressing the Terminal Expansion facilities in the operation and maintenance procedures and manuals, including hot work procedures and philosophy. *(section 4.12.3)*

66. **Prior to commissioning**, Cameron LNG shall maintain a detailed training log to demonstrate that operating staff has completed the required training. *(section 4.12.3)*

67. **Prior to introduction of hazardous fluids**, Cameron LNG shall complete a firewater pump acceptance test and firewater monitor and hydrant coverage test. The actual coverage area from each monitor and hydrant shall be shown on facility plot plan(s). *(section 4.12.3)*

68. **Prior to introduction of hazardous fluids**, Cameron LNG shall complete all pertinent tests (Factory Acceptance Tests, Site Acceptance Tests, Site Integration Tests) associated with the Distributed Control System that demonstrates full functionality and operability of the system. *(section 4.12.3)*

69. **Prior to commencement of service**, progress on the construction of the proposed systems shall be reported in **monthly** reports filed with the Secretary. Details shall include a summary of activities, problems encountered, contractor nonconformance/deficiency logs, remedial actions taken, and current project schedule. Problems of significant magnitude shall be reported to the FERC **within 24 hours**. *(section 4.12.3)*

In addition, recommendations 70-72 shall apply throughout the life of the Terminal Expansion facility:

70. The facility shall be subject to regular FERC staff technical reviews and site inspections on at least an **annual basis** or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, Cameron shall respond to a specific data request, including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed piping and instrumentation diagrams reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, shall be submitted. *(section 4.12.3)*

71. Semi-annual operational reports shall be filed with the Secretary to identify changes in facility design and operating conditions, abnormal operating experiences, activities (including ship arrivals, quantity and composition of imported and exported LNG, liquefied and vaporized quantities, boil-off/flash gas, etc.), plant modifications, including future plans and progress thereof. Abnormalities shall include, but not be limited to: unloading/loading/shipping problems, potential hazardous conditions from off-site vessels, storage tank stratification or rollover, geysering, storage tank pressure excursions, cold spots on the storage tanks, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non-scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, vapor or liquid releases, fires involving natural gas and/or from other sources, negative pressure (vacuum) within a storage tank and higher than predicted boil-off rates. Adverse weather conditions and the effect on the facility also shall be reported. Reports shall be submitted **within 45 days after each period ending June 30 and December 31**. In addition to the above items, a section entitled "Significant Plant Modifications Proposed for the Next 12 Months (dates)" also shall be included in the semi-annual operational reports. Such information would provide the FERC staff with early notice of anticipated future construction/maintenance projects at the LNG facility. *(section 4.12.3)*

72. Significant non-scheduled events, including safety-related incidents (e.g., LNG, condensate, refrigerant, or natural gas releases, fires, explosions, mechanical failures, unusual over pressurization, and major injuries) and security-related incidents (e.g.,

attempts to enter site, suspicious activities) shall be reported to the FERC staff. In the event an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification shall be made **immediately**, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification shall be made to the FERC staff **within 24 hours**. This notification practice shall be incorporated into the LNG facility's emergency plan. Examples of reportable LNG, NGL, condensate, or refrigerant related incidents include:

a. fire;

b. explosion;

c. estimated property damage of $50,000 or more;

d. death or personal injury necessitating in-patient hospitalization;

e. release of LNG, NGL, condensate, or refrigerants for 5 minutes or more;

f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes gas, NGL, condensate, refrigerants, or LNG;

g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes gas, refrigerants, NGL, condensate, or LNG;

h. any malfunction or operating error that causes the pressure of a pipeline or LNG facility that contains or processes gas, NGL, condensate, refrigerants, or LNG to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the build-up allowed for operation of pressure limiting or control devices;

i. a leak in an LNG facility that contains or processes gas, refrigerants, NGL, condensate, or LNG that constitutes an emergency;

j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;

k. any safety-related condition that could lead to an imminent hazard and cause (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility that contains or processes gas, NGL, condensate, refrigerants, or LNG;

l. safety-related incidents to LNG, condensate, or refrigerant vessels occurring at or en route to and from the LNG facility; or

m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, the FERC staff would determine the need for a separate follow-up report or follow-up in the upcoming semi-annual operational report. All company follow-up reports shall include investigation results and recommendations to minimize a reoccurrence of the incident. *(section 4.12.3)*